**Teacher motivation and student outcomes:**

**Searching for the signal**

Lisa Bardach1\* and Robert M. Klassen2

1 Hector Research Institute of Education Sciences and Psychology, University of Tübingen, Tübingen, Germany

2 Department of Education, University of York, York, United Kingdom

\*Correspondence concerning this article should be addressed to Lisa Bardach, Hector Research Institute of Education Sciences and Psychology, University of Tübingen, Walter-Simon-Straße 12, 72072 Tübingen, Germany; Phone: +49070712976577; E-mail: lisa.bardach@uni-tuebingen.de

**Abstract**

Recent years have witnessed a burgeoning interest in the study of teacher motivation. Although links between teacher motivation and teacher well-being, commitment to the profession, and other teacher-related outcomes are well-documented, prior research on associations between teacher motivation and student outcomes has been less consistent. This article focuses on teacher motivation as situated within two prominent frameworks: self-determination theory and achievement goal theory. First, two systematic reviews of research on self-determination theory and achievement goal theory are conducted to examine whether, when, how, and why teachers’ motivation may influence—or at least relate to—which student outcomes. The processes by which teacher motivation is associated with student outcomes, such as via specific instructional strategies, are also taken into account. Second, the question of why research on teacher motivation often fails to find consistent effects on student outcomes is considered, including where in the complex chain of events from teacher motivation to student outcomes the signal gets lost. Third, the need to study the reverse ordering of effects, reciprocal effects, and the dynamic interplay between teacher motivation and student outcome variables is discussed.

*Keywords:* teacher motivation, student outcomes, self-determination theory, achievement goal theory, instructional quality

Motivation is fundamental to human nature and performance. Aligned with this, motivational constructs–such as individual goals and competence-related beliefs or interests–play a critical role for performance attainment in different domains (e.g., education, the workplace, and sports, Cellar et al., 2011; Howard et al., 2021; Van Yperen et al., 2014). Educational psychology has a long history of examining the nature and dynamics of students’ motivation for learning and the effects of motivation on academic achievement (e.g., Kriegbaum et al., 2018; McInerney, 2015). Over the last decades, researchers are also starting to explore *teachers’ motivation,* including its structure, quality, and effects (e.g., Butler, 2007; Schiefele et al., 2013; Watt & Richardson, 2007). By applying motivational frameworks (e.g., achievement goal theory, self-determination theory, expectancy-value theory) extensively studied in student populations to teacher populations, recent research highlights that motivation matters for teachers too. For example, studies and reviews drawing on different motivational theories have documented substantial relations between teachers’ motivation and teacher-related outcomes, such as their well-being, job satisfaction, commitment to the profession, and engagement in professional development (e.g., Bardach et al., 2021a; Janke et al., 2019; Lauermann, 2017; Richardson et al., 2014).

However, the relations between teacher motivation and *student* outcomes, such as students’ achievement or motivation, are less consistent; in fact, they are often small or even non-existent (e.g., Bardach et al., 2021a; Taylor & Ntoumanis, 2007). Teachers’ potential contributions to student learning and adaptive development are of central interest for both educational research and practice, and form a fundamental building block for models of teacher performance (see research on teacher effectiveness, e.g., Seidel & Shavelson, 2007) and teacher competencies (e.g., Kunter et al., 2013). The struggle of teacher motivation research to show consistent links with student outcomes thus deserves closer attention.

In this article, we focus on teacher motivation as situated within two prominent frameworks: self-determination theory and achievement goal theory (e.g., Butler, 2007; Roth et al., 2007)[[1]](#footnote-1). Our work is guided by the following three strands of questions (see Figure 1 for a graphical representation). First, based on a systematic account of the current literature, we aim to shed light on *whether, when, how,* and *why* teachers’ motivation may influence—or at least relate to—*which* student outcomes. In addition to inquiring about links between teacher motivation and student outcomes, we attend to the processes by which teacher motivation is associated with student outcomes, such as via specific instructional strategies. For this purpose, we conducted two systematic reviews for self-determination theory and achievement goal theory, respectively. Second, we discuss why research on teacher motivation often fails to find consistent effects (or relations). Specifically, we wonder where in the complex chain of events from teacher motivation to student outcomes the signal gets lost. How do conceptualizations, measures, and research designs that researchers use potentially prevent the detection of effects, and how can research on teacher motivation be advanced? Third, we reflect on what can be learned by considering the reverse ordering of effects, reciprocal effects, and the dynamic interplay between teacher motivation and variables predominantly conceptualized as student outcomes.

[Insert Figure 1 here]

**Motivation to Teach: Using Self-Determination Theory and Achievement Goal Theory to Conceptualize Teachers’ Motivation**

Motivation has commonly been defined as “the process whereby goal-directed activity is instigated and sustained” (Pintrich & Schunk, 2002, p. 5). Initial research on teacher motivation was mainly concerned with the *quantity* of motivation, for example as assessed by the level of job satisfaction (e.g., Butler, 2007, Butler & Shibaz, 2008). In contrast, social-cognitive theories of motivation, such as achievement goal theory (e.g., Elliot, 2005) and self-determination theory (Ryan & Deci, 2020) emphasize *qualitative differences* in teachers’ motivation for teaching. Hence, these frameworks provide a fertile foundation to study different types of teachers’ motivation, and their potential implications for student outcome variables (Butler & Shibaz, 2014).

**Self-Determination Theory**

*Self-determination theory* outlines a continuum of different types of motivation, which depend on the level of an individual’s propensity to self-regulate (i.e., determine) their behavior (Ryan et al., 2021). *Intrinsically motivated* individuals pursue an activity, such as teaching, for its own sake or for the inherent satisfaction of carrying out the activity. The four types of *extrinsic motivation* refer to the reasons for behaviors other than for inherent satisfactions, and can be further divided into relatively autonomous forms of extrinsic motivation (identified and integrated extrinsic motivation) and controlled forms (introjected and external extrinsic motivation). *Identified extrinsic motivation* relates to consciously identifying with or personally endorsing the value of an activity, whereas *integrated extrinsic motivation* means that one does not only recognize and identify with the value of the activity, but also finds it to be congruent with one’s own core interests and values. *Introjected* extrinsic motivation concerns partially internalized extrinsic motivation in that the behavior is regulated by the internal rewards of self-esteem for success and by avoidance of factors like anxiety, shame, or guilt for failure. In the presence of *external* extrinsic motivation, behaviors are purely driven by externally imposed rewards and punishments. Lastly, *amotivation* describes the lack of any motivation or interest to partake in an activity. Self-determination theory further posits that the level of self-determination is determined by the satisfaction of the three innate psychological needs for autonomy, competence, and relatedness (Ryan & Deci, 2020; Taylor & Ntoumanis, 2007). Self-determination theory has successfully been applied to the study of teachers’ motivation (e.g., Roth et al., 2007; Taylor & Ntoumanis, 2007).

In their review on the “love for teaching”, Kunter and Holzberger (2014) noted the strong conceptual overlap between different constructs, such as autonomous motivation, individual interest, passion, and enthusiasm in research on teachers. To expand the scope of our work, we therefore consider teachers’ *interest* as a further motivational feature connected with self-determination theory. Interest can be defined as a relatively enduring preference for certain objects, behaviors, or domains, characterized by high cognitive commitment and attachment to this object or domain (e.g., Krapp, 2002). More recently, Schiefele (2013) adapted the concept of interest for the teaching domain by introducing the three dimensions of subject interest (interest in the subject matter), didactic interest (interest in teaching methods), and educational interest (interest in the educational or pedagogical aspect of the teaching profession). We acknowledge that some ambiguities remain because interest and related constructs have also been studied in research on other approaches to teacher (and student) motivation, such as Expectancy-Value Theory, and because interest theory is a motivational theory on its own. Although we include teacher interest in our review on self-determination theory due to previously discussed overlaps (Kunter & Holzberger, 2014), it should be noted that we do not equate autonomous motivation with interest and discuss respective findings separately.

**Achievement Goal Theory**

In research with students, *achievement goals* have been described as future-focused cognitive representations of academic competence-related end states that individuals seek to either approach or avoid (Hulleman, et al., 2010). Extrapolating from research on students, Butler (2007) proposed four types of achievement goals for teachers. *Mastery-approach goals* (also termed learning goals) center on developing teaching competence and learning. Teachers with *performance-approach goals* (also termed ability-approach goals) aspire to show that their teaching performance is superior to that of other teachers. *Performance-avoidance goals* (also termed ability-avoidance goals) are characterized by attempts to avoid the demonstration of worse teaching performance than others. Teachers endorsing *work avoidance* *goals* aim to minimize work effort (Butler, 2007; see also Butler & Shibaz, 2008; Nitsche et al., 2011; Papaioannou & Christodoloudis, 2007). In light of the social nature of teaching processes, Butler (2012) later expanded achievement goal theory by adding a further type of achievement goal, *relational achievement goals*, focusing on teachers’ strivings to create close and caring relationships with students.

**Question 1: Is There a Signal? DoesTeacher Motivation Influence (or at Least Relate to) Student Outcomes?**

In order to make informed claims about *whether, when, how,* and *why* teacher motivation matters for *which* student outcomes, we conducted two systematic reviews, one for self-determination theory and one for achievement goal theory. In addition to exploring the links between teacher motivation and student outcome variables, we were particularly interested in instructional practices as a potential mediator of the teacher motivation-student outcome link. We focused on *student-reported* instructional practices because students’ subjective interpretation of the classroom context and teacher behavior have been found to be most closely related to student outcomes (e.g., Stroet et al., 2013). Although teachers’ self-reports of their instructional behavior may be related to their well-being and other teacher outcomes, they have been criticized for a lack of predictive power for student outcomes. Moreover, teachers tend to overestimate the quality of their instruction and their own reports of instructional practices often do not converge with student reports, especially for less observable teacher practices (e.g., Kunter & Baumert, 2006; Wagner et al., 2016). Ratings of instruction provided by external observers (e.g., video observations) are a viable alternative to student reports; however, they have very rarely been included in studies on the motivational teacher constructs of interest in this article (for an exception, see Keller et al., 2017).

We conducted two separate database searches in Web of Science and PsycINFO between July 28th and August 4th 2021, yielding a total of 666 hits for self-determination theory and 1,738 for achievement goal theory. A set of inclusion- and exclusion criteria was applied for the database results. For instance, studies had to focus on school teachers’ motivation according to self-determination theory (including interest as a related construct) and/or achievement goal theory; rely on teacher-reported motivation; and incorporate student outcome(s) and/or student-reported instructional strategies. Furthermore, studies had to be peer-reviewed and published to make it more likely that the work had undergone a rigorous quality control process. After additionally considering studies recommended by experts in research on teacher motivation not identified in our search, we were left with ten studies for the self-determination review and seven studies for the achievement goal review. A detailed description of the search procedures and inclusion and exclusion criteria is provided in Online Supplement S1.

**Results of Review 1: Self-Determination Theory**

As can be seen in Table S1 in the Online Supplement, five of the ten studies directly referred to self-determination theory (Ahn et al., 2021; Bieg et al., 2011; Lam et al., 2009; Roth et al., 2007; Taylor & Ntoumanis, 2007) and five to teacher interest (Lazarides & Schiefele 2021; Schiefele, 2017; Schiefele & Schaffner, 2015; Ohle et al. 2015; Keller et al., 2017).Except for the studies of Ahn et al. (2021), Ohle et al. (2014), and Keller et al. (2017), all studies relied on cross-sectional observational designs[[2]](#footnote-2). This caveat severely limits the conclusions that can be drawn from the findings as they do not allow inferences about the temporal precedence or directions of effects of teacher motivation and student outcome variables. In all studies, the hierarchical data structure, with students nested in classrooms/teachers was appropriately taken into account by conducting multilevel modeling. In several studies, sample sizes at the critical classroom level of analysis were small (e.g., 30 teachers in Ohle et al., 2015), which decreases statistical power and can be problematic for estimating more complex models, such as multilevel models involving latent variables (e.g., Zitzmann & Helm, 2021). For each study, Table S1 provides an overview of sample sizes (teachers and students), educational level, country, teacher motivation measure, and domains of investigated student-reported instruction and/or student outcome variables. In addition, the table includes main findings from the multi-level models and, when reported, bivariate correlations between teacher motivation and class-average instructional practices and/or student outcomes.

***Findings Regarding Student Outcomes***

The findings pertaining to student outcomes can be summarized along four lines. First, research on teachers’ self-determined motivation and interest was “doubly motivational,” with nine of ten studies investigating the link between teacher motivation and student motivation. The motivational student outcomes also often mirrored the teacher motivational construct: for example, autonomous teacher motivation and autonomous student motivation in Taylor and Ntoumanis (2007); teacher interest and student interest in Ohle et al (2015). Second, findings for teacher autonomous motivation/intrinsic motivation seem most promising, as significant relations to student autonomous/intrinsic motivation were documented in three of the five relevant studies (Ahn et al., 2021; Lam et al., 2009; Roth et al., 2007). The study of physical education teachers by Taylor and Ntoumanis (2007) was one of the two exceptions, as their multilevel modeling results did not reveal a significant association between teacher and student autonomous motivation. Any interpretations of specific patterns are tempered by the small number of studies, but obvious differences in the contexts (physical education versus classroom-based instruction) may be a factor. Although basic assumptions of self-determination theory have been presumed to hold across contexts (e.g., Haerens et al., 2013), studies have also reported context-, cultural-, and content-area specificities (e.g., Guay & Bureau, 2018). On the other hand, the analyses of Bieg and colleagues (2011) did not yield a significant relation between teacher intrinsic motivation for teaching in “academic” subjects (such as Physics, Biology, and German) and students’ intrinsic motivation either. Interestingly, negative teacher motivational factors, such as teachers’ controlled motivation and its components or amotivation were not significantly associated with their counterparts in students (Ahn et al., 2021, Taylor & Ntoumanis, 2007).

Third, keeping in mind the small number of studies, current research on teacher interest and student motivation suggests that higher teacher interest goes along with higher student interest (see the cross-sectional study of Schiefele & Schaffner, 2015) and may even be predictive of student interest (see the longitudinal study of Keller et al., 2017). Furthermore, it seems useful to distinguish between different teacher interest domains, such as subject-related interest and interest related to teaching itself. Specifically, the results of Schiefele and Schaffner (2015) indicated that educational interest, but not didactic and subject interest, showed significant and positive links to students’ interest in their main analyses including all interest domains and further teacher motivational variables (but see Table S1 for significant bivariate correlations between teachers’ subject interest as well as didactic interest and students’ interest). Explanations other than the teacher interest measure may underlie the non-significant effect of teacher interest on student interest in Ohle et al. (2015); still, it is noteworthy that in this study the two interest aspects were combined into one scale: interest in teaching physics and interest in physics itself. In addition, the study by Schiefele and Schaffner (2015) stands out as it included student mastery-approach goals as a further motivational student outcome. Despite significant (but small) bivariate correlations between student mastery goals and teachers’ educational and didactic interest, there were no significant direct relations between both interest domains and students’ mastery-approach goals in the main analyses (but see section on instructional practices below for findings from mediation analyses).

Fourth, the relations of teacher motivation with student achievement were rarely addressed in research on teachers’ self-determined motivation. In Ahn and colleagues’ (2021) study, teacher motivation variables did not significantly predict student achievement. With regards to interest, associations between teacher interest and student achievement were inconsistent and, overall, not very promising. No significant effects were obtained in the two studies estimating effects of teacher interest assessed at the first wave on student achievement at the second wave (Keller et al., 2017; Ohle et al., 2015), and a significant *negative* bivariate correlation between educational interest and student achievement of almost medium size was found in the third cross-sectional study (Lazarides & Schiefele, 2021). Other student outcomes, such as learning strategies, self-regulation, emotions, or well-being were not investigated in studies focusing on self-determination theory or interest.

***Findings Regarding Instructional Practices***

In the theory sections of several studies, it was stressed that teachers with higher levels of autonomous motivation should be more likely to engage in need-supportive teaching behaviors, such as autonomy support, which can facilitate adaptive student outcomes (e.g., Ahn et al., 2021; Lam et al., 2009; Roth et al., 2007; Taylor & Ntoumanis, 2007). However, Lam and colleagues (2009) also suggested that teachers’ autonomous motivation may directly spark students’ autonomous motivation as students model the motivational orientations of their teachers. All studies testing mediations relied on cross-sectional mediation analyses[[3]](#footnote-3), which is unfortunate as cross-sectional data can misrepresent the mediation of longitudinal processes and often leads to misleading and biased estimates (e.g., O’Laughlin et al., 2018).

Keeping in mind the pitfalls of cross-level mediations, the studies were generally supportive of mediating effects. The study by Ahn et al. (2021) showed that teachers’ need-supportive practices, together with students’ basic needs satisfaction in terms of autonomy and competence, fully mediated the link between teacher autonomous motivation and students’ autonomous motivation. Similarly, in the study by Roth et al. (2007), autonomy-supportive teaching mediated the association between teacher autonomous motivation and students’ autonomous motivation. In another cross-sectional study, instructional support (composite of teachers’ cognitive support and affective support) partially transmitted the relation between teachers’ and students’ intrinsic motivation (Lam et al., 2009). Although Bieg and colleagues (2011) did not conduct mediation analyses, it should be mentioned that they found that teacher intrinsic motivation was not significantly correlated with student reports of teacher autonomy-support and care.

In research on interest, it has generally been assumed that teacher motivation and student outcome variables should be indirectly related and therefore be mediated by instructional practices (e.g., Schiefele, 2017). All studies in our review that tested mediating effects found at least some support for this claim, although theoretical contributions are again limited by the reliance on cross-sectional mediation models. Keller and colleagues (2017) argued that the effects of interest seem to be transmitted by enthusiasm in teaching. Aligned with this, their findings revealed a partial mediation effect. Some further support for the potential relevance of teacher educational interest for emotionally relevant classroom practices was provided in Lazarides and Schiefele’s (2021) main analyses. These analyses showed that educational interest was positively associated with students’ perceptions of teachers’ emotional support and not associated with cognitive activation (e.g., teachers’ use of higher order thinking tasks and other cognitively demanding activities) and classroom management (e.g., teachers’ effective handling of disruptive student behavior). Nonetheless, it is worth noting that none of the additionally reported bivariate correlations between teacher educational interest and class-average student-perceived teaching quality dimensions were statistically significant (Lazarides & Schiefele, 2021).

Schiefele’s (2017) main analyses showed a positive link between educational interest and classroom management and found that classroom management fully mediated the link between teacher educational interest and student interest. Schiefele and Schaffner (2015) relying on the same data set as Schiefele (2017) demonstrated that teachers’ educational interest was significantly related to mastery goal structures, but not to cognitive activation. The concept of mastery goal structures stems from achievement goal theory and has originally been coined to capture teaching practices and a classroom climate that make a mastery-approach goals salient to students (see e.g., Bardach et al., 2020). No significant association between educational interest and students’ mastery-approach goals emerged in the main analyses; nonetheless, the relation was fully mediated by mastery goal structures. Moreover, the relation between teachers’ educational interest and students’ interest was partially mediated by mastery goal structures (Schiefele & Schaffner, 2015). In this study, mastery goal structures were assessed with a strong focus on teachers’ recognition of all students’ progress, which is closely connected to the conceptualization of teacher educational interest concerned with students’ individual development. Teachers’ didactic and subject interest (Schiefele & Schaffner, 2015) and teachers’ didactic interest (Schiefele, 2017) did not share significant links with the investigated instructional practices, neither in the main analyses nor as bivariate correlations (see Table S1).

**Results of Review 2: Achievement Goal Theory**

A total of seven studies investigating teacher achievement goals, student outcomes and/or instructional practices were identified through our search process (see Online Supplement S1). Three studies (Butler & Shibaz, 2008; Butler, 2012; Butler & Shibaz, 2014) were longitudinal insofar as they assessed teacher motivation in the first wave and student outcomes and instructional strategies in the second wave. The other studies employed fully cross-sectional designs. All studies relied on multilevel modeling. Sample sizes, educational levels, countries, teacher motivation measures, and types of investigated student outcomes and instructional practices are presented in Table S2 in the Online Supplement.

***Findings Regarding Student Outcomes***

Similar to our findings from Review 1, student motivation represented the most commonly examined student outcome and was assessed in four of the seven studies. The student outcomes in Review 2 were slightly more diverse than those addressed in the research on self-determination theory and interest, as two studies linked teacher achievement goals to students’ help-seeking and one study each focused on cheating and achievement. The one study on academic achievement (Pamuk et al., 2018) did not reveal a significant association between any of the investigated four types of teacher achievement goals (mastery-approach, performance-approach, performance avoidance, work avoidance goals) and students’ science achievement. In the studies examining help-seeking, the same four types of teacher achievement goals were not significantly linked to students’ help-seeking (Butler & Shibaz, 2008), but a later study that additionally included teachers’ relational goals found a significant positive association between relational goals and help-seeking (Butler & Shibaz, 2014). The authors interpreted this finding as indicating that the behaviors of teachers who value and strive to create close and caring relationships encourage their students to turn to them for adaptive help (Butler & Shibaz, 2014). In the 2008 study by Butler and Shibaz, teacher performance-avoidance goals moreover significantly and positively predicted the frequency with which students engaged in cheating. This points towards potential maladaptive consequences of this teacher achievement goal type for students; however, a later study did not obtain consistent links between teacher performance-avoidance goals—as well as other detrimental teacher achievement goals such as their performance-approach and work avoidance goals—and further student outcomes such as interest (Butler & Shibaz, 2014).

Overall, findings regarding teachers’ achievement goals and students’ motivation were inconclusive and the small number of studies using the same student outcomes makes the detection of specific patterns difficult. Moreover, with one exception (Butler & Shibaz, 2014), relational goals were not assessed. Studies demonstrated, for example, both a significant positive relation between teachers’ mastery-approach goals and student interest in Butler and Shibaz (2014) and a not statistically significant relation in the main analyses of Schiefele & Schaffner (2015). Most surprisingly, none of the studies including teacher mastery-approach goals and student mastery-approach goals established a significant relation between the two constructs in their main analyses (Dresel et al., 2013; Schiefele & Schaffner, 2015). However, the bivariate correlations between teacher mastery-approach goals and aggregated student mastery-approach goals as well as student interest in Schiefele and Schaffner (2015) attained statistical significance. Furthermore, Dresel and colleagues (2013) found some significant relations between among specific teacher achievement goal-student achievement goal combinations. For example, their results revealed negative associations between teacher mastery-approach goals and student performance-approach goals and between teachers’ work avoidance goals and students’ mastery-approach goals, as well as positive associations between teacher performance-avoidance goals and student performance-approach goals and between teacher performance-approach and student mastery-approach goals (Dresel et al., 2013). Whereas all other studies relied on achievement goal measures developed by Butler, the study by Dresel and colleagues (2013) employed the measure developed by Nitsche and colleagues (2011) (for more details see Table S2).

***Findings Regarding Instructional Practices***

Almost all of the studies (with the exception of Pamuk et al., 2018) linked teacher achievement goals to some kind of student-perceived instructional practices. Furthermore, most researchers hypothesized that specific instructional strategies may act as potential mediators; such mediations were tested in several studies (e.g., Butler & Shibaz, 2008; Butler & Shibaz, 2014; Dresel et al., 2013; Schiefele & Schaffner, 2015; Schiefele, 2017). In discussing their findings, however, Butler and Shibaz (2014) also mentioned that teachers’ own mastery-approach goals may lead them to experience and convey positive emotions, and such cues may then prompt students both to infer teachers’ interest and to expect the lesson to be interesting.

The findings on teachers’ mastery-approach and relational goals deserve particular attention. First, teachers’ mastery-approach goals were associated with cognitively stimulating (or activating) instruction (Butler and Shibaz, 2014; Schiefele & Schaffner, 2015 in the multilevel model). In the former study, cognitive stimulation also partially mediated the relation between teacher mastery-approach goals and students’ interest (Butler & Shibaz, 2014). Cognitively activating practices are proximal to students’ cognitive learning processes (Schiefele, 2017; see also Kunter et al., 2013) and therefore seem likely to be associated with a form of teacher motivation such as teacher mastery-approach goals that emphasizes the growth of competence (Butler & Shibaz, 2014; Schiefele, 2017).

Second, for teachers’ relational goals, the work of Butler (Butler, 2012; Butler & Shibaz, 2014) evidenced associations with socio-emotional support. Socio-emotional support furthermore fully mediated the relation between teacher relational goals and students’ help-seeking. Teachers motivated by achievement strivings and the desire to maintain close relationships with students may be more likely to offer socio-emotional support to students. Hence, relational goals were related to instructional practices in a theoretically coherent way as well. Positive associations between relational goals and mastery goal structures have also been reported (Butler, 2012), which fits well with the “social nature” of mastery goal structures previously discussed in the literature (e.g., Patrick et al., 2011): Valuing and emphasizing student effort and individual improvements as one of the core features of mastery goal structures in common measures also carries information on the extent to which teachers care about students and other social aspects. Accordingly, the respective association with teachers’ relational goals only further corroborates these goals’ connection with socio-emotional practices.

Third, in addition to such specialized effects, with mastery-approach goals being linked to cognitive classroom processes and relational goals to socio-emotional classroom processes, associations with instructional practices of the other “type” surfaced in some studies. Specifically, teachers’ relational goal predicted not only socio-emotional support, but also cognitively stimulating instruction (Butler & Shibaz, 2014). Teacher mastery goals furthermore significantly and positively predicted teacher support for question asking, which comprises cognitive factors (e.g., “answers questions carefully and thoroughly”); however, they also significantly and negatively predicted inhibition of question asking (Butler & Shibaz, 2008), which reflects (negative) socio-emotional factors (e.g., “makes students embarrassed to ask for help or explanations”). As has been found in research on students, at school the social and academic domains are not clearly demarcated and are instead intertwined. For instance, students’ social goals do not only have implications for social outcomes, such as their social adjustment, but also for academic outcome (for a review, see Dawes, 2017). This may be no different for teachers, their goals, and how these goals are expressed in their everyday classroom practices. Hence, whereas the primary connection between teacher mastery and relational goals may remain with cognitive versus socio-emotional processes, both desirable achievement goal classes seem likely to show relations with the other type of instructional practice as well. Finally, no significant association between mastery-approach goals and classroom management was found in the full model including teacher interest domains in addition to mastery-approach goals (Schiefele, 2017), even though the bivariate correlation between the two was significant.

What about further types of achievement goals? In Butler and Shibaz’s work (2008), the relation between teachers’ performance-avoidance goal and student cheating was not significantly mediated by teacher inhibition of students’ question asking. Moreover, in the study by Dresel and colleagues (2013), teacher achievement goals exhibited largely the same pattern of relations to different types of goal structures than they did to the respective type of student achievement goal. For example, teachers’ performance-approach goals were not only linked to students’ mastery-approach goals, but also to mastery goal structures (see Table S2). However, this study employed a measure of goal structures focusing on the classroom as referent, whereas measures of goal structure in all other studies focused on the teacher as referent. Prior research has suggested that the former type of measure is more difficult to interpret by students and is possibly conflated with their personal goals to a large extent (e.g., Karabenick et al., 2007; but see Bardach et al., 2020 for a process-model integrating both types).

To conclude, the findings from the two reviews have both shown that there are faint signals--albeit mostly cross-sectional--and that these faint signals are elusive. Even in the event of relatively recurring findings, the links were often weak and not replicated in all studies. This directly leads us to our second question: *why* and *where* the signal gets lost.

**Question 2: Losing the Signal - Why Does Research on Teacher Motivation Often Fail to Find Consistent Effects on (or Relations to) Student Outcomes?**

An elusive or weak signal representing the effects of teacher motivation on student outcomes can easily get lost in the long chain of events starting from teacher motivation and ending at student outcomes. In the following sections, we therefore outline examples of where and how the chain may break and what can be done to create stronger ties between teacher motivation and student outcomes (see also Figure 1, Question 2). While embarking on this journey in search for the signal, we also share observations conducive to a more integrated understanding of the findings of the two reviews, and to advancing research on teacher motivation more broadly.

**Conceptualizations and Basic Assumptions**

The way teacher motivation is conceptualized can impact on the ability to detect a signal. In addition, we argue that some basic assumptions about the links between teacher motivation and student outcomes may need revision: If the search for the signal is based on misleading assumptions, it will always go astray.

***Generality vs. Specificity***

When comparing the findings from the two reviews, differences in the conceptualization of teacher motivation become obvious. Conceptualizations of teacher motivation referring to the motivation to teach a specific class were more predominant in studies on autonomous/intrinsic motivation, whereas teacher motivation as a more general construct not tied to teaching a specific class dominated achievement goal theory and interest research. This could be one of the reasons why self-determination theory-based research on teachers has produced slightly more consistent findings than achievement goal theory research. We do not say that more general teacher motivational constructs should be abandoned or revised to exclusively focus on more specific, narrow components; nonetheless, researchers should be aware of potential implications associated with the location of their teacher motivation construct on the generality-specificity continuum. At the same time, we want to stress that constructs on a more general level, such as achievement goals, may yield smaller effects, but they are of theoretical relevance as they tap into more generalized motivational patterns that should transcend situations and contexts. Hence, if these more general motivational constructs show any relations with student outcome variables, we should consider this as particularly meaningful.

***Student Outcome Types and “Space” for Teacher Motivation Effect***

One of the key unifying features of studies from different theoretical traditions summarized in our reviews was the often-reported relatively small or non-significant coefficients for the relation between teacher motivation and student outcome variables, and the complete lack of significant positive relations to academic achievement in the albeit few relevant studies. Certainly, most studies on teacher motivation conducted by educational psychology researchers have been inspired by the presumption that teacher characteristics, including teacher motivation, should influence student outcomes. What often gets overlooked, however, is whether student outcomes of interest leave enough “space” (i.e., amount of variance that can be explained) for teacher motivation effects, after we have accounted for the “space” already occupied by other influencing factors. If there is no such space, there cannot be a signal, and researchers on teacher motivation will search for it in vain.

We therefore deem it critical to distinguish among *types* of student outcome variables, and specifically between academic achievement and other outcomes, such as motivation. Individual differences between students represent the main drivers of academic achievement outcomes, with large correlations observed between intelligence, prior knowledge and performance at all grade levels (e.g., Deary et al., 2007; Grasby et al., 2020). As such, there is arguably very limited space for potential teacher effects, including effects of (or relations with) teacher motivation. Based on these considerations and the findings from our two reviews, we suggest that educational psychology researchers would be well advised not to expect direct associations between teacher motivation and student achievement. Although individual differences between students are also relevant for their motivational development and other outcomes, these types of student outcome variables seem much more promising to explore as linkages for teacher motivation research.

We further want to emphasize that finding small, inconsistent and even non-significant links is not specific to research on teacher self-determined motivation, interest, and achievement goals, but pertains to teacher characteristics in general (e.g., Klassen & Tze, 2014; Bardach & Klassen, 2020, Bardach et al., 2021a). Moreover, this is not only an educational psychology problem; economics research in education has also struggled to establish connections between teacher characteristics and student outcomes (e.g., Rockoff et al., 2011). Hence, we believe that it would be reasonable to scale down expectations and to be prepared for the reality that in many instances small associations, at best, will emerge from teacher motivation research. Even so, small potential contributions of teacher motivation to student outcomes can be meaningful and worth exploring (see also Bardach et al., 2021a).

***Teacher Motivation - Student Outcome Match***

Stronger signals should emerge if a teacher motivation construct is conceptually close to a specific student outcome construct. For some teacher motivation – student outcome combinations there may be no reliable signal at all. We therefore believe that theoretical considerations pertaining to the match between teacher motivation and student outcome variables should more strongly guide future research on teacher motivation. To provide an example, we focus on teacher motivational constructs from our self-determination and achievement goal reviews and consider how these might be integrated and synthesized. Most importantly, we highlight which “construct family” may be most closely connected to which instructional practice, process, and with which student outcome in order to provide a roadmap for future research.

Expanding on the discussed overlap of individual interest and intrinsic motivation (Kunter & Holzberger, 2014), similarities in single interest domains and other constructs have to be noted. Specifically, Butler’s (2012) relational goals share characteristics with the construct of educational interest as both involve a focus on students’ personal development and, thus, imply a caring relationship with students (Schiefele, 2017). Didactic interest, with its focus on learning and improvement, by contrast, shows some similarities with mastery-approach goals. Aligned with this, Schiefele (2017) reported the strongest correlations between didactic interest and mastery-approach goals. We see subject interest linked to intrinsic motivation and therefore, (subject) enthusiasm (not reviewed in greater detail in our paper, see e.g., Kunter et al., 2008). Interest and autonomous forms of extrinsic motivation also overlap with value beliefs (which we have not covered in this review), but which are worth considering in future integrated work.

First, teacher motivation variables from the same “construct family” (e.g., relational goals and educational interest) should share relations with the same instructional practices. We base the following considerations on tentative findings from our reviews as well as on purely theoretical considerations not yet supported by empirical evidence. As indicated in our review, relational goals and educational interest seem likely to show close connections with teachers’ provision of socio-emotional support and, in self-determination theory terms, with teaching practices that satisfy students’ need for relatedness. Cognitively-focused mastery-approach goals and didactic interest may be more likely to be linked to cognitively activating instruction and other instructional practices associated with satisfying students’ need for competence (e.g., Butler & Shibaz, 2014). Moreover, due to the overlap between intrinsic motivation and enthusiasm, teachers with high levels of intrinsic motivation and interest may be more likely to engage in enthusiastic teaching behaviors (see also e.g., Keller et al., 2017; Schiefele et al., 2013).

Second, the patterns of relations between teacher motivation constructs and instructional strategies described above also make it possible to suggest links to matching student outcomes. For instance, teachers’ mastery-approach goals could, via cognitively activating instruction and instructional practices that satisfy students’ need for competence, support students’ self-concepts concerning their abilities and self-efficacy, and spark their curiosity (e.g., Praetorius et al., 2018). Conceptually, we deem it plausible that teachers’ intrinsic motivation and possibly also (subject) interest may bear significance particularly for promoting positive motivational outcomes such as students’ intrinsic motivation, values, interest, and positive emotions. This relation may unfold as transmitted via enthusiastic teaching, which has been found to be predictive of affective and motivational outcomes such as enjoyment and interest (e.g., Frenzel et al., 2009; Keller et al., 2016). Teachers’ relational goals and educational interest, which may prompt them to create socio-emotionally supportive learning environments in class, could be especially relevant for fostering students’ sense of belonging, positive student-teacher and student-student relations, and positive school-related attitudes such as school liking (e.g., Praetorius et al., 2018). Of course, this is not to say that each construct relates to a single matching type of instructional behavior and student outcome alone. Rather, our notion of different construct families suggests some theoretically plausible connections between teacher motivation, instruction, and student outcome variables. We invite future research on teacher motivation to test and expand—or refute—the provided suggestions.[[4]](#footnote-4)

**Measures**

Scholars need to be able to reliably trace the signal from teacher motivation to student outcomes. The measures used in teacher motivation research thus play a key role in the search for the signal. Here, we discuss these issues with reference to teacher motivation measures, measures assessing instructional practices, and measures capturing student outcome variables.

***Teacher motivation***

 Given the phenomenological underpinnings of major current theories, asking teachers about their self-perceived levels of motivation represents a valuable strategy: If we want to gain insights into teacher motivation, asking for their subjective interpretation is indispensable. However, the pitfalls associated with self-reports of teacher motivation, such as social desirability, faking or susceptibility to response bias also have to be acknowledged. In some cases, self-report measures may actually hinder attempts to detect potential effects (e.g., in the presence of ceiling effects and limited variability of self-rated and obviously desirable motivational features). Hence, researchers might want to experiment with other measures, not to replace but to complement self-reports. Examples of complementary measures for research on teacher motivation that can be relatively easy to implement include situational judgement tests (SJTs), a vignette-based approach that has successfully been applied in research on teachers (Aldrup et al., 2020; Klassen et al., 2020). The SJT methodology incorporates real-life vignettes based on authentic teaching situations that highlight particular attributes (e.g., empathy or conscientiousness), and that require the test-taker to make a judgment about desirable courses of action. At a theoretical level, SJTs are hypothesized to assess implicit trait policies, or an evaluation of the costs and beneﬁts of particular courses of action (Lievens & Motowidlo, 2016). In organizational psychology, SJTs have gained considerable momentum as a method with which to assess applicants’ likely behavior and decision-making in work situations. The use of SJTs as a mechanism to understand teachers’ motivation is also a growing field of research (e.g., Klassen et al., 2020), and research on construct-driven SJTs has reduced the “fuzziness” previously associated with the method (e.g., Tiffin et al., 2020).

***Instructional practices***

 In this article, we have mostly focused on student ratings of teachers’ instructional behavior. Even though student ratings should, in our opinion, be preferred over teachers’ ratings of their instructional practices, they can be problematic too. Student ratings of instruction have, for example, been shown to be substantially affected by the characteristics students bring with them (e.g., Fauth et al., 2020) and they are prone to the flaws routinely associated with self-reports. Moreover, when using class-averages of student-reported instruction, researchers should be aware that students within the same class exposed to the same teacher can differ greatly in their perceptions of instructional quality (e.g., Bardach et al., 2021b; Schweig, 2016). We therefore strongly advise that future research on teacher motivation expand the scope to include measures of teacher behavior apart from teacher and student reports. For instance, in a recent study, Boden and colleagues (2020) used 40 classroom video clips to code the content of teachers’ talk according to achievement goal theory (i.e., mastery-oriented talk). They showed that teacher talk differed between higher and lower conceptual learning growth classrooms. Although this study did not link teacher talk to teacher motivation, it may inspire future research on teacher motivation to adopt similar measurement approaches to gauge indicators of adaptive instruction, and preferably to combine several of these indicators.

Furthermore, currently-used measures of instructional practices offer potential explanations why findings of teacher self-determination research have revealed stronger support for theoretical assumptions regarding relations between teacher motivation and student perceptions of instruction (e.g., that teacher autonomous motivation should be linked with need-supportive teaching). Achievement goal theory research has more often struggled to do so. For example, consistent support for a relation between teachers’ mastery-approach goals and perceived mastery goal structures is lacking. This is not to say that achievement goal theory is less strong as a theory; instead, we argue that some of the measures used by achievement goal theorists may be partially responsible for the lack of effects. Specifically, earlier conceptualizations of mastery goal structures (e.g., Ames, 1992; see also Bardach et al., 2020; Kaplan & Maehr, 2007; Lüftenegger et al., 2017) distinguished between different dimensions of mastery goal structures (e.g., regarding the task structure, autonomy support and evaluation practices, etc.). This multi-dimensionality was later reduced and eliminated (see pattern of adaptive learning scale, PALS, Midgley et al., 2000), probably due to practical reasons as more items were needed to capture different facets. As a result, some facets were lost that may be conceptually much closer to teacher achievement goals, particularly to the cognitively-oriented mastery-approach goal. Importantly, multi-dimensional measures of mastery goal structures and unidimensional measures (such as the PALS scale) do not differ in the strength of relation to students’ personal achievement goals (see the meta-analysis by Bardach et al., 2020). However, multi-dimensional mastery goal structure measures may help to more strongly connect teacher achievement goals with instructional practices, and, in turn student outcome variables.

***Student Outcomes***

 Finally, the measures applied to capture student outcome variables represent another factor potentially limiting progress in the field. We encourage teacher motivation researchers to embrace the diverse nature of student outcomes and to assess a range of outcomes beyond motivation and achievement, especially because other student outcomes such as socio-emotional variables may be particularly sensitive to specific teacher motivation variables (e.g., relational goals). We are convinced that the field will be best served by adopting measurement pluralism for student learning and outcome variables (e.g., Järvelä et al., 2019). Examples that can complement typical measures (e.g., students’ self-reported motivations, emotions, and learning approaches, standardized achievement test results, or school grades) are “online-measures” of learning collected during tasks, physiological indicators, and attention measured via eye-tracking. Another example refers to the use of EEG to record brain-to-brain synchrony between students and between students and teachers, which has been shown to be indicative of students’ engagement in class, their learning outcomes, and social dynamics (e.g., van Atteveldt et al., 2018).

**Research Designs**

From our point of view, the most salient design-related problem in current research on teacher motivation is the overreliance on observational cross-sectional data. After almost 15 years of research on teacher motivation according to self-determination theory and achievement goal theory, we still know very little about causality or the temporal ordering of teacher motivation and variables labeled as “student outcomes.” We thus urgently call for sufficiently powered longitudinal studies with assessments of teacher motivation, instructional practices, and student outcome variables at multiple time points, as well as experiments, and intervention research.

***Longitudinal research***

Longitudinal studies are needed to investigate effects of teacher motivation on student outcomes, and to study longitudinal mediation processes via instructional practices (e.g., O’Laughlin et al., 2018). We thereby especially encourage intensive longitudinal studies with series of measurement points allowing to map dynamics in teacher motivation, and to better understand the interplay of these “micro-level” motivational patterns with student outcomes. Relatedly, such research designs would also allow to gain a more thorough understanding of the stability versus variability of teacher motivation, raising issues for the study of its relation to student outcomes. For example, if certain teacher motivational characteristics fluctuate to a relatively high degree, multiple measurement points may be necessary to reliably capture the construct (e.g., Praetorius et al., 2014). Such insights into the variability of teacher motivation would furthermore add to theory-building, and could inform intervention studies aiming to strengthen adaptive motivational patterns in teachers.

Adopting intensive longitudinal designs and a process perspective on the study of teacher motivation would also lend itself well to investigations of the relations between teacher motivation and momentary motivation regulation (e.g., Scholer et al., 2018). In comparison to research on emotion regulation (e.g., Chang & Taxer, 2020), the regulation of motivation has not yet received attention in research on teachers. Nonetheless, we propose that recurring failures of teachers to regulate their motivation - that may occur even though teachers still perceive themselves as, overall, motivated - could lead to diminished associations with student outcome variables. For instance, a teacher may in general perceive herself as highly mastery-approach goal-oriented, but may not always choose or be able to act upon this motivational orientation. Hence, the study of momentary teacher motivation regulation could add another perspective to teacher motivation research. With regard to longitudinal studies more generally, it may furthermore be illuminating to join forces with scholars from other disciplines to address educational psychology questions regarding the effects of teacher motivation on student outcomes with analytical approaches to determine “teacher effects” from these other disciplines (e.g., value-added models from economics, Atteberry et al., 2015, or classroom allocation models from behavioral genetics, Grasby et al., 2020).

On a related note, we believe that future longitudinal studies would particularly benefit from paying closer attention to teachers’ contexts. Context-related restrictions may stifle the potential for teacher motivation to have positive influences on student outcome variables, and thus, adversely affect the signal from teacher motivation to student outcomes. Examples of such constraints include requirements that teachers use prescribed curricula, or teach heavily scripted lessons. Further influential contextual features include factors such as the incessant public blaming of teachers, and limits preventing content that can be taught or discussed in class (with critical race theory being a recent example from the U.S.). At the school and class level, teachers may face a lack of support from the principal and colleagues, conflicts with parents, or disruptive and challenging classes (e.g., Olsen & Sexton, 2009; Pelletier et al., 2002). These forms of contextual factors arguably affect not only teachers, but students as well. For example, student motivation has been found to fluctuate over a single semester depending on critical events such as tests (Bardach et al., 2019). Hence, studying contextual characteristics in conjunction with day-to-day changes in teacher motivation, along with changes in student outcome variables, is imperative to gain a clearer understanding of teacher motivation. A truly contextual account of the role of teacher motivation for student outcome variables should furthermore simultaneously consider the multiple contexts relevant for students’ development (e.g., family, peers, community, and out-of-school environments) and empirically compare these effects on students with teacher factors, such as their motivation.

***Intervention studies and experimental research***

 Although intervention studies and experiments offer excellent remedies to address causality, they have rarely been adopted in research on teacher motivation. Thus, in sharp contrast to the relatively large number of intervention studies aiming to foster student motivation, there remains much to learn about how to causally influence and raise the motivation of teachers. Greater clarity can be achieved through intervention studies that build on solid theories, that address a range of different motivational constructs within self-determination theory and achievement goal theory, and that contrast different intervention approaches (e.g., more intense vs. minimal interventions such as nudging, Damgaard & Nielsen, 2018).

Concerning experimental research, we emphasize that virtual reality approaches hold great promise for research on teacher motivation due to the combination of experimental control and realistic classroom situations (e.g., Blume et al., 2019). Virtual reality environments can serve both as training tools that can be integrated into teacher education or as a testbed for fundamental classroom processes that are difficult or impossible to manipulate in real-life (Huang et al., 2021). With virtual reality, researchers are able to experimentally influence teacher motivation to study its causal effects on teaching performance in the virtual classroom setting. Furthermore, levels of initial motivation can serve as a moderator variable, even though this resulting effect without an experimental manipulation of motivation can then not be interpreted as causal effect. In the future, when reliable behavioral indicators of teacher motivation are available, we further envision studies creating virtual teachers who differ in the extent of behaviorally displayed motivation, allowing for investigation of the effects on students who participate in the experiment.

**Acknowledging and Embracing Diversity**

Issues related to diversity have critical implications for the study of teacher motivation, but have not yet received the attention they deserve. First, the cultural, linguistic, and ethnic composition of the student and teacher samples was rarely described or considered in the studies we reviewed. Neither have scholars paid attention to the “Whiteness” of the motivational theories on which the studies drew. Future research on teacher motivation should systematically examine how teachers’ and student’ sociohistorical and cultural contexts influence teacher motivation, student-teacher interactions, and student motivation (see Usher, 2018).

Second, research on teacher motivation and student outcomes covered in our reviews has addressed adaptive instructional practices from different frameworks (e.g., instructional quality, need-supportive teaching, goal structures). However, this line of research has yet to be integrated with work on instructional approaches relevant to teaching diverse student populations. Hence, we need to ask the question: Which teacher motivation constructs make teachers more likely to, for example, engage in culturally responsive pedagogical practices, and what consequences does this have for student outcomes (e.g., Kumar et al., 2015; Kumar et al., 2021)?

Third, it may be promising to broaden the focus of certain teacher motivational constructs to include aspects presumed to be important for teachers’ support of students in multicultural classes. Research on teachers’ motivational beliefs has introduced the construct of culturally responsive classroom management self-efficacy (Siwatu et al., 2017). We suggest that teacher motivation researchers could, for example expand current teacher interest conceptualizations to explore teachers’ interestin the implementation of culturally responsive instructional approaches.

Finally, although informative and important, the discussion of teacher motivation and student outcomes has been mostly unidirectional with the emphasis clearly placed on the presumed effects of teacher motivation on student outcomes. In light of the complexity of classroom life, this perspective is arguably overly simplistic, leading us to the last guiding question of the present paper.

**Question 3: What can be Learned by Considering the Reverse Ordering of Effects, Reciprocal Effects and the Dynamic Interplay Between Teacher Motivation and Variables Predominantly Conceptualized as Student “Outcomes”?**

Teaching and learning have long been recognized as situated, complex, and reciprocally interactive activities (e.g., Nückles, 2021). Research on teacher motivation and student outcomes can therefore not afford to be blind to issues related to the complexity of classroom and teaching/learning processes, such as reciprocal effects, dynamic interaction processes, and differentiated patterns of effects. These issues could arguably also be part of the problem of tracing the signal; however, we decided to cover these aspects in a separate section and not subsume them under Question 2 to further underline their relevance for research on teacher motivation.

To start with, teacher motivation and student outcomes are likely reciprocal. Teacher motivation may influence students, but students influence their teachers as well. Student characteristics and behaviors evoke different instructional patterns and responses among teachers (e.g., Nurmi & Kiuru, 2015), and it is likely that these student factors therefore also affect teacher motivation. In the future, more longitudinal studies on teacher motivation and student outcomes are needed where differing routes of influences can be compared and the temporal precedence of variables can be established. Such research is necessary to replace more simplistic “input-output” perspectives where teacher motivation shapes certain student outcomes without considerations of the reverse ordering of effects or reciprocal links. Recent research underscores the importance of instructional practices and teacher behavior as mediating the link between teacher motivation and student outcomes (e.g., Ahn et al., 2021; Butler & Shibaz, 2008; Schiefele, 2017). We propose that such behavior may function as an intermediate process when we look at the effects of student outcomes on teacher motivation too. For instance, low student motivation may hinder teachers from engaging in effective instructional practices (e.g., Bardach et al., 2021b; Nurmi & Kiuru, 2015), which can cause decrements in teachers’ motivation.

If we seek to develop a better understanding of teacher motivation and its interplay with variables commonly known as “student outcomes”, it will be critical to take a more fine-grained look at differentiated effects by scrutinizing dynamic student-teacher interactions. The same teacher’s motivation may not be equally adaptive for all students, depending on individual configurations of student characteristics and dispositions. Furthermore, the same teacher’s motivation may not be influenced in the same way by different students, and the same teacher’s motivation may not interact in the same way with varying student characteristics and situational demands. Hence, relevant questions become: What works for whom, which student-teacher combinations, under which circumstances, and in which settings? Questions like these are at the core of debates on adaptive teaching and personalized learning (e.g., Dumont, 2018; von Stumm & Wertz, 2021). They should, from our point of view, also fuel discussions on teacher motivation and student outcomes. For example, in both reviews, we have covered evidence on *average* effects from studies using designs that ignore differential student-teacher interactions and idiosyncratic developmental trajectories of students. Hence, it remains an important task for future research on teacher motivation and student outcomes to systematically investigate student-teacher interactions and related dynamic motivational processes, and to build a respective research agenda.

**Conclusions**

One of the most vexing challenges that has faced teacher motivation research has been to establish connections between teacher motivation and student outcomes. In this paper we have approached this issue by asking three of the most pressing questions: First, is there a signal? Does teacher motivation actually affect—or at least relate to—student outcomes? Second, why and where does the signal get lost? Third, what is the importance of alternative pathways such as reverse effects, differentiated effects and dynamic student-teacher interactions? We have provided some initial answers to these questions and highlighted potentially profitable research strategies. As such, this work is meant to serve as a springboard for extensions, revisions, and critical reflections on teacher motivation theories and research. We hope that it will contribute to enhancing future teacher motivation research both conceptually and methodologically, will inspire scholars to re-think basic assumptions about the complex interplay between teacher motivation and student outcomes, and will stimulate cross-fertilization of ideas among researchers from different research traditions.

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\* Denotes study included in the review on self-determination theory (including interest);
\*\* denotes study included in the review on achievement goals

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*Figure 1.* The Three Questions Guiding the Current Paper.

**Online Supplement S1: Description of the search procedure**

We conducted two separate database searches in Web of Science and PsycINFO between July 28th and August 4th 2021.

For the search for the achievement goal theory review, we combined achievement goal-related search terms (“achievement goal” or “achievement goal orientation” or “goal orientation”) with search terms referring to teacher (teacher or instructor or educator), including the plural of all motivation- and teacher-related terms. This yielded a total of 1,039 hits from Web of Science and a total of 699 hits from PsycINFO.

We adopted a slightly different search procedure for the self-determination theory review, as using the same approach as for achievement goals (i.e., combining two search strings referring to (a) motivational constructs and (b) teacher search terms, respectively) resulted in a very large number of hits (e.g., > 20, 0000 on Web of Science). Specifically, we used teacher-terms (teacher, instructor, educator) together with motivation terms and thus searched for the following combinations (including the plural of all terms): “teacher autonomous motivation" or “teacher controlled motivation" or “teacher intrinsic motivation" or "teacher interest" or “teacher extrinsic motivation” or “teacher amotivation” or “autonomous motivation of teacher” or “controlled motivation of teacher” or “intrinsic motivation of teacher” or “interest of teacher” or “extrinsic motivation of teacher” or “amotivation of teacher” or “autonomous motivation for teaching” or “controlled motivation for teaching” or “intrinsic motivation for teaching” or “extrinsic motivation for teaching”. We used the same combinations for instructor and educator (e.g., “instructor autonomous motivation”), including the plural for all teacher- and motivation-related terms. This yielded a total of 231 hits from Web of Science and a total of 435 hits from PsycINFO. In addition to the database search, we also considered recommendations from experts in teacher motivation research.

Next, we applied a set of inclusion and exclusion criteria to determine which papers to include in the reviews:
(a) The paper had to focus on school teacher motivation according to self-determination and/or achievement goal theory.
(b) Teacher motivation had to be assessed via teacher self-reports, meaning that studies using student ratings of teacher motivation were excluded.

(c) The paper had to additionally include student outcome variables (e.g., achievement, motivation, emotions, well-being, learning strategies), and/or student-reported instructional practices; studies relying on teacher-reported instruction were not considered.

(d) The paper had to be peer-reviewed and published to make it more likely that the work had undergone a (rigorous) quality control process.

(e) The paper had to be written in English.

# Table S1

## Studies on teachers’ motivation according to self-determination theory: Study characteristics and main findings

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Authors & date | *n,* educational level and country  | Teacher motivation measure  | Domains of student-reported instruction/ teacher behavior or classroom climate | Student outcome(s) | Analytical approach and main findings regarding the relations between teacher motivation and student outcomes, and/or teacher motivation and student-reported instructional practices, and/or mediating effects |
| Ahn et al. (2021) | 35 elementary school teachers and 697 students from South Korea | Items from the teacher self-determination measure from Taylor & Ntoumanis (2007): Five subscales assessing intrinsic motivation, identified regulation (combined to autonomous motivation), introjected regulation, external regulation (combined to controlled motivation), amotivation; referring to the specific class for which student data was collected  | Teachers’ basic need-supportive practices in terms of autonomy support, structure, involvement (modelled as a single factor) | Students’ intrinsic and introjected regulation (combined to autonomous motivation), identified and external regulation (combined to controlled motivation), amotivation, mathematics achievement | *Multilevel modeling results* (testing the sequence teacher motivation 🡪 perceived need-supportive practices 🡪 student basic need satisfaction 🡪 student motivation 🡪 student achievement; all variables except for achievement were measured at the same time point) including control variables:(a) Teacher autonomous motivation was significantly and positively related to students’ autonomous motivation.(b) Neither teacher controlled nor teacher amotivation were statistically significantly linked to the those of their students.(c) Teacher autonomous motivation significantly and positively linked to need-supportive practices.(d) Teachers’ need-supportive practices (together with students’ basic need satisfaction: autonomy, competence) fully mediated the link between teacher autonomous motivation and students’ autonomous motivation.(d) No significant association between teacher motivation variables and student achievement. |
| Bieg et al. (2011)  | 48 secondary school teachers and their 1,195 students from Germany | Intrinsic motivation scale from the Perceived Autonomy in Teaching measure (PAT, Mittag et al., 2010, based on Ryan and Connell (1989) and Roth et al. (2007)); general assessment and not specific to a class | Teachers’ autonomy-support and care | Students’ intrinsic motivation  | *Classroom level results from multilevel model* (including teacher and student-reported autonomy and care as additional classroom level predictors):No significant association between teachers’ intrinsic motivation and students’ intrinsic motivation.*Correlations between teacher motivation and class average student variables*:(a) Teachers’ intrinsic motivation not significantly related to students’ intrinsic motivation (*r* = .05).(b) No significant associations between teachers’ intrinsic motivation and students’ reports of teacher autonomy-support (*r* = .10) and care (*r* = -.12). |
| Keller et al. (2016) | 77secondary school teachers and their 1,614 students from Switzerland and Germany  | Teachers’ interest in teaching physics, newly developed, based on the interest conceptualization by Krapp (2007) and addressing the positive affect that comes with teaching physics as well as the personal value attributed to the activity of teaching physics; general assessment and not specific to a class | Student perceived enthusiastic teaching, (cognitive activation also assessed via videos and rated by experts) | Students’ interest and achievement in physics | *Classroom level results from longitudinal multi-level models* (including teachers’ pedagogical knowledge assessed at the first wave as further classroom level predictor; controlling for student interest and achievement assessed at the first wave at the individual student level): (a) No statistically significant relation between teacher interest at the first wave and students’ achievement at the second wave.(b) Teacher interest at the first wave was significantly and positively related to student interest at the second wave.(c) Students’ reports of enthusiastic teaching (assessed at the first wave) partially mediated the effect of teacher interest on student interest.*Correlations between teacher motivation and class average student variables*: (a) Significant relation between teacher interest and students’ perceptions of enthusiastic teaching (*r* =.27); no statistically significant correlation between teacher interest and cognitive activation, *r* = .09)(b) Significant correlation between teacher interest and student wave 1 interest (*r* =.29) and wave 2 interest (*r* =.43). No statistically significant association with wave 1 achievement (*r* =.13) and wave 2 achievement (*r* =.13).  |
| Lam et al. (2009) | 126 secondary school teachers and 631 students from Hong Kong | Teachers’ intrinsic motivation to participate in a project-based learning activity a adapted from the intrinsic motivation subscale of the Self-Regulation Questionnaire (Ryan & Connell, 1989) and Stepping Motivation Scale (Hayamizu, 1997) | Instructional support (composite of teachers’ cognitive support and affective support) | Students’ intrinsic motivation | *Classroom level results from multilevel models* (all variables assessed after the project-based learning activity had taken place): (a) Significant positive relation between teachers’ intrinsic motivation and students’ intrinsic motivation (both with and without controlling for relations between student-reported instructional support and student intrinsic motivation).(b) Teachers’ intrinsic motivation significantly and positively associated with students’ reports of instructional support.*Results from multi-level mediation analyses:* Instructional support partially mediated the relation between teachers’ and students’ intrinsic motivation. |
| Lazarides & Schiefele (2021) | 84 secondary school teachers and 1,718 students from Germany | Teachers’ interest (dimension: educational interest) from the Teacher Interest Scale developed by Schiefele et al. (2013) | Cognitive activation, classroom management, student support | Students’ achievement (not of main interest for the paper and only used as control variable) | *Classroom level results from multilevel models* (additionally including teacher self-efficacy as further predictor as well as control variables): (b) No significant relations between teacher interest and cognitive activation or classroom management(b) Teacher interestwas significantly and positively related to emotional support.*Correlations between teacher motivation and class average student variables:* (a) Statistically significant negative correlation between teacher interest and student achievement (*r* = -.26)(b) No statistically significant correlations between teacher interest and cognitive activation (*r* = .03), classroom management (*r* = .13), and emotional support (*r* = .15) |
| Ohle et al. (2015) | 58 elementary school teachers (but seems as if only 30 were included in the main analyses) and originally 1,326 students from Germany | Teachers’ interest in physics and teachers’ interest in teaching physics (combined to one dimension), developed by the project team  |  | Students’ interest and achievement  | *Classroom-level results from multilevel models* (separate model for predicting wave 2 achievement and interest, controlling for student achievement and interest assessed at wave 1 at the individual student level): No statistically significant effect of teacher interest assessed at wave 1 on student interest and achievement assessed at wave 2 (same patterns of results in further multilevel models including teachers’ pedagogical content knowledge and instructional quality as further predictors). |
| Roth et al. (2007)  | 132 elementary school teachers and 1,255 students from Israel | Autonomous motivation for teaching assessed with a measure developed for this study comprising four scales (intrinsic, identified, introjected, and external motivation); composite score used b; general assessment and not specific to a class | Autonomy-supportive teaching, competence-supportive teaching (the latter was not of main interest for the study and included for control reasons) | Students’ autonomous motivation for learning (intrinsic, identified, introjected, and external motivation), composite score used b | *Classroom level results from multilevel models:* (a) Significant relation between teacher and student autonomous motivation(b) Significant relation between teacher autonomous motivation and autonomy-supportive teaching; non-significant relation between teacher autonomous motivation and competence-supportive teaching*Results from multi-level mediation analyses* (controlling for the relation between competence-supportive teaching and autonomy-supportive teaching as well as student autonomous motivation): Autonomy-supportive teaching mediated association between teacher autonomous motivation and students’ autonomous motivation. The same mediation results were obtained in further analyses not controlling for competence-supportive teaching.*Correlations between teacher motivation and class average student variables:* (a) Statistically significant positive correlation between teacher autonomous motivation and students’ autonomous motivation (*r* = .22)(b) Statistically significant positive correlation between teacher autonomous motivation and autonomy-supportive teaching (*r* = .22); no statistically significant correlation with competence-supportive teaching (*r* = .12) |
| Schiefele & Schaffner (2015) c | 110 elementary school teachers and 1,731 students from Germany  | Teacher Interest Scale developed by Schiefele et al. (2013) with its three subscales: Subject interest, didactic interest, and educational interest | Cognitive activation, mastery goal structures (goal structures referring to the teacher) | Interest, mastery-approach goals | *Classroom level results from multilevel models* (also including teacher mastery goals and self-efficacy as further predictors):(a) Teachers’ educational interest was significantly related to mastery goal structures and students’ interest, but not to cognitive activation and students’ mastery goals.(b) Teachers’ didactic interest was not significantly related to the two types of instructional practices and the two types of student outcomes.(c) Teachers’ subject interest was not significantly related to the two types of instructional practices and the two types of student outcomes.*Mediating effects* (other motivational teacher variables not included):(a) Relation between teachers’ educational interest and students’ mastery-approach goals fully mediated by mastery goal structures. (b) Relation between teachers’ educational interest and students’ interest partially mediated by mastery goal structures. *Correlations between teacher motivation and class average student variables*:(a) Teachers’ educational interest statistically significantly associated with student-reported mastery goal structures (*r* = .34), student interest (*r* = .30), and mastery goals (*r* = .23). No statistically significant association with cognitive activation (*r* = .12).(b) Teachers’ didactic interest statistically significantly associated with student interest (*r* = .21), and mastery goals (*r* = .21). No statistically significant associations with student-reported mastery goal structures (*r* = .19) and cognitive activation (*r* = .12).(c) Teachers’ subject interest statistically significantly associated with student interest (*r* = .28). No statistically significant associations with students’ mastery goals (*r* = .06), mastery goal structures (*r* = .05), and cognitive activation (*r* = -.01). |
| Schiefele (2017) c | 110 elementary school teachers and 1,731 students from Germany | Two subscales of the Teacher Interest Scale developed by Schiefele et al. (2013): Didactic interest and educational interest | Classroom management, mastery goal structures (goal structures referring to the teacher); goal structures mainly included for control purposes | Interest, mastery-approach goals | *Classroom level results from multilevel models* (including teachers’ mastery goals as further predictor as well as control variables): (a) No significant relation between teachers’ didactic interest and classroom management as well as mastery goal structures(b) Educational interest significantly related to both classroom management and mastery goal structures. *Mediating effects* (teacher mastery-approach goals not included in model): (a) Relation between teacher educational interest and students’ interest fully mediated by mastery goal structures and classroom management (b) Relation between teachers’ educational interest and students’ mastery-approach goals fully mediated by mastery goal structures (as in Schiefele & Schaffner, 2015, using the same data set). *Correlations between teacher motivation and class average classroom management* (see the summary of Schiefele and Schaffner (2015) above for all other bivariate correlations):(a) Teachers’ educational interest statistically significantly associated with classroom management (*r* = .30) (b) No statistically significant association between teachers’ didactic interest and classroom management (*r* = .16). |
| Taylor & Ntoumanis (2007) | 51 physical education teachers and 787 students from England | Teachers’ self-determination to teach their class, adapted from the Situational Motivation Scale (SIMS; Guay et al., 2000); items from the motivation regulation questionnaire by Goudas et al. (1994) also included. Five subscales (intrinsic motivation, identified regulation, introjected regulation, external regulation, and amotivation) combined to a score b |  | Students’ self-determination, five subscales (intrinsic motivation, identified regulation, introjected regulation, external regulation, and amotivation) combined to a score b  | *Classroom level results from multilevel models* (including control variables):Teachers’ self-determination was not significantly related to students’ self- determination. In further models including separate sub-scales, nonsignificant relations were also found between teachers’ and students’ intrinsic motivation, identified regulation, introjected regulation, external regulation, and amotivation.  |

*Note. n* = total sample size; n.s. = not statistically significant;
a In the study by Lam et al. (2007), students (*n* = 631) were divided into 126 groups, with each group supervised by one teacher while carrying out a project-based learning activity. The topics of the projects were diverse and multi-disciplinary in nature (e.g., air pollution in Hong Kong, teenage hip-hop culture) and the projects mostly lasted for 2–3 months.
b In the study by Roth et al. (2007) and Taylor and Ntoumanis (2007) both teacher and student motivation was measured with four scales and subsequently a composite variable was created by assigning different weights. The product scores were then summed to build an index of self-determination.
c The studies by Schiefele (2017) and Schiefele and Schaffner (2015) relied on the same data set.

# Table 2S

## Studies on teachers’ achievement goals: Study characteristics and main findings

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Authors & date | *n,* educational level and country  | Teacher motivation measure  | Domains of student-reported instruction/ teacher behavior or classroom climate | Student outcome(s) | Analytical approach and main findings regarding the relations between teacher motivation and student outcomes, and/or teacher motivation and student-reported instructional practices, and/or mediating effects |
| Butler & Shibaz (2008) | 53 secondary school teachers and 1,287 students from Israel  | Teacher achievement goal measure developed by Butler (2007) comprising teachers’ mastery-approach, performance-approach, performance-avoidance, and work avoidance goals; general assessment and not specific to a class  | Teacher support for and inhibition of question asking and help seeking | Cheating and help seeking  | *Classroom-level results from multilevel models* to investigate associations between teachers’ achievement goals for teaching assessed in the first half of the school year, and student reported instruction, as well as students’ cheating and help-seeking at the end of the year:(a) Teacher mastery goals significantly and positively predicted teacher support for question asking and significantly and negatively predicted inhibition of question asking.(b) Teacher performance-avoidance goals significantly and negatively predicted teacher support and significantly and positively predicted the frequency with which students engage in cheating; marginally significant positive association with teacher inhibition(c) No statistically significant associations between performance-approach and work-avoidance goals and teacher instruction variables(d) No significant association between teacher achievement goals and students’ help seeking*Results from multi-level mediation analyses:* Tested whether relation between teachers’ performance-avoidance and student cheating was mediated by teacher inhibition: No significant effect*Correlations between teacher achievement goals and class average student variables* (support/ inhibition/ help-seeking/ cheating): (a) Mastery-approach goals: *r*’s = .44/ -.30/ .19, n.s./ -.10, n.s.(b) Performance-approach goals: *r*’s (all n.s.) = .10/ -.06/ .01 / .04(c) Performance-avoidance goals: *r*’s = -.21, n.s. / .20, n.s./ -.14, n.s/ .28(d) Work-avoidance goals (all n.s.): *r*’s = -.04/ .02/ -.03/ .12 |
| Butler (2012), Study 2 | 73 secondary school teachers and 1,790 students from Israel | Teacher achievement goal measure developed by Butler (2012) comprising teachers’ mastery-approach, performance-approach, performance-avoidance, work avoidance goals, and relational goals; general assessment and not specific to a class | Social support, low demands, mastery goal structures, performance goal structures (goal structures referring to the teacher) |  | *Classroom level results from multilevel models* to investigate associations between teachers’ achievement goals assessed at the beginning of the school year and student-reported instruction assessed at the end of the school year:(a) Teachers’ relational goals were significantly and positively associated with social support and mastery goal structures(b) Marginally significant negative relation between teachers’ mastery goals and performance goal structures and between relational goals and low demands.(d) No statistically significant associations for performance-approach, performance-avoidance, and work-avoidance goals and the instructional practices.*Correlations between teacher achievement goals and class average student variables* (social support/ mastery goal structures/ performance goal structures/ low demands)(a) Mastery-approach goals: .17., n.s./ .23, n.s./ -.26, n.s./ -.20, n.s. (mentioned in text that correlations for mastery and performance goal structures were marginally significant)(b) Performance-approach goals: (all n.s.): .02/ .07/ 12/ .11 (c) Performance-avoidance goals (all n.s.): .09/ .14/ -.02/ .03(d) Work avoidance goals (all n.s.): .01/ .08/ .04/ .03(e) Relational goals: .45/ .37/ -.08, n.s./ -.29 |
| Butler & Shibaz (2014), Study 2 | 51 middle and secondary school teachers and 1,280 students from Israel | Teacher achievement goal measure developed by Butler (2012) comprising teachers’ mastery-approach, performance-approach, performance-avoidance, work avoidance goals, and relational goals a; general assessment and not specific to a class | Cognitive stimulation, social support | Help-seeking and interest  | *Classroom level results from multilevel models* to investigate associations between teachers’ achievement goals assessed at the beginning of the school year and student-reported instruction, interest, and help seeking assessed at the end of the year: (a) Teachers’ relational goal significantly and positively predicted student’ help seeking, perceptions of social support and cognitively stimulating instruction (b) Teachers’ mastery goals significantly and positively predicted students’ interest as well as cognitively stimulating instruction (c) No significant associations for teachers’ performance-approach, performance-avoidance, and work avoidance goals*Results from multilevel mediation models*:(a) Cognitively stimulating instruction partially mediated the relation between teacher mastery goals and students’ interest.(b) Social support fully mediated the relation between teacher relational goals and students’ help-seeking.*Correlations between teacher achievement goals and class average student variables* (social support/ cognitively stimulating instruction/ help-seeking/ interest): (a) Mastery-approach goals: .24, n.s./ .38/ .12, n.s./ .42(b) Performance-approach goals (all n.s.): .18/ .19/ .16/ .16(c) Performance-avoidance goals (all n.s.): .12/ .18/ .02/ .08(d) Work avoidance goals (all n.s.): 12/ .11/ .09/ .20(e) Relational goals: .49/ .32/ .33/ .27 |
| Dresel et al. (2013) | 46 secondary school teachers and 930 students from Germany | Teacher achievement goal questionnaire developed by Nitsche et al. (2011) comprising mastery-approach, performance-approach, performance-avoidance, and work avoidance goals; general assessment and not specific to a class | Mastery goal structures, performance-approach goal structures, performance-avoidance goal structures (referring to the class and not the teacher) | Achievement goals (mastery-approach, performance-approach, performance avoidance, and work avoidance goals) | *Classroom level results from multilevel models* to investigate associations between teachers’ achievement goals and student-reported instruction as well as students’ achievement goalsa: (a) Teachers’ mastery-approach goals: Significant negative associations with students’ perceptions of performance-approach and performance-avoidance goal structures, and students’ performance-approach goals (marginally significant association for students’ performance-avoidance goals)(b) Teachers’ performance-approach goals: Significant positive association with students’ perceptions of mastery goal structures and students’ mastery-approach goals(c) Teachers’ performance-avoidance goals: Significant positive association with students’ perceptions of performance-approach goal structures (marginally significant association for performance-avoidance goal structures), and students’ performance-approach goals (d) Teachers’ work avoidance goals: Significant negative association with students’ perceptions of mastery goal structures and mastery goals.(e) The relations between teachers’ achievement goals and students’ achievement goals as well as goal structures reported in (a) to (d) stem from models including either students’ achievement goals or their perceptions of goal structures; in another set of models including teacher achievement goals and student-perceived goal structures as predictors of students’ achievement goals, the relation between teachers’ mastery goals and students’ performance-approach goals, the relation between teachers’ performance-avoidance goals and students’ performance-approach goals, and the relation between teachers’ work avoidance goals and students’ mastery goals did not attain statistical significance anymore.*Results from multi-level mediation analyses:* (a) Relations between teachers’ performance approach as well as work avoidance goals and students’ mastery-approach goals were (partly) mediated by mastery goal structures. (b) Relation between teachers’ mastery-approach goals and students’ performance-avoidance goals was mediated by performance-avoidance goal structures(b) Marginally significant mediating effects of teachers’ mastery and performance-avoidance goals on students’ performance approach goals by performance- approach goal structure. |
| Pamuk et al. (2017) | 137 elementary school teachers and 3,281 students from Turkey | Teacher achievement goal measure developed by Butler (2007) comprising teachers’ mastery-approach, performance-approach, performance-avoidance, and work avoidance goals; general assessment and not specific to a class |  | Science achievement  | *Multilevel modelling results* (including further teacher-reported predictors, such as teachers’ self-efficacy, and student-reported predictors, such as different epistemological beliefs and motivational beliefs): No significant relations between any of the teacher achievement goal types and students’ science achievement |
| Schiefele &Schaffner (2015) b | 110 elementary school teachers and 1,731 students from Germany  | Teacher mastery-approach goal scale from the measure developed by Butler (2007, Hebrew version) and Retelsdorf (2006, German version, see also Retelsdorf et al., 2010); general assessment and not specific to a class | Cognitive stimulation, mastery goal structures (goal structures referring to the teacher) | Mastery-approach goals, interest  | *Classroom level results from multilevel models* (including teacher interest domains, self-efficacy and control variables as further predictors):(a) Teachers’ mastery-approach goals significantly associated with cognitive activation.(b) No significant relations between teachers’ mastery-approach goals and mastery goal structures, students’ mastery-approach goals or interest. (c) No mediation analyses for teachers’ mastery-approach goals conducted.*Correlations between teacher mastery-approach goals and class average student variables:* mastery goal structures, *r* = 27, cognitively activating instruction, *r* = .19, n.s., students’ interest, *r* = .24, student mastery-approach goals, *r* = .21 |
| Schiefele (2017) b | 110 elementary school teachers and 1, 731 students from Germany | Teacher mastery-approach goal scale from the measure developed by Butler (2007, Hebrew version) and Retelsdorf (2006, German version, see also Retelsdorf et al., 2010); general assessment and not specific to a class | Classroom management, mastery goal structures (goal structures referring to the teacher)  | Mastery-approach goals, interest | *Classroom level results from multilevel models*: Teachers’ mastery-approach goals not significantly related to classroom management and mastery goal structures.*Correlations:* Significant correlation between teacher mastery-approach goals and class average classroom management: *r* = .19 (see study above for bivariate correlations to student interest and mastery-approach goals) |

*Note. n* = total sample size, a In this study, one item each was added to the original mastery-approach and performance-avoidance scales of Butler (2012), bThe studies by Schiefele and Schaffner (2015) and Schiefele (2017) relied on the same data set.

1. Please note that we focus on teacher motivation as opposed to teacher motivation *beliefs* (i.e., self-efficacy, self-concept, causal attributions) that are covered in another contribution to the Special Issue (see Lauermann & ten Hagen, 2021/this issue). [↑](#footnote-ref-1)
2. In the work of Ohle et al. (2015) and Keller et al. (2017) teacher interest assessed at the first wave was used to predict student interest and achievement assessed at the second wave. In Ahn et al.’s (2021) study all variables except for achievement were assessed at the same wave. [↑](#footnote-ref-2)
3. In longitudinal designs with two measurement points (e.g., Keller et al., 2017) at least one of the paths in the mediation model also reflects a contemporaneous relation. [↑](#footnote-ref-3)
4. We have focused on desirable motivational teacher characteristics in the integrated discussion as, overall, they have been found to be linked to student outcomes and instructional practices more consistently than undesirable ones (e.g., performance goals, controlled motivation). However, we also acknowledge the conceptual overlap between maladaptive teacher motivational factors according to self-determination theory and achievement goal theory, which, in some instances, even transcends to items as smallest unit of measurements. For example, some of Taylor and Ntoumanis’ (2007) items assessing introjected extrinsic regulation (e.g., “Because I want my colleagues to think I am a good teacher”) strongly resembles performance-approach goals. [↑](#footnote-ref-4)