Need satisfaction and achievement goals of university faculty: an international study of their interplay and relevance

Martin Daumiller [1] · Stefan Janke [2] · Raven Rinas [1] · Oliver Dickhäuser [2] · Markus Dresel [1]

Abstract

Previous research has successfully used basic psychological need satisfaction and achievement goal approaches for describing the motivations of university faculty for teaching and for explaining differences in faculty experiences, success, and learning. However, the interplay between these motivational constructs has been largely ignored, with only faculty from specific educational contexts being studied—neglecting those from other higher education systems and institution types that potentially differ in the configurations, levels, and effects of their motivations. As combining both approaches and examining multiple educational contexts is essential for a comprehensive theoretical understanding of faculty motivation and generalizable results, we conducted an international study including 1410 university faculty members from German, Indian, and US-American teaching and research universities. Aside from need satisfaction and achievement goals, we measured their positive affect, teaching quality, and professional learning. Results demonstrated measurement invariance of basic need and achievement goal scales regarding language, higher education context, and institution type. We found small differences in motivations between the three higher education contexts and negligible differences between institution types. Task, learning, and relational goals were positively and work avoidance goals were negatively linked to the outcome variables. Need satisfaction sensibly explained differences in pursuit of these goals, and—directly and indirectly through the goals—also the outcome variables. Taken together, these results provide international evidence for the importance of faculty motivation for teaching and illuminate how need satisfaction is relevant for goal pursuit, while both motivation approaches uniquely matter for faculty experiences, success, and learning.

Keywords Teacher · Motivation · Goal orientations · Need satisfaction · International

✉ Martin Daumiller
Martin.Daumiller@phil.uni–augsburg.de

Extended author information available on the last page of the article

Motivation of teaching personnel has experienced a surge of interest in educational research over the last decades. Originating from reflections on school teachers, recent research has focused on the understudied population of higher education faculty. While the basic psychological need approach to faculty motivation has primarily been researched in the US higher education system (Stupnisky et al. 2017, 2018), an achievement goal approach has been focused on in the German higher education system (Daumiller et al. 2019; Hein et al. 2019; Rinas et al. 2020b). Researchers suggest that these motivational perspectives can be theoretically bridged, as satisfaction of faculty needs may energize achievement motivation, particularly in the form of learning goals, that should consequently matter for faculty well-being, teaching quality, and professional development (Janke and Dickhäuser 2018; Stupnisky et al. 2017). Aside from goals potentially functioning differently if they are pursued for autonomous or controlled reasons (Sommet and Elliot 2017; Vansteenkiste et al. 2014), investigations into how these two prominent motivational approaches align are scarce in general motivation literature (cf. Janke and Dickhäuser 2018). Therefore, systematic studies examining their interplay are required. Additionally, as these approaches have been employed in distinct education systems, different contexts must be considered to (a) confirm that the approaches apply equally well, (b) investigate possible differences in configurations of the respective motivations, and (c) ensure that associations between need satisfaction, achievement goals, and outcomes can be generalized to these different educational contexts (see Stupnisky et al. 2018). We address this in our study by considering three higher education systems (Germany, India, and the USA) and two institution types (research and teaching universities). Next to Germany and the USA, which represent more individualistic countries where prior research on faculty needs and goals has primarily been conducted, we incorporate India as a large higher education system outside of the western hemisphere characterized by a more collectivistic culture.

Basic need satisfaction and achievement goals as approaches to faculty motivation

Faculty motivation can be defined as "the overall processes that give rise to faculty members initiating, sustaining, and regulating goal-directed behaviors" (Daumiller et al. 2020, 2021b, p. 3). Different theoretical-conceptual approaches have been used to understand the quantity and quality of this motivation, where self-determination theory (SDT) and the achievement goal approach are particularly prominent.

SDT posits that humans strive for psychological growth and are most likely to follow this striving if they feel that their environment is responsive to their basic psychological needs (henceforth abbreviated to "needs") for autonomy, competence, and relatedness (Ryan and Deci 2017). Thus, individuals follow their inner desires when they are unobstructed by external forces (high *autonomy*), under conditions that allow them to be effective (high *competence*), and in a supportive environment (high *relatedness*).

Research on higher education faculty indicates that need satisfaction at work is linked with autonomous work motivation and contentment with one's output (Stupnisky et al. 2017). Need satisfaction has also been linked with faculty members' self-reported teaching quality through intrinsic motivation (Stupnisky et al. 2018). Despite being limited to primarily North American higher education systems (cf. Esdar et al. 2016), these findings suggest higher education practitioners enjoy working under need-supportive conditions, which consequently facilitates successful work experiences and outcomes.

Whereas SDT focuses on why and how individuals are motivated, achievement goal research focuses on what endstates individuals aspire to achieve (Vansteenkiste et al. 2014). To show which types of goals are most relevant and theoretically distinguishable from one another, Daumiller et al. (2019) presented an overview model for describing and investigating faculty goals. The model differentiates mastery strivings, which focus on conducting professional tasks right or not wrong (*task goals*), or on the improvement of one's own competencies (*learning goals*), as well as performance strivings, which focus on normative comparisons regarding performance (*normative goals*), or on competence demonstration (*appearance goals*). These goal types can be differentiated based on their valence, which describes whether aspired states are sought to be approached or avoided. For example, normative approach goals focus on outperforming others, whereas normative avoidance goals focus on avoiding being worse than others. Additionally, *relational goals* (striving for high-quality relationships with students) and *work avoidance goals* (striving to get by with little effort) are included, given their relevance within the teaching achievement context (see Butler 2012).

Although mostly conducted in the German higher education system, research on faculty members' achievement goals indicates the viability of this approach for describing faculty motivation (Daumiller et al. 2016, 2019) and predicting work-related outcomes. Achievement goals are tied to faculty members' well-being (Daumiller and Dresel 2020; Rinas et al. 2020b), teaching quality (Daumiller et al. 2016, 2019), and professional development (Hein et al. 2019). However, not all types of goals equally explain differences in such outcomes. Task avoidance and learning avoidance goals have rarely accounted for additional variance past task approach and learning approach goals (Daumiller et al. 2019; Daumiller and Dresel 2020). Moreover, research indicated that normative goals may matter more for well-being and learning than appearance goals, making it critical to conceptually distinguish these two types of performance goals (see also Hulleman et al. 2010). It is therefore necessary to reflect on which types of goals are relevant for respective research questions for theoretical clarity and minimization of statistical problems, such as suppression effects. Consequently, we did not consider task avoidance and learning avoidance goals and focused exclusively on normative aspects within performance goals.

Need satisfaction as a foundation of achievement goal striving

Although studies grounded in SDT and achievement goal approaches have each inspired fruitful research contributing to understanding faculty experiences and behaviors, a greater understanding of how these approaches align is necessary. The model proposed by Janke and Dickhäuser (2018) illuminates this connection: The notion that need satisfaction facilitates strivings for personal growth (Ryan and Deci 2017) corresponds to the assumption that need satisfaction might be a requirement for the adoption of learning goals that is more context-bound (Holzberger et al. 2014). Specifically, learning goals can be considered contextualized growth goals (Janke and Dickhäuser 2019). Faculty should therefore be more likely to strive for personal development if they feel that they can choose how to develop their abilities (experienced autonomy), believe they are capable of doing so (experienced competence), and are supported by colleagues and superiors (experienced relatedness). The assumption that learning goals are bound to need satisfaction is mirrored in first research on students and secondary school teachers (Benning et al. 2019; Janke et al. 2015).

Beyond learning goals, insights into how need satisfaction matters for the pursuit of other types of goals are rare. Given the central nature of need satisfaction for energizing motivation,

need satisfaction should account for how strongly other approach goals, such as task approach and performance approach goals, are pursued, while need frustration might initiate stronger avoidance, particularly work avoidance, goals (see also Ryan et al. 1996). Further, specific needs may be tied to specific goals. Competence satisfaction may be central to pursuing performance approach goals, as both valuing and approaching high performance likely require a feeling of competence in the first place. Relatedness satisfaction, on the other hand, may be a necessary foundation for developing goals directed at fostering meaningful relations with others (relational goals). Examining these associations is important for better understanding the relations between need satisfaction and goal pursuit.

Relevance of need satisfaction and achievement goals

While need satisfaction can constitute a relevant antecedent of faculty goal pursuit, researchers also suggest that need satisfaction matters for positive affect during teaching, teaching quality, and teaching-related professional development (Stupnisky et al. 2017, 2018). Thereby, we consider need satisfaction to be important for growth strivings as well as strivings to complete tasks well—such as learning and task goals. Consequently, learning goals are oriented towards professional development and should go along with higher contentment, indicated by positive affect (Rinas et al. 2020b). Task goals are similarly related to such aspects, along with teaching quality (Daumiller et al. 2019). We therefore assume that learning and task goals mediate the impact of need satisfaction on outcome variables such as faculty well-being, teaching quality, and professional learning. It is worth noting that other goals may also mediate these effects. Specifically, work avoidance goals might mediate effects of need frustration, as "sub-optimally […] motivated faculty may choose less effective strategies as their goal is the shortest path to outcome completion" (Stupnisky et al. 2018, p. 15).

Indeed, given their focus on improving competencies, learning(-approach) goals are theorized to be beneficial for professional development and achieving higher teaching quality. Simultaneously, such motivations should lead to perceiving obstacles more positively, which is why they may be linked with positive affect. Based on theorizing into the nature of these goals and empirical findings, similar associations can be expected for task approach and relational goals, while performance avoidance and work avoidance can be expected to be negatively linked to these outcomes (see Table 1).

Beyond indirect effects through achievement goals, need satisfaction itself could provide a foundation for occupational contentment and effective teaching practices, as individuals generally enjoy being effective, free of pressure, and within a friendly environment (Stupnisky et al. 2018; Van den Broeck et al. 2016). As such, also direct links, particularly with experiences of positive affect and teaching quality, can be expected.

A broader perspective: different higher education systems and institution types

As noted above, research on need satisfaction and achievement goals of faculty has primarily been conducted in North America and Germany, respectively (see Daumiller et al. 2020 for an overview), which threatens the comprehensibility and generalizability of findings concerning configurations and effects of faculty motivations. We therefore consider the higher education system and the institution type that faculty work in as decisive educational contextual factors.

Table 1 Hypothesized relations between achievement goals and positive affect, teaching quality, and professional learning time

	Expected associations	Theoretical rationale/prior empirical findings
Learning approach goals	+ professional development + teaching quality + positive affect	Focused on improving competencies and perceiving obstacles more positively; adaptively linked with positive affect, teaching quality, and professional learning time in faculty, school teachers, and students (Daumiller et al. 2019; Hulleman et al. 2010; Rinas et al. 2020b)
Task approach goals	+ professional development + teaching quality + positive affect	Less researched than learning-approach goals; indications of similar or more adaptive links with aforementioned outcomes; more strongly tied to positive teaching experiences and teaching quality than learning goals (Daumiller et al. 2019; Brondino et al. 2014; Mascret et al. 2015)
Performance approach goals	+ teaching quality	Oriented towards achieving performance-related outcomes; linked to performance attainment (see Van Yperen et al. 2014); unclear associations with faculty emotions and professional learning (Daumiller et al. 2019; Kücherer et al. 2020; Rinas et al. 2020b)
Performance avoidance goals	− professional development − teaching quality − positive affect	Oriented towards masking incompetence; should go along with avoidance strategies and worries that evoke maladaptive effects; negative associations with positive affect and student ratings of teaching quality (Daumiller et al. 2016, 2019, 2021a)
Relational goals	+ teaching quality + positive affect	Adaptive for successful teaching, as teaching requires building and maintenance of relationships to be conducted happily and in high-quality manner (Butler 2012); little investigated, but meaningful and positive associations thus far with teaching quality (Butler 2012; Butler and Shibaz 2014), self-reported teaching quality, and positive affect in higher education teaching (Daumiller et al. 2019)
Work avoidance goals	− professional development − teaching quality − positive affect	Related to less positive affect, worse student ratings of teaching quality, less effort and engagement, and decreased learning gains (Daumiller et al. 2021b; Daumiller et al. 2016; Janke and Dickhäuser 2018; Rinas et al. 2020b)

Note. "+" denotes a positive hypothesized association, "−" denotes a negative hypothesized association.

Comparative research of higher education systems suggests that US faculty experience more administrative support for teaching, time spent on teaching, and valuation of teaching compared to their German counterparts (Bentley and Kyvik 2012; Teichler et al. 2013). This may speak to US faculty members having greater need satisfaction and stronger approach-based goals for teaching than those in Germany. Simultaneously, both the German and the US systems are highly competitive, also concerning post-doc or tenure-track positions (Shin and Jung 2014; see Honan and Teferra 2001 for a summary of the US academic profession). This may contrast the higher education system in India, where hiring is partially governed by a quota system in which a large percentage of faculty positions can be reserved for members of different castes or social classifications (Altbach et al. 2012). Therefore, faculty from India could have weaker performance goals than those from Germany and the USA. Further, Germany and the USA are characterized by more individualistic norms that may be suitable for facilitating normative comparisons (Daumiller et al. 2020, 2021b). Conversely, faculty in more collectivistic systems, such as in India, might more strongly value relational and avoidance goals (Elliot et al. 2001), as in collectivist cultures, the self is construed in interdependent terms, with individuals more strongly focusing on "fitting in" instead of "standing out" (Markus and Kitayama 1991). Besides potential mean level differences in motivations, these

differences in educational contexts might also moderate the effects of faculty motivations. For instance, in systems that strongly value competition (e.g., Germany, USA), performance goals could be more strongly tied to experiences of positive affect than in India.

Regarding the institution type, if faculty are more interested in research than in teaching, their work experiences and instruction may be affected (Wilkesmann and Schmid 2014). Moreover, different types of universities differentially reward teaching efforts, thus creating different motivations (Stupnisky et al. 2018). Systematic differences between faculty from teaching versus research universities are consequently possible (Marginson 2006), and configurations of their motivations and their effects could differ based on institution type (Stupnisky et al. 2018). First indications of this have been provided by Stupnisky et al. (2018) who found that faculty at doctoral institutions reported stronger need satisfaction than faculty at master's and bachelor's institutions in the USA, while small differences emerged in how need satisfaction mattered for autonomous teaching motivation.

Against this background, differences in faculty need satisfaction and achievement goals based on higher education systems and institution types are possible (mean level differences). Elucidating such differences is important for better understanding the role of different educational contexts in faculty motivation (Daumiller et al. 2020). Further, effects of these motivations may differ between different contexts (structural differences). While we expect the underlying psychological processes to be general in nature (see Chen et al. 2014), empirical support is needed. This makes international research on need satisfaction and achievement goal striving crucial to asserting generalizable statements on how they relate and matter for faculty members' positive affect, teaching quality, and professional learning.

A central assumption underlying this line of research is that the motivational approaches function similarly across the different educational contexts. While the universality of the basic psychological needs is widely supported (e.g., Chen et al. 2014) and achievement goal approaches have been successfully used in different educational contexts (e.g., Murayama et al. 2009), the finer differentiation of achievement goals used in our research has so far only been used regarding German faculty (Daumiller et al. 2016, 2019). We expect this framework to work equally well in different educational contexts; however, this core assumption needs to be empirically confirmed. For example, faculty members from more collectivist countries might not distinguish as well between different types of performance goals, or may understand the respective items differently compared to faculty from more competitive educational systems. Therefore, it is essential to first confirm that the measures used to assess need satisfaction and goals function similarly (methodological premise) and that the motivational frameworks used—particularly the finer differentiated achievement goal model—hold true (theoretical premise) across the different educational contexts.

Research questions and hypotheses

We combine two prominent approaches to faculty motivation that have mostly been investigated in isolation from each other in an international study incorporating different higher education systems (Germany, India, the USA) and institution types (teaching and research universities). We tested if these educational contexts are associated with mean level differences in need satisfaction and goal pursuit. Further, we elucidated the relationships between need satisfaction and achievement goals and their joint relevance for positive affect, teaching quality, and professional learning.

Central assumption: measurement invariance

A central assumption of our investigation is that the key constructs and the measures we used to assess them function similarly across the different contexts. We thereby first tested the measurement invariance of need satisfaction and achievement goals.

Research question 1: mean level differences

We subsequently explored mean level differences in achievement goals and need satisfaction between the educational contexts.

Research question 2: interplay and relevance of need satisfaction and achievement goals

Next, we hypothesized, based on the aforementioned theoretical rationale and empirical findings (see in particular Table 1), that positive affect, teaching quality, and professional learning are positively related to task approach and learning approach goals and negatively related to performance avoidance and work avoidance goals. Further, we expected positive links between teaching quality and performance approach and relational goals and relational goals to additionally go along with positive affect.

We also expected need satisfaction to be positively associated with the dependent variables through achievement goals (indirect effects). We hypothesized this mediation through learning and task goals and also generally expected approach goals to positively mediate these relations and avoidance goals to negatively mediate them. We additionally hypothesized that need satisfaction is positively linked to positive affect and teaching quality (direct effects).

Structural generalizability across educational contexts

Lastly, we hypothesized the associations between need satisfaction, achievement goals, and the dependent variables to be generalizable across the different educational contexts (i.e., for higher educational systems and institution types).

Method

We conducted a bilingual online study including 1410 university instructors from Germany, the USA, and India who reported their need satisfaction, achievement goals, positive affect, self-reported teaching quality, and professional learning. As a separate research question, we also assessed multi-faceted well-being and examined its relation to achievement goals in another paper based on the same dataset (Rinas et al. 2020a).

Sample

Our final sample included 1410 higher education faculty from Germany ($N = 633$), the USA ($N = 364$), and India ($N = 413$). A total of 1775 faculty agreed to participate in our study; however, some did not finish the survey. We ex ante decided to include only those who answered at least one-third of the survey, as there would otherwise have been too little information to impute their missing answers. Consequently, 350 individuals (20%) were

excluded. In all countries, we recruited participants from teaching and research universities ($n = 590$ and $n = 819$). German faculty were randomly invited to participate in English or in German ($n = 293$ and $n = 340$). This allowed for testing differences (1) depending on participants from the same country taking the survey in English or German, and based on this, (2) between different countries, and (3) between different institution types. A priori power tests indicated that a sample size of 290 for each of these subgroups was adequate for conducting our planned analyses.

Measures

We used scales that have proven successful in prior research on faculty. In Table 2, we summarize descriptive statistics and internal consistencies. All scales in this study were characterized as having good reliability based on the lowest McDonald's omega value being .77, where .70 is considered acceptable (Viladrich et al. 2017).

Basic psychological need satisfaction

We used the faculty adaptation of the work-related basic need satisfaction scale (Van den Broeck et al. 2010; Stupnisky et al. 2018). Participants reported their satisfaction of autonomy, competence, and relatedness in their teaching with four items each (answer options: 1 = *never*, 2 = *sometimes*, 3 = *often*, 4 = *very often*). To generate the English version of the questionnaire and ensure that items were easily understandable and captured the correct meanings, we translated and back-translated the items through individuals with native level proficiency in English and German. After careful discussion of each item, a finalized version of the questionnaire was developed. We then conducted cognitive interviews with four German faculty members, resulting in the version of the questionnaire used in our study. All items are presented as supplemental materials.

Achievement goals

We used the higher education faculty achievement goal scale from Daumiller et al. (2019). On a Likert-type scale from 1 (*do not agree at all*) to 8 (*agree completely*), participants reported how strongly they pursued task approach, learning approach, performance normative approach, performance normative avoidance, relational, and work avoidance goals for teaching (4 items each).[1] We conducted the analogous steps as in the need satisfaction scale to generate the English items. All items are presented as supplemental materials.

Positive affect, teaching quality, and professional learning

For positive affect when teaching, we used a scale by Keller et al. (2014) in which participants assessed their enjoyment in teaching with three items (e.g., "I really enjoy teaching") on a

---

[1] To internationally validate the complete original scale, we also assessed task avoidance, learning avoidance, performance-appearance approach, and performance-appearance avoidance goals. As these goals were not of interest for the links with the outcomes in our study, we do not report on them in the main analyses; however, we additionally conducted the measurement invariance testing for these goals.

Table 2 Descriptive statistics and bivariate correlations

	M	SD	Skew	ω_h	1	2	3	4	5	6	7	8	9	10	11	12
Basic need fulfillment																
1 Autonomy	3.27	0.55	−0.41	.82												
2 Competence	3.39	0.54	−0.55	.86	.50											
3 Relatedness	3.04	0.64	−0.10	.87	.44	.38										
Achievement goals																
4 Task approach	7.27	0.82	−1.60	.77	.23	.22	.22									
5 Learning approach	7.12	1.07	−1.68	.90	.16	.15	.14	.51								
6 Performance (normative) approach	4.20	2.16	−0.01	.95	.02	.07	.02	.17	.21							
7 Performance (normative) avoidance	5.46	2.16	−0.66	.92	−.01	.03	.02	.16	.11	.51						
8 Relational	6.04	1.50	−0.78	.82	.13	.06	.20	.32	.38	.31	.17					
9 Work avoidance	2.41	1.75	1.38	.93	−.18	−.14	−.09	−.21	−.14	.19	.20	−.06				
Teaching outcomes																
10 Positive affect	4.53	0.63	−1.93	.84	.32	.27	.29	.42	.36	.07	.05	.26	−.21			
11 Teaching quality	6.64	0.82	−0.76	.86	.33	.38	.31	.43	.42	.20	.12	.42	−.21	.46		
12 Professional learning time	16.00	21.83	3.20	.78	.11	.06	.09	.14	.23	.12	.02	.19	−.02	.14	.22	
Demographics																
Age	43.49	9.27	0.36		.02	−.07	−.01	.02	−.10	.04	−.04	.03	−.21	−.03	−.01	−.01
Gender (female=1, male=0)	.33				.03	.02	.06	.06	.04	−.12	.00	.01	−.12	.01	.07	−.07
PhD (yes=1, no=0)	.80				.15	.12	.03	.03	.06	.06	−.03	.15	−.09	.10	.11	.07
Tenure (yes=1, no=0)	.41				−.07	−.02	.00	−.01	−.04	.05	.05	.03	.16	−.02	−.03	.00
Teaching experience (in years)	14.3	10.4	0.76		.12	.06	.01	.03	−.03	−.01	−.06	.09	−.24	.09	.13	.03
Average class size	1.38	0.60	1.34		.01	.06	.01	.07	.08	.07	.02	.06	.01	.11	.09	.09
Teaching hours (on average per week)	8.65	6.16	2.03		.03	.07	.04	.07	.12	.05	.07	.03	−.03	.12	.14	.14

Note. $N = 1410$. Theoretical range for basic need fulfillment: 1–4, achievement goals; 1–8, positive affect; 1–5, teaching quality; 1–8, professional learning time: 0–300.

$|r| > .05$: $p < .05$; $|r| > .08$: $p < .01$; $|r| > .10$: $p < .001$.

Likert-type scale from 1 (*not at all true*) to 5 (*completely true*). To assess self-reported teaching quality, we used the scale by Daumiller et al. (2019) based on the SEEQ (Marsh 2007). With reference to all courses they were teaching, participants rated how well they implemented ten aspects of teaching quality on a Likert-type scale from 1 (*very poor*) to 8 (*very well*). Finally, teaching-related professional learning time was assessed with a scale by Daumiller (2018) that distinguishes relevant learning activities and content with four items that focus on formal and informal learning activities regarding professional expertise and methodological competencies (see Hein et al. 2019 for a detailed description). We translated and back-translated the original items through native speakers and piloted the resulting items with cognitive interviews.

Demographic variables

We assessed participants' gender, age, years of teaching experience, PhD status, tenure status, average class size, and average weekly teaching hours.

Analyses

Measurement invariance testing

We conducted multi-group confirmatory factor analyses in Mplus 8.1 (Muthén and Muthén 2017) using WLSMV as an estimator (theta parameterization). For language (English and German, from the subsample from Germany), institution type (teaching and research), and higher education system (Germany, India, the USA), we estimated a series of hierarchical models with imposing restrictions between subgroups (Gregorich 2007). Following Muthén and Muthén (2017), we estimated (a) a model in which item-factor clusters were set as equivalent for all three groups (*configural invariance*), (b) a model in which the factor loadings were restricted between the groups (*metric invariance*), (c) a model in which the thresholds were additionally restricted (*scalar invariance*), and (d) a model in which the residual variances were additionally restricted (*strict invariance*). If a more restricted model does not describe the data worse than the previous model, the corresponding form of invariance can be assumed. To determine if differences in model fit were significant, we followed Chen (2007) and considered a deterioration of $CFI \geq .010$ and $RMSEA \geq .015$ or $SRMR \geq .010$ as indicative of noninvariance (for metric invariance: $SRMR \geq .030$).

Mean level differences for higher education systems and institution types

To test mean level differences in need satisfaction and achievement goals, we modeled need satisfaction and goals on the latent level. We used item parcels as indicators, which is preferable to using items as indicators as it reduces the amount of error in complex model estimations (Little et al. 2013). Specifically, based on exploratory factor analyses that indicated unidimensionality of each construct, we used the item-to-construct method with two parcels for each construct (Little et al. 2002). Then, we regressed them on the higher education system (dummy coded) and institution type variables while controlling for the demographic variables. We controlled for these variables as they may vary between the assessed higher education systems and institution types and could distort the findings. For completeness, we also ran these analyses without control variables.

Structural equation modeling

We estimated a comprehensive mediation structural equation model, in which (1) the three outcome variables were regressed on need satisfaction and achievement goals and (2) achievement goals were regressed on need satisfaction. Correlations between need satisfaction, between goals, and between the three outcome variables were allowed. Indirect effects from need satisfaction on the outcome variables through the goals were calculated using the "model indirect" command in Mplus, which estimates standard errors for the indirect effects using the delta method and provides significance tests of the indirect effect coefficients using z-tests. Like before, we modeled goals and need satisfaction as latent variables based on item parcels.

Generalizability of associations across educational contexts

To determine if the associations differed between the higher education systems and institution types, we estimated this model in the form of two multi-group models in which we restricted factors, factor loadings, intercepts, and residual variances to be equal across the subgroups and compared its fit against a model with additionally restricted regressions between the subgroups using the same criteria as for the metric measurement invariance testing.

Results

Descriptive results

We found rather high means for need satisfaction paired with strong pursuit of task and learning approach goals and moderate performance goals (Table 2). These mean values are similar to past research on faculty goals (e.g., Daumiller et al. 2019) and needs (e.g., Stupnisky et al. 2018).

Measurement invariance

Our results confirmed strict measurement invariance for language, higher education system, and institution type, indicating that the need satisfaction and achievement goal questionnaires were equally answered to in English and German by participants from Germany, India, and the USA and by participants from teaching and research universities (see Table 3).[2] Besides methodologically enabling the subsequent analyses, this affirms that the differentiated achievement goal framework holds true on an international level, with researchers from the USA and India similarly distinguishing between the different types of goals. Having attested this central premise, we investigated mean level differences next.

Mean level differences

For the type of institution that the participants were employed in, we found negligible mean level differences in achievement goals and need satisfaction (see Table 4). For the three higher

---

[2] Measurement invariance testing of the complete achievement goal framework by Daumiller et al. (2019) indicated strict measurement invariance (see Table S3 in the supplemental material), which extends the theoretical and methodological conclusions drawn here to the complete framework.

Table 3 Results of measurement invariance testing

	df	χ^2	χ^2/df	CFI	TLI	RMSEA	SRMR	ΔCFI	ΔRMSEA	ΔSRMR
Measurement invariance of achievement goals based on language (German, English)										
Configural invariance	466	807	1.86	.993	.992	.052	.039			
Metric invariance	484	897	1.85	.993	.992	.052	.039	.001	.001	.001
Scalar invariance	610	1287	2.11	.988	.989	.059	.042	.005	.007	.003
Strict invariance	634	1430	2.26	.986	.988	.063	.042	.002	.004	.000
Measurement invariance of achievement goals based on type of institution (teaching, research)										
Configural invariance	467	2148	4.60	.986	.984	.071	.039			
Metric invariance	485	2137	4.41	.987	.985	.070	.039	-.001	-.001	.001
Scalar invariance	618	2195	3.55	.987	.989	.060	.039	.001	-.010	.001
Strict invariance	642	2232	3.48	.987	.989	.059	.039	.001	-.001	.000
Measurement invariance of achievement goals based on higher education system (Germany, India, USA)										
Configural invariance	699	2203	3.15	.987	.985	.068	.045			
Metric invariance	735	2270	3.09	.987	.985	.067	.045	.001	-.001	.001
Scalar invariance	985	2914	2.95	.984	.986	.065	.046	.003	-.002	.001
Strict invariance	1033	3760	3.64	.977	.982	.075	.049	.007	.010	.003
Measurement invariance of need satisfaction based on language (German, English)										
Configural invariance	102	266	2.61	.979	.973	.073	.050			
Metric invariance	111	276	2.49	.979	.975	.071	.050	.001	-.002	.000
Scalar invariance	125	307	2.45	.977	.976	.070	.051	.002	-.001	.001
Strict invariance	137	346	2.53	.974	.975	.071	.054	.003	.001	.003
Measurement invariance of need satisfaction based on type of institution (teaching, research)										
Configural invariance	102	688	6.75	.975	.967	.093	.042			
Metric invariance	126	649	5.15	.978	.976	.079	.043	-.003	-.014	.001
Scalar invariance	130	674	5.19	.977	.976	.079	.042	.001	.000	-.001
Strict invariance	142	682	4.80	.977	.978	.076	.043	.000	-.003	.001
Measurement invariance of need satisfaction based on higher education system (Germany, India, USA)										
Configural invariance	153	735	4.80	.975	.968	.093	.046			
Metric invariance	171	734	4.29	.976	.972	.086	.047	.001	.007	.001
Scalar invariance	205	887	4.33	.971	.972	.087	.049	.005	.001	.002
Strict invariance	229	906	3.96	.971	.975	.082	.051	.001	.005	.002

Note. n(German) = 340, n(English) = 293. n(teaching university) = 590, n(research university) = 819. n(Germany) = 633, n(USA) = 364, n(India) = 413.

Table 4 Differences in achievement goals and basic need satisfaction based on higher education systems and institution types

	β (S.E.)								
	Task approach	Learning approach	Performance (normative) approach	Performance (normative) avoidance	Relational	Work avoidance	Autonomy	Relatedness	Competence
Higher education system									
India (1) vs. Germany and US (0)	**.17 (.04)**	**.31 (.03)**	**.19 (.04)**	**.04 (.05)**	**.26 (.04)**	.04 (.04)	.07 (.04)	.06 (.04)	.01 (.04)
Germany (1) vs. US (0)	**-.10 (.05)**	-.05 (.04)	-.09 (.04)	-.03 (.06)	**-.28 (.05)**	.07 (.04)	**-.08 (.04)**	**-.10 (.04)**	-.05 (.04)
Institution type (research=1, teaching=0)	.01 (.03)	.04 (.03)	-.05 (.03)	-.04 (.03)	.05 (.03)	**-.07 (.03)**	**.07 (.03)**	-.01 (.03)	.02 (.03)
Gender (female=1, male=0)	**.10 (.03)**	**.08 (.03)**	**-.10 (.03)**	-.01 (.03)	.04 (.03)	**-.13 (.03)**	.06 (.03)	**.07 (.03)**	.01 (.03)
PhD (yes=1, no=0)	-.03 (.04)	-.01 (.03)	.01 (.03)	-.04 (.03)	.02 (.03)	-.01 (.03)	**.09 (.04)**	-.01 (.03)	**.11 (.03)**
Tenure (yes=1, no=0)	.03 (.04)	-.04 (.03)	**.09 (.03)**	.03 (.04)	**.14 (.03)**	**.07 (.03)**	.01 (.04)	.02 (.03)	.02 (.04)
Teaching experience (in years)	.03 (.04)	**-.07 (.03)**	.01 (.03)	-.06 (.04)	.06 (.03)	**-.20 (.03)**	**.10 (.04)**	.01 (.03)	.05 (.04)
Average class size	-.05 (.04)	-.03 (.04)	-.03 (.03)	.01 (.03)	**-.06 (.03)**	.01 (.03)	**-.07 (.03)**	-.03 (.03)	-.01 (.03)
Teaching hours (on average per week)	**.12 (.03)**	**.11 (.04)**	**.09 (.03)**	**.10 (.03)**	.07 (.04)	-.01 (.03)	.02 (.04)	.05 (.03)	**.09 (.03)**
ΔR^2 (country and institution only)	.05	.10	.06	.01	.20	.01	.02	.02	.01

Note. $N = 1410$. Results are based on a structural equation model in which need satisfaction and goals were regressed on country (dummy coded) and institution type while controlling for the demographic variables. We also ran the analyses without control variables and present the respective findings in Table S4 in the electronic supplement. Presented are standardized regression weights and their standard errors in brackets. Statistically significant parameters are boldfaced. $\chi^2 = 674.9$, CFI = .959, TLI = .929, RMSEA = .046, SRMR = .023.
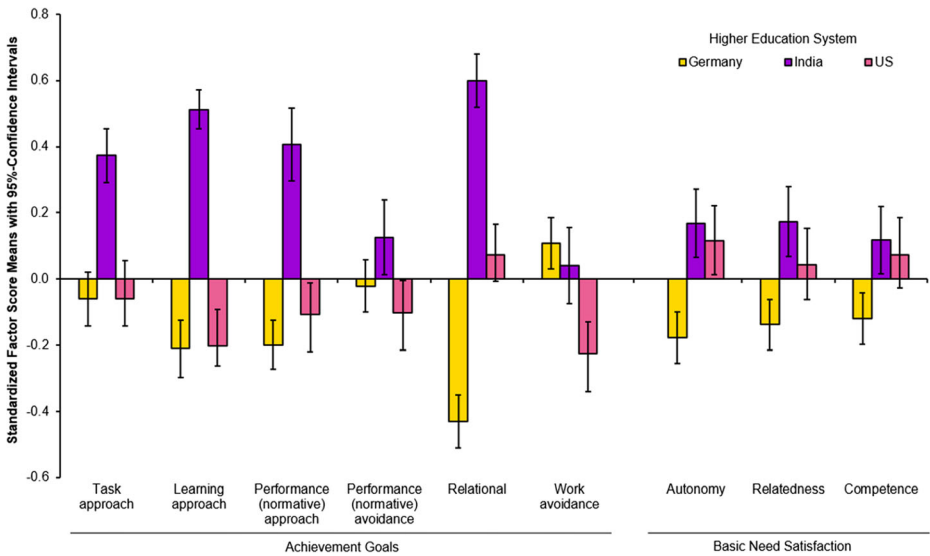
Fig. 1 Differences between faculty members from Germany, India, and the USA in basic need satisfaction and achievement goals. Presented are standardized factor score means that are controlled for participants' gender, PhD, tenure, teaching experience, average class size, and teaching hours

educational contexts, we observed meaningful, small differences (see Fig. 1). Faculty members from India reported stronger task approach, learning approach, and relational goals than their counterparts from Germany and the USA. They also had stronger performance approach goals and no statistically significant differences concerning work avoidance goals and need satisfaction. Faculty members from the USA and German primarily differed concerning their relational goals that were weaker for the German than the US sample.

Associations of goals and needs with the investigated outcomes

Structural equation modeling the associations between need satisfaction, achievement goals, and the outcome variables revealed meaningful relations between the focused constructs (Table 5). Task approach goals were positively associated with positive affect and teaching quality. In the same direction but descriptively weaker, learning goals and relational goals were also associated with these variables and additionally went along with increased professional learning time. Work avoidance goals were negatively related to positive affect and teaching quality, and performance goals were linked to professional learning.

Variation in achievement goals, consequently, could partially be attributed to differences in need satisfaction. This was especially the case for task approach goals that were associated with satisfaction of all three needs, learning approach goals that were positively tied to satisfaction of competence and relatedness, and work avoidance goals that were increased when needs for autonomy and competence were not fulfilled. Interestingly, there was also a positive link between relational goals and need for relatedness.

Investigation of indirect effects showed that through this variation in achievement goals, need satisfaction was also statistically significantly related to differences in the outcome variables (see Fig. 2). Specifically, task approach goals mediated the positive associations between the need satisfaction and the three dependent variables, learning approach goals

Table 5 Associations between achievement goals and basic need satisfaction and positive affect, teaching quality, and professional learning

	β (S.E.)								
	Positive affect	Teaching quality	Professional learning	Task approach	Learning approach	Performance (normative) approach	Performance (normative) avoidance	Relational	Work avoidance
Achievement goals									
Task approach	**.33 (.06)**	**.21 (.05)**	−.05 (.06)						
Learning approach	**.10 (.05)**	**.12 (.04)**	**.22 (.04)**						
Performance (normative) approach	−.04 (.04)	.02 (.04)	**.10 (.05)**						
Performance (normative) avoidance	−.01 (.04)	.01 (.03)	**−.09 (.05)**						
Relational goals	**.09 (.04)**	**.31 (.04)**	**.17 (.04)**						
Work avoidance	**.07 (.03)**	**.08 (.03)**	.02 (.04)						
Basic need fulfillment									
Autonomy	**.14 (.05)**	.03 (.05)	.09 (.06)	**.13 (.06)**	.06 (.05)	−.03 (.05)	−.06 (.05)	.07 (.05)	**−.16 (.05)**
Competence	.08 (.04)	**.29 (.04)**	−.02 (.05)	**.13 (.05)**	**.10 (.04)**	**.11 (.04)**	.06 (.05)	−.05 (.05)	**−.08 (.04)**
Relatedness	**.09 (.04)**	.05 (.04)	.01 (.04)	**.16 (.04)**	**.09 (.04)**	−.01 (.04)	.03 (.04)	**.23 (.04)**	.02 (.04)
R^2	.37	.51	.12	.12	.04	.01	.01	.06	.04

Note. N = 1410. Results are based on a structural equation model in which the three outcome variables were regressed on the goals and needs, and the goals were regressed on the needs. Correlations between achievement goals were modeled. Statistically significant indirect effects are reported in the text. Presented are standardized regression weights and their standard errors in brackets. Statistically significant parameters are boldfaced. χ^2 = 468.6, CFI = .981, TLI = .971, RMSEA = .033, SRMR = .020.
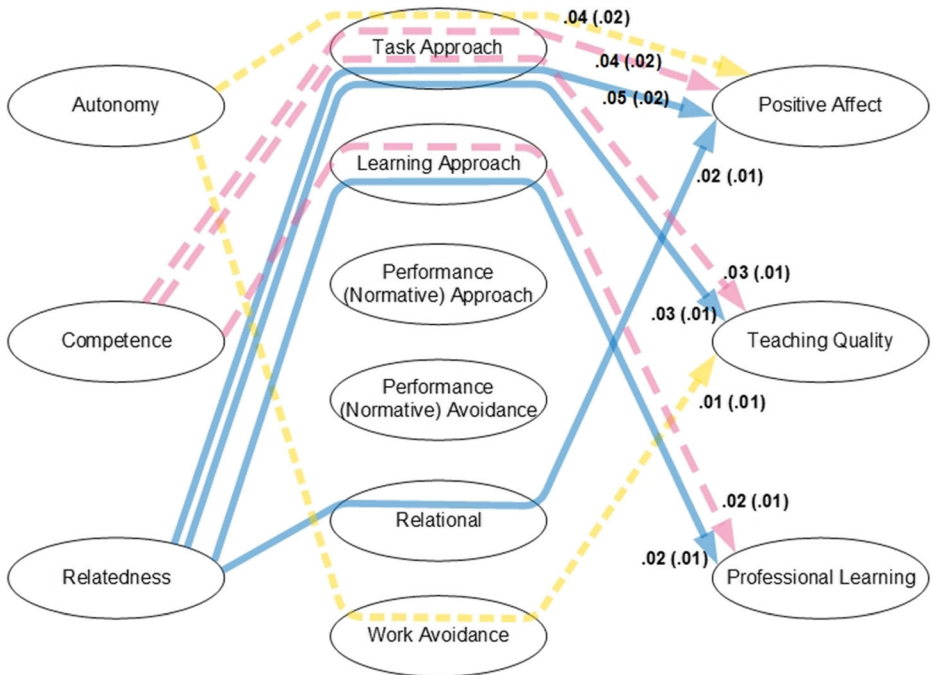
Fig. 2 Visualization of the indirect effects of basic need satisfaction on positive affect, teaching quality, and professional learning. Depicted are statistically significant, standardized indirect effects with standard errors in brackets; factor indicators, residuals, and correlations between factors are not shown for clarity

mediated the links between competence and relatedness satisfaction for professional learning, relational goals mediated the positive association between relatedness satisfaction and experience of positive affect, and finally, autonomy was positively linked to teaching quality through decreased work avoidance goals. We also observed direct effects in that autonomy and relatedness satisfaction were positively and directly linked to positive affect, and competence satisfaction was positively associated with teaching quality.

Generalizability of associations across educational contexts

Finally, we tested if the links between motivations and outcomes differed between higher education systems and institution types. Invariance testing confirmed that these links did not differ significantly between higher education systems or institution type (ΔCFI = .009 < .010, ΔRMSEA = .001 < .010, ΔSRMR = .028 < .030; ΔRMSEA = .002 < .010, ΔSRMR = .012 < .030; see Table S5).

Discussion

Our study provided an international perspective on faculty motivation and integrated two prominent approaches, basic psychological needs, and achievement goals. Our findings documented that faculty construe satisfaction of autonomy, competence, and relatedness as well as achievement goals similarly regardless of the higher education system (Germany,

India, or the USA) or institution type (teaching university or research university) they were employed in. There were small mean level differences between the higher education systems, notably with Indian faculty reporting stronger approach goals. Achievement goals also acted as mediators facilitating indirect effects of need satisfaction on teaching quality, professional learning, and positive affect at work, with little direct effects between need satisfaction and these outcomes remaining. As expected, need satisfaction was positively linked to stronger learning goals but also stronger task goals and less work avoidance goals. Task approach, learning approach, and relational goals were positively and work avoidance goals negatively associated with positive affect, teaching quality, and professional learning. We found that all observed associations between the constructs were stable across educational contexts. This provides generalizable insights into how need satisfaction and achievement goals align and uniquely matter for positive affect, teaching quality, and professional learning.

Theoretical contribution for research on faculty motivation

Our findings highlight the relevance of achievement goals as a crucial part of faculty motivation tied to faculty experiences and behaviors. We can infer that a differentiated evaluation of faculty goal pursuit is necessary for a comprehensive understanding of how these motivations matter. For instance, while task and learning goals have been intertwined into a singular goal class labeled as mastery goals, our results illuminate, similar to Daumiller et al. (2019), that such a simplification does not suit the construct well, as both learning approach and task approach goals were differentially related to the outcome variables. On one hand, as task approach goals increase the focus on the teaching task itself, this may enable the likely well-prepared faculty members to provide high-quality teaching and to have an overall positive experience. On the other hand, learning approach goals entail a focus on faculty improving their own competencies, which should facilitate the active search for and use of learning opportunities and, consequently, stronger learning progress. Therefore, learning approach goals may matter less than task approach goals for teaching quality, as focusing on one's own competence does not necessarily imply that one also provides the best teaching experiences for students. While both task approach and learning approach goals might be important for mastering teaching, we therefore understand them as two distinct paths towards this ultimate target.

Further, our findings underline the relevance of relational goals (Butler 2012), as an important but little investigated aspect of motivation for teaching. This type of goal was positively associated with all investigated outcome variables. We interpret this as evidence for the relevance of relational goals for successful teaching—also in higher education, where classes are often larger and interaction is less frequent than in secondary education. Finally, for performance and work avoidance goals, we found rather small associations. While the pattern of associations supported our assumptions of avoidance goals providing a maladaptive motivational foundation for teaching, the size of the effects also imply that such motivations may not be as decisive for the studied outcomes as the approach goals.

A clear strength of our research is that it focuses on the associations between achievement goals and outcome variables, as well as potential antecedents of achievement goals bound to situational cues in the form of need satisfaction at work. Such research is only beginning to emerge (e.g., Janke et al. 2021; Dickhäuser et al. 2020; Janke and Dickhäuser 2018), although insights into potentially modifiable antecedents of achievement goals are crucial for shaping work-related motivation of faculty through workplace design. Specifically, how need

satisfaction and achievement goals align is generally little understood and scarcely examined in motivational research. Extending research by Janke and Dickhäuser (2018), our findings suggest that need satisfaction, especially relatedness and competence, provides a foundation for individuals to facilitate their inner striving for personal growth at work, as indicated by learning goals. Further, need satisfaction was particularly relevant for the adoption of task goals, which may be due to teaching tasks being experienced as more strongly tied to the self when faculty members' needs are satisfied. Consequently, faculty members might be more motivated to complete tasks well under this condition, as opposed to tasks with less meaning. Moreover, the negative associations between work avoidance goals and satisfaction of autonomy and competence could be explained by low autonomy triggering faculty to react by pursuing stronger work avoidance goals. This aligns with other internationally grounded works highlighting the need to enhance faculty autonomy (Dee et al. 2000). Similarly, faculty who are not feeling competent may not fully engage in their teaching tasks, as they could be worried about not being able to be successful in the first place. Finally, interpreting the positive link between relational goals and relatedness satisfaction is not as straightforward regarding the presumed modes of operation. Aside from need satisfaction providing grounds for goal pursuit, it seems plausible that strong relational goals should also lead to greater satisfaction of the need for relatedness. As such, need satisfaction and relational goals may not be unidirectionally related, but interwoven in a more complex manner. Future research using longitudinal designs should investigate this to elucidate the nature of their relationship in depth, also regarding other types of goals.

Although more research is needed, our findings provide clear evidence that need satisfaction is a fruitful foundation for mastery in higher education teaching. This would not have become evident had we focused solely on the zero-order correlations of need satisfaction. In fact, achievement goals explained most of the links between need satisfaction and the outcome variables, with few direct effects remaining. Regarding these direct links, the association between need satisfaction and positive affect strongly aligns with research on SDT that has indicated the immediate relevance of need satisfaction for wellness (Ryan et al. 2008). However, SDT has also stated that need satisfaction is central for personal growth (Ryan and Deci 2017). Our research provides further knowledge through which mechanisms of need satisfaction may facilitate personal growth and professional development. Specifically, need satisfaction seems to facilitate growth- and mastery-centric striving in faculty (task and learning goals), which may thereby contribute to professional development and optimal teaching.

In sum, our findings advance both SDT and achievement goal research by suggesting how these lines of research can coexist in describing motivation but also how they intersect. We expand research on different functionalities of achievement goals depending on if they are pursued for autonomous or controlled reasons (Sommet and Elliot 2017; Vansteenkiste et al. 2014) by illuminating how need satisfaction can serve as requisite for goal pursuit. We posit that the uncovered mechanisms are not specific for faculty teaching motivation but should also transcend domains. Future research should follow up on this by also considering motivations for other domains, such as research or service work. Further, we have no reasons to believe that these findings on the interplay between need satisfactions and achievement goals might be specific to the population of faculty. This could mean that need-supportive teaching practices also facilitate growth-centric motivation in students at school and in other educational domains (Janke et al. 2021). However, more research is needed before drawing further conclusions. An

important step towards this is that the associations uncovered in our research were robust across different educational contexts.

The merit of international studies on faculty motivation

Research on faculty motivation has yet to develop an international narrative. SDT has primarily been studied in the US higher education system, while achievement goals have primarily been studied in Germany. This creates difficulties in understanding which aspects of motivation are generalizable throughout higher education systems and which reflect cultural influences. We took a first step towards a theoretical framework on faculty motivation that could be valid throughout different systems. As such, we simultaneously bridge the higher education system specific narratives and different theoretical traditions. Moreover, we expand the scope of research to India, a large higher education system outside of the western hemisphere that is characterized by a more collectivistic culture than Germany and the USA (Baron and Byrne 1997). Our findings lead to three conclusions on the generalizability of faculty need satisfaction and achievement goals. First, faculty members of all three higher education systems construe achievement goals and need satisfaction similarly, as indicated by the strict invariance of the measures. This speaks to the basic premise of this work and speaks to the generalizability of these motivation approaches across different educational contexts (Chen et al. 2014; Murayama et al. 2009). This also implies that the further differentiated framework by Daumiller et al. (2019) can be generalized across different educational contexts and that the respective instrument can be used cross-nationally. This goal differentiation can thus be interpreted in a more generalizable manner. Second, the associations between need satisfaction, achievement goals, and the investigated outcome variables did not statistically significantly differ across educational contexts either, meaning that they likely represent generalizable mechanisms. This is a central finding, both for drawing conclusions from the present associations and also for interpreting prior works on the effects of need satisfaction and achievement goals restricted to specific educational contexts in a more generalizable manner. Finally, our findings imply that higher education culture is mainly indicated through different means in achievement goals. These in turn likely reflect different values and emphases of these contexts.

Concerning these values, Indian faculty were overall more inclined to report stronger approach goals. This could mean that Indian faculty value teaching more than their counterparts in Western countries or that they want to appear as though they do. An indication against the latter may be the non-significant differences regarding performance avoidance and work avoidance goals, which we would expect to be less frequently stated by individuals who strive for strong impression management. The first interpretation aligns well with salary levels being higher in India than in Germany and the USA, relative to other professions (Altbach et al. 2012), which might go along with a greater valuation of higher education teaching. At first glance, the stronger performance approach goals in India may be surprising given the lack of exclusively performance-based hiring processes and overall less competition compared to Germany and the USA (Altbach et al. 2012; Shin and Jung 2014). However, this finding might also be explained by the higher degree of collectivism present within India compared to the USA or Germany. This might make it desirable to give back to one's community, for example, by providing knowledge to future generations, eliciting stronger (performance) approach goals for teaching. It is worth noting that most of the effects of higher education systems and institution types on the achievement goals were rather small, implying that goals

may not be strongly bound to educational contexts. Exceptions are learning and relational goals, which were quite different across the three systems. Given this, it is important to mention that we did not find differences between teaching and research universities, indicating that these differences are not directly attributable to different emphases or valuation of teaching, but rather to broader influences. This aligns with characteristics of the higher education systems in that hiring processes in India may be more facilitative of task and learning approach goals and that the higher degree of collectivism might explain stronger relational goals (Altbach et al. 2012). Specifically, the stronger value on achieving societal goals and obligations in India might facilitate learning goals; simultaneously, faculty from India may also identify more strongly regarding relationships (Sinha 2014). Adding to this, the finding that German faculty pursued relational goals the least out of all three groups may not only parallel the often large lecture sizes in the German higher education system (in which achieving relational goals may be more difficult than in smaller classes), but also the stronger individualistic culture (Darwish and Huber 2003), which, according to Hofstede (1991), may be conducive to looser ties between individuals.

Limitations and future research

Our research contributes to a unified understanding of faculty motivation. Future research might integrate additional motivational constructs bound to expectancy rather than personal values (e.g., self-efficacy) while expanding away from overrepresented populations of German and US faculty. We consider it of interest to examine higher education systems where faculty experience high satisfaction at work paired with low distress, such as Italy, Norway, Mexico, Brazil, Argentina, or Malaysia (Shin and Jung 2014). This would allow for investigations into whether the same factors that make faculty happy (i.e., need satisfaction) are especially present in these education systems and if they indirectly support excellence in teaching.

Another limitation is that we only considered self-reported outcome variables. While this is adequate for the assessment of positive affect, as well as need satisfaction and achievement goals, professional learning and teaching quality could have been assessed through other means. We consider it a challenging but fruitful direction for future research to include further data from different sources (e.g., student ratings of teaching quality, log data from the use specific online professional learning courses) to expand and bolster our findings.

To further understand how major theoretical frameworks intersect within research on faculty motivation, future research should provide data allowing for stronger causal inferences. While our theoretical assumption that need satisfaction is foundational for goal striving is supported by a strong theoretical and empirical background, we cannot rule out that goals also contribute to need satisfaction, as we relied on cross-sectional data. This is especially true for the effects of the other types of goals, which we investigated for the first time in our study. For example, the finding that relatedness predicts relational goals may also function in reverse, with relational goals facilitating behavior that leads to relatedness. Additionally, we can imagine bidirectional processes for task goals with experiences of competence fostering task goals, which in turn foster mastery and, as such, stabilize competence experiences. Given the complexity of the associations between need satisfaction and achievement goals, longitudinal research should be conducted to unravel these temporal trends.

Conclusion

Our work advances research into faculty motivation by providing an international narrative that integrates different theoretical approaches and concepts regarding motivation. We found that the construal of need satisfaction and achievement goals, as well as the links and effects of these two constructs, are similar for German, Indian, and US faculty. A central takeaway is that the provision of need-supportive working environments in higher education may facilitate optimal goal pursuit of faculty, resulting in increased well-being, high-quality teaching, and enriched professional development on an international level.

Declarations

References

Altbach, P., Reisberg, L., Yudkevich, M., Androushchak, G., & Pacheco, I. (Eds.). (2012). *Paying the professoriate*. Routledge.
Baron, R., & Byrne, D. (1997). *Social psychology*. Allyn & Bacon.

Benning, K., Praetorius, A.-K., Janke, S., Dickhäuser, O., & Dresel, M. (2019). Das Lernen als Ziel [Learning as objective]. *Unterrichtswissenschaft, 47*, 523–545. https://doi.org/10.1007/s42010-019-00054-7.

Bentley, P., & Kyvik, S. (2012). Academic work from a comparative perspective. *Higher Education, 63*(4), 529–547. https://doi.org/10.1007/s10734-011-9457-4.

Brondino, M., Raccanello, D., & Pasini, M. (2014). Achievement goals as antecedents of achievement emotions. In T. Di Mascio, R. Gennari, P. Vitorini, R. Vicari, & F. de la Prieta (Eds.), *Methodologies and intelligent systems for technology enhanced learning* (pp. 53–60). Springer.

Butler, R. (2012). Striving to connect. *Journal of Educational Psychology, 104*, 726–742. https://doi.org/10.1037/a0028613.

Butler, R., & Shibaz, L. (2014). Striving to connect and striving to learn. *International Journal of Educational Research, 65*, 41–53. https://doi.org/10.1016/j.ijer.2013.09.006.

Chen, F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling, 14*(3), 464–504. https://doi.org/10.1080/10705510701301834.

Chen, B., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E., Van der Kaap-Deeder, J., et al. (2014). Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motivation and Emotion, 39*(2), 216–236. https://doi.org/10.1007/s11031-014-9450-1.

Darwish, A.-F., & Huber, G. (2003). Individualism vs collectivism in different cultures. *Intercultural Education, 14*(1), 47–56. https://doi.org/10.1080/1467598032000044647.

Daumiller, M. (2018). *Motivation of university scholars for teaching and research [Motivation von Wissenschaftlern in Lehre und Forschung]*. Springer. https://doi.org/10.1007/978-3-658-21182-0.

Daumiller, M., Dickhäuser, O., & Dresel, M. (2019). University instructors' achievement goals for teaching. *Journal of Educational Psychology, 111*(1), 131–148. https://doi.org/10.1037/edu0000271.

Daumiller, M., Grassinger, R., Dickhäuser, O., & Dresel, M. (2016). Structure and relationships of university instructors' achievement goals. *Frontiers in Psychology, 7*. https://doi.org/10.3389/fpsyg.2016.00375.

Daumiller, M., Janke, S., Hein, J., Rinas, R., Dickhäuser, O., & Dresel, M. (2021a). Do teachers' achievement goals and self-efficacy beliefs matter for students' learning experiences? Evidence from two studies on perceived teaching quality and emotional experiences. *Learning and Instruction*. Advanced online publication. https://doi.org/10.1016/j.learninstruc.2021.101458.

Daumiller, M., Rinas, R., Olden, D., & Dresel, M. (2021b). Academics' motivations in professional training courses. *International Journal of Academic Development, 26*(1), 7–23. https://doi.org/10.1080/1360144X.2020.1768396.

Daumiller, M., Stupnisky, R. H., & Janke, S. (2020). Motivation of higher education faculty. *International Journal of Educational Research, 20*. https://doi.org/10.1016/j.ijer.2019.101502.

Dee, J. R., Henkin, A. B., & Chen, J. H. H. (2000). Faculty autonomy: Perspectives from Taiwan. *Higher Education, 40*(2), 203–216 https://www.jstor.org/stable/3448110.

Dickhäuser, O., Janke, S., Daumiller, M., & Dresel, M. (2020). Motivational school climate and teachers' achievement goal orientations. *British Journal of Educational Psychology*. https://doi.org/10.1111/bjep.12370.

Elliot, A., Chirkov, V., Kim, Y., & Sheldon, K. (2001). A cross-cultural analysis of avoidance (relative to approach) personal goals. *Psychological Science, 12*(6), 505–510. https://doi.org/10.1111/1467-9280.00393.

Esdar, W., Gorges, J., & Wild, E. (2016). The role of basic need satisfaction for junior academics' goal conflicts and teaching motivation. *Higher Education, 72*(2), 175–190. https://doi.org/10.1007/s10734-015-9944-0.

Gregorich, S. (2007). Do self-report instruments allow meaningful comparisons across diverse population groups. *Medical Care, 44*, 78–94. https://doi.org/10.1097/01.mlr.0000245454.12228.8f.

Hein, J., Daumiller, M., Janke, S., Dresel, M., & Dickhäuser, O. (2019). How learning time mediates the impact of university scholars' learning goals on professional learning in research and teaching. *Learning and Individual Differences, 72*, 15–25. https://doi.org/10.1016/j.lindif.2019.04.002.

Hofstede, G. (1991). Empirical models of cultural differences. In N. Bleichrodt & P. Drenth (Eds.), *Contemporary issues in cross-cultural psychology* (pp. 4–20). Swets & Zeitlinger.

Holzberger, D., Philipp, A., & Kunter, M. (2014). Predicting teachers' instructional behaviors. *Contemporary Educational Psychology, 39*(2), 100–111. https://doi.org/10.1016/j.cedpsych.2014.02.001.

Honan, J. P., & Teferra, D. (2001). The US academic profession: Key policy challenges. *Higher Education, 41*(1), 183–203. https://doi.org/10.1023/A:1026735317457.

Hulleman, C., Schrager, S., Bodmann, S., & Harackiewicz, J. (2010). A meta-analytic review of achievement goal measures. *Psychological Bulletin, 136*, 422–449. https://doi.org/10.1037/a0018947.

Janke, S., & Dickhäuser, O. (2018). A situated process model of vocational achievement goal striving within members of the academic staff at university. *Motivation and Emotion, 42*(4), 466–481. https://doi.org/10.1007/s11031-017-9657-z.

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

Janke, S., Nitsche, S., & Dickhäuser, O. (2015). The role of perceived need satisfaction at work for teachers' work-related learning goal orientation. *Teaching and Teacher Education, 47*, 184–194. https://doi.org/10. 1016/j.tate.2015.01.009.

Janke, S., Daumiller, M., Praetorius, A.-K., Dresel, M., & Dickhäuser, O. (2021). What reduces the adverse development of motivation at the beginning of secondary education. *Zeitschrift für Erziehungswissenschaft.* https://doi.org/10.1007/978-3-658-31064-6_7.

Keller, M., Goetz, T., Becker, E., Morger, V., & Hensley, L. (2014). Feeling and showing. *Learning and Instruction, 33*, 29–38. https://doi.org/10.1016/j.learninstruc.2014.03.001.

Kücherer, B., Dresel, M., & Daumiller, M. (2020). Relationship between achievement goals and attention of university instructors in professional training courses. *Higher Education, Skills and Work-Based Learning.* Advanced online publication. https://doi.org/10.1108/HESWBL-05-2020-0075.

Little, T., Cunningham, W., Shahar, G., & Widaman, K. (2002). To parcel or not to parcel. *Structural Equation Modeling, 9*(2), 151–173. https://doi.org/10.1207/s15328007sem0902_1.

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

Marginson, S. (2006). Dynamics of national and global competition in higher education. *Higher Education, 52*(1), 1–39. https://doi.org/10.1007/s10734-004-7649-x.

Markus, H., & Kitayama, S. (1991). Culture and the self. *Psychological Review, 98*, 224–253. https://doi.org/10. 1037/0033-295X.98.2.224.

Mascret, N., Elliot, A., & Cury, F. (2015). Extending the 3 x 2 achievement goal model to the sport domain. *Psychology of Sport and Exercise, 17*, 7–14. https://doi.org/10.1016/j.psychsport.2014.11.001.

Murayama, K., Zhou, M., & Nesbit, J. (2009). A cross-cultural examination of the psychometric properties of responses to the achievement goal questionnaire. *Educational and Psychological Measurement, 69*(2), 266–286. https://doi.org/10.1177/0013164408322017.

Muthén, L., & Muthén, B. (2017). *Mplus user's guide*. CA: Muthén & Muthén.

Rinas, R., Dresel, M., & Daumiller, M. (2020a). Higher education teachers' subjective well-being: An achievement goal approach. https://psyarxiv.com/gqyuj/

Rinas, R., Dresel, M., Hein, J., Janke, S., Dickhäuser, O., & Daumiller, M. (2020b). Exploring university instructors' achievement goals and discrete emotions. *Frontiers in Psychology, 11*(1484), 1–15. https://doi. org/10.3389/fpsyg.2020.01484.

Ryan, R., & Deci, E. (2017). *Self-determination theory*. Guilford.

Ryan, R., Sheldon, K., Kasser, T., & Deci, E. (1996). All goals are not created equal. In P. Gollwitzer & J. Bargh (Eds.), *The psychology of action (pp. 7–26)*. Guilford.

Ryan, R., Huta, V., & Deci, E. (2008). Living well. *Journal of Happiness Studies, 9*(1), 139–170. https://doi.org/ 10.1007/s10902-006-9023-4.

Shin, J., & Jung, J. (2014). Academics job satisfaction and job stress across countries in the changing academic environments. *Higher Education, 67*(5), 603–620. https://doi.org/10.1007/s10734-013-9668-y.

Sinha, J. (2014). Collectivism and individualism. In J. Sinha (Ed.), *Psycho-social analysis of the Indian mindset* (pp. 27–51). Springer.

Sommet, N., & Elliot, A. (2017). Achievement goals, reasons for goal pursuit, and achievement goal complexes as predictors of beneficial outcomes. *Journal of Educational Psychology, 109*(8), 1141–1162. https://doi. org/10.1037/edu0000199.

Stupnisky, R., Hall, N., Daniels, L., & Mensah, E. (2017). Testing a model of pretenure faculty members' teaching and research success. *The Journal of Higher Education, 88*(3), 376–400. https://doi.org/10.1080/ 00221546.2016.1272317.

Stupnisky, R., BrckaLorenz, A., Yuhas, B., & Guay, F. (2018). Faculty members' motivation for teaching and best practices. *Contemporary Educational Psychology, 53*, 15–26. https://doi.org/10.1016/j.cedpsych.2018. 01.004.

Teichler, U., Arimoto, A., & Cummings, W. (2013). *The changing academic profession*. Springer. https://doi. org/10.1007/978-94-007-6155-1.

Van den Broeck, A., Vansteenkiste, M., De Witte, H., Soenens, B., & Lens, W. (2010). Capturing autonomy, competence, and relatedness at work. *Journal of Occupational and Organizational Psychology, 83*(4), 981–1002. https://doi.org/10.1348/096317909X481382.

Van den Broeck, A., Ferris, D., Chang, C.-H., & Rosen, C. (2016). A review of self-determination theory's basic psychological needs at work. *Journal of Management, 42*(5), 1195–1229. https://doi.org/10.1177/ 0149206316632058.

Van Yperen, N., Blaga, M., & Postmes, T. (2014). A meta-analysis of self-reported achievement goals and nonself-report performance across three achievement domains. *PLoS One, 9*(4), 1–16. https://doi.org/10. 1371/journal.pone.0093594.

Vansteenkiste, M., Lens, W., Elliot, A., Soenens, B., & Mouratidis, A. (2014). Moving the achievement goal approach one step forward. *Educational Psychologist, 49*(3), 153–174. https://doi.org/10.1080/00461520.2014.928598.

Viladrich, C., Angulo-Brunet, A., & Doval, E. (2017). A journey around alpha and omega to estimate internal consistency reliability. *Annals of Psychology, 33*(3), 755–782. https://doi.org/10.6018/analesps.33.3.268401.

Wilkesmann, U., & Schmid, C. (2014). Intrinsic and internalized modes of teaching motivation. *Evidence-based HRM, 2*(1), 6–27. https://doi.org/10.1108/EBHRM-07-2013-0022.

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Affiliations

Martin Daumiller[1] · Stefan Janke[2] · Raven Rinas[1] · Oliver Dickhäuser[2] · Markus Dresel[1]

[1] Department of Psychology, University of Augsburg, Universitätsstr. 10, 86159 Augsburg, Germany

[2] Educational Psychology, University of Mannheim, Mannheim, Germany