Physicians as clinical teachers: Motivation and attitudes

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Especially in university hospitals, many physicians have to fulfil multiple roles as they treat patients, conduct research and act as clinical teachers. The present study focuses upon the latter role and analyses which attitudes and motivational patterns guide physicians in their teaching activities. With regard to motivation, we draw on self-determination theory and distinguish between autonomous and controlled motives. In terms of attitudes, we examine the extent to which clinical teachers use teaching activities that relate to a transmissive or constructivist paradigm. These questions are investigated using data from a questionnaire study conducted at a German university hospital. The respondents were 314 physicians who participated in one of two didactic qualification workshops at different points in their professional career. Physicians reported higher scores for autonomous types of motivation (derived from the self) than for controlled types (influenced by external factors). Further, we found that overall, the physicians considered both transmissive and constructivist concepts relevant for their teaching, but agreed even stronger to the constructivist paradigm. Latent class analyses revealed distinct patterns of attitudes towards teaching, but no relation between different motivations and teaching attitudes was found.

1 Introduction

Physicians work in a technology-rich, rapidly evolving context and require an array of diverse abilities, e.g. to be medical experts, versatile communicators, interprofessional collaborators, and proficient managers of healthcare (Frank & Danoff, 2007). Our study's emphasis is upon physicians' role as clinical teachers who instruct medical students (Busari et al., 2003; Steinert et al., 2017). A widely accepted framework, "Canadian Medical Education Directives for Specialists" (CanMEDS) defines this role as "*the demonstration of a lifelong commitment to reflective learning, as well as the creation, dissemination, application and translation of medical knowledge*" (Frank & Danoff, 2007, p. 645).

We analyse the role of physicians as teachers from a motivational (ten Cate et al., 2011) and an attitudinal (Beck et al., 2000) perspective and investigate the interrelation between these two aspects. We thereby focus on individual psychological factors which are relevant for how clinical teachers approach and enact their teaching respon-

sibilities, which didactical approaches they favour, and which role they assign to students during their courses (Richardson et al., 2014). By focusing these constructs in the medical context, we seek to advance the thriving research on factors and contextual conditions behind physicians' engagement as clinical teachers (e.g. Lochner et al., 2012; Steinert & Macdonald, 2015; van Lankveld et al., 2017).

In the motivational context we draw upon the self-determination theory of motivation (Ryan & Deci, 2000). While most physicians have not been educated as teachers, many universities currently emphasise innovative didactics, especially regarding the use of digital tools for teaching. Moreover, it may be difficult for physicians to integrate their roles as clinicians and as teachers (Cantillon et al., 2019). We therefore examine to which degree physicians perceive different kinds of motivation as being relevant for their teaching.

Regarding attitudes towards teaching, we differentiate between transmissive and constructivist approaches, drawing upon two influential learning theories (Torre et al., 2006). *Cognitivism* represents the view that knowledge can be transferred from a teacher to a learner. *Constructivism*, in contrast, is characterised by the notion that knowledge is actively constructed by the learner. Physicians possess very detailed biomedical and clinical knowledge, but are often not educated didactically, possibly entailing a more transmissive orientation towards teaching. Medicine, however, is a didactically very diverse subject area, with practical courses in and outside the patient room, simulation-based courses and a growing degree of integration of new media and digital formats in teaching. This could influence physicians in developing more modern, constructivist attitudes towards teaching.

In the following, we will provide contextual and theoretical information in order to substantiate our empirical study. First, we will differentiate forms of motivation as described in the self-determination theory and contextualise this approach in clinical teaching.

2 Context and theory

2.1 Teacher motivation: Autonomous vs. controlled

Teachers' motivation to teach has been found to influence the quality of teaching and student performance, for example students' achievement and knowledge acquisition, teachers' working and health conditions, and teacher retention (Han & Yin, 2016). Furthermore, Roth et al. (2007) found that motivation to teach is positively related to autonomous motivation to learn and negatively related to emotional exhaustion.

Self-determination theory posits that engagement in and persistence with specific behaviours (like teaching) can be predicted by the quality of an individuals' motivation. Two basic dimensions of this quality are differentiated: an autonomous and a controlled aspect (Ryan & Deci, 2000). According to Ratelle et al. (2007), autonomous motivation means that an action derives inherently from the self, while controlled motivation is observed when the origin or the governance of an action is externally controlled.

2.1.1 Autonomous motivation

Ryan and Deci (2000) differentiate various forms of autonomous motivational regulation, i.e. intrinsic regulation and identified regulation: *Intrinsic motivation* is positioned on the high end of the motivational continuum and is, according to Hein et al. (2012, p. 125), "*the prototypical form of autonomous motivation*". The reasoning behind the execution of a task or a behaviour lies in the enjoyment and contentment that this action brings to the person, rather than in its outcomes or rewards. *Identified regulation* is characterised by a lower degree of internal regulation: individuals perform actions mainly because they are in line with their own personal preferences and goals. However, compared to intrinsic motivation, identified regulation does not directly relate to individuals' passions or feelings of enthusiasm. With regard to physicians as teachers, views associated with identified motivation to teach could be that through teaching, physicians enhance their career options, obtain relevant qualifications and fulfil a role which they regard as being a relevant aspect of their profession.

Both intrinsic and identified motivation have been shown to be relevant for clinical teachers: Chapman et al. (2016) show that junior physicians are motivated by the need to develop professionally and by the happiness that teaching activities bring back to them. A similar study on senior physicians showed that their main motivation was the wish to educate medical students in a proper way. They saw teaching itself as a demanding activity and describe enthusiasm to teach and having been inspired while being students themselves (Dahlstrom et al., 2005).

2.1.2 Controlled motivation

In controlled motivation, behaviour is driven by a specific external reinforcement, which can be the desire to gain something, e.g. material rewards or appreciation by relevant others. Also, external factors can function in inhibitory ways, e.g. through sanctions connected to not performing certain actions (Kong, 2009). Ryan and Deci (2000) distinguish between two forms of controlled motivation: external and introjected regulation.

Introjected regulation is characterised by some degree of alignment between external demands and a person's individual goals and motives, because individuals internalise external motives and assign personal relevance to actions or goals which are imposed upon them. This leads to feelings of pressure, anxiety or guilt and the need to achieve approval from oneself and from other individuals.

The type of controlled motivation located at the low end of the continuum is *external regulation*, in which the underlying behaviours are reinforced by the wish to comply with orders, to acquire certain benefits, or even by the desire to avoid sanctions due to not performing certain actions (Han & Yin, 2016).

2.1.3 Situation in the current sample

The physicians in our sample (as is common in the German system) have a contractual and legal requirement to teach, but do not receive any additional payment when doing so. However, teaching may be connected to the ambition of physicians to pursue an academic career since teaching experience is a requirement for completing a *habilitation* (i.e. a further academic degree after a doctorate, which is a key step in an academic career). We hypothesise that both autonomous and controlled forms of motivation will be relevant for our respondents: For many physicians, the opportunity to share and discuss their knowledge with young colleagues in medical education is a key aspect of their academic career (Dahlstrom et al., 2005). Some previous research suggests that many teachers have higher intrinsic rather than extrinsic motivation (Ellis, 1984). However, according to Pelletier et al. (2002), teachers are less self-determined towards teaching when they perceive pressure from above (e.g. they must comply with performance standards) or from below (e.g. they realise that their students do not have a self-determined position towards the class).

Our study was conducted in the context of two professional development courses dedicated to improve clinical teachers' didactic knowledge and skills: Course one – *the lecturer workshop* – is a one-day workshop compulsory for physicians newly employed at the Klinikum rechts der Isar (the university hospital associated with the TU München where the present study was conducted, henceforth labelled as TUM MRI); course two – *the lecturer training* – is a more intensive voluntary five-day clinical teacher-training programme. We investigate whether participants in the two workshop formats perceive different types of motivational regulation as relevant for their clinical teaching: Participants in the lecturer-workshop are newly employed at the TUM MRI, the workshop is mandatory for them. Many, but not all of them, have some teaching duties. In contrast, most physicians in the lecturer training are at a more advanced stage of their career and most of them are pursuing a habilitation and require the certificate of attendance. We also take into account whether the variables gender, age and career stage are related to different types of motivation towards teaching.

Through our study, we seek to extend the literature in three ways: First, we investigate the relevance of a broad spectrum of motivational factors for clinical teachers, from intrinsic to extrinsic; second, in drawing upon quantitative methodology, we provide a different methodological perspective than most existing studies, which use qualitative approaches; third, our sample comprises physicians in different career stages, which allows us to take career-related aspects into account in our analyses. We address the following research questions regarding motivation:

RQ1: To which degree do physicians perceive different types of motivational regulation (intrinsic, identified, introjected and external) as relevant for their clinical teaching?

RQ2: How do physicians taking part in the lecturer workshop vs. the lecturer training perceive the different types of motivational regulation as relevant for their clinical teaching?

RQ3: To what extent does the perception of different types of motivational regulation as being relevant for physicians' teaching depend upon gender, age and career stage?

2.2 Teacher didactic paradigm – transmissive vs. constructivist

The second focus of our study is the didactic paradigm clinical teachers draw upon in their teaching. We focus on two guiding viewpoints, the *transmissive* vs. the *constructivist* concept (Leutner & Klauer, 2007).

2.2.1 Transmissive concept of teaching

The transmissive concept focuses the role of the teacher as an expert in a specific field who structures, didactically edits and presents subject matter so that students can understand it. Thereby, learners are guided by the teacher in their learning; however, the teacher may also purposefully orchestrate students' activity, e.g. by posing questions and assigning work tasks (Reinmann-Rothmeier & Mandl, 1994).

The transmissive concept of teaching is critically discussed for several reasons. Especially in higher education, a passive-receptive role stands in contradiction with learners' status as intellectually mature individuals on the verge of entering professions with high societal relevance and responsibility (Hodges, 2014). Also, theorists criticise the reductionist approach underlying this paradigm. Their point is that because teachers pre-structure, partition and edit subject matter to a high degree, learners are not guided towards fully comprehending its relevance and embeddedness in overarching contexts and discourses (Reinmann-Rothmeier & Mandl, 1994).

2.2.2 Constructivist concept of teaching

An alternative, more learner-centred approach is the constructivist teaching concept. One key idea of constructivism is that in essence, learning is an active and social process. It is characterised by individuals' processing and sense-making of information, whereby they actively construct new knowledge by connecting it to existing knowledge and experiences (Dennick, 2016). A key goal of constructivist didactics is to motivate learners and to wake their interest and curiosity for a specific context. This mainly occurs by confronting them with relevant and challenging problems which are then solved by the students, individually or in cooperation.

However, implementing learning environments which follow constructivist principles is challenging. On the one hand, it requires much time and effort in preparation. On the other hand, the teachers' role is not primarily an instructional one, but is better described as facilitating learning through motivation and as coaching of learners and interacting with them in critical discussion (Dennick, 2016; Duffy, Lowyk, & Jonassen, 1991; Lueddeke, 1999).

In our empirical study, we investigate to which degree respondents agree to the relevance of these concepts for their clinical teaching. Thereby, an open question is to which extent these instructional paradigms are perceived as being mutually exclusive. In this respect, we do not see these concepts as contradictory, but hypothesise that clinical teachers pragmatically integrate aspects of both conceptions. Our research questions are as follows:

RQ 4: Which groups of clinical teachers can be differentiated regarding their attitudes towards teaching?

RQ 5: Do the members of these groups differ systematically regarding their gender, age and academic title?

2.3 Relationship between physicians' motivation and attitudes towards teaching

Besides examining motivations to teach and attitudes towards teaching separately, we also investigate how these concepts are related. Studies from medical education suggest that focusing on relationships between attitudes and motivation is worthwhile, (e.g. Escher et al., 2017) but this relationship has not yet been investigated among physicians and with focus upon their teaching role. Our respective research question is:

RQ 6: Do the groups of teachers sharing specific attitude profiles towards teaching differ systematically regarding their motivation towards teaching?

3 Method

3.1 Study context and ethics

The study was conducted in context of two professional development courses dedicated to improve clinical teachers' didactic knowledge and skills: Course one – *the lecturer workshop* – is a half-day workshop every physician newly employed at the TUM MRI is required to attend. Its purpose is to inform participants about the curriculum of the medical school and give them a rough introduction to the field of didactics in medical education. Course two – *the lecturer training* – is a much more intensive clinical teacher training programme, which lasts five days. It is typically attended by more experienced physicians and addresses a variety of topics and skills relevant for medical educators, e.g. theoretical assumptions relevant for teaching in higher education, practical skills relevant for bedside teaching, simulation-based teaching and various forms of examination.

Between autumn 2017 and summer 2019, the participants in both workshops were invited to complete a questionnaire which was the basis for the present study. The questionnaire was distributed by members of the TUM Medical Education Center and collected directly after respondents had completed it so that the anonymity of respondents was maintained. The lecturer workshop is organised four times and the lecturer training two times per year by the TUM Medical Education Center. The administration staff responsible for the distribution of the questionnaire, the supervision and the data collection informed the participants about the aims of the study and the use of the data. Participation was voluntary.

Ethical approval for the study was obtained from the Klinikum rechts der Isar ethics committee (approval code 487/19 S-KK).

3.2 Participants

Our study participants (N = 314) form two groups according to the two training programmes in which they participated (see Table 1 for the age distribution in both groups). The *workshop group* included 212 participants (41.0% male, 50.5% female, 8.5% missing response). Among these, 54% had not yet acquired any academic title, while 38.7% of them were physicians (Dr. med.). The *training group* included 103 participants (68% male, 16.5% female, 15.5% no answer). In this group, no participants were under 25 or over 60 years old. In terms of their academic degrees, 93.2% had a medical doctor's-degree (Dr. med./MD) while 2.9% had obtained a PhD degree. In this group, only 1% carried no academic qualification. The training group members were more advanced in their career and most of them were pursuing a habilitation.

Table 1: Participants' age distribution

	< 25	25–29	30–39	40–49	50–59	60 +
Lecturer workshop	1%	54.7%	33.5%	7.2%	1%	1%
Lecturer training		4.9%	77.7%	12.6%,	1.9%	

3.3 Measures

Motivation to teach was assessed by a questionnaire scale adapted from Ryan and Connell (1989), which had been used in various studies since (e.g. Johannes, Fendler, Hoppert, & Seidel, 2011). It consisted of 13 items and a four-point Likert scale ranging from 1 (does not apply) to 4 (totally applies, see Table 3 for means and standard deviation values of questionnaire scales). The items were organised in four subscales according to the spectrum of motivation: The intrinsic motivation-subscale consisted of 4 items (α = .76, sample item "I teach because teaching gives me pleasure"). Identified motivation was measured with a 3-item subscale (α = .57, sample item "I teach in order to obtain further qualifications, e.g. a habilitation"). Due to the alpha-value being at the threshold of acceptability (Gliem & Gliem, 2003), we decided to include it in our further analyses, but consider respective outcomes as explorative. The facet of introjected motivation was measured by means of a 3-item scale (α = .70, sample item "I teach because I would feel guilty if I wouldn't"). Extrinsic motivation was measured using 3 items (α = .80, item example "I teach because otherwise, I get pressure from my supervisors").

The questionnaire used to measure subjective teaching concepts consisted of 14 items and was adapted from Kauper et al. (2012). Seven of these items were related to the transmissive, the other seven items to the constructivist teaching concept. The items are displayed in Table 1, along with mean values and standard deviations (items are sorted in descending order of mean values).

Table 2: Items relating to the transmissive and constructivist teaching concept

Teaching concept	Item	*M*	*SD*
Transmissive	demonstrating	3.31	.70
	lecturing	2.82	.71
	distributing work assignments	2.54	.84
	repeating key phrases	2.52	.90
	inculcating	2.43	.87
	writing on the blackboard	2.16	.85
	controlling	1.94	.81
Constructivist	arousing interest	3.88	.38
	encouraging	3.63	.57
	asking questions	3.56	.60
	scrutinising	3.49	.69
	accompanying	3.32	.66
	allowing	3.04	.72
	researching	3.03	.83

3.4 Statistical analyses

We used MANOVAs to test differences in types of motivation to teach between the workshop and the training group and between groups based on gender, age and academic title. To investigate participants' agreement to the transmissive vs. the constructivist teaching concepts, we conducted a latent class analysis (LCA). To determine the optimal number of latent classes, we relied on the Bootstrap Likelihood Ratio Test (BLRT; McLachlan & Peel, 2000; Nylund et al., 2007) and several further information criteria (Consistent Akaike Information Criterion (CAIC), Bayesian Information Criterion (BIC) and the Approximate Weight of Evidence Criterion (AWE; Masyn, 2013)). For interpreting the LCA, we report expectation values for all items on the four-type Likert scale for each latent class. These values are calculated based only upon the values of participants who responded to the specific item. Non-responders are excluded and the probability of non-response is taken into account (if this probability is >0% in the model). All analyses were done with R 4.0.0 (R Core Team, 2020) using the poLCA-package (Linzer & Lewis, 2011). The BLRT was adapted using functions from the e1071 (Meyer et al., 2019) and the doSNOW-packages (Microsoft Corporation & Weston, 2019).

4 Results

4.1 Motivation to teach

(RQ1) Overall, clinical teachers in our sample reported higher agreement regarding the aspects of autonomous as compared to the controlled motivation (cf. Table 3). A direct comparison of both overarching concepts (autonomous: $M = 2.98$, $SD = .53$; controlled: $M = 1.61$, $SD = .51$) revealed a statistically significant effect with large effect size, $t(308) = 99.6$, $p < .01$, $d = -2.64$.

(RQ2) Accordingly, we found higher mean values regarding autonomous (intrinsic and identified) as compared to controlled types of motivation (introjection and external regulation) in both groups (workshop and training, cf. Table 3). The correlations between the different aspects of motivational regulation had a plausible pattern, with positive associations between the autonomous and controlled types of regulation and no or negative cross-correlations. Also, this meets the MANOVA assumption of moderate correlation between the dependent variables (Gamst et al., 2008).

Table 3: Motivation to teach – mean values and standard deviations in different levels of motivation, in different training groups and correlation values in the full sample

	Autonomous motivation		Controlled motivation	
	1. Intrinsic *M (SD)*	2. Identified *M (SD)*	3. Introjected *M (SD)*	4. External *M (SD)*
Overall ($n = 314$)	3.07 (.61)	2.89 (.67)	1.64 (.63)	1.57 (.69)
Workshop ($n = 211$)	3.12 (.59)	2.82 (1.09)	1.69 (.63)	1.63 (.68)
Training ($n = 103$)	3.02 (.61)	3.18 (.50)	1.55 (.62)	1.43 (.65)
1.	1	.33**	–.01	–.37**
2.		1	.13*	-.14*
3.			1	.27**
4.				1

Note. * p<.05, ** p<.01

On this basis, mean values of different types of motivation between the workshop and training groups were compared using MANOVA. We found a statistically significant overall effect, Pillais' Trace = .101, $F(4, 239) = 6{,}692$, $p < .001$, and the estimate of the multivariate effect size value was $\eta^2 = .10$. This indicates that an amount of 10% of the variance of the dependent variables could be accounted for by membership in the workshop vs. training group.

Regarding motivation, two significant differences were found: First, participants in the lecturer training reported significantly higher values for identified motivation ($p < .01$, $\eta^2 = .03$); second, participants in two groups differed significantly regarding external motivation ($p < .05$, $\eta^2 = .02$), with the workshop group showing higher values (cf. Table 3).

(RQ3) Further, we also sought to determine the influence of gender, age and career stage on different types of motivational regulation for teaching. For this purpose, we also calculated a MANOVA, whereby our overall model was not statistically significant, Pillais' Trace = .99, $F(20, 988) = 1{,}255$, $p = .20$.

However, regarding the different variables, we found a significant effect of age regarding extrinsic motivation ($p < .05$, $\eta^2 = .04$). Also, we found a significant interaction effect between age and gender regarding extrinsic motivation ($p < .05$, $\eta^2 = .04$). This means that older, male respondents in our sample reported higher degrees of extrinsic motivation.

4.2 Attitudes towards teaching

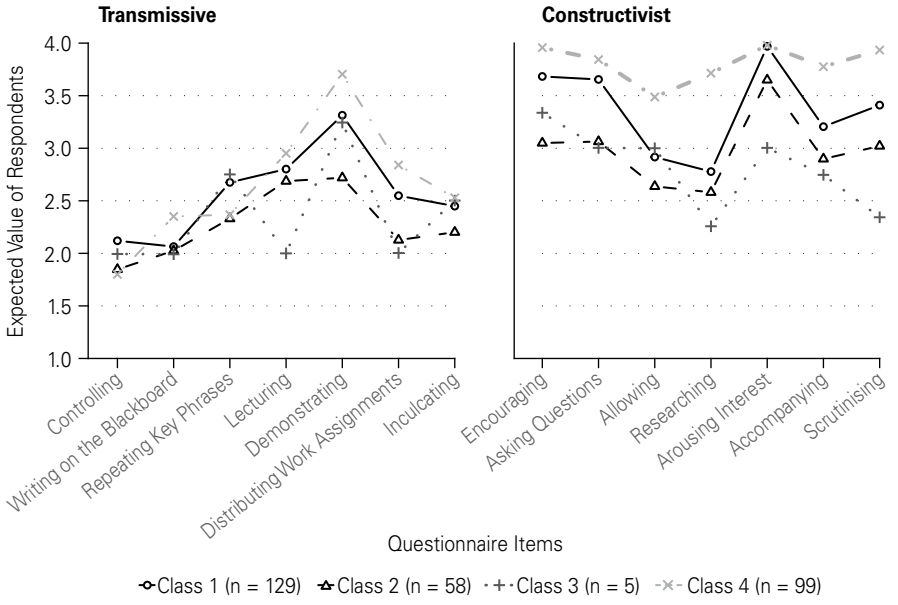
RQ4 concerns the differentiation of clinical teachers regarding their attitudes towards teaching. We conducted LCAs to answer this question. As Table 4 shows, while the further information criteria pointed towards two or even one class, we favoured a solution in which four latent classes were differentiated. This decision was made based upon the BLRT value and the fact that differences between the four latent classes seemed practically relevant and easy to interpret.

Figure 1 shows the results which best represented our data. This solution differentiates four latent classes characterised by their agreement to the relevance of the different teaching activities and to specific non-response patterns. The left half of Figure 1 shows the items related to the transmissive, the right half shows the items related to the constructivist teaching concept.

Table 4: Information criteria for models with different latent classes

Latent classes in model	df	–2*log-likelihood	BIC	CAIC	AWE	BLRT	
						$\Delta_{-2loglik}$	*p*
One	237	8,580.1	8,887	8,941	*9,193*		
Two	182	8,180.2	*8,799*	*8,908*	9,418	399.9	.000
Three	127	8,011.0	8,941	9,105	9,874	169.2	.001
Four	**72**	**7,885.7**	**9,128**	**9,347**	**10,373**	**125.3**	**.002**
Five	17	7,810.8	9,365	9,639	10,923	74.9	.239

Figure 1: Latent profiles of agreement to teaching activities related to the transmissive and the constructivist teaching concept



Overall, the items relating to the constructivist teaching concept (right half of Figure 1) receive higher agreement than the items that relate to the transmissive concept. Beyond this, several latent classes were differentiated: The largest *class one* comprises 129 individuals and is characterised by high agreement (>3.0) to one transmissive item ("demonstrating") and to five out of seven of the constructivist items. The individuals in class one see "arousing interest" as essential in their teaching. Also, they judge "encouraging" and "asking questions", "demonstrating" and "scrutinising" as very important teaching activities. For them, the least important aspects of teaching are "controlling" and "writing on the blackboard". Further, respondents in class one show the lowest overall non-response.

The *class two* profile consisted of 58 respondents and mirrors the overall response pattern of profile one – yet on a lower level of agreement to almost all items, and is also characterised by very low non-response. The only apparent difference appeared in the transmissive item "demonstrating", which the class two respondents did not see as particularly relevant.

Class three only consisted of five individuals, who showed high non-response of up to 60%. For these reasons, it is difficult to reliably interpret our findings here. The class three individuals do not seem to generally favour either of the two teaching concepts.

Instead, they regard some few instructional elements as very relevant ("demonstrating", "encouraging") for their teaching, but clearly reject other aspects ("controlling", "writing on the blackboard", "lecturing", "distributing work assignments", "researching" or "scrutinising").

The *class four* profile comprised 99 clinical teachers, who clearly favour the constructivist teaching concept and showed a low degree of non-response. In particular, they exhibit almost perfect agreement (3.5–4.0) to all constructivist items and to the transmissive item "demonstrating". In contrast, they showed substantially lower agreement to all other items from the transmissive concept. Regarding the item "controlling", class four shows the lowest agreement value in the entire study (but with only a small difference to the class 2 value).

Regarding *RQ5*, we focus the question whether the members of the latent profiles differ systematically regarding their gender, age and academic title. Table 5 shows the respective distributions.

Despite none of the four profiles seems dominated by males or females, profile two shows a slight overrepresentation of male physicians. Regarding age, the median age group of all latent classes is 30–39 and the differences between percentages of age group members between the various classes are small. Hence, no substantial differences could be identified here.

With respect to academic title, the categories were "study" (the final degree of a specific programme, mostly medicine in our case), "doctorate" (PhD or MD), "assistant professor" (Privatdozent or PD in German) and "associate professor" (Apl. Prof. in German). The median value of 2, doctorate, was equal in all classes, and no significant differences emerged between the individuals in the various latent profiles.

Table 5: Distribution of sex, age and tenure in the latent profiles in absolute numbers (in italics) and percentages

	Sex		Age						Academic title			
#	m	f	<25	25–29	30–39	40–49	50–59	60+	Study	Doctorate	Asst. Prof.	Assoc. Prof.
n	*56*	*44*	*0*	*38*	*50*	*9*	*2*	*0*	*37*	*58*	*0.6*	*0.6*
1	55	44	0	50	40	57	40	100	45	45	50	100
2	63	37	0	14	23	18	20	0	15	22	50	0
3	0	100	0	1	1	4	0	0	2	1	0	0
4	53	47	100	36	35	21	40	0	38	32	0	0

Note. # = number of latent profile; m = male; f = female; in each box of solid lines, numbers add up to 100% (exceptions are due to rounding errors).

Finally, regarding *RQ6,* we investigated whether the members in the latent profiles differ regarding their agreement to the different motivation scales. We could not find any statistically significant differences in this respect.

5 Discussion

In the present study, we investigated the role of physicians as clinical teachers drawing upon motivational and attitudinal variables. The following discussion is structured along the research questions addressed in our study. Then, we address study limitations and draw further, more general conclusions.

The first research question targeted the degree to which physicians report different types of motivational regulation as being relevant for their clinical teaching. In line with previous research, results showed, with large effect size, that physicians reported higher scores for autonomous (intrinsic and identified) motivation when compared to controlled types of motivation.

However, our model only explained 10% of variance in the dependent variables. This shows that beyond the variables in focus of our study, other important predictors of motivation to teach exist (cf. Kusurkar et al., 2011). Furthermore, two differences regarding motivation to teach were found:

First, clinical teachers who were more advanced in their career, were teaching regularly and were in process of their habilitation reported higher values for identified motivation. This aspect is associated with the notion that teaching is a key aspect of the medical profession and that respective experiences are important for advancing one's career. The finding supports the description by Steinert et al. (2015) that teaching in medical higher education is associated with positive emotions, but also with strategic advantages, e.g. with regard to the chance to identify promising students and recruit them or – as is more relevant in the present study – regarding the fulfilment of the formal requirements for a habilitation. This dual character comprising internal and external aspects clearly relates to the idea of identified regulation. However, due to the low reliability of the respective questionnaire scale, we consider this outcome explorative and argue that it should be further verified in future research.

Second, we found that physicians in the lecturer workshop reported higher external motivation, but with small effect size. This outcome might simply reflect the fact that these physicians had to attend the workshop. In principle, extrinsic motivation is unproblematic, as long as it does not induce detrimental effects, like e.g. overjustification (Akin-Little & Little, 2019). From the perspective of curriculum design, we argue

that a concise didactic course can contribute to nudge (Hargreaves, 2013) physicians towards seeing teaching and didactics as a relevant topic at a university hospital.

Further, we investigated differences in types of physicians' motivation to teach depending upon gender, age and career stage. Here, we found that elder, male respondents reported higher degrees of extrinsic motivation. In the sample investigated here, attendance in the lecturer training was related to completing habilitation as a further academic degree (which is a non-altruistic motive). It seems that male respondents who were more advanced in their career perceived a certain degree of dissatisfaction with being urged to attend a didactic seminar as a prerequisite for completing their habilitation. However, as the respective effects showed very small effect sizes, generalisation of these outcomes does not seem warranted.

The second focus of our study are physicians' attitudes towards teaching. Our results show that overall, physicians regarded both the transmissive and the constructivist teaching concept as being relevant for their teaching. However, agreement to constructivist teaching activities was even higher. This relates to key elements of reforms that affected medical education over the last decade, like the growing importance of simulation-based learning (Griswold-Theodorson et al., 2015) or the focus upon competencies like communication and interprofessional cooperation (Baartman & de Bruijn, 2011). Clinical teachers' agreement-patterns that emerged in our study reflect this trend towards more learner-centred instructional formats, especially given the high agreement values to behaviours like "encouraging", "arousing interest" or "accompanying". However, a critical question which cannot be answered based on the present results is to which degree this favour towards constructivist instructional orientations actually translates into teaching practice. Observational studies could help clarifying this point in the future.

When relating teaching concepts to teaching motivation, we found no specific differences regarding teaching motivation between the respondents in the different attitude profiles in our study. Preferred concepts of teaching, therefore, seem to be developed independently of the reasons behind physicians' teaching activities. Finally, we found no statistically significant differences in the latent profiles regarding respondents' gender, age and academic title.

Regarding limitations, our study relied entirely on questionnaire data. Known biases, like social desirability (Bortz & Döring, 2009), might have affected its outcomes. In particular, latent class #4 responded like model lecturers highly engaged with innovative, constructivist viewpoints. In part, these individuals could be biased by assumptions that responding in this fashion would cast a positive light on them and their colleagues. Also, the study was embedded in two didactic course formats, the lecturer

workshop and the lecturer training –, which both are dedicated to foster competence and motivation in medical education. Being immersed in discussions around what is good and innovative medical education might have led them to rate their motivation as being higher and their attitudes as being more positive as they would have done during their usual daily work routine.

In sum, the results of our study show that clinical teachers' motivation to teach is dominantly regulated autonomously – but with controlled motives also playing a role. Also, clinical teachers' attitudes towards teaching are dominated by the constructivist approach. However, none of the two approaches is fundamentally rejected, respondents' agreement/disagreement seemed pragmatically motivated. Overall, one could conclude that the clinical teachers' motivation and attitude patterns we found are a fruitful basis for implementing innovative didactics and educational methods in higher education in the medical context. Various studies highlight that staff development courses for medical teachers have substantial potential to spark transformations in attitudes towards teaching and teaching practices (Steinert et al., 2006; Weurlander & Stenfors-Hayes, 2008). Focusing upon motivational aspects is crucial in this context because, on the one hand, physicians seem very reluctant to engage in such programmes if they do not see any concrete benefits for themselves (van Bruggen et al., 2020). On the other hand, very personal and altruistic motives, like personal growth and giving things back to a relevant professional community, are also described in the literature (Steinert & Macdonald, 2015). In this respect, the quasi-longitudinal approach adopted in the present study is limited. So, future studies should adopt a longitudinal perspective on the question of how teaching-related motivation and attitudes of clinical teachers develop across their (academic) career. Clarke and Hollingsworth (2002) differentiate various dimensions of teacher change, e.g. change as training (i.e., as an external influence instigating potentially transformative processes in teachers), change as personal development (understood as an internal process of transformation of skills or routines) or change as systemic restructuring – meaning that teachers enact change agendas which are decided by their superiors. Future research on clinical teachers' attitudes towards teaching and their motivation to teach should adopt more diverse perspectives and strive to simultaneously focus the spectrum of external and internal forces which drive clinicians to teach medical students.

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