Intrinsic and internalized modes of teaching motivation

Uwe Wilkesmann and Christian J. Schmid
Center for Higher Education, TU Dortmund University, Dortmund, Germany

Received 26 July 2013
Revised 26 November 2013
11 December 2013
Accepted 13 December 2013

Abstract

Purpose – The introduction of New Public Management in the German system of higher education raises issues of the academics' motivation to do research and to teach. The purpose of this paper is to present evidence-based findings about contextual factors which influence intrinsic and related modes of internalized teaching motivation in German higher education institutions. The paper discusses parallels between internalized forms of motivation and public service motivation (PSM). In accordance with self-determination theory (SDT), the paper empirically tests factors which correlate with autonomous motivation to teach. The paper also addresses the issue of the crowding effect of intrinsic motivation by selective incentives.

Design/methodology/approach – The analyses are based on the data of two online surveys among German professors ($n = 2{,}061$) representative for the population of state-governed universities. To test the theory-driven hypotheses the paper used multivariate regression analysis.

Findings – The results support the basic claims of the SDT that intrinsic teaching motivation is facilitated by social relatedness, competence, and partly by autonomy for German professors, too. If teaching is managed by objective agreements intrinsic motivation is significantly decreased.

Originality/value – The authors translated, reformulated, and applied the SDT framework to academic teaching. The analysis presents evidence that the management of autonomy-supportive work environmental factors is also superior to selective incentives in higher education institutions. The study on academic teaching motivation is a specific contribution to PSM research. Academic teaching in public higher education institutions is a service to the public.

Keywords Employee motivation, HRM in the public sector

Paper type Research paper

1. Introduction

Professors must fulfill at least two tasks (besides all the administrative work): research and teaching. Academic careers are dependent on reputation as a researcher. Consequently, teaching is said to be the professoriate's neglected stepchild. Therefore, rectorates believe that they have to reinforce the academics' effort and investment in teaching. Theoretically, the governing body at universities has two possibilities to increase the motivation to teach (and the overall motivation).

First, by introducing private sector management tools, like pay-for-performance, management by objectives (MbO), and performance-related budgeting (de Boer *et al.*, 2007; Enders *et al.*, 2002; Kehm and Lanzendorf, 2007; Leišytė *et al.*, 2009), policy makers build on the extrinsic dimension of motivation. This is the way new public management (NPM) has been adopted to universities. Existing research provides evidence that selective incentives have either no effect or a negative effect on teaching (Wilkesmann and Schmid, 2012).

A second option is to rely on existing intrinsic motivation. Traditionally, professors were considered to be highly intrinsically motivated to teach and to do research because otherwise they would not endure the pressures and imponderables of accomplishing successful academic careers: "We may say that it is this intrinsic motivation which makes academics commit themselves to their scholarly activities not as a job but as a vocation, profession and hobby; which sustains them despite deteriorating working conditions and

Evidence-based HRM: a Global Forum for Empirical Scholarship
Vol. 2 No. 1, 2014
pp. 6-27

2049-3983
DOI 10.1108/EBHRM-07-2013-0022

salaries" (Moses and Ramsden, 1992, p. 105). Intrinsic motivation, that is to enjoy the activity itself, cannot be externally enforced upon the employees; it can only be governed indirectly by the design of the work environment. Therefore, our main research question is:

RQ1. Which contextual factors in the work environment facilitate intrinsic teaching motivation?

Then again, private sector management tools could have unintended and unwanted effects of corrupting possible intrinsic pleasures of teaching. Therefore, an additional research question is whether selective incentives actually crowed out intrinsic teaching motivation.

The paper is organized as follows. After conceptualizing motivation with self-determination theory (SDT; Ryan and Deci, 2000b) as our dependent variable, we also discuss parallels between SDT and public service motivation (PSM). Moreover, SDT implies core assumptions and hypotheses about the interrelation between motivation and exogenous factors, which can be tested empirically. For this purpose, we use data from two representative surveys about governance of academic teaching in Germany where we questioned 1,119 professors at research universities and 942 professors at universities of applied sciences. The main difference between these two types of HEI in Germany is the objective to educate practice-oriented work forces at the universities of applied science vs research-oriented academics at traditional research universities. To qualify for a position at a university of applied sciences applicants are required to work in private industry for at least three years. The teaching load of professors at research universities is nine hours per week, whereas at universities of applied science the teaching load is 18 hours per week.

2. SDT

To be motivated means in our context to be motivated to teach, performing acts of teaching (Ryan and Deci 2000a, p. 54). In the SDT, Ryan and Deci (2000a, b) distinguish between different reasons that evoke action. Intrinsically motivated action equals any action which is performed for pure enjoyment and satisfaction. In comparison, if an action is accomplished for separable outcomes, the motivation is extrinsic (see Ryan and Deci, 2000a, p. 56, 2006, p. 1562). Intrinsically motivated behavior satisfies three basic, innate psychological needs. These are relatedness, competence, and autonomy (Reeve *et al.*, 2004; Ryan and Deci, 2000b, p. 74; see also Ryan and Deci, 2006; Niemiec and Ryan, 2009). Our first three hypotheses focus on these primary human needs. Research in the tradition of SDT emphasizes the autonomy-supportive work environment as a relevant prerequisite to foster intrinsic motivation (Ryan and Deci, 2000a, p. 58).

The SDT also incorporates amotivation, which is any behavior that is not valuing or any compulsory task performed by actors who feel absolutely incompetent. Extrinsic motivation is further subdivided into four qualitatively different types with regard to the perceived locus of causality: external, introjected, identified, and integrated (see Figure 1). Ryan and Deci (2000a, pp. 61-62) define external motivation as behavior which is rewarded and/or punished by others. The other three types of extrinsic motivation differ in accordance with the level of internalization of goals. Introjected motivation "[…] describes a type of internal regulation that is still quite controlling because people perform such actions with the feeling of pressure in order to avoid guilt

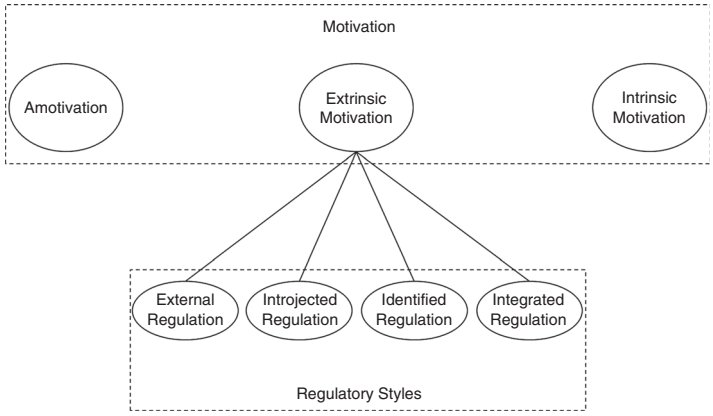


Figure 1.
Self-determination theory

Source: Ryan and Deci (2000b, p. 72)

or anxiety or to attain ego-enhancements or pride" (Ryan and Deci, 2000a, p. 62). Identified motivation reflects the next level of internalization where the individual identifies himself or herself with the behavior by valuing it as personally important. The last level of internalization is called integrated motivation. "Integration occurs when identified regulations have been fully assimilated to the self" (Ryan and Deci, 2000a, p. 62). Action is in alignment with self-perception.

To begin with, the empirically interesting question is whether intrinsic, self-determined motivation dominantly explains the professors' engagement and commitment to teaching. Before we develop our hypotheses, we draw on parallels between SDT and PSM.

3. SDT and PSM

The extant literature about PSM emphasizes accordance between SDT and PSM as well as difference between intrinsic motivation and PSM (Grant, 2008; Jacobsen *et al.*, 2013; Perry *et al.*, 2010). PSM "[…] is defined as an individual's predisposition to respond to motives grounded primarily or uniquely in public institutions" (Perry, 1996, p. 6). It is a form of motivation that is common to public servants, and driven by motives that are seldom found in private sector workers (O'Flynn, 2007; Perry *et al.*, 2010, p. 681). Perry (1996) distinguishes with a confirmatory factor analysis four dimension of PSM: public policy making, commitment to public interest, compassion, and self-sacrifice. Vandenabeele (2007) specify PSM definition as "[…] beliefs, values and attitudes that go beyond self-interest and organizational interest, that concern the interest of a larger political entity […]" (p. 547). In this sense, doing academic teaching could also be theorized as a form of PSM because it is not done for the utilitarian purpose of obtaining selective incentives.

SDT and PSM describe a form of interested action which is framed by the aspect of autonomy in the work environment and the internalization of goals. Both conceptualize work motivation as not exclusively restricted to cognitive rationales of instrumentally maximizing individual material rewards. In other words, they warn against the oversimplifying constructs of economic theories of rational choice and its (unintended) consequences whenever organizational structures are designed along the model of homo oeconomicus. Economic theories of action presuppose the more or less asocial man with given material preferences. Without any altruistic tendencies, professional

ethics, or self-sacrificial service to a wider group or community, the ideal type rational actor relates to others only through market exchange and price mechanisms. Additionally, with the help of SDT we can describe the internalization process of public service values and norms to a public service identity. "SDT is a valuable asset in the development of an institutional theory on PSM. It clarifies the relationship between the individual level and the institutional level by relating the concept of identity to the institutional make-up through the environmental responsiveness to individual basic psychological needs" (Vandenabeele, 2007, p. 551).

However, PSM has to be distinguished from intrinsic motivation. The latter is about the immanent enjoyment and pleasure of exercising a certain task, whereas PSM is about pro-social behavior that enhances meaning and purpose as drivers of lines of action. People are intrinsically motivated when they rather egoistically "derive spontaneous satisfaction from the activity itself" (Gagné and Deci, 2005, p. 331). PSM, however, implies an orientation of "doing good" in the service for other people and society (in more general terms public welfare). In alignment with SDT, PSM is interpreted as a form of "internalized extrinsic motivation, which is dependent on satisfaction of the three basic needs for competence, autonomy, and relatedness" (Jacobsen *et al.*, 2013, p. 4). We have to extend our main research question to include internalized extrinsic motivation: Which contextual factors in the work environment facilitate intrinsic and internalized teaching motivation?

3.1 Autonomy

In order to be intrinsically motivated perceived autonomy is all-important. A work environment which supports autonomous action enables the satisfaction of the basic needs because only this makes the perception of an internal locus of control possible. Moreover, integrated motivation, as a fully internalized form of originally external regulation, requires that "people must inwardly grasp" (Ryan and Deci, 2000a, p. 64) the meaning and worth of the regulation. This is only possible in an environment without pressure, control, and alienation. Therefore, SDT is, for example, used theoretically to underpin the design of the organizational structure, called the "initiative-freeing organizational form" ("F-form"; Carney and Getz, 2009; Getz, 2009).

There is vast empirical evidence that perceived external pressure and control significantly reduce intrinsic motivation. Inter alia, this mechanism has already been observed for teaching motivation (Niemiec and Ryan, 2009; Roth *et al.*, 2007). More interestingly, with regard to PSM, there is a social consequence to the corruption of intrinsic motivation. Studies confirmed that the more school teachers felt controlled by superior decision-making bodies, the more they passed on this "control pressure" to their students (Pelletier *et al.*, 2002; Roth *et al.*, 2007). Taylor *et al.* (2008), Leroy *et al.* (2007), and Niemiec *et al.* (2006) found that in the case of teachers, perceived exogenous restrictions negatively correlate with intrinsic motivation. We summarize these findings in *H1*:

H1. The more autonomy-supportive academic work environment is perceived, the more internalized is the motivation to teach.

3.2 Relatedness

Internalization of motives is contingent on feelings of social relatedness to significant others. "This suggests that the groundwork for facilitating internalization is providing a sense of belongingness and connectedness to the persons, group, or culture

disseminating a goal, or what in SDT we call a sense of *relatedness*" (Ryan and Deci, 2000a, p. 64). Persons commit to and internalize a social norm only when they feel related to the agent of such a norm. In other words, social relatedness is understood as a social mechanism of appreciation, which fosters self-esteem and encourages individual initiative. Müller *et al.* (2009) and Pelletier *et al.* (2002) have enquired into the interrelation of relatedness and intrinsic motivation in the setting of schools. Our second hypothesis is as follows:

H2. The higher the perception of relatedness, the more internalized is the motivation to teach.

3.3 Competence

Internalization is further supported by competence. Only when a person is acknowledged as competent can he or she fully internalize external objectives. For example, students are more likely to "[…] adopt and internalize a goal if they understand it and have the relevant skills to succeed at it. Thus, we theorize that supports for competence (e.g. offering optimal challenges and effectance-relevant feedback) facilitate internalization" (Ryan and Deci 2000a, p. 64). Reeve *et al.* (2004) describe competence as "[…] the need to be effective in interactions with the environment, and it reflects the inherent desire to exercise one's capacities and, in doing so, seek out and master optimal challenges" (Reeve *et al.*, 2004, p. 34). Zhou *et al.* (2009) emphasize that autonomous motivation is "[…] associated with a higher level of interest, perceived competence, and choice, whereas controlled motivation was related to reduced interest and a lower level of perceived choice" (Zhou *et al.*, 2009, p. 497).

Thus, there may be a positive correlation between intrinsic motivation to teach and the feedback attesting to a professor's teaching skills. For example, if the rectorate emphasizes that the decision of a professor's appointment has been significantly informed by the judgment over his or her convincing teaching competence, this will have an impact on his or her internalized teaching motivation. We summarize this in *H3*:

H3. The higher the perception of acknowledged competence for teaching, the more internalized is the motivation to teach.

3.4 Workload

We also want to incorporate another aspect of facilitating internalized motivation which is not dealt with in the SDT framework: workload. Only motivation research drawing on goal setting theory (GST) (cf. Locke and Latham, 1990, 2006) addresses this aspect.

To test the nexus between internalized motivation and workload, we assume a positive correlation. Given the assumption that a professor enjoys teaching, he or she will do so much more in front of preferably a great audience. It is also conceivable, however, that the opposite is the case. Because the mandatory teaching load differs between universities of applied sciences and research universities, we expect systematically different levels of internalized teaching motivation. *H4* is as follows:

H4. The higher the teaching load, the more internalized is the motivation to teach.

3.5 Crowding out effect

As mentioned above, our second research interest is whether management tools introduced in the wake of NPM crowd out internalized teaching motivation. The expansion of managerial modes of governing German universities is accompanied by the necessity to control academic performance with various indicators, which cause a perceived loss of autonomy and alienation. For example, formula-based budgeting has to rely on auditing mechanisms and employee accountability (Shore, 2008, p. 289). These measurements could engender a perception of control by the professors. Within SDT this means less self-determined action and consequently less internalized motivation (Ryan and Deci, 2000b, p. 74). Jacobsen *et al.* (2013) have already shown a similar effect for the crowding-out of intrinsic motivation caused by obligatory students plans in Denmark.

Gibbons (1998) concluded his inquiry about incentives in organizations with the claim that management practices based on economic theories risk jeopardizing or crushing non-economic realities such as intrinsic motivation and social relations, that is, self-determination, a culture of collegiality, and bilateral-granted autonomy typically found at universities. Academics are said to be primarily intrinsically motivated (Moses and Ramsden, 1992) because the career path to the professoriate means enduring lengthy periods of little or no extrinsic awards, and research on their motives for pursuing academic careers indicates that the prime allure of university work environments is exactly to be found in self-determination and autonomy (Lindholm, 2004, p. 611). These characteristics are, in turn, essential to and interrelated with intrinsic motivation because the "[…] degrees of satisfaction of the need for autonomy is what distinguishes whether identification or integration, rather than just introjection, will occur" (Gagné and Deci, 2005, p. 337). Meta-evaluations (see Gagné and Deci, 2005; p. 345) support the idea that autonomy-supportive (rather than restricting) workplaces promote intrinsic motivation and therefore lead to persistence, effective performance, organizational commitment, and a higher acceptance of organizational change. If German professors are highly intrinsically motivated, the recently introduced selective incentives (pay for performance, performance-related budgeting, MbO) may generate an unpleasant crowding-out effect (Frey, 1997; Frey and Neckermann, 2008).

In Germany, the following selective incentives were implemented during the last decade to increase the professoriate's motivation (cf. Schimank, 2005; Jansen, 2007).

3.5.1 Pay for performance. It is revolutionary for German academics to be subjected to performance pay. Since 2005, a new salary system ("W-Besoldung") has been established in Germany (Wilkesmann and Schmid, 2012). All professors, who were appointed after January 2005, are now part of this new salary system. Two-thirds of the salary is fixed wage and one-third is reserved for performance bonuses. Among criteria addressing administrative functions or research excellence, these additional payments can also remunerate "extra-ordinary achievements" or "outstanding performance" in academic teaching, e.g. measured by high scores in student teaching evaluations.

3.5.2 Performance-related budgeting. German universities gained increasing financial authority to distribute their overall budget internally to faculties, departments, and professors via self-determined performance-related funding formulas. Teaching is typically included by indicators such as number of student enrolments or average time to complete studies.

3.5.3 MbO. In recent years, most German universities established MbO as a management instrument allowing for "controlled autonomy" (Müller-Böling and Schreiterer, 1999, p. 14). The president (or rectorate) co-operatively negotiates with

faculty deans and/or with single professors to reach an agreement on strategic objectives which can also include teaching activities.

3.5.4 Teaching awards. Almost all German universities award a prize for teaching excellence to upgrade symbolically the status of academic teaching. On average, the rewarded prize money is rather low (ca. €1,000). However, teaching awards are far less reputable than research awards in the episteme of academics. In our study, we have included teaching awards as a management tool. However, it is important to note that they do not qualify as selective incentives in a narrower sense. They do a posteriori award qualitatively "outstanding" teaching, but do not systematically discriminate between quantitative efforts (Wilkesmann and Schmid, 2010, 2012). In other words, they do not punish shirking.

The *H5* is:

H5. Selective managerial incentives at universities crowd out internalized forms of motivation to teach.

4. Empirical evidence[1]

4.1 Survey design

We will test the aforementioned hypotheses with the survey data. The first survey was conducted at German research universities between April and June 2009 (cf. Wilkesmann and Schmid, 2012), and the second survey at universities of applied sciences ("Fachhochschulen") between March and July 2011. The target population was the German professoriate at all state-controlled/-funded universities.

In our first survey (Wilkesmann and Schmid, 2012), we were able to approach 8,000 professors via the e-mail distribution list of the "German Association of University Professors" (DHV). The professors paid within the framework of the new pay-for-per-performance ("W-salary") were of interest theory-wise, because they are subjected to the performance-related payment scheme. Therefore, we opted for a disproportionate stratified sampling, differentiating between two strata according to the salary categories (pay-for-performance "W-salary" vs age-related seniority scheme "C-salary"). After comprehensive data cleansing with plausibility checks, we can use a net-sample of 1,119 completed surveys. The overall response rate was thus 14 percent.

In order to get a more complete picture of possible non-response and the representativeness of our sample, we examined differences between our respondents (sample) and the general population. The population data were requested and retrieved from the German Federal Statistical Office (Destatis), which keeps precise records on the finances and personnel of all higher education institutions. Table I shows the comparison between our sample and the target population.

Our second survey was part of a follow-up study to extend our research interest into the domain of universities of applied sciences, which are widely neglected in higher education studies. Mediated by an e-mail list of the "German Association of University of Applied Science Professors" (hlb), we reached out to all deans of all German universities of applied sciences. We sent an e-mail with a link to the online questionnaire and requested the deans to forward this e-mail to their faculty's professors. In all, 942 professors completed the questionnaire. Our sample thus covers 6 percent of this sub-population. Table II features the numbers of the comparison between sample and population.

Both surveys are highly representative of the target population as regards characteristics such as scientific discipline, gender, and age, which allows us to generalize our findings for German professors *per se*. Due to our sampling strategy,

Variables	Percentage within population %	Percentage within sample %
Payment scheme		
Old wage system C (C3 + C4)	68.6 ($n = 14,338$)	41.5 ($n = 458$)
New wage system W (W2 + W3)	31.4 ($n = 6,569$)	58.5 ($n = 645$)
Gender		
Male	79.9 ($n = 18,395$)	77.7 ($n = 826$)
Female	20.1 ($n = 4,628$)	22.3 ($n = 237$)
Age (mean)	49.7 ($n = 23,023$)	49.0 ($n = 1,030$)
Scientific discipline (without research centers and schools)		
Linguistics and cultural studies	21.4($n = 4,915$)	26.1 ($n = 292$)
Law, economics and social sciences	14.8 ($n = 3,413$)	18.3 ($n = 205$)
Mathematics and natural sciences	24.7 ($n = 5,678$)	27.2 ($n = 304$)
Medicine, veterinary medicine and pharmacy	13.5 ($n = 3,105$)	7.9 ($n = 88$)
Forestry, agricultural science, nutritional science	1.8 ($n = 421$)	1.3 ($n = 14$)
Engineering	9.9 ($n = 2,282$)	7.0 ($n = 78$)
Science of art	11.7 ($n = 2,687$)	1.2 ($n = 13$)
Sports	0.8 ($n = 187$)	0.5 ($n = 6$)

Table I. Comparison sample – population (survey 1: professors at state-controlled research universities)

Variables	Percentage within population %	Percentage within sample %
Payment scheme		
Old wage system C (C3 + C4)	60.9 ($n = 9,704$)	52.2 ($n = 492$)
New wage system W (W2 + W3)	39.1 ($n = 6,231$)	47.8 ($n = 450$)
Gender		
Male	81.6 ($n = 13,003$)	78.7 ($n = 741$)
Female	18.4 ($n = 2,932$)	21.3 ($n = 200$)
Age (mean)	50.8 ($n = 15,935$)	50.3 ($n = 942$)
Scientific discipline (without research centers and schools)		
Linguistics and cultural studies	3.28 ($n = 521$)	2.0 ($n = 18$)
Law, economics and social sciences	35.4 ($n = 5,610$)	31.4 ($n = 278$)
Mathematics and natural sciences	13.7 ($n = 2,170$)	15.0 ($n = 133$)
Medicine, public health	1.6 ($n = 255$)	2.0 ($n = 18$)
Forestry, Agricultural science, nutritional science	3.4 ($n = 541$)	3.7 ($n = 33$)
Engineering	37.9 ($n = 6,019$)	42.9 ($n = 379$)
Science of art	4.5 ($n = 718$)	2.8 ($n = 25$)
Sports	0.04 ($n = 6$)	–

Table II. Comparison sample – population (survey 2: professors at state-controlled universities of applied sciences)

professors within the new performance-oriented salary system ("W-salary") are overrepresented in our data. That is why we use weighting factors for univariate descriptive statistics. There is, however, no need to weigh the disproportionate strata for the purpose of multivariate regression analyses, because we integrate the respective variables in our models.

4.2 Measurements

4.2.1 Dependent variable – motivation to teach. To operationalize the SDT, we drew from Fernet *et al.*'s (2008) Work Tasks Motivation Scale for Teachers (WTMST) and

the Academic Motivation Scale (AMS) developed by Vallerand *et al.* (1992). Both questionnaires are proven to be reliable tests for applying Ryan and Deci's (2000) SDT of motivation to the domain of (academic) teaching. In line with other empirical studies, which could not confirm the exact theoretical dimensionality of the SDT model, we cancelled "integrated motivation" from the overall scale. After we translated the items into German, we tested them in two preliminary studies with $n = 98$ professors at two German universities to evaluate the reliability of our measures. Eventually, only minor adaptations of the wording and sequence of the questions had to be made.

All items were measured on a five-point Likert scale ranging from 1 "I totally disagree" to 5 "I totally agree." We used a principal component analysis (PCA) to test the dimensionality of our translated and modified motivation scale. The PCA with varimax rotation shows four latent variables (KMO value 0.830; explained variance of 57 percent; see Table III): intrinsic motivation (Cronbach's $\alpha = 0.79$), introjected motivation (Cronbach's $\alpha = 0.65$), extrinsic motivation (Cronbach's $\alpha = 0.68$), and amotivation (Cronbach's $\alpha = 0.61$). Moreover, we deleted one item ("Because I would feel bad if I neglected my task of teaching") to increase Cronbachs' α. The empirical merger of the intrinsic and the identified motivation subscales explains the difficulty of analytically differentiating between these two levels of internalization for our sample or task of academic teaching. The reliability coefficients may not seem optimal (< 0.70) in our case. On the one hand, this is a consequence of our strategy to adopt rather short scales (number of overall items). On the other hand, we explicitly and willingly tried not to push artificially the reliability of coefficients by formulating quasi-identical items. We will not integrate the amotivation scale in our analysis because of the low reliability and the difficulty of interpreting the construct of amotivation.

In the rest of this paper, we will concentrate on intrinsic and introjected motivation as our dependent variables as two forms of internalized teaching motivation.

4.2.2 Independent variables. (a) Perceived autonomy. To test our first hypothesis (perception of workplace autonomy), we take items from our survey of professors of universities of applied sciences. We asked them about the reasons why they decided to re-enter academia; that is, choose an academic over a "private sector" career. A PCA with varimax rotation shows three latent variables (KMO value 0.761; explained variance of 61.24 percent). We interpret the first factor as "autonomy" (Cronbach's $\alpha = 0.662$), the second as "income security" (Cronbach's $\alpha = 0.772$), and the third as "knowledge transfer" (see Table IV).

The above-mentioned items were only used in our questionnaire for the universities of applied science. Another variable to test our first hypothesis was asked in both surveys: "To work autonomously is a value in itself which cannot be compensated with all the known incentives exclusively provided by private sector companies (e.g. higher income, company car, etc.)."

(b) Perceived relatedness. To test our second hypothesis about the perceived social relatedness, we chose two items. The first is to measure the institutional support or appreciation by the dean ("The dean provides active support for the enhancement of teaching activities"). The other variable is to map social relatedness on the side of the students ("My students are eager to participate actively in teaching"). There exists no multicollinearity to the dependent variable "perceived competence".

(c) Perceived competence. The third hypothesis (perceived competence) is operationalized with the following item: "My approach to teaching was a central criteria for my [successful] appointment."

Table III.
Principal component analysis of motivation to teach (SDT) (KMO = 0.830)

Items motivation to teach	Intrinsic teaching motivation (Cronbach's α = 0.79)	Amotivation (Cronbach's α = 0.61)	Introjected motivation (Cronbach's α = 0.65)	Extrinsic motivation (Cronbach's α = 0.68)
Question: "Why do you teach?"				
Because for me, the task of teaching is of personal importance	*0.770*	−0.178	0.052	−0.147
Because I find the task of teaching interesting	*0.745*	−0.318	0.073	−0.141
Because I derive much pleasure from teaching	*0.634*	−0.433	0.066	−0.249
Because the task of teaching provides the chance to realize an aspect of my academic profession that is of personal meaning to me	*0.708*	−0.009	0.064	0.096
Because I see my teaching as a significant contribution to my students' overall academic progress	*0.592*	0.007	0.069	−0.098
Because during teaching I'm in a pleasant mental state of "flow"	*0.474*	−0.181	0.379	−0.298
Because my aspiration is to be successful at teaching, otherwise I would feel like a loser (v_21_12)	0.033	0.102	*0.793*	0.108
Because a good performance in teaching contributes largely to my self-esteem as a professor	0.246	−0.060	*0.638*	0.163
Primarily because I get positive feedback from my students	−0.046	−0.019	*0.745*	−0.105
Because I feel very uncomfortable if I neglect my teaching	0.248	0.418	*0.463*	0.215
Because I get paid for it	−0.102	−0.014	0.116	*0.854*
Because my employment contract demands me to teach	−0.213	0.161	0.055	*0.783*
I don't know, sometimes I don't see the actual purpose of teaching [at all]	−0.174	*0.748*	−0.025	0.008
I don't know why, because the work conditions provided for academic teaching are unbearable	−0.153	*0.691*	−0.083	−0.036
Teaching does not mean a lot to me, because I cannot really see what academic teaching can accomplish in my students	−0.389	*0.591*	−0.011	0.103
Because I would feel bad if I would neglect my task of teaching	0.025	*0.598*	0.324	0.162

The reason why I became a professor is	"Income Security" (Cronbach's $\alpha = 0.77$)	"Autonomy" (Cronbach's $\alpha = 0.66$)	"Knowledge Transfer"
[…] because as a professor I am guaranteed a secure lifetime income	0.782		
[…] because my job position is then irredeemable	0.773		
[…] because in this job I'll be held in great esteem when I get older	0.737		
[…] that I can carry the title of a "professor"	0.719		
[…] that I can decide autonomously about the content of my work		0.759	
[…] to work independent from a direct superior		0.731	
[…] to organize my workload on my own (working stress)		0.677	
[…] to benefit from a sound work-life balance		0.572	
[…] to pass on my (expert-) knowledge and experiences to younger generations			0.939

Table IV.
Principal component analysis of reasons for becoming a professor (KMO = 0.761)

(d) Teaching load. For the fourth hypothesis (teaching load), we conducted a PCA to conclude a scale which measures the perceived amount of effort, time, or preparatory work invested in the "instructional design of teaching" (KMO value 0.783; explained variance of 51.70 percent). The following items can be summarized with one latent factor (Cronbach's α 0.760; see Table V).

Additionally, we asked the university professors for an estimation of the average number of students they have in seminars (not lectures). We then calculated the average number of students per professor (arithmetic mean). A dummy variable was built when they had more than 25 students in a seminar or more than 30 students in an undergraduate seminar. We used these dummy variables because the metric number of students causes a non-linear effect. Moreover, professors of research universities should discriminate from professors of universities of applied science, because the latter have twice the amount of teaching load, no (non-professorial) teaching staff ("Mittelbau"). Nonetheless, they are increasingly expected to also engage in practice-oriented research activities within only small time budgets and without academic research assistance.

How much effort does it actually take for you	
[…] to develop specific methods of instruction? (e.g. discussions, lectures, experiments, case studies)	0.773
[…] to enrich the courses' teaching-learning-process with additional learning aids? (e.g. handouts, motivational instructions , web-based resources)	0.783
[…] to conceptualize/organize the social organization of the teaching-learning-processes? (e.g. cooperative learning groups, project teams)	0.767
[…] to conceptualize/organize the use of audio-visual means of instruction? (e.g. instructional films, e-learning, audio-tapes, projector)	0.693
[…] to conceptualize and communicate clear educational/instructional goals for your respective courses?	0.554

Table V.
Principal component analysis of "effort instructional design/ methods of teaching" ($\alpha = 0.76$; KMO = 0.783)

(e) Managerial governance. To test our fifth hypothesis (new managerial governance tools), we used three dummy-variables which could be answered with "yes" (=1) or "no" (=2):

(1) "are you receiving merit pay [bonuses] for teaching?";

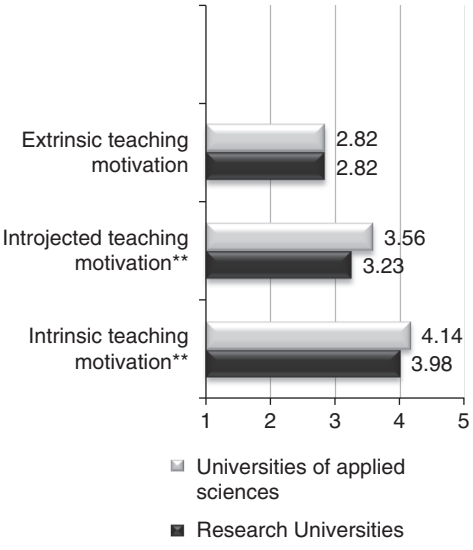
(2) "does your agreement on objectives [with the dean/rectorate] include any statements on the advancement of teaching activities?"; and

(3) "have you ever won a teaching award?"

We controlled for age, gender, payment scheme, and the duration of employment at the current university. For an overview of the correlation of all dependent and independent variables, mean, and standard derivation see Table AI.

5. Empirical results and findings

First of all, we present a short descriptive analysis of the dependent variable in a comparison between the two types of universities. Figure 2 shows that professors at universities of applied science have a slightly higher intrinsic teaching motivation. This result is a first hint at our fourth hypothesis (teaching load), because they have to master twice the teaching load of professors at traditional research universities. A self-selection process of professors at universities of applied sciences could explain this result. They are professors because they love to teach and consciously chose to end their careers in the private sector and apply for a job in academia. It should be remembered that to apply for a position at a university of applied sciences, the professors must give a testimonial of having worked at least three years outside university. The path to the professoriate at traditional universities is usually not interrupted by such an experience and, consequently, there is no decision to re-enter university and teach.



Notes: **,*Significant at 1 and 5 percent levels, respectively

Figure 2.
Teaching motivation of German professors

5.1 Regression analysis

We used OLS regression analyses to test the five hypotheses formulated above (Tables VI and VII). We estimated four multiple regression models for both types of universities (research universities; universities of applied sciences) to test and compare the total impacts of our explanatory items on the dependent variables intrinsic and introjected motivation to teach. All effect sizes are represented by standardized regression coefficients.

The regression analysis with intrinsic motivation as the dependent variable shows that we have partly rejected hypothesis one. Perceived autonomy and secure income have no significant influence on intrinsic teaching motivation. However, professors at universities of applied sciences are more intrinsically motivated when a main reason for becoming a professor is to enjoy the act of sharing knowledge with students. This supports the self-selection assumption of professors: at universities of applied sciences, they more consciously dedicate themselves to a career in academic teaching; they still do not show any difference in the dimension of intrinsic motivation to teach. The influence of "knowledge transfer" on intrinsic teaching motivation could be also interpreted as a perceived competence. To be a professor is more of a "calling" than a job or vocation. The ideal type professor enjoys himself by sharing and passing

	β coeff.	
Intrinsic teaching motivation	Universities of Applied sciences	Research universities
H1 autonomy		
Autonomy as a reason for becoming a professor	0.033	–
Secure income as a reason for becoming a professor	0.018	–
Knowledge transfer	0.389**	–
More autonomy in comparison with private companies	0.117**	0.047
H2 Relatedness		
Support from the dean	−0.015	0.039
Support from students	0.080**	0.060*
H3 Competence		
Job requirement	0.157**	0.201**
H4 Teaching load		
Efforts instructional design/methods	0.051	0.124**
More than 25 students per course (1 = yes; 0 = no)	–	0.054
More than 30 students per tutorial (1 = yes; 0 = no)	–	0.023
H5 Crowding-out effect		
Receiver of merit pay for teaching (1 = yes; 0 = no)	−0.002	0.004
Agreement on objectives includes teaching (1 = yes; 0 = no)	−0.071*	−0.064*
Teaching award winner (1 = yes; 0 = no)	0.046	0.077**
Extrinsic teaching motivation	−0.189**	−0.321**
Control variables		
Gender (1 = male; 0 = female)	−0.006	0.024
Age	−0.019	−0.049
Payment scheme (1 = pay for performance W; 0 = old wage system C)	0.024	0.064
Duration of employment at the current university	−0.019	0.068
n	803	970
Adj. R^2	0.321	0.205

Notes: **,*Level of significance at 1 and 5 percent, respectively

Table VI.
Effects on intrinsic teaching motivation

Introjected teaching motivation	β coeff. Universities of Applied Sciences	Research Universities
H1 Autonomy		
Autonomy as a reason for becoming a professor	0.026	–
Secure income as a reason for becoming a professor	0.181**	–
Knowledge transfer	0.102**	–
More autonomy in comparison with private companies	0.037	0.016
H2 Relatedness		
Support from the dean	−0.019	0.010
Support from students	0.051	0.030
H3 Competence		
Job requirement	0.051	0.137**
H4 Teaching load		
Efforts instructional design/methods	0.026	0.109**
More than 25 students per course (1 = yes; 0 = no)	–	0.093**
More than 30 students per tutorial (1 = yes; 0 = no)	–	0.023
H5 Crowding-out effect		
Receiver of merit pay for teaching (1 = yes; 0 = no)	0.012	−0.014
Agreement on objectives includes teaching (1 = yes; 0 = no)	−0.087*	−0.047
Teaching award winner (1 = yes; 0 = no)	0.002	0.042
Extrinsic teaching motivation	0.170**	0.169**
Control variables		
Gender (1 = male; 0 = female)	−0.043	−0.055
Age	−0.009	0.058
Payment scheme (1 = pay for performance "W"; 0 = old wage system "C")	0.007	0.036
Duration of employment at the current university	0.155**	0.054
n	802	969
Adj. R^2	0.101	0.066

Notes: **,*Level of significance at 1 and 5 percent, respectively

Table VII.
Effects on introjected teaching motivation

on his knowledge or wisdom to his students. Additionally, professors judge universities as, in principle, much more autonomy-supportive workplaces than private sector settings (mean for professors at universities of applied sciences 4.27 with a significant influence on intrinsic motivation; mean for professors at research universities 4.34).

H2 can be partially confirmed. The perceived support or appreciation demonstrated by students actually increases internalized motivation to teach; the same is not true with regard to the demonstrated support on the side of deans or rectorates. A plausible interpretation of this result is that in Germany deans are not known for intervening and/or supporting teaching activities.

H3 is fully supported by our data. The perceived level of attributed competence has a significantly positive effect on the level of intrinsic motivation to teach. *H4* can only be partly supported for professors at research universities. Efforts to prepare teaching activities have a positive influence on the dependent variable, i.e. internalized teaching motivation. Quite interestingly, the comparison of group means of teaching motivation between professors at research universities and at universities of applied science (see Figure 2) indicates differences between both types of higher education institution.

The regression model shows that there are similar differences in other influencing factors: professors at the universities of applied sciences report no influence of their work effort for developing new teaching methods on internalized teaching motivation.

Last but not least, we can find hints at a crowding-out of internalized teaching motivation in academia because agreement on objectives which includes teaching as well as extrinsic motivation have a negative impact on intrinsic teaching motivation. An appropriate empirical validation of this hypothesis would require longitudinal data. Teaching awards seemingly do not crowd-out intrinsic motivation, in the case of research universities (cf. Frey and Neckermann, 2008). This can be attributed to the character of awards, because they do not qualify as selective incentives as they do not really matter as regards the distribution of monetary and personal funds within universities. Awards only reward those who already excelled in a task without punishing those who did not. There is no direct correlation between effort and reward. Therefore, a person cannot calculate possible profits between his or her performance and the reward he or she will receive for investments.

Both regression models for introjected teaching motivation have a very low model fit (adj. R^2). In a nutshell, the introjected motivation to teach cannot be sufficiently explained by the independent variables, especially not for professors at research universities. Therefore, we have no evidence to support the hypotheses in the case of introjected motivation. From the point of view of SDT, this result is not really surprising because the introjected motivation is defined with a less self-determined regulatory style of motivation; that is, a less internalization level (Ryan and Deci, 2000b). Therefore, the hypothetical influencing factors have less impact on introjected motivation than on intrinsic motivation. Nonetheless, there are some noteworthy observations: for professors at universities of applied sciences "secure income" and the pleasure to share knowledge impact introjected motivation as well as the payment scheme. Professors who are additionally paid by performance measures show higher values with regard to introjected motivation than professors within the senior payment scheme. Also of interest is that extrinsic motivation (teaching for money and/or as an obligation) has a positive impact on introjected motivation. Our data show that the crowding-out effect for introjected motivation does not exist. For professors at research universities the teaching effort has a positive impact on introjected motivation.

In conclusion, we find the identical influencing factors for intrinsic and introjected motivation, but no hint of a crowding-out effect in the case of introjected motivation. This can be explained by the level of internalization: the last is a more or less low level of internalization and has closer relation to external incentives, whereas intrinsic motivation represents the highest quality of internalization.

6. Discussion and conclusion

In our study we found some empirical evidence for the assumptions of SDT. There exists a positive correlation between intrinsic motivation to teach in academia and supporting activities, as well as an appreciation or reinforcement of the academics' perceived competence. Our findings suggest the importance of a "supportive teaching culture" (Feldman and Paulsen, 1999), which is superior to any means of trying to impose monetary incentives on the academics' teaching motives. Rectorates are well advised to save monetary funds by implementing and emphasizing symbolic rewards and protecting the professoriate's demand for autonomy against all these highly ineffective "management fads" (Birnbaum, 2001) in higher education. On the other hand, we have weak evidence for a crowding-out effect on intrinsic types of motivated

academic teaching. NPM tools run the risk of reducing and harming internalized teaching motivation in the long run. Strong evidence, however, necessitates longitudinal studies and panel data. NPM may be successful in the re-structuring of higher education institutions into a "complete organization" (Ahrne and Brunsson, 2011), because it strengthens top-down hierarchical management and effective decision making. In comparison, NPM causes rather significant unintended effects on the micro-level of the professors' behavior, which outweigh the benefits of this organizational management reform.

SDT suggest useful recommendations for efficient organizational designs. Carney and Getz (2009) adopted SDT to management studies and summarized it into four principles. The third is: "Stop trying to motivate people" (Carney and Getz, 2009, p. xii). This principle emphasizes that direct influence on action with the help of selective incentives is not recommendable; rather, there should be a "meta-level" management where an environment indirectly allows the workforce to grow and self-direct their actions.

If we intended to apply our results ("lessons learned") to an evidence-based management of academic teaching, the following points would be important: if intrinsically motivated academic teaching is considered as important and worthwhile to protect and preserve, then universities have to concentrate on seriously promoting an organizational culture, which explicitly supports teaching in various respects (e.g. Deem and Lucas, 2007; Paulsen and Feldman, 1995). A "supportive teaching culture" includes a symbolic appreciation of academic teaching from the top of the organization (rectorate, vice-president) to the bottom. It requires upgrading the work conditions which really support everyday teaching like well-equipped classrooms, administrative support of teaching, didactic support to develop innovative teaching methods, etc. Furthermore, there has to be commitment to new teaching methods and to establishing and maintaining an atmosphere where such discussion between colleagues is not perceived as a waste of time. Examples could be:

(1) A sabbatical for developing new teaching methods in order to increase opportunity to develop new thoughts and the free time required to accomplish this.

(2) Mentoring programs to emphasize the outstanding relevance of teaching. An experienced colleague can support a "freshman" if asked to do so.

(3) Collegial team coaching for teaching; if voluntary, it can support and provide assistance for good teaching and present opportunities to discuss problems in academic teaching beyond the standardized feedback of student teaching evaluations.

Further research is needed to provide empirical evidence whether all these forms will have an effect on the professors' teaching behavior. Higher education research has a history of comparative studies on national and international levels, but here again, teaching is widely neglected in favor of research. In accordance with only anecdotal evidence, the place, and value of academic teaching within universities is different in other countries.

Our survey is limited by some reasons: It provides only evidence with cross-sectional data for the case of Germany. Additionally, we would also ask for a more detailed discussion of PSM within the field and organizations of higher education. Particularly, we have to bear in mind that introjected motivation is only an approximation of PSM (Perry 1996).

Note

1. The data collection has been financed by the German Research Foundation (project-ID: WI 2052/2-1 and WI 2052/2-2).

References

Ahrne, G. and Brunsson, N. (2011), "Organization outside organizations: the significance of partial organizations", *Organization*, Vol. 18 No. 1, pp. 83-104.

Birnbaum, R. (2001), *Management Fads in Higher Education: Where They Come From, What They Do, Why They Fail, 1*, 2nd ed., Jossey-Bass, San Francisco, CA.

Carney, B.M. and Getz, I. (2009), *Freedom*, Freedom Inc Crown Business, New York, NY.

de Boer, H., Endres, J. and Schimank, U. (2007), "On the way towards new public management? The governance of university systems in England, the Netherlands, Austria, and Germany", in Jansen, D. (Ed.), *New Forms of Governance in Research Organizations*, Springer, Dordrecht, pp. 137-154.

Deem, R. and Lucas, L. (2007), "Research and teaching cultures in two contrasting UK policy contexts: academic life in education departments in five English and Scottish universities", *Higher Education*, Vol. 54 No. 1, pp. 115-133.

Enders, J., Kehm, B. and Schimank, U. (2002), "Structures and problems of research in German higher education", in McAdams, R. (Ed.), *Trends in American and German Higher Education*, American Academy of Arts and Sciences, Cambridge, MA, pp. 85-119.

Feldman, K.A. and Paulsen, M.B. (1999), "Faculty motivation: the role of a supportive teaching culture", *New Directions for Teaching and Learning*, Vol. 1999 No. 78, pp. 69-78.

Fernet, C., Senécal, C., Guay, F., Marsh, H. and Dowson, M. (2008), "The work tasks motivation scale for teachers (WTMST)", *Journal of Career Assessment*, Vol. 16 No. 2, pp. 256-279.

Frey, B.S. (1997), *Not Just for the Money*, Edward Elgar Publishing, Cheltenham.

Frey, B.S. and Neckermann, S. (2008), "Academics appreciate awards. A new aspect of incentives in research", Working Paper No. 2008 -32, Center for Research in Economics, Management and the Arts, University of Zurich, Zurich.

Gagné, M. and Deci, E.L. (2005), "Self-determination theory and work motivation", *Journal of Organizational Behavior*, Vol. 26 No. 4, pp. 331-362.

Getz, I. (2009), "Liberating leadership: how the initiative-freeing radical organizational form has been successfully adopted", *California Management Review*, Vol. 51 No. 4, pp. 32-58.

Gibbons, R. (1998), "Incentives in organizations", *Journal of Journal of Economic Perspectives*, Vol. 12 No. 1, pp. 115-132.

Grant, A.M. (2008), "Does intrinsic motivation fuel the prosocial fire? Motivational synergy in predicting persistence, performance, and productivity", *Journal of Applied Psychology*, Vol. 93 No. 1, pp. 48-58.

Jacobsen, C.B., Hvitved, J. and Andersen, L.B. (2013), "Command and motivation: how the perception on external interventions relates to intrinsic motivation and public service motivation", *Public Administration*, available at: http://onlinelibrary.wiley.com/doi/10.1111/padm.12024/abstract (accessed March 25, 2013).

Jansen, D. (2007), "Governance of research – working towards interdisciplinary concepts", in Jansen, D. (Ed.), *New Forms of Governance*, Dordrecht, Springer, pp. 110-133.

Kehm, B.M. and Lanzendorf, U. (2007), "The impacts of university management on academic work: reform experiences in Austria and Germany", *Management Revue*, Vol. 18 No. 2, pp. 153-173.

Leišytė, L., Enders, J. and de Boer, H. (2009), "The balance between teaching and research in Dutch and English universities in the context of university governance reforms", *Higher Education*, Vol. 58 No. 5, pp. 619-635.

Leroy, N., Bressoux, P., Sarrazin, P. and Trouilloud, D. (2007), "Impact of teachers' implicit theories and perceived pressures on the establishment of an autonomy supportive climate", *European Journal of Psychology of Education*, Vol. 22 No. 4, pp. 529-545.

Lindholm, J.A. (2004), "Pathways to the professoriate: the role of self, others, and environment in shaping academic career aspirations", *Journal of Higher Education*, Vol. 75 No. 6, pp. 603-635.

Locke, E.A. and Latham, G.P. (1990), *A Theory of Goal Setting and Task Performance*, Englewood Cliffs, Prentice-Hall, Inc., NJ.

Locke, E.A. and Latham, G.P. (2006), "New directions in goal setting theory", *Current Directions in Psychological Science*, Vol. 15 No. 5, pp. 265-268.

Moses, I. and Ramsden, P. (1992), "Academic values and academic practice in the new universities", *Higher Education Research and Development*, Vol. 11 No. 2, pp. 101-118.

Müller, F.H., Hanfstingl, B. and Andreitz, I. (2009), "Bedingungen und Auswirkungen selbstbestimmter Lehrermotivation", *Erziehung und Unterricht*, Vol. 159 Nos 1/2, pp. 142-152.

Müller-Böling, D. and Schreiterer, U. (1999), "Hochschulmanagement durch Zielvereinbarungen – Perspektiven eines neuen Steuerungsinstruments", in Fedrowitz, J., Krasny, E. and Ziegele, F. (Eds), *Hochschulen und Zielvereinbarungen – neue Perspektiven der Autonomie: vertrauen – verhandeln – vereinbaren*, Bertelsmann Stiftung, Gütersloh, pp. 9-25.

Niemiec, C.P. and Ryan, R.M. (2009), "Autonomy, competence, and relatedness in the classroom. Applying self-determination theory to educational practice", *Theory and Research in Education*, Vol. 7 No. 2, pp. 133-144.

Niemiec, C.P., Lynch, M.F., Vansteenkiste, M., Bernstein, J., Deci, E.L. and Ryan, R.M. (2006), "The antecedents and consequences of autonomous self-regulation for college: a self-determination theory perspective on socialization", *Journal of Adolescence*, Vol. 29 No. 5, pp. 761-775.

O'Flynn, J. (2007), "From new public management to public value: paradigmatic change and managerial implications", *The Australian Journal of Administration*, Vol. 66 No. 3, pp. 353-366.

Paulsen, M.B. and Feldman, K.A. (1995), *Taking Teaching Seriously Meeting the Challenge of Instructional Improvement*, ERIC Clearinghouse on Higher Education, Washington, DC.

Pelletier, L.G., Seguin-Lévesqui, C. and Legault, L. (2002), "Pressure from above and pressure from below as determinants of teachers' motivation and teaching behaviors", *Journal of Educational Psychology*, Vol. 94 No. 1, pp. 186-196.

Perry, J.L. (1996), "Measuring public service motivation: an assessment of construct reliability and validity", *Journal of Public Administration Research and Theory*, Vol. 6 No. 1, pp. 5-22.

Perry, J.L., Hondeghem, A. and Wise, L.R. (2010), "Revisiting the motivational bases of public service: twenty years of research and an agenda for the future", *Public Administration Review*, Vol. 70 No. 5, pp. 681-690.

Reeve, J., Deci, E.L. and Ryan, R.M. (2004), "Self-determination theory: a dialectical framework for understanding socio-cultural influences on student motivation", in Van Etten, S. and Pressley, M. (Eds), *Big Theories Revisited*, Information Age Publishing, Inc., Greenwich, pp. 31-60.

Roth, G., Assor, A., Kanat-Maymon, Y. and Kaplan, H. (2007), "Autonomous motivation for teaching: how self-determined teaching may lead to self-determined learning", *Journal of Educational Psychology*, Vol. 99 No. 4, pp. 761-774.

Ryan, R.M. and Deci, E.L. (2000a), "Intrinsic and extrinsic motivation: classic definitions and new directions", *Contemporary Educational Psychology*, Vol. 25 No. 1, pp. 54-67.

Ryan, R.M. and Deci, E.L. (2000b), "Self-determination theory and the facilitation of intrinsic motivation, social development and well-being", *American Psychologist*, Vol. 55 No. 1, pp. 68-78.

Ryan, R.M. and Deci, E.L. (2006), "Self-regulation and the problem of human autonomy: does psychology need choice, self-determination, and will?", *Journal of Personality*, Vol. 74 No. 6, pp. 1557-1558.

Schimank, U. (2005), "A comparative perspective on changes in university governance in Europe: ANU", *National Institution of Social Sciences & Law*, Vol. 1 No. 1, pp. 1-10.

Shore, C. (2008), "Audit culture and illiberal governance: universities and the politics of accountability", *Anthropological Theory*, Vol. 8 No. 3, pp. 278-298.

Taylor, I.M., Ntoumanis, N. and Standage, M. (2008), "A self-determination theory approach to understanding the antecedents of teachers' motivational strategies in physical education", *Journal of Sport & Exercise Psychology*, Vol. 30 No. 1, pp. 75-94.

Vallerand, R.J., Pelletier, L.G., Blais, M.R., Briere, N.M., Senecal, C. and Vallieres, E.F. (1992), "The academic motivation scale: a measure of intrinsic, extrinsic, and amotivation in education", *Educational and Psychological Measurement*, Vol. 52 No. 4, pp. 1003-1017.

Vandenabeele, W. (2007), "Government calling: public service motivation as an element in selecting government as an employer of choice", *Public Administration*, Vol. 86 No. 4, pp. 387-412.

Wilkesmann, U. and Schmid, C.J. (2010), "Ist der Lehrpreis ein Leistungsanreiz für die Lehre?", in Tremp, P. (Ed.), "*Ausgezeichnete Lehre!" Lehrpreise an Universitäten*, Waxmann Verlag, Münster, pp. 39-55.

Wilkesmann, U. and Schmid, C.J. (2012), "The impacts of new governance on teaching at German universities. Findings from a national survey in Germany", *Higher Education*, Vol. 63 No. 1, pp. 33-52.

Zhou, M., Ma, W.J. and Deci, E.L. (2009), "The importance of autonomy for rural Chinese children's motivation for learning", *Learning and Individual Differences*, Vol. 19 No. 4, pp. 492-498.

Further reading

Frey, B.S. and Jegen, R. (2001), "Motivation crowding theory", *Journal of Economic Surveys*, Vol. 15 No. 5, pp. 589-611.

Frey, B.S. and Osterloh, M. (2002), *Successful Management by Motivation*, Springer, New York, NY and Berlin.

Gibbons, M., Limoges, C. and Nowotny, H. (Eds) (1994), *The New Production of Knowledge*, Sage, Beverly Hills, CA.

Perrow, C. (1986), "Economic theories of organization", *Theory and Society*, Vol. 15 No. 1, pp. 11-45.

Smeenk, S., Teelken, C., Eisinga, R. and Doorewaard, H. (2009), "Managerialism, organizational commitment, and quality of job performances among European university employees", *Research in Higher Education*, Vol. 50 No. 6, pp. 589-607.

Vandenabelle, W. (2007), "Toward a public administration theory of public service motivation: an institutional approach", *Public Management Review*, Vol. 9 No. 4, pp. 545-556.

Vaughan, D. (1998), "Rational choice, situated action, and the social control of organizations", *Law and Society Review*, Vol. 32 No. 1, pp. 23-61.

Appendix

	Mean	SD	Intrinsic motivation	Introjected motivation	Autonomy as a reason for becoming a professor	Secure income as a reason for becoming a professor	Knowledge sharing	More autonomy in comparison with private companies	Support from the dean	Support from students	Job requirement	Efforts methods	More than 25 students per course	More than 30 students per tutorial	Receiver of merit pay for teaching	Agreement on objectives includes teaching	Teaching award winner	Extrinsic teaching motivation	Gender	Age	Payment scheme	Duration of employment at the current university
Intrinsic motivation	4.06	0.66	1																			
Introjected motivation	3.10	0.88	0.261**	1																		
Autonomy as a reason for becoming a professor	3.43	0.90	0.074*	0.123**	1																	
Secure income as a reason for becoming a professor	2.79	0.98	0.053	0.213**	0.422**	1																
Knowledge sharing	4.42	0.75	0.488**	0.106**	0.054	0.094**	1															
More autonomy in comparison with private companies	4.31	0.98	0.070**	0.058**	0.402**	0.192**	0.035	1														
Support from the dean	2.80	1.16	0.102**	0.030	−0.010	0.049	0.048	0.044	1													
Support from students	2.67	1.07	0.098**	0.023	−0.006	−0.002	0.043	0.025	0.233**	1												
Job requirement	3.29	1.33	0.294**	0.152**	0.020	0.085*	0.220**	0.003	0.235**	0.085**	1											
Efforts methods	3.30	0.83	0.177**	0.093**	0.030	0.020	0.160**	−0.046*	0.072**	0.011	0.189**	1										
More than 25 students per course (1 = yes; 0 = no)	0.15	0.36	−0.012	0.016	.c	.c	.c	0.013	−0.100**	0.009	−0.129**	0.015	1									
More than 30 students per tutorial (1 = yes; 0 = no)	0.10	0.31	−0.002	−0.015	.c	.c	.c	0.020	−0.051*	0.032	−0.104**	−0.039	0.153**	1								
Receiver of merit pay for teaching (1 = yes; 0 = no)	0.13	0.34	0.049*	0.012	0.051	0.060	0.073*	−0.011	0.051*	0.003	0.099**	0.009	−0.081**	−0.052*	1							
Agreement on objectives includes teaching (1 = yes; 0 = no)	0.38	0.49	−0.023	−0.042	−0.006	−0.033	−0.015	−0.011	0.169**	0.028	0.102**	0.011	−0.042	−0.021	0.082**	1						
Teaching award winner (1 = yes; 0 = no)	0.06	0.24	0.069**	0.012	0.036	0.035	−0.004	0.000	0.028	0.060**	−0.007	−0.051*	0.001	0.038	0.019	−0.008	1					
Extrinsic teaching motivation	2.83	1.26	−0.314**	0.152**	0.107**	0.203**	−0.210**	0.005	−0.023	0.050*	−0.102**	−0.041	−0.007	−0.025	−0.014	−0.036	−0.036	1				
Gender (1 = male; 0 = female)	0.74	0.44	−0.001	−0.042	0.136**	0.067*	0.010	0.044	0.061**	0.021	−0.004	−0.103**	−0.081**	0.029	−0.002	0.037	0.021	−0.062**	1			
Age	49.74	7.36	−0.029	0.042	−0.043	−0.030	0.010	0.001	−0.053*	−0.042	−0.080**	−0.102**	0.046*	0.034	−0.149**	0.048*	0.037	−0.127**	0.146**	1		

(*continued*)

Table AI.
Correlation matrix

	Mean	SD	Intrinsic motivation	Introjected motivation	Autonomy as a reason for becoming a professor	Secure income as a reason for becoming a professor	Knowledge sharing	More autonomy in comparison with private companies	Support from the dean	Support from students	Job requirement	Efforts methods	More than 25 students per course	More than 30 students per tutorial	Receiver of merit pay for teaching	Agreement on objectives includes teaching	Teaching award winner	Extrinsic teaching motivation	Gender	Age	Payment scheme	Duration of employment at the current university
Payment scheme (1 = pay for performance "W"; 0 = old wage system "C")	0.53	0.50	0.027	−0.032	0.069*	0.053	0.101**	−0.013	0.022	0.020	0.016	0.071**	0.046*	−0.026	0.325**	−0.072**	−0.040	0.083**	−0.109**	−0.581**	1	
Duration of employment at the current university	8.40	6.83	−0.013	0.078**	−0.006	−0.039	−0.052	0.028	−0.011	−0.013	−0.004	−0.069**	−0.072**	−0.006	−0.136**	0.093**	0.032	−0.108**	0.153**	0.714**	−0.658**	1

Notes: c; cannot be computed because at least one of the variables is constant. ** $p < 0.1$; * $p < 0.05$; two-tailed tests

Table AI.

About the authors

Professor Uwe Wilkesmann holds a Chair of Organization Studies and Continuing Education Management and is the Director of the Center of Higher Education, TU Dortmund University; additionally, he serves as Adjunct Professor at the Knowledge Management and Innovation Research Centre at The Hong Kong Polytechnic University. Professor Uwe Wilkesmann is the corresponding author and can be contacted at: uwe.wilkesmann@tu-dortmund.de

Christian J. Schmid, Dipl.-Soz., is a Research Associate at the Chair of Organization Studies and Continuing Education Management, TU Dortmund University.