Teaching-Focused Faculty: The Supports, Structures, and Policies that Relate to Their Perceptions of Influence on Their Colleagues' Teaching

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Abstract

The demand for high-quality teaching to prepare students to succeed in a rapidly evolving workforce is increasing the popularity of teaching-focused faculty: labeled "Teaching Professors" or "Professors of Teaching" (TP/PoTs) within the University of California system. We leverage self-determination theory to examine the institutional supports, structures, and policies that might satisfy TP/PoTs' needs for autonomy, competence, and relatedness to bolster TP/PoTs' influence on their colleague's teaching. We found that TP/PoTs' relatedness-satisfaction was the strongest predictor of their perceived influence, followed by their competence-satisfaction and then their autonomy-satisfaction. All of the institutional factors that we examined, excluding startup funds, mediated the relationship between TP/PoTs' needs-satisfaction and their perceived influence. These results have implications for how institutions can increase both the quantity and quality of faculty's influence on their colleague's teaching.

Keywords: teaching-focused faculty, influence, self-determination theory

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Sense of Autonomy, Competence, Relatedness, and Influence at Work

As we continue to automate more rudimentary jobs, employees are being asked to solve increasingly complicated and unpredictable problems (Young & Glanfield, 1998). This shift is reflected in current education agendas that prioritize the development of students' abilities to independently and collaboratively develop novel ideas, solutions, and questions. For example, the Next Generation Science Standards call for students to ask questions, define problems, develop and use models, plan and carry out investigations, construct explanations, and design solutions (NGSS, 2013). The Common Core State Standards for Mathematics calls for students to reason abstractly, construct viable arguments, critique the reasoning of others, use tools strategically, and look for and make use of structures and regularity in repeated reasoning (California Department of Education, 2013). These expectations extend to higher education, where a recent symposium organized by the National Academies of Sciences, Engineering, and Medicine highlights the importance of developing not only students' critical thinking and analytical skills but also virtues that cannot be replaced by computers, like persistence, curiosity, and creativity (NASEM, 2022). It has perhaps never been more difficult for teachers to prepare students to succeed in the workforce.

In higher education institutions, the demand for high-quality teaching is increasing the popularity of a faculty model that is neither traditional research faculty (i.e., faculty who are evaluated primarily on the strength of their research program), nor traditional adjunct faculty (i.e., faculty whose sole responsibility is classroom instruction). This newer class of teaching-focused faculty are known within the University of California system as "Teaching Professors"

or "Professors of Teaching" (TP/PoTs). Similar to traditional research faculty, TP/PoTs are on the tenure-track, but are primarily evaluated on their teaching, followed by their scholarly activity and service. Compared to other faculty, TP/PoTs have demonstrated greater pedagogical expertise (Harlow et al. 2020) and a greater likelihood to implement evidence-based teaching practices (Denaro et al., 2022). Faculty stakeholders (i.e., department chairs or vice-chairs, deans or associate deans, and hiring committee chairs) report that they hire TP/PoTs to provide students with "excellent" instruction and to positively influence their colleagues' teaching by "bringing consistency to department teaching-related efforts and service" (Harlow et al., 2022, p. 7).

In this study, we aim to identify specific ways that institutions can bolster TP/PoTs' influence on their colleague's teaching: measured as a single construct that is indicated by TP/PoTs' perceptions of the extent to which they influence their colleague's teaching beliefs, knowledge, and practices. We examine the relationship between TP/PoTs' influence and several institutional factors, and we leverage self-determination theory to infer the quality of this influence.

Self-determination theory (e.g., Ryan et al., 2010; Ryan & Deci, 2000) postulates that the quality of people's motivation will increase as they satisfy three fundamental psychological needs: the need to feel autonomous, the need to feel competent, and the need to feel related or connected. The greater people's needs-satisfaction and motivational quality, the greater their interest, persistence, performance, job satisfaction, and general well-being (Rigby & Ryan, 2018). For example, employees who report a high needs-satisfaction are more likely to share their knowledge (Foss et al., 2009), perform better (Kuvaas, 2009) have less frequent turnover intentions (Richer et al., 2002), and experience less burnout (Fernet et al. 2012). Teachers who

report they have a high-quality motivation are more likely to implement practices that increase

the motivational quality of their students (Pelletier & Sharp, 2009). In higher education,

Stupinksy et al., (2018) found that faculty's needs-satisfaction positively predicts the quality of

their motivation, which positively predicts their use of effective teaching practices including

instructional clarity, and practices that facilitate learning that is higher-order, reflective,

integrative, and collaborative. There is also evidence that the level of autonomy-support that

employers offer can be increased and that this may improve employed outcomes. Deci et al.,

(1989) implemented an autonomy-supportive training intervention for managers and found that

of the fifteen outcomes they examined, two significantly increased posttreatment: trust in the

corporation and satisfaction with the potential for advancement. The authors also found that

managers' autonomy-supportive orientation (measured as managers' responses to what they

would do in a variety of work situations) positively relates to employees' loyalty, job

satisfaction, and positive work attitudes. Like Deci (1989), we are interested in leveraging self-

determination theory to identify malleable factors that can improve employee outcomes. In our

context, this includes institutional supports, structures, and policies that may bolster TP/PoTs'

influence on their colleague's teaching.

In this study, we examine whether TP/PoTs' needs-satisfaction mediates the relationship

between their institutional factors and their perceived influence. Although we do not directly

examine the quality of teaching-faculty's influence, we reason that if faculty report a high needs-

satisfaction then their influence will be of high quality. We base this reasoning on self-

determination theory which indicates that people put forth their highest quality efforts when their

three needs are satisfied (e.g., Ryan & Deci, 2000). Although self-determination theory is

supported by extensive (often experimental), cross-cultural, and robust research, there is

comparatively little work that examines how self-determination theory plays out with faculty in higher education, and no research, to our knowledge, that examines the relationship between people's needs-satisfaction and their perceived influence on others' beliefs, knowledge, and practices.

Research Questions

In this study, we focus on two research questions:

1. To what extent do TP/PoTs' perceptions of institutional factors relate to their (a) autonomy-, (b) competence-, and (c) relatedness-satisfaction?

2. To what extent do TP/PoTs' (a) autonomy-, (b) competence-, and (c) relatedness-satisfaction mediate the relationship between institutional factors and their perceived influence on their colleagues' teaching?

Method

Participants and Procedure

We analyzed survey responses from 260 TP/PoT faculty (123 women, 110 men, 20 who preferred not to answer, 3 who preferred to self-describe, 2 who selected "genderqueer, gender non-binary, or gender fluid", and 2 with missing gender responses). These data were from a survey (63% response rate[1]) that we sent out in Fall of 2021 to all TP/PoTs across the UC system. We conducted this study in accordance with the institutional review board of the University of California Irvine, and with the support of the National Science Foundation: Division of Undergraduate Education (DUE) Grant 1821724.

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[1] The survey was administered to 473 faculty and 299 responded. Of those 299 responses, 260 completed more than half the survey.

Measures

Table 1 lists the items that indicate each latent construct: autonomy-satisfaction, competence-satisfaction, relatedness-satisfaction, and perceived influence. Tables 6, 7, and 8 list the items indicating the institutional factors that are autonomy-, competence- and relatedness-relevant, respectively.

Institutional Factors

We measured TP/PoTs' perceptions of institutional factors, which we categorized as being one or more of the following: autonomy-relevant, competence-relevant, and relatedness-relevant (see Tables 6, 7, and 8, respectively). Example items include: "Do you have the right to serve on L(P)SOE faculty search committees" (autonomy-relevant), "My campus provides adequate training opportunities for me to improve my teaching" (competence-relevant), and "How many faculty in your department do you view as a mentor to you?" (relatedness-relevant).

We examined the consistency in TP/PoTs' reports of institution- and department-level institutional factors across respondents from the same institution and department. Institution-level institutional factors include: whether TP/PoTs are allowed to (1) vote on merit and promotion cases; (2) serve on hiring committees; or (3) serve as principal investigator on research projects. Note that teaching and scholarly work training are institutional factors that may or may not be institutional-level supports. The department-level institutional factor asked respondents to rate the degree to which the department is committed to teaching compared to research.

Needs Satisfaction: Autonomy, Relatedness, and Competence

We modified items from Diener et al. (2010)'s flourishing scale to measure the extent to which TP/PoTs believe that their institution satisfies their needs for autonomy, competence, and

relatedness (see Table 1). Ryan and Deci (2000) describe self-determination theory as a scientific framework for studying human flourishing. The idea is that humans will flourish when their three fundamental psychological needs are met.

Two items measure autonomy satisfaction (e.g., "My work is purposeful and meaningful", response scale ranges from 1 = "strongly disagree" to 6 = "strongly agree"), three items measure competence satisfaction (e.g., I am competent and capable in this job", scale ranges from 1 = "strongly disagree" to 6 = "strongly agree"), and six items measure relatedness satisfaction (e.g., How much do you feel like you belong as a faculty member in your department?, response scale ranges from 1 = "not at all" to 6 = "completely").

We measure faculty perceptions of autonomy based on two assumptions: (1) people are autonomous when they engage in activities they value and (2) people value feeling benevolent. The former assumption implies that people can be autonomously motivated even when that motivation depends on external factors. This perspective is challenged by Hackman and Oldham (1976) who equate autonomy with independence. In contrast, Edward Deci and Richard Ryan (e.g., Ryan & Deci, 2000), the founders of self-determination theory, argue that autonomy and independence are not the same thing, and that we can feel autonomously motivated even when that motivation depends on external factors. The second assumption (i.e., people value feeling benevolent) in conjunction with the first assumption (i.e., people feel autonomous when they engage in acts they value) implies that acting benevolently aligns with acting autonomously. These two assumptions together are challenged by Martela and Riekki (2018) who measured participant's feelings of autonomy separately from their feelings of benevolence, indicating that the authors perceive autonomy and benevolence as two distinct constructs. In contrast, Ryan and Deci (2000) explain that people feel autonomous when they engage in activities that they value

and, as Martela and Ryan (2016) point out, the research on people's prosocial tendencies (e.g., Hepach et al., 2012; Warneken & Tomasello, 2009) and the evolutionary advantages of prosocial behavior (e.g., Brown & Brown, 2006; Fehr & Fischbacher, 2003) indicate that people inherently value feeling benevolent.

To best measure TP/PoTs' relatedness-satisfaction, we included 4 items that measure feelings of belonging in their occupation. Belonging is identical to relatedness in that both constructs are concerned with social connectedness, but researchers typically situate each construct in different theoretical frameworks. For example, researchers tend to study belonging in the context of social psychology, whereas relatedness is a core concept in self-determination theory, a broader theory of human motivation and well-being. We chose to emphasize the term belonging in our measure of relatedness because belonging is an increasingly popular motivational construct (Peter's citation: Motivation SIG at AERA, 2023) in higher education and TP/PoTs may be more familiar with items that explicitly refer to their feelings of belonging.

Table 5 provides estimates of composite reliability and convergent validity for each construct that we modeled. We use the Fornell-Larker (1981) criteria to evaluate whether the reliability and validity estimates are acceptable. The constructs show acceptable composite reliability and convergent validity; although for competence, the estimated composite reliability ($\omega = 0.65$) is just below the 0.70 cutoff for acceptable reliability, and the convergent validity estimate ($\omega = 0.493$) is just below the 0.50 cutoff for acceptable validity. The constructs show acceptable discriminant validity, which we tested by examining whether the square root of the estimated composite reliability is greater than the correlation between the model constructs.

Eight faculty members, each with expertise in education research, evaluated the validity of our scales in the context of our study. All scales show perfect agreement across all eight experts and for all indicators[2].

Influence

We used three items (see Table 1) to measure influence: "How much are you influencing your colleagues' teaching beliefs?"; "How much are you influencing your colleagues' teaching practices?", "How much are you influencing your colleagues' teaching knowledge?", Items were rated on a scale from 1 (not at all) to 6 (completely). Influence shows acceptable composite reliability, convergent validity, and discriminant validity (see Table 5).

Confirmatory Factor Analysis for Testing Construct Validity

We used confirmatory factor analysis to test the fit of the 3-factor measurement model for TP/PoTs' perceptions that their three psychological needs are met. Table 9 lists the fit indices for the 3-factor model along with the fit indices of alternative models. Alternative models include 2-factor models of varying combinations of the original three factors. We also test the fit of a model that specifies two factors: (1) a flourishing factor that is indicated by the items we modified from Diener et al. (2010)'s flourishing scale; and (2) a belonging factor that is indicated by items that explicitly ask the participant to report on how well they belong in varying occupational situations. The 3-factor model is the best fitting model as indicated by the high

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[2] The initial agreement test we conducted (to examine the validity of our original scales) did not show perfect agreement. We originally had 4 items to measure autonomy and 4 items to measure competence. However, after deliberating with these experts, and calibrating our definitions of autonomy and competence using the theory and research that we base our hypotheses on, we settled on 2 items to measure autonomy and 3 items to measure competence.

(higher = better fit) CFI/TLI values and the low (lower = better fit) SRMR and RMSEA values. Table 9 also provides results from the chi-square difference tests we conducted to compare the fit of our model to the alternative models. The 3-factor model fits our data significantly better than the alternative models.

Analysis

We used structural equation modeling to examine the relationship between TP/PoTs' institutional factors and their feelings of autonomy, competence, relatedness, and influence, and ran three sets of models, one set for each need. Figures 1,2, and 3 illustrate the structural relations for the three models. Each figure illustrates the two research questions we addressed with the labels: [RQ.1a and RQ.2a], [RQ.1b and RQ.2b], and [RQ.1c and RQ.2c], for the autonomy, competence, and relatedness models, respectively.

We examined the extent to which our hypothesized models fit our observed data using the following indices: the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), and the Root Mean Square Error of Approximation (RMSEA). Each of these indices are widely used and are robust to sample size and data distributions. Additionally, the CFI, TLI, and RMSE each consider the model's complexity and parsimony.

We used confirmatory factor analysis to examine the construct validity of the needs-satisfaction scales and multi-group confirmatory factor analysis to examine whether the needs-satisfaction and influence scales are invariant across gender. Missing data were handled using full information maximum likelihood. Analyses were conducted using MPlus version 8.8 and MATLAB version R2022b.

Results

Table 2 provides summary statistics for all observed measures: the individual items that indicate TP/PoTs' institutional factors, needs-satisfaction, perceived influence, identity as a researcher, identity as an instructor, identity as a PoT professional, and gender. Table 3 provides the Pearson correlations between TP/PoTs' reports of how influential they are and their reports of how well their institution meets their need for autonomy, competence, and relatedness. Following Cohen's (1998) conventions, there is a large correlation between autonomy and competence ($r=0.892$, $p<0.001$), and moderate correlations between relatedness and autonomy ($r=0.525$, $p<0.001$) and relatedness and competence ($r=0.555$, $p<0.001$). There is a moderate positive relationship between TP/PoT faculty's influence and their need satisfaction for relatedness ($r=0.414$, $p<0.001$), a small to moderate correlation between influence and competence ($r=0.298$, $p<0.01$), and a small correlation between influence and autonomy ($r=0.198$, $p<0.05$).

We used structural equation modeling to examine the relationship between TP/PoTs' institutional factors, their perceptions of needs (i.e., autonomy, competence, and relatedness) satisfaction, and their perceptions of influence. To avoid multicollinearity, we ran three sets of models, each of which specified a different need (i.e., autonomy, competence, or relatedness) as the mediator: Autonomy models, Competence models, and Relatedness models.

RQ.1: To what extent do TP/PoTs' perceptions of institutional factors relate to their (a) autonomy-, (b) competence-, and (c) relatedness-satisfaction?

Table 6 provides results from the autonomy models (Figure 1). The institutional factors that significantly predict autonomy include: Committee (respondents have the right to serve on TP/PoT hiring committees), Office Location (the respondent's office is located near the majority of their faculty colleagues), Teach Focus (the extent to which the respondent's department is

focused more on teaching than on research), Train(Teach) (the institution provides adequate training for teaching-related activities), and Train(Scholar) (the institution provides adequate training for scholarly activities). After including autonomy in the model, only one institutional factor significantly predicted influence: Teach Focus.

Table 7 provides results from the competence models (Figure 2). The institutional factors that significantly predict competence include: Train (Teach), Train (Scholar), Mentors (the number of departmental faculty mentors that the respondent has access to), Committee, and Teach Focus.

Table 8 provides results from the relatedness models (Figure 3). The institutional factors that significantly predict relatedness include: Mentors, Office, Train (Teach), Train (Scholar), Committee, Teach Focus, PI (TP/PoTs have the right to serve as PI on external grants).

RQ.2: To what extent do TP/PoTs' (a) autonomy-, (b) competence-, and (c) relatedness-satisfaction mediate the relationship between institutional factors and their perceived influence on their colleagues' teaching?

Autonomy fully mediated the relationship between influence (dependent variable) and the institutional factors (independent variables) Committee, Train (Teach), and Train(Scholar). Competence fully mediated the relationship between influence (dependent variable) and the following institutional factors (independent variables): Train (Teach), Train(Scholar), Mentors, and Committee. Lastly, competence partially mediated the relationship between Teach Focus and Influence. Relatedness fully mediated the relationship between influence (dependent variable) and the following institutional factors (independent variables): Mentors, Office, Train (Teach), Train (Scholar), Committee, and PI. Lastly, relatedness partially mediated the relationship between Teach Focus and Influence.

Discussion

Our principal observation is that TP/PoTs report greater influence on their colleague's teaching the more they perceive that their institution satisfies their three fundamental psychological needs: the need to feel autonomous, the need to feel competent, and the need to feel related or connected to others. This is consistent with our hypothesis which is largely based on evidence that employees are more likely to contribute their knowledge when their needs for autonomy, competence, and relatedness are satisfied (Foss et al., 2009).

We found that TP/PoTs' relatedness-satisfaction most strongly predicted their perceived influence, followed by their competence-satisfaction and then their autonomy-satisfaction. TP/PoTs' sense of relatedness in their institution refers to their sense of connection, belonging, and interpersonal support with others in their workplace. TP/PoTs who report high relatedness-satisfaction are indicating that they feel supported and respected by their colleagues: a necessary condition if they are to influence their colleagues' teaching.

The Relationship between TP/PoTs' Institutional Factors and their Needs-Satisfaction

We found that TP/PoTs' autonomy-, competence-, and relatedness-satisfaction mediated the relationship between their perceived influence and the relevant institutional factors: relatedness-relevant (all examined), competence-relevant (3 out of 7 examined), and autonomy-relevant (5 out of 8 examined). This was true even after controlling for gender and the extent to which the TP/PoT identified as teachers and researchers. These results imply that institutions may be able to increase TP/PoTs' influence by implementing supports, structures, and policies that satisfy TP/PoTs' needs for autonomy, competence, and relatedness.

Although all of the relatedness-relevant factors were positively correlated with relatedness, there were several autonomy-relevant and competence-relevant factors that were not

correlated with autonomy and competence, respectively. What especially interests us is that the

factors we identified to be relevant for a particular need were positively correlated to a different

need. For example, we expected, but did not find, that TP/PoTs' reports of competence-

satisfaction would positively relate to their reports that their institution provides adequate

training for them to improve their scholarly work. Instead, scholarly work training was positively

related to autonomy and relatedness. This mismatch suggests that there could be a third factor

that predicts TP/PoTs' autonomy- and relatedness-satisfaction as well as their perception that

adequate training is provided. In this case, there was substantial variation in TP/PoTs' reports of

adequate training within the institution, which indicates that the third factor may be a person-

level factor. Perhaps there is something about respondents who feel autonomous and related that

also explains why they perceive that adequate training is provided even though other TP/PoTs

disagree. For example, TP/PoTs who feel autonomous may like to work on their own, and

TP/PoTs who feel related may be less likely to seek out training opportunities to connect with

co-workers.

Providing TP/PoTs the Right to be Involved with Faculty Hiring

Of the institutional policies we modeled, only two predicted TP/PoTs' autonomy-

satisfaction: (1) their right to serve on TP/PoT hiring committees, and (2) their right to contribute

to faculty hiring plans. These results imply that TP/PoTs value their involvement with faculty

hiring more than they value serving as a PI on external grants or voting in merit and promotion

cases. This implication is supported by self-determination theory which says that people feel

more autonomous the more they engage in work activities they value (Ryan et al., 2010).

Providing faculty the right to be involved with hiring processes signals to them that they are in a

distinguished and respected position within the organizational hierarchy, which may increase

faculty's feelings of autonomy.

TP/PoTs' right to serve on faculty hiring committees was the strongest predictor of their

relatedness-satisfaction. Faculty who are in a position to influence hiring decisions have more

control over who they work with and connect with. Faculty that serve on hiring committees have

the opportunity to meet and connect with newly hired faculty early on, and possibly to earn the

new faculty's appreciation for being hired.

The Amount of Start-up Funds Provided to TP/PoTs

Of all the institutional factors we examined, there was only one that did not significantly

predict any of the three needs: the amount of start-up funds provided to TP/PoTs. Although we

hypothesized that TP/PoTs' start-up funds would relate to their sense of autonomy and

competence but not their relatedness, we ran a follow-up analysis to see whether the autonomy-

and competence-relevant supports predicted relatedness. We suspected they might be based on

the correlations we report in Table 4. We found that all of the autonomy- and competence-

relevant supports predict TP/PoTs' relatedness-satisfaction, except for start-up funds.

These results suggest that TP/PoTs may perceive start-up funds as an external motivator

for their efforts, which, according to self-determination theory (e.g., Ryan & Deci, 2000) may

obstruct TP/PoTs' needs-satisfaction. External motivators promote a low-quality motivation

known as controlled motivation because they shift a person's motivation for a goal-directed

behavior from the intrinsic value of the behavior itself to the external reward provided for the

behavior (Deci et al., 1985), especially when the salary is contingent on performance (Ryan &

Deci, 2000). In this context, start-up funds are not contingent on performance, they are provided

upon hiring, which may explain why there is no relationship rather than a negative relationship between start-up funds and TP/PoTs' needs-satisfaction.

We are still curious as to why materials support predicted TP/PoTs' feelings of autonomy and competence, but startup funds did not. Perhaps TP/PoTs are less likely to view materials support as an external motivator because it is not contingent on performance and/or because it is materials rather than money. Materials support and startup funds also differ in that the materials support is not limited to the beginning of the occupation while startup funds are. So while startup finds may have some predictive power over teaching-focused faculty's initial needs-satisfaction, on-going materials support may repeatedly signal to TP/PoTs that their contributions are important and valued.

Providing TP/PoTs Adequate Training for Teaching and Scholarly Work

We found that TP/PoTs' access to adequate training in scholarly work predicts TP/PoTs' competence-satisfaction while TP/PoTs' access to adequate training in teaching does not. This may reflect TP/PoTs' belief that they have received sufficient training in teaching and so do not perceive any increase in their competence due to additional pedagogical training, but this may not be true for their scholarly work. Harlow (2020) surveyed a sample of TP/PoTs from UC campuses and found that they have minimal prior experience with education research: a common scholarly activity for TP/PoTs. An alternate explanation is that the institutions, which in our study are research-intensive, may expect and reward excellence in research over excellence in teaching (Chen, 2015), even for teaching-focused positions.

Limitations and Future Work

Although we provide recommendations to institutions regarding means to support their teaching-focused faculty, our results are not necessarily causal. Many of the supports that we

observed to positively relate with TP/PoTs' needs-satisfaction were supported by prior research (e.g., Lyness, 2013; Ryan et al., 2000), but it could be a feature of our study population or the institutions within which they reside that explain the relationships identified. Perhaps the institutions that offer supports such as training, mentoring opportunities, or opportunities for TP/PoTs to serve on hiring committees, also implement other supports that are more important for TP/PoTs' needs-satisfaction. It could also be that when institutions offer supports, they are sending a message that they value their TP/PoTs, and it may be this message that is most important for TP/PoTs' needs-satisfaction.

To measure TP/PoTs' influence we asked them to report what they believe their influence is on their colleague's teaching knowledge, beliefs and practices. While it may not be possible to accurately measure and quantify TP/PoTs' actual influence on their colleague's teaching, future work can compare our measure of influence with alternative measures of this construct, for example from their colleagues' perspectives.

To measure the institutional factors, we asked TP/PoTs to report this information. We recommend for future researchers to validate this information, for example by questioning administrators who oversee the institutional factors or, if possible, examining whether the TP/PoTs' reports match the information provided on their institution's website.

There are several other supports that we did not examine that could potentially impact TP/PoTs' feelings of autonomy, relatedness, and competence. Institutional factors that are autonomy-relevant include providing TP/PoTs with the ability to decide their course or assignments, providing options for meeting promotion requirements, avoiding controlling language (see, for example, Reeve, 2002), and providing TP/PoTs with meaningful rationales when limiting their options (Lyness, 2013). Institutional factors that are competence-relevant

could include a system for providing informative feedback regarding one's teaching and/or

scholarly work performance and providing opportunities for faculty to engage in work that is

optimally challenging for them. An institutional factor that is relatedness-relevant is to provide

structures for facilitating connections among faculty members (Lyness, 2013).

Conclusion

Our results imply that institutions could improve the quality of teaching in their

organization by implementing supports, structures, and policies to satisfy TP/PoTs' needs for

autonomy, competence, and relatedness so that these faculty can positively influence their

colleague's teaching. This implication is an extension of prior research which has demonstrated

that when employees satisfy their psychological needs, they "show both their highest quality

efforts and their highest well-being" (Ryan et al., 2010) and are more likely to share their

knowledge (Foss et al., 2009). Our results also imply that institutions can satisfy TP/PoTs'

psychological needs by providing adequate training for teaching and/or scholarly work,

implementing an integrative office layout, and by allowing TP/PoTs to be involved with hiring

processes. We offer suggestions for future research to expand on our results to better understand

how institutions can support TP/PoTs to flourish so that they may positively influence the quality

of teaching throughout their department.

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Table 1

Items Measuring all Latent Constructs

Measure/ Item Label	Item
Autonomy	
A1	My work is purposeful and meaningful
A2	I am engaged and interested in my daily work activities
Competence	
C1	I am competent and capable in this job
C2	I actively contribute to the happiness and well-being of my colleagues
C3	I actively contribute to the happiness and well-being of the students
Relatedness	
R1	How much do you feel like you belong as a faculty member in your department?
R2	If you were to rank all faculty in your department from who belongs the most to who belongs the least, where would you put yourself?
R3	How much do you feel like you belong as a faculty member at this university?
R4	My relationships with colleagues are supportive and rewarding
R5	People respect me at work
Influence	
I1	How much are you influencing your colleagues teaching beliefs?
I2	How much are you influencing your colleagues teaching knowledge?
I3	How much are you influencing your colleagues teaching practices?

Table 2

Summary Statistics of all Observed Measures

Variable	M	σ^2	skewness	kurtosis	min	max
A1	5.30	0.69	-1.358	2.055	2.00	6.00
A2	5.13	0.76	-1.05	2.00	6.00	
C1	4.38	1.30	-0.661	0.446	1.00	6.00
C2	5.37	0.57	-1.28	1.91	2.00	6.00
C3	5.58	0.42	-1.80	4.50	2.00	6.00
R1	4.64	1.05	-0.70	0.33	1.00	6.00
R2	4.87	1.85	-1.07	-0.24	2.00	6.00
R3	4.25	2.34	-0.30	-1.50	2.00	6.00
R4	4.73	1.82	-0.94	-0.47	2.00	6.00
R5	4.85	1.08	-0.94	0.49	2.00	6.00
Inf1	2.99	1.18	0.25	-0.69	1.00	5.00
Inf2	2.99	1.04	0.59	0.04	1.00	6.00
Inf3	2.98	0.98	0.65	-0.20	1.00	6.00
Inf4	3.01	1.16	0.40	-0.34	1.00	6.00
Training (Scholar) is Adequate	3.51	1.48	-0.53	-0.65	1.00	5.00
Training (Teach) is Adequate	4.32	1.07	-1.78	2.61	1.00	5.00
Startup Funds Amount	34.78	870.72	0.95	-0.05	0.00	110.00
Number of Mentors	2.25	3.06	0.69	0.17	0.00	8.00
Department Committed to Teaching	1.48	2.04	1.82	3.03	0.00	6.00
Time Expected to Teach	24.71	98.03	0.28	-0.17	0.00	50.00
Dichotomous Variables						
Gender	0.34	0.47			0.00	1.00
Materials Support	0.47	0.25			0.00	1.00
Lab Space (when needed)	0.27	0.20			0.00	1.00
Office Located near Majority Faculty	0.81	0.15			0.00	1.00
Right to Vote	0.71	0.21			0.00	1.00
Right to Serve as PI	0.68	0.22			0.00	1.00
Right to Serve on Hiring Committee	0.88	0.11			0.00	1.00
Right to Contribute to Hiring Plans	0.74	0.19			0.00	1.00

Note. $^*p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Table 3

Zero-Order Correlations Between all Latent Constructs

	1	2	3	4
1. Autonomy	1.000			
2. Competence	0.892***	1.000		
3. Relatedness	0.525***	0.555***	1.000	
4. Influence	0.198*	0.298**	0.414***	1.000

Note. $^*p < .05.$ $^{**}p < .01.$ $^{***}p < .001.$

Table 4

Zero-order Correlations Between the Independent Variables (Institutional Factors and Controls)

and the Latent Constructs

	Autonomy	Competence	Relatedness	Influence
Institutional Factors				
Amount of Startup Funds Provided	0.077	0.095	0.105	-0.080
Materials Support	0.221**	0.115	0.209**	0.079
Lab Space (When Needed)	0.026	0.072	0.194**	0.014
Department Committed to Teaching	0.126*	0.055	0.230**	0.235***
Time Expected to Teach	0.099	0.157*	0.104	-0.501
Train (Teach) Provided	0.314***	0.149$^+$	0.351***	0.083
Train (Scholar) Provided	0.191*	0.079	0.310***	0.026
Number of Mentors	0.083	0.082	0.196**	0.099
Office Located near Majority Faculty	0.114$^+$	0.142*	0.214**	0.034
Right to Vote	-0.031	-0.023	0.126$^+$	0.004
Right to serve as PI	0.079	-0.023	0.175**	0.007
Right to serve on Hiring Committees	0.185*	0.115	0.344***	0.022
Right to Contribute to Hiring Plans	0.185*	0.115	0.344***	0.014
Controls				
Gender (Ref. Category = Men)	0.078	0.043	-0.171*	-0.061
Identifies as a Researcher	0.159*	0.153*	-0.084	0.040
Identifies as an Instructor	0.194**	0.214**	0.102	0.130$^+$
Identifies as LPSOE	0.100	0.074	0.309***	-0.077

Note. $^*p < .05.$ $^{**}p < .01.$ $^{***}p < .001.$

Table 5

Estimates of Composite Reliability (ω) and Convergent Validity (AVE) and Tests of Discriminant

Validity (criteria:$\sqrt{AVE} > r$) for all Latent Constructs

	ω	AVE	$\sqrt{AVE}$	r	$\sqrt{AVE} > r$
1. Autonomy	0.81	0.69	0.83	0.19	yes
2. Competence	0.65	0.49	0.70	0.26	yes
3. Relatedness	0.85	0.54	0.73	0.41	yes
4. Influence	0.91	0.76	0.95	0.19; 0.26; 0.41	yes

Table 6

Parameter Estimates for the Autonomy Models; Controlling for Identity (Researcher, Instructor,

and LPSOE) and Gender

Model / Parameter	β	S.E.	CFI/TLI	RMSEA	SRMR
Model: Faculty can Vote on Merit and Promotion Cases			0.993/0.987	0.028	0.028
Influence mediated by Autonomy	0.189*	0.082			
Influence regressed on Vote	0.015	0.071			
Autonomy regressed on Vote	-0.094	0.072			
Model: Faculty can Serve as Principal Investigator			1.000/1.000	0.000	0.024
Influence mediated by Autonomy	0.242*	0.123			
Influence regressed on PI	-0.047	0.139			
Autonomy regressed on PI	0.106	0.115			
Model: Faculty can Contribute to Hiring Plans			1.000/1.000	0.000	0.025
Influence mediated by Autonomy	0.182*	0.082			
Influence regressed on Hire Plan	0.015	0.073			
Autonomy regressed on Hire Plan	0.162*	0.072			
Model: Faculty can Serve on Faculty Hiring Committees			1.000/1.000	0.000	0.024
Influence mediated by Autonomy	0.190*	0.084			
Influence regressed on Committee	0.002	0.074			
Autonomy regressed on Committee	0.141[+]	0.076			
Model: Department is Focused on Teaching			1.000/1.000	0.000	0.026
Influence mediated by Autonomy	0.148[+]	0.082			
Influence regressed on Teach Focus	0.200**	0.067			
Autonomy regressed on Teach Focus	0.157 *	0.067			
Model: Startup Funds			0.997/0.995	0.018	0.033
Influence mediated by Autonomy	0.176[+]	0.103			
Influence regressed on Startup funds	-0.093	0.075			
Autonomy regressed on Startup funds	0.084	0.073			
Model: Materials Support Provide			1.000/1.000	0.000	0.024
Influence mediated by Autonomy	0.181*	0.084			
Influence regressed on Materials	0.036	0.072			
Autonomy regressed on Materials	0.226**	0.072			
Model: Lab Space Provided (When Needed)			1.000/1.000	0.000	0.028
Influence mediated by Autonomy	0.250[+]	0.146			
Influence regressed on Lab space	0.031	0.149			
Autonomy regressed on Lab space	0.241*	0.100			

Note. $^*p < .05.$ $^{**}p < .01.$ $^{***}p < .001.$

Table 7

Parameter Estimates for the Competence Models, Controlling for Identity and Gender

Model / Parameter	β	S.E.	CFI/TLI	RMSEA
Model: Access to Adequate Training in Teaching			0.984/0.973	0.037
Influence mediated by Competence	0.206	0.175		
Influence regressed on Train (Teach)	0.037	0.110		
Competence regressed on Train (Teach)	0.161	0.138		
Model: Access to Adequate Training in Scholarly Work			0.994/0.989	0.023
Influence mediated by Competence	0.290*	0.121		
Influence regressed on Train (Scholar)	0.010	0.082		
Competence regressed on Train (Scholar)	0.182*	0.077		
Model: Number of Colleagues Considered to be Mentors			1.000/1.000	0.000
Influence mediated by Competence	0.304**	0.111		
Influence regressed on Mentors	0.048	0.073		
Competence regressed on Mentors	0.151*	0.065		
Model: Lab Space Provided (When Needed)			1.000/1.00	0.00
Influence mediated by Competence	0.265*	0.129		
Influence regressed on Lab Space	0.034	0.139		
Competence regressed on Lab Space	0.210	0.150		
Model: Department Focus on Teaching Compared to Research			1.000/1.000	0.000
Influence mediated by Competence	0.333**	0.101		
Influence regressed on Teach Focus	0.197**	0.065		
Competence regressed on Teach Focus	0.101	0.065		
Model: Materials Support Provided			1.000/1.000	0.000
Influence mediated by Competence	0.357***	0.101		
Influence regressed on Materials	0.041	0.069		
Competence regressed on Materials	0.113[+]	0.067		
Model: Startup Funds			1.000/1.000	0.000
Influence mediated by Competence	0.325**	0.107		
Influence regressed on Startup Funds	-0.094	0.069		
Competence regressed on Startup Funds	0.041	0.061		

Note. $^*p < .05.$ $^{**}p < .01.$ $^{***}p < .001.$

Table 8

Parameter Estimates for the Relatedness Models, Controlling for Identity (Researcher,

Instructor, and LPSOE) and Gender

Model	β	S.E.	CFI/TLI	RMSEA	SRMR
Model: Number of Colleagues Considered to be Mentors			0.967/0.954	0.047	0.053
Influence mediated by Relatedness	0.486***	0.073			
Influence regressed on Mentors	0.010	0.067			
Relatedness regressed on Mentors	0.186**	0.069			
Model: Office Located Near Colleagues			0.959/0.943	0.052	0.058
Influence mediated by Relatedness	0.491***	0.072			
Influence regressed on Office	-0.044	0.067			
Relatedness regressed on Office	0.173*	0.069			
Model: Faculty can Serve on Faculty Hiring Committees			0.967/0.953	0.048	0.055
Influence mediated by Relatedness	0.547***	0.075			
Influence regressed on Committee	-0.150	0.074			
Relatedness regressed on Committee	0.336***	0.064			
Model: Faculty can Contribute to Hiring Plans			0.962/0.947	0.050	0.057
Influence mediated by Relatedness	0.501***	0.073			
Influence regressed on Committee	-0.064	0.069			
Relatedness regressed on Committee	0.211**	0.068			
Model: Department Focus on Teaching Compared to Research			0.972/0.960	0.044	0.054
Influence mediated by Relatedness	0.461***	0.074			
Influence regressed on Teach Focus	0.123[+]	0.065			
Relatedness regressed on Teach Focus	0.241***	0.066			

Note. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Table 9

Fit Indices to Compare Models

Model	CFI/TLI	RMSEA/SRMR	χ^2(*df*)	$\Delta\chi^2$(Δdf)
Autonomy vs. Competence vs. Relatedness	0.967/0.945	0.064/0.065	54.84(27)	–
Autonomy-Competence vs. Relatedness	0.947/0.918	0.078/0.067	73.43(29)	18.59(2)
Autonomy-Relatedness vs. Competence	0.842/0.755	0.134/0.104	161.30(29)	106.46(2)
Competence-Relatedness vs. Autonomy	0.855/0.775	0.128/0.095	150.91(29)	96.07(2)
Flourishing vs. Belonging	0.809/0.704	0.147/0.101	189.53(29)	134.69(2)

Figure 1

Model of the Relationship between Autonomy-Satisfaction, Influence, and Relatedness-Relevant
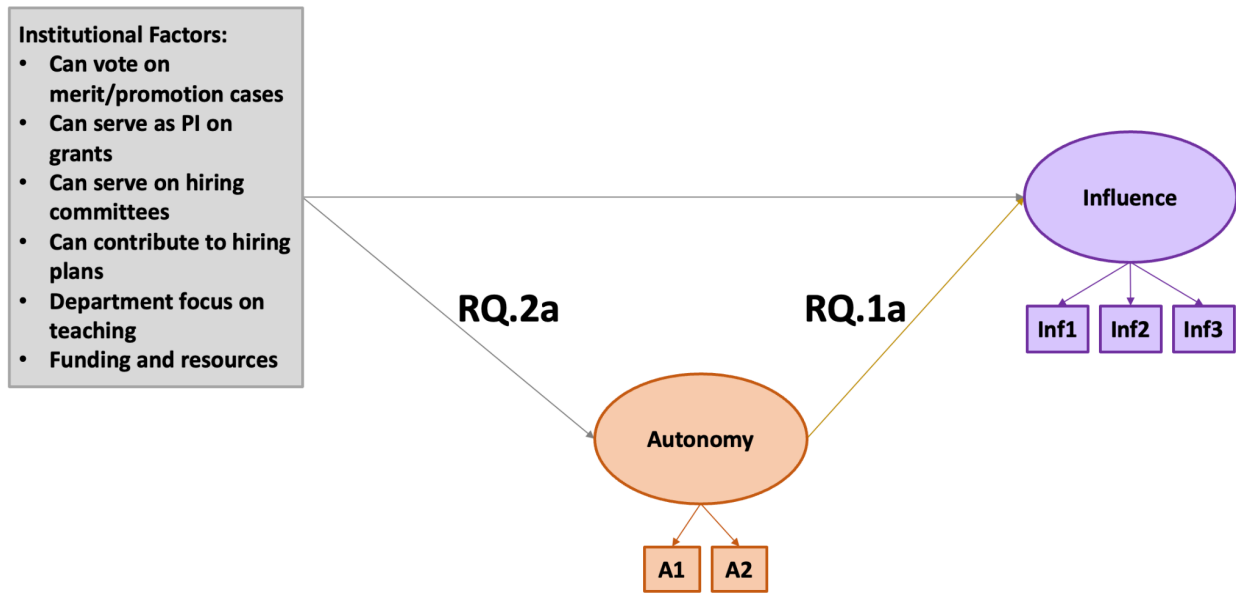
Institutional Factors

Figure 2

Model of the Relationship between Competence-Satisfaction, Influence, and Relatedness-
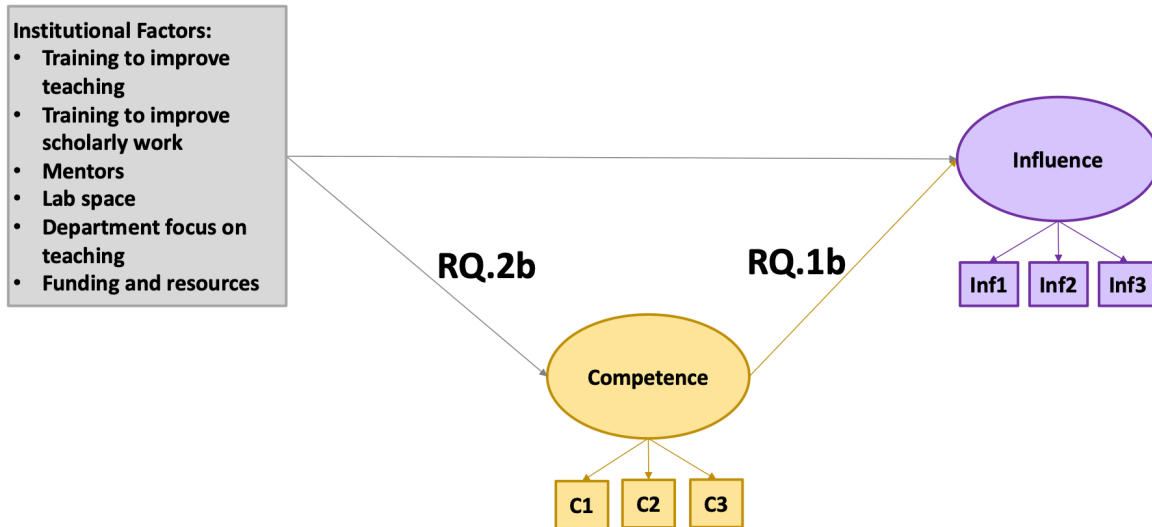
Relevant Institutional Factors

Figure 3

Model of the Relationship between Relatedness-Satisfaction, Influence, and Relatedness-

Relevant Institutional Factors