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Research productivity of management faculty: job demands-resources approach

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Abstract

Purpose – The main purpose of this study was to examine which job resources are most valuable for research productivity, depending on varying teaching demands.

Design/methodology/approach – Data was collected from 324 management faculty at research, balanced and teaching (i.e. respectively low-, moderate- and high-teaching demands) public universities in the United States.

Findings – Results showed that no single job resource predicted research productivity across all three types of schools. At research schools (i.e. low-teaching demands), productivity was positively associated with job resources including summer compensation, level of protection for untenured faculty and number of research assistant hours, while negatively associated with travel funding. At balanced schools (i.e. moderate-teaching demands), research output was positively associated with time allocated to research, grant money, travel funding and conference attendance, while negatively associated with amount of consulting hours. At teaching schools (i.e. high-teaching demands), the only significant resource was time allocated to research.

Practical implications – This paper can help management faculty and business school leaders understand what resources are most appropriate given the teaching demands associated with

the specific institution, and by further helping these institutions attract and retain the best possible faculty.

Originality/value – This study extends prior work on academic research performance by identifying resources that can help faculty publish given different levels of teaching demands. This is important as teaching demands tend to be relatively stable within an institution, while they can vary greatly across types of institutions.

Keywords Research productivity, Teaching, Service, Demands, Resources, Management, Faculty

While the primary goal of business schools, for many, is to educate future managers and leaders, publishing academic research has been an integral part of business academia since the mid-1930s (Miller *et al.*, 2011; Podsakoff *et al.*, 2008). As publishing has become a pervasive part of the academic profession, authors of business publications began to cite the phrase, "Publish or Perish", originally coined by Coolidge and Lord (1932, p. 308). In fact, one of the earlier publications about circulating business-related academic papers stated that "the college teacher who has thought about the publish or perish watchword is more concerned with the extent to which [publishing] pressures are real and what influence they may have on marketability" (Skeels and Fairbanks, 1968, p. 17). Because publishing and staying marketable through these publications is a critical aspect of business academia (e.g. Baruch and Hall, 2004; Glick *et al.*, 2007), our study's overarching goal is to investigate job resources most valuable to produce research across various types of job demands, especially teaching demands.

Past evidence indicates that research productivity is linked to various external and internal factors including promotion, salary, intrinsic motivation and job involvement (e.g. Chen *et al.*, 2006; Kraimer *et al.*, 2019; Ryazanova and McNamara, 2016; Seibert *et al.*, 2017; Williamson and Cable, 2003). Although the job description of a typical faculty member comprises three central elements – research, teaching and service – the degree of balance between these elements can vary widely across individuals, but also across institutions, especially in terms of job demands and resources. Building on the Job Demands-Resources model (JD-R; Bakker and Demerouti, 2007; Bakker *et al.*, 2004; Demerouti *et al.*, 2001), we expect that there will be a

distinct set of job resources that are linked to research productivity for different types of institutions. Specifically, we expect that these job resources will vary depending on the institution's focus: research, balanced or teaching. Indeed, these institutions have varying levels of teaching demands, with research schools having low teaching demands, balanced schools having moderate teaching demands and teaching schools having high teaching demands.

While some people enter academia because of a love of writing (Kiriakos and Tienari, 2018), or they feel a special calling toward the occupation (Conklin, 2012), many individuals enter academia based on a love for teaching, even though instruction is only one aspect of the job (Baruch and Hall, 2004; Zacher *et al.*, 2019). In addition to teaching demands, there are also a number of service demands, and of course publication demands. Publishing in academic journals is a key part of business academia; because it relates to job security, advancement and even prestige (Judge *et al.*, 2007; Miller *et al.*, 2005). In this paper, we seek to better understand the job resources associated with research productivity for faculty at three types of business schools with varying teaching demands (i.e. research, balanced and teaching institutions). We also examine differences among the three types of schools, in terms of resources associated with each type of school.

This paper contributes to the literature in various ways. First, we extend prior work on academic research performance by identifying job resources that can help faculty publish given different levels of teaching demands, while also including research and service demands in our models to rule out alternative explanations. This is important as teaching demands tend to be relatively stable within an institution, while they can vary greatly across types of institutions. Second, we extend the JD-R model by examining various job resources that can contribute to objective performance, while most prior research has focused on burnout and work engagement as outcome variables (e.g. Bakker and Demerouti, 2007; Bakker *et al.*, 2005; Demerouti *et al.*, 2001; Schaufeli and Bakker, 2004; Xanthopoulou *et al.*, 2009). Overall, this paper has theoretical and practical implications, in that it can help academic institutions understand what resources are most appropriate for their faculty, given the teaching demands associated with the specific institution. Because we identify correlates that differ across institution type, we are able to highlight a number of implications with regards to seeking to attract and retain the

best possible faculty, which further contributes to both the fit literature (e.g. Kristof-Brown *et al.*, 2005) and the attraction- selection-attrition model (Schneider, 1987).

Research productivity and type of institution: a job demands-resources approach

Research productivity

Prior work on research productivity has identified a number of factors that influence publishing outcomes of academics in business and other disciplines (e.g. Allison and Long, 1990; Chen *et al.*, 2006; Kraimer *et al.*, 2019; Ryazanova and McNamara, 2016; Seibert *et al.*, 2017; Williamson and Cable, 2003). For example, some scholars have shown that department affiliation (Allison and Long, 1990), promotion (i.e. tenure; Ruscio, 1987; Tien and Blackburn, 1996) or salary (Hedrick *et al.*, 2010) are related to academic productivity, while others suggest intrinsic motivation, rather than extrinsic motivation, lead to higher research productivity (Miner, 1980). Taylor *et al.* (1984) further documented that personal job involvement was a factor related to research productivity, while Chen *et al.* (2006) found that faculty with higher intrinsic and extrinsic motivation for rewards publish more academic articles. In another study, Seibert *et al.* (2017) found that coauthoring with a large number of scholars was positively related to the number of publications in top-tier journals. Williamson and Cable (2003) as well as Hadani *et al.* (2012) studied early-career faculty and found that predictors of research productivity include the dissertation advisor's research productivity and the faculty member's pre-appointment productivity. Newly minted PhDs also benefit greatly from mentorship and assistance with publishing during the doctoral program (Lee and Kamler, 2008) and positive supervisory relationships in academic settings (Crozier and Woolnough, 2020).

Additionally, White *et al.* (2012) indicated that prior work has focused mostly on correlates of research productivity based on individual motivation (e.g. personal values, job involvement, intrinsic motivation) rather than environmental factors (e.g. pay, citations, job expectations) to determine an academic's research behavior. Furthermore, Newman and Cooper (1993) suggested that academic recognition comes in the form of citations, which can then lead to renewed motivation to pursue one's research. Yet, other research argues that a department's culture might foster productivity (Edgar and Geare, 2013), or that research productivity is

fostered by external pressures from business school accrediting bodies (Hedrick *et al.*, 2010; Martınez *et al.*, 2000).

Overall, we expect that research productivity in business schools will be influenced by not just internal motivation, but also by external factors (Seibert *et al.*, 2017; White *et al.*, 2012). Specifically, we expect that various job resources will be linked to research productivity. More explicitly, we expect that the linkages between these resources and research productivity will vary across the type of institution (i.e. research, balanced or teaching) and their associated teaching demands.

Type of institution

Interest in producing and publishing research, and even the reasons for this interest, vary from person to person (Dowd and Kaplan, 2005; Zacher *et al.*, 2019). At the same time, research demands at various institutions can also dictate whether an academic desires employment at a particular school (Glick *et al.*, 2007). This is consistent with the fit literature, which suggests that individuals look for work settings that align with their values and interests (e.g. Kristof- Brown *et al.*, 2005). Prior work suggests that academic job seekers consider four criteria in evaluating potential employers: salary, research support, teaching load and potential for research collaboration (Froman, 1996). While the first criterion seems self-explanatory, because salary tends to be important to any type of job seeker (e.g. Boswell *et al.*, 2012), the second, third and fourth criteria require a different explanation. Specifically, these three factors all relate, at least indirectly, to publishing research, which could be influenced by resources such as institutional support and time allocation.

Consistent with prior work on research productivity and teaching effectiveness (e.g. Certo *et al.*, 2010; Tanner and Manakyan, 1992), faculty demands at research schools or teaching schools are relatively straightforward because they focus on each end of the research- teaching continuum. However, balanced schools are unique in that they espouse a dual mission of both researching and teaching and will thus end up somewhere closer to the middle of the continuum. In a sense, faculty at balanced schools are academic *dualists*, defined as someone who has strong dual responsibilities of both researching and teaching (Boyer, 1990; Griffiths, 2004).

These dualist faculty are not to be confused with research-informed teachers, which refers to educators who link research and teaching in the classroom (Clark, 1997; Xu *et al.*, 2012). Prior work has not clearly distinguished what constitutes a teaching institution as compared to a research or balanced institution. We believe a critical aspect through which schools communicate or signal this balance is through the typical teaching load (i.e. teaching demands) for their faculty, which represents, at least, a partial tradeoff with time available for research.

A four-four teaching load (four courses per semester or eight courses total) per academic year is frequently considered a "full load" where teaching is the predominant demand and research plays a much less important role. For example, institutions in the California State University system document this expectation as a formal policy in their faculty guidelines (CSU, 2015), and similar policies are typical of many public universities throughout the United States. Furthermore, faculty guidelines often include a formal research expectation to receive a "course release" and thus decrease the teaching load, which would officially modify the faculty teaching demand (Greenberg and Moore, 2013). From this example, we define a "typical teaching load" as the usual number of courses that a faculty member, in that particular department, teaches each year, and in our data collection efforts asked participants to report their typical teaching load. As such, we categorize a school with a four-three or four-
four teaching load or more per academic year (21þ credit hours annually) to be a "teaching school" because there are no or little research demands. On the other end of the continuum, research schools expect substantial time to be devoted to research. As such, they reduce the teaching load to two-two (0–12 credit hours annually) or lower [1] to clearly signal research expectations as a priority, as well as enable sufficient time for publishing research. Balanced institutions fall in the middle of the continuum, where faculty are expected to maintain a significant emphasis on both research and teaching. We suggest this is typically adopted and signaled with a teaching load of three-two or three-three (13–20 credit hours annually).

In sum, these three types of institutions are associated with different teaching demands (i.e. loads): low-teaching demands for research schools, moderate-teaching demands for balanced schools and high-teaching demands for teaching schools. Because individual faculty can differ from the typical load at their institution (e.g. more research focused than typical), we

rely on the typical teaching demands at an institution, as job resources are likely to vary depending on the institutional focus. Table 1 summarizes our conceptualization of the three overarching types of institutions.

Job demands-resources model and research productivity

Like any other job, academic jobs have varying levels of demands: teaching, research and service demands. This notion is consistent with the Job Demands-Resource model (JD-R; Bakker and Demerouti, 2007; Demerouti *et al.*, 2001). Specifically, *job demands* are defined as "physical, social, or organizational aspects of the job that require sustained physical or mental effort and are associated with certain physiological and psychological costs (e.g. exhaustion)." (Demerouti *et al.*, 2001, p. 501). In the case of academic jobs, one of the most prevalent job demands is the amount of teaching associated with the appointment (Cao *et al.*, 2020; Han *et al.*, 2020). Indeed, a key reason for hiring new faculty is to fulfill an institution's teaching needs. Nevertheless, faculty also must publish research and contribute to service requirements. As mentioned earlier, these teaching demands will vary depending on the type of institution, from high-teaching demands at teaching schools to low-teaching demands at research schools.

Table 1. Institution types

Defined type	Total credit hours/year
Research	0-12
Balanced	13-20
Teaching	21-or more

To balance these demands, most jobs involve various resources. *Job resources* are defined as "physical, psychological, social, or organizational aspects of the job that may do any of the following: (1) be functional in achieving work goals, (2) reduce job demands, and (3) stimulate personal growth and development" (Demerouti *et al.*, 2001, p. 501). In the case of academic jobs, resources available to faculty can help them achieve their work goals in terms of teaching effectiveness or research output (e.g. Certo *et al.*, 2010; Tanner and Manakyan, 1992). These

resources can also help them reduce their job demands: obtaining a grant could result in a teaching reduction (i.e. a course release), and in turn lower teaching demands (Greenberg and Moore, 2013). Finally, these resources can help stimulate personal growth and development, for example through publications and other research output Akerlind, 2005, 2008).

Evidence indicates that the combination of job demands and resources can lead to better outcomes (e.g. Alarcon, 2011). Specifically, some demands can provide challenges, rather than hindrances, thus resulting in positive outcomes (e.g. Bakker and Demerouti, 2017; Crawford *et al.*, 2010). Furthermore, the JD-R model suggests that individuals with high levels of resources deal more effectively with job demands, preventing potential negative outcomes (e.g. Xanthopoulou *et al.*, 2007). Some prior research has tested the JD-R model among faculty members, although it has focused on the interaction of demands with resources and their joint impact on well-being (e.g. Han *et al.*, 2020), and thus failed to examine whether and how resources interact with demands to predict research performance.

While teaching demands are a central aspect of the academic life, research productivity often provides the clearest path to achieving one of faculty's main work goal (e.g. obtaining tenure), as well as other goals important to some, such as reducing teaching demands (e.g. course releases) and stimulating personal growth and development. Surprisingly, though, prior research has examined predictors of research productivity irrespective of the actual teaching demands involved with different types of institutions.

We are thus interested in investigating job resources linked to research productivity for management faculty, depending on the type of institution (i.e. research, balanced and teaching) and its associated teaching demands. While some evidence indicates that job resources are likely to buffer the effect of job demands on burnout (e.g. Bakker *et al.*, 2005), findings also indicate that job resources predict performance (e.g. Bakker *et al.*, 2004). In this study, we seek to understand which job resources are related to academic research performance, given varying levels of teaching demands (i.e. low-level, moderate-level and high-level teaching demands). Furthermore, we are also interested in examining whether each of the three types of business schools has a set of job resources that makes up or defines a unique archetype or profile.

To do so, we chose to focus on research questions rather than formal hypotheses so that we could investigate the research productivity story broadly, rather than attempting a narrower approach that relies on formal theory building about each potential relationship among the various resources and institution types. Most importantly, this approach facilitates our focus on institution types and not just the various resources. To do this, we followed the investigative style used by Dean *et al.* (2011) as well as Finch *et al.* (2017) to examine faculty research productivity through exploratory research questions. As such, we specifically seek to answer the following research questions:

RQ1. What job resources are common for faculty at each type of business school (research, balanced and teaching)?

RQ2. What are the most useful job resources in terms of research productivity depending upon the teaching demands associated with each type of business school (research, balanced and teaching institutions)?

Research design

Procedure and sample

In this study, we focused on management faculty at public universities in the United States. Most US states have lists of public universities on official state websites, which multiple experts involved in our study cross-checked, using additional websites and ad hoc web searches. In total, we identified 475 universities that matched our criteria. We chose not to collect data for private or non-US universities for several reasons. First, we found that contact information is less likely to be available for faculty at private schools than at public schools, especially at smaller balanced- and teaching-oriented private schools. Second, worldwide standards for business schools, including associated teaching demands, vary greatly across the globe, as business academic "differences are greater across international boundaries" (Dean *et al.*, 2011, p. 4). In addition to avoiding potential biasing issues, by focusing on US public institutions, we were able to manage the scope of our study. We identified management faculty by using department titles that included terms equal to or equivalent to the divisions and interest groups of the Academy of Management (AOM, 2017). A partial list includes

"Management," "Business Administration," "Strategic Management," "Entrepreneurship," "Organization Theory," "Organizational Behavior," "Human Resources," "Leadership," "Business Ethics" and "Supply Chain." Names and contact information of faculty were gathered from university websites where possible and by email or phone requests otherwise. Four schools declined to provide email addresses. In total, we obtained contact information for 7,063 individuals from 471 universities.

Survey

We sent a unique survey link to each of the 7,063 faculty in our sample in the spring of 2017. We asked faculty about their demographics, educational history, current work status (rank, compensation, teaching load, etc.), 5-year publication record and a number of characteristics of their institution such as typical teaching load, research and travel support, tenure difficulty and service demands (see Appendix for the complete list). To increase the response rate, we sent two reminders, offered a $5 donation to be made in their honor to one of seven highly rated charities, and offered a summary of the findings upon study completion (Dillman *et al.*, 2009). We received 590 responses (8.4%). Although this response rate is relatively low, the total number of responses is comparable to other similar studies where academics were the target participants (e.g. Bergeron *et al.*, 2014; Finch *et al.*, 2017; Miller *et al.*, 2005; Ryazanova and McNamara, 2016).

To ensure respondents fit our intended profile, they were asked to self-identify as a management professor at a public US university or college with at least some research demands as a component of their overall job demands, resulting in a sample of 487. Of those, 355 respondents from 217 institutions completed the survey, of which 324 had been at their institution three years or longer, resulting in a useable response rate of 4.6%.

Outcome variable

We sought to capture the research productivity of each faculty member over the five-year period from 2012 to 2016. We randomly verified the self-reported list of publications for about 10% of our sample using Google Scholar and CVs posted to faculty webpages. The majority of

respondents (27 of 34, or 79%) were accurate, while those that over reported (4, or 12%) and underreported (3, or 9%) were roughly equal. All publication information that we collected was ranked by its SCImago Scientific Journal Ranking (SJR) which is a size-independent citation rate (scimagojr.com/aboutus.php). SJRs typically range from 0.1 to 10. SJR was chosen over other similar citation rate measures, such as Journal Citation Report's Journal Impact Factor (jcr.incites.thomsonreuters.com), because, while SJR and JCR's Impact Factor are extremely highly correlated, SJR is publicly available and includes a much larger number of journals. Thus, research productivity is calculated as the sum of publication SJRs over the five-year timeframe. Because many respondents reported publications not on the SCImago list, such as conference presentations, and book chapters, as counting toward the tenure requirements at their institutions, these items were assigned a (minimal) value of 0.1 and included in the sum. As this measure is highly skewed, we take the log of the 5-year sum.

Resources and other measures

Appendix includes a complete list of variable names and descriptions, a few of which justify additional explanation. *PhD productivity* captures the collective productivity of one's PhD granting institution and is measured two ways: the *University of Texas at Dallas (UTD) PhD* ranking and the *Texas A&M University (TAMU) PhD* ranking cumulative five-year scores. These rankings of research productivity are similar as they are both based on lists of "A" publications. We calculate these as a sum over 2012–2016 of the rankings published by UT–Dallas and Texas A&M. We use two measures because each has a key weakness regarding their use in this study. The UTD ranking system applies to an entire business school and not just the management department but includes institutions around the globe. The TAMU ranking system applies to just the management departments but includes only institutions in North America. As indicated in Table 1, we define *research* schools as those with a 2-2 load or less (0–12 annual teaching credit hours) as the norm, *balanced* schools as those with a 3-2 or 3-3 load (13–20 annual teaching credit hours) as the norm and *teaching* schools as those with a 4-3 load or greater (21þ annual teaching credit hours) as the norm. We categorized institutions by typical teaching load (or demands) per year, as this is a key factor in defining the job demands and attracting suitable

applicants. We also capture the differences in demands across individuals, as faculty diverge from the institution norm at times. Thus, we include both the norm as a measure of institutional focus and personal demands.

Because we are interested in examining job resources in terms of research productivity in relation to the teaching demands at different types of academic institutions, we measure competing demands: research demands (i.e. *tenure difficulty*) and service demands (i.e. *service items at the school, university and professional* levels). We also measure *rank*, as higher rank may be related to greater availability of resources (e.g. Miller *et al.*, 2005). Finally, we capture demographic variables (e.g. *gender* and *age*).

Analytical strategy

Because our outcome variable is a five-year aggregate measure based on publications from 2012 to 2016, it is important to consider how long faculty have been at their current institution. Thus, we analyzed only faculty that have been at their current institution three or more years, such that the majority of their productivity measure aligns with the various measures related to their current institution. In addressing RQ1, we take a descriptive approach wherein we report the average and/or median responses of individuals by institution type. We also test whether the means differ across types of schools. RQ2 uses three main models, one for each institution type: research, balanced and teaching schools.

Results

Means, standard deviations and pairwise correlations are found in Table 2. Variables in all models have variance inflation factors (VIFs) below 4 with a single exception. Rank has VIF of 6.9 in the balanced institution model and moderately covaries with salary and age. Thus, multicollinearity does not seem to be a problem in our models.

Table 2. Means, standard deviations and pairwise correlations

	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. Research productivity (5 year)	11.99	18.88											
2. Gender (0-female, 1-male)	0.59	0.49	0.15										
3. Age	49.75	11.84	-0.18	0.16									
4. Rank	1.10	0.85	0.04	0.16	0.71								
5. Faculty (count)	14.13	6.28	0.15	0.07	0.06	0.09							
6. Junior faculty ratio	0.32	0.15	-0.13	-0.05	-0.18	-0.19	-0.12						
7. Research %	0.38	0.20	0.43	0.20	-0.17	-0.08	0.17	-0.02					
8. Teaching %	0.42	0.18	-0.40	-0.10	0.04	-0.14	-0.14	0.05	-0.71				
9. Service %	0.21	0.15	-0.10	-0.16	0.18	0.27	-0.06	-0.04	-0.53	-0.22			
10. Teaching credits (annual)	14.46	5.02	-0.48	-0.03	0.07	-0.12	-0.13	0.08	-0.46	0.68	-0.18		
11. Overloads	0.60	1.01	-0.05	0.00	0.02	0.02	0.02	-0.03	-0.20	0.09	0.17	0.09	
12. Service items (school)	2.57	1.42	0.01	-0.16	-0.06	0.06	-0.02	0.04	-0.12	-0.10	0.29	-0.06	0.02
13. Service items (university)	1.26	1.22	-0.15	-0.04	0.17	0.17	-0.05	-0.04	-0.37	0.16	0.33	0.16	0.04
14. Service items (professional)	1.46	1.50	0.32	0.02	-0.02	0.08	0.03	-0.04	0.15	-0.23	0.07	-0.17	-0.07
15. Consulting hours (monthly)	2.68	8.87	0.00	0.06	0.07	0.06	-0.03	-0.01	0.07	-0.05	-0.04	-0.06	0.02
16. Tenure difficulty	10.49	10.25	0.55	0.12	-0.08	0.05	0.24	-0.08	0.49	-0.53	-0.05	-0.65	-0.11
17. Accreditation	1.91	0.35	0.13	0.10	-0.06	0.04	0.14	-0.02	0.24	-0.19	-0.10	-0.33	-0.08
18. PhD program	0.41	0.49	0.45	0.04	-0.03	0.08	0.10	-0.07	0.46	-0.47	-0.07	-0.51	-0.08
19. Protect untenured	0.57	0.50	0.33	-0.02	-0.24	-0.11	0.11	-0.14	0.31	-0.30	-0.08	-0.40	0.03
20. Brown bags	5.96	7.69	0.19	0.04	-0.02	0.05	0.18	0.03	0.17	-0.22	0.03	-0.26	0.01
21. PhD productivity	65.91	71.26	0.12	0.06	0.05	0.09	0.14	-0.04	0.17	-0.27	0.10	-0.34	-0.07
22. Salary ($10,000s)	13.64	5.13	0.53	0.20	0.15	0.38	0.21	-0.15	0.40	-0.54	0.10	-0.65	-0.11
23. Summer pay ($10,000s)	1.04	1.31	0.42	0.13	-0.13	-0.04	0.05	-0.05	0.36	-0.27	-0.17	-0.32	0.00
24. Rsrch. asnt. hours (weekly)	5.36	5.31	0.38	0.02	-0.14	-0.05	-0.01	-0.05	0.36	-0.34	-0.09	-0.42	-0.12
25. Grants received ($10,000s)	19.50	180.34	0.16	0.07	0.06	0.10	0.03	0.00	0.01	-0.15	0.16	-0.16	-0.04
26. Travel funding ($10,000s)	0.24	0.12	0.36	0.08	-0.12	0.05	0.16	-0.10	0.40	-0.41	-0.06	-0.49	-0.12
27. Research funding ($10,000s)	0.19	0.23	0.36	0.15	-0.02	0.14	0.08	-0.10	0.25	-0.31	0.02	-0.40	-0.02
28. Conference attendance	8.37	5.35	0.24	0.00	-0.11	-0.01	0.07	0.03	0.21	-0.27	0.03	-0.20	-0.08

(*continued*)

	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
13. Service items (university)	0.22															
14. Service items (professional)	0.16	0.04														
15. Consulting hours (monthly)	0.04	0.09	0.00													
16. Tenure difficulty	-0.01	-0.19	0.18	-0.07												
17. Accreditation	0.03	-0.19	0.06	0.00	0.22											
18. PhD program	0.02	-0.17	0.17	0.00	0.69	0.19										
19. Protect untenured	-0.09	-0.27	0.05	-0.01	0.38	0.22	0.30									
20. Brown bags	0.06	-0.11	0.07	-0.04	0.37	0.15	0.26	0.09								
21. PhD productivity	-0.04	-0.06	0.04	-0.09	0.39	0.18	0.26	0.16	0.27							
22. Salary ($10,000s)	0.02	-0.09	0.21	-0.02	0.69	0.24	0.52	0.31	0.31	0.34						
23. Summer pay ($10,000s)	-0.06	-0.09	0.09	0.04	0.38	0.13	0.31	0.20	0.19	0.05	0.30					
24. Rsrch. asnt. hours (weekly)	0.01	-0.17	0.15	0.04	0.33	0.17	0.35	0.25	0.17	0.10	0.34	0.30				
25. Grants received ($10,000s)	0.03	0.08	-0.01	0.23	0.09	0.02	0.10	0.00	-0.01	0.10	0.21	-0.05	0.14			
26. Travel funding ($10,000s)	-0.09	-0.17	0.18	0.00	0.48	0.20	0.33	0.33	0.30	0.26	0.45	0.37	0.42	0.05		
27. Research funding ($10,000s)	-0.04	-0.09	0.15	-0.01	0.39	0.16	0.27	0.21	0.28	0.12	0.48	0.36	0.34	0.13	0.44	
28. Conference attendance	0.05	0.05	0.30	0.12	0.18	0.06	0.14	0.09	0.19	0.06	0.17	0.10	0.16	0.08	0.29	0.22

Note(s): *N* 5524; Correlations ≥ 0.11 are significant at $p < 0.05$ level; *M* 5mean: SD 5standard deviation

RQ1: What a typical research, balanced or teaching institution looks like

Our first research question explored resources linked to research productivity depending on varying teaching demands. These resources along with some other criteria, however, only hint at what some of the defining characteristics of the institution types are. We suspect that many resources that differ drastically across research, balanced and teaching schools are not significant correlates of research productivity, yet they constitute real differences in the typical anatomy of a department within their respective types. Stated differently, focus the correlates of research outcomes are only one element of why institutions are the way they are. A focus on primarily research or teaching demands, or a dual focus on research and teaching demands may lead to unique structures or compositions of schools. Understanding what a "research" school or "balanced" school looks like becomes important for those seeking to find the best fit possible (Kristof-Brown *et al.*, 2005). Thus, we here we begin by describing what each type of business school "looks like" without attempting to explain why these distinguishing characteristics have emerged or their relationship with research productivity.

Table 3 displays the job resources, along with other characteristics across institution types. Differences are noteworthy in a number of ways. In consideration of conciseness, we forgo a lengthy discussion of each distinguishing element between institution types. Instead, we have selected to focus only on a small number of the most interesting findings.

One striking difference across faculty is that individuals at research schools are about four times more research productive than faculty at balanced and seven time more than those at teaching schools. Consistent with this is that tenure research requirements (i.e. research demands) closely mirror actual productivity. It seems that organizations and individuals match themselves to each other in this dimension (Kristof-Brown *et al.*, 2005) fairly well. We note that, in terms of productivity, the gap between research and balanced schools is far greater than the gap between balanced and teaching schools. This is also true in terms of financial job resources, such as salary and summer support, and other institution characteristics, such as having a PhD program in one's business school, and access to research assistants, for which balanced schools are more similar to teaching schools than to research schools.

While some comparisons suggest balanced schools are closer to teaching than research schools, this is not to suggest that the differences between balanced and teaching schools are

not substantial. Indeed, sample individuals at balanced schools produced 66% more research than those at teaching schools (5.8–3.5 cumulative SJR) and are paid 21% more ($115,000 to $95,000). Further, along certain dimensions, balanced schools are squarely in the middle of the two endpoints. For example, average annual credit hours taught (11, 17 and 23 credits), productivity of their PhD granting institutions (96, 62, and 20), likelihood of protecting untenured faculty from service (83–52 to 24%) and number of brown-bag research meetings (9.0–5.3 to 2.1). In short, there are clear differences between all three types of schools that go far beyond (albeit not unrelated to) the initial categorization mechanism (teaching load).

We also highlight several similarities across institution types. For instance, department size, department composition (in terms of average rank and junior faculty ratio), number of faculty that receive grants and number of conferences attended do not greatly vary across school types. Granted, there are likely some qualitative differences among these measures, some captured by our data (e.g. size of grants) and some not (e.g. which conferences they attend), but we observe certain characteristics that do not seem to reside within the archetypes that have emerged around the school's focus.

RQ2: Differences in resources across institution types

While a broad understanding of the job resources linked to research productivity among business schools is helpful, we recognize that a particular school is unlikely to be the proverbial "average" school. It is also likely that some key effects may go undetected if they vary across meaningful categories such as institution type. With this in mind, our approach of inspecting which resources relate to research productivity at each institution type – research, balanced and teaching schools – is more interesting and useful than prior studies that lump them together (e.g. Dean *et al.*, 2011; Hedrick *et al.*, 2010; Williamson and Cable, 2003). We note that the preferences of academic job seekers will drive them to target certain types of institutions (Dowd and Kaplan, 2005; Kristof-Brown *et al.*, 2005; Schneider, 1987). Across the three types, the job resources, as well as the faculty themselves, are likely to differ in critical ways. As such, we expect that some of these differences in resources will be related to research productivity.

Table 3. Profiles and difference of research, balanced and teaching institutions

	Research	Balanced	Teaching	R-B	R-T	B-T
Research productivity						
Cumulative SJR (5 year)	25.5	5.8	3.5	19.8***	22.0***	2.2†
Top pubs (SJR 3.5+)	4.6	0.7	0.3	1.1***	4.4***	0.5*
High Pubs (SJR 1.5-3.5)	19	0.9	0.5	1.1***	1.4***	0.3
Good Pubs (SJR 0.1-1.4)	25	3.0	2.6	-0.5	0.0	0.4
Other Pubs (SJR 0-0.1)	12	28	2.5	-1.6***	-1.2†	0.3
Demographics						
Gender (0-female, 1-male)	0.67	0.58	0.47	0.09	0.20*	0.10
Age	47.5	50.6	51.6	-3.2†	-4.1†	-1.0
Rank (0: Ast, 1: Asc, 3: Full)	1.08	1.15	L03	-0.06	0.05	0.11
Faculty (court)	15	14	12	1	3**	2†
Junior facility ratio	30%	32%	34%	-2%	-4%	-2%
Job demands						
Research % allocation	51%	35%	20%	16%***	30%***	15%***
Teaching % allocation	29%	44%	58%	-15%***	-29%***	-14%***
Service % allocation	20%	21%	22%	-1%	-2%	-1%
Teaching Credits (annual)	11	17	23	-6***	-12***	-6***
Overload credit (annual)	1.3	1.8	2.6	-.44	-1.24†	-0.80
Service items (school)	2.5	2.6	2.6	-0.2	-0.1	0.1
Service items (university)	0.9	1.3	1.8	-0.5***	-0.9***	-0.5†
Service items (professional)	1.9	1.2	1.3	0.7**	0.5†	-0.1
Consulting hours (monthly)	2.1	2.7	3.6	-0.7	-1.5	-0.9
Tenure difficulty (cumulative SJR)	21.5	5.7	2.7	15.8***	18.9***	3.0***
Tope required	3.3	0.4	0.2	2.9***	3.2***	0.3†
High required	2.3	1.1	0.4	1.2***	1.9***	0.7***
Other required	1.0	3.7	2.9	-2.7***	-1.9***	0.8*
Accreditation	2.00	1.97	1.61	0.0	0.4***	0.4***
Job resources						
PhD program	86%	19%	14%	67%***	73%***	6%
Protect untenured	83%	52%	24%	32%***	60%***	28%***
Brown bags	9.0	5.3	2.1	3.6**	6.9***	3.3***
PhD productivity	96	62	20	34***	76***	42***
Salary (median)	$165,000	$115,000	$95,000			
Salary (mean)	$181,000	$120,000	$96,000	$61,000***	$85,000***	$24,000***
Summer pay (median)	$15,000	$2,500	$2,000			
Summer pay (mean)	$17,100	$7,200	$6,200	$9,900***	$10,900***	$1,000
Rsrch asnt. Hours (weekly)	8.5	4.3	2.5	4.2***	6.0***	1.8*
Grants (% faculty >0)	45%	46%	39%	-1%	6%	7%
Grant size (median)	$15,000	$10,000	$10,000			
Grant size (mean)	$1,155,000	$79,000	$42,000	$1,076,000	$1,113,000	$37,000

Travel funding	$3,200	$2,200	$1,600	$1,000***	$1,600***	$600***
Research finding	$3,100	$2,200	$1,600	$1,000***	$1,600***	$600***
Conference attendance (annual)	1.9	1.6	1.5	0.3	0.4	0.0
Note(s): $^{y}p < 0.l$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; Calculated using two-tailed *t*-tests with Bonferroni collection for multiple comparisons						

Results by institution type are reported in Table 4. While investigating the demands and resources associated with research productivity across institution types, we found that none were important across all three school types. The variable closest to being important across all three types was one of the variables used to capture research demands: tenure difficulty (p 5 0.058, 0.138, and 0.072 at research, balanced and teaching institutions, respectively). The lack of any consistently strong correlates of research productivity across types of institutions supports the notion that research, balanced and teaching schools truly do operate differently from one another and rely on different resources to manage the distinct demands. While each of them pursues research activity to a degree, the resources linked to this activity are not universal. There are a number of resources unique to each type of institution.

Research institutions. An example of a finding that is unique to one category is that summer pay (β 5 0.195, p 5 0.003) is a significant positive job resource for research productivity *only* at research institutions. This may be reflective of summer pay being more tightly linked to research objectives at research schools, while being awarded on the basis of a broader spectrum of criteria (i.e. research, teaching and service objectives) at balanced and teaching schools. In terms of other job resources, we find that respondents at research schools where protecting junior faculty from onerous service demands is a priority, were more productive (β 5 0.656, p 5 0.013). We had expected these job resources to be prevalent in academic jobs but find it surprising that faculty at balanced and teaching schools with protection from service are not more productive than those without these benefits.

One puzzling finding is that higher levels of travel funding, another job resource, were related to lower research productivity (β 5 -2.348, p 5 0.008). This curious finding prompted a post hoc test of a curvilinear relationship, tested by adding a squared term (β 5 -3.511, p 5 0.006) and plotting the relationship. Doing this indicated that increases in travel funding positively relates to productivity until about $1,500 annually (i.e. about the equivalent of attending one conference per year), after which further increases are associated with decreases in research outcomes. One possible interpretation is, perhaps, that, for research school faculty, traveling to more than one conference (or other work-related trip) a year is likely to take time away from the expected focus on journal submissions and revisions. Furthermore, conference

submissions are likely to not count toward tenure requirements at research schools.

At research institutions we also observe a positive relationship with rank (*β* 5 0.657, *p* 5 0.008), and a negative one with age (*β* 5 -0.037, *p* 5 0.004). Interestingly, while these two variables are highly correlated, we note that the effects are opposite and that the effect of rank is larger than that of age. This suggests that an advancement in rank is more than enough of a resource to offset the typical drop in productivity with increasing age. Notably, most research institutions have research productivity demands that extend beyond tenure and promotion, which may even lead high performers to change institution to further increase their salary (Schwab, 1991). As such, perhaps the continued pressure and stress such faculty accumulate may lead to withdrawal behaviors as they further advance in age (e.g. Podsakoff *et al.*, 2007).

Table 4. Correlates of research productivity by institution type

	Research Model 1	Balanced Model 2	Teaching Model 3
Demographics			
Gender (0-female, 1-male)	0.217	-0.163	0.189
Age	-0.037**	-0.006	-0.10
Rank	0.657**	-0.178†	-0.067
Faculty (count)	-0.005	0.013	0.002
Junior faculty ratio	-0.880	0.272	-0.618
Job demands			
Research %	-0.422	1.445**	2.736*
Teaching credits (annual)	-0.017	-0.012	0.012
Overloads	-0.117	0.119†	0.027
Service items (school)	0.039	-0.006	0.069
Service items (university)	-0.173†	0.059	0.045
Service items (professional)	0.115*	0.007	0.023
Consulting hours (monthly)	0.025	-0.015*	0.000
Tenure difficulty	0.024†	0.018	0.065†
Accreditation	--	0.202	-0.032
PhD program	-0.136	0.054	0.342
Job resources			
Protect untenured	0.656*	0.097	-0.018
Brown bags	-0.004	-0.008	0.013
PhD productivity	0.001	0.000	-0.004
Salary	-0.05	0.017	0.056
Summer pay (10,000s)	0.195**	-0.018	-0.283†

Rsch. asnt. hours (weekly)	0.023	0.003	-0.011
Grants received (log)	0.041	0.162*	-0.175
Travel funding	-2.348**	1.129†	0.964
Research funding	0.215	-0.159	1.470
Conference attendance	0.000	0.026	0.014
Constant	3.742**	0.282	-0.141
N	109	156	59
F	3.94***	4.07***	2.14*
R^2	0.543	0.451	0.634
Note(s): For all yes/no variables, 0-no, 1-yes; †$p < 0.1$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; Accreditation excluded from Model 1 because all observations are AACSB accredited			

Finally, in terms of service demands, we see a unique result for professional service activities (*β* 5 0.115, *p* 5 0.016) among research school faculty. While it is not the case at balanced or teaching schools, research school faculty that have higher professional service demands are also more research productive. The opportunity to serve in such roles might provide synergies, learning and experience to faculty that is then applied to their own research projects. Conversely, the causality might be reversed such that success in research leads to more service opportunities. For example, journals are likely to appoint editors and reviewers that have demonstrated scholarly success (Brown, 2014). That this relationship is absent for faculty at balanced and teaching schools might indicate that the specific types of professional service differ for them. For instance, balanced and teaching schools faculty might be less likely to serve as editors or reviewers at top journals and instead provide professional service such as reviewing for conferences and other journals – roles that are less dependent on past productivity and/or less likely to provide critical learning. In contrast to professional service demands, university service demands are negatively related to productivity (*β* 5 -0.173, *p* 5 0.099). This may indicate that appointment processes of such service roles are decoupled from research success and also less compatible with producing it.

Balanced institutions. Among faculty at balanced institutions, the strongest positive job resource linked to research productivity is their individual research allocation percentage (*β* 5 1.445, *p* 5 0.004). This finding is notable, in part, because of its surprising absence at research schools. This might indicate that there are diminishing returns on research allocation percentage. At balanced and teaching institutions where faculty give less time to scholarly

pursuits *in lieu* of teaching or service demands an increase in the allocation to research is strongly related to higher productivity, while this is not the case for faculty at research schools where the allocation percentage is higher.

Conference attendance (*β* 5 0.026, *p* 5 0.033) is another job resource linked to research productivity at balanced institutions, one that is absent for the other two institution types. Conferences seem to matter most for the dualists in academia, because they provide an opportunity to receive input on project ideas, feedback on working papers and general motivation to generate new ideas and produce academic research. Perhaps conferences aid in refocusing on or boosting research when one's focus is frequently split between research, teaching and service. Relatedly, balanced school faculty also see a benefit to productivity from an increase in travel funding, a job resource (*β* 51.129, *p* 50.082) across high and low amounts of funding (unlike the inverse *U*-shaped relationship found for faculty at research institutions).

Another finding that may have a similar explanation is an association between another job resource, grants (*β* 50.162, *p* 50.037) and research productivity. It seems that faculty at balanced schools tend to be more productive when they apply for and receive grants. The responsibility to attend to projects attached to grants may serve as a refocusing mechanism that is not as critical for faculty with a more singular focus (research or teaching). While some resources may refocus the dualists, other resources, such as consulting hours (*β* 5-0.015, *p* 5 0.022), provide the opposite effect; they are less productive when involved in more consulting work.

We highlight a negative effect of rank on productivity (*β* 5 -0.178, *p* 5 0.083). Opposite to the finding for faculty at research institutions, advancing in rank leads to lower research productivity at balanced schools. Post hoc contrasts indicate that there is no difference in productivity between associate and full professors and that the effect is fully due to the difference between assistant professors and the others. In the case of balanced schools, tenure requirements tend to be higher than at teaching schools, but lower than at research schools. Furthermore, once faculty obtain tenure, these requirements become somewhat minimal. As such, consistent with the goal regulation literature (e.g. Ilies and Judge, 2005), faculty at balanced schools tend to focus their attention and effort on achieving the requirements to

obtain tenure, but then turn their attention to other goals once they get tenure. Finally, contrary to faculty at research institutions, service demands did not seem to affect, in either direction, faculty's research productivity at balanced schools.

Teaching institutions. In contrast to the other two school types, few resources were found to be strongly or even marginally associated with research productivity. This may merely be reflective of a simpler set of mechanisms in this particular context, which is dominated by a focus on teaching and service demands. Similar to our finding at balanced institutions, the research allocation percentage (β 5 2.736, p 5 0.015) was a highly predictive job resource for research productivity, presumably for the same reasons discussed in the previous section. However, there is a notable lack of findings involving financial resources and incentives within the teaching school context. Indeed, we observe only a marginal negative relationship between productivity and summer pay (β 5-0.283, p 50.051). Such mechanisms may be more effective in contexts of lower time allocations to teaching demands. Alternatively, a larger pool of research active faculty at teaching schools may be required to obtain a clearer picture.

Discussion

The main purpose of this study was to examine the job resources associated with research productivity of faculty across different types of academic institutions. Specifically, we built on the JD-R model (e.g. Bakker and Demerouti, 2007; Demerouti *et al.*, 2001) to suggest that the resources most correlated to performance (i.e. research output) will vary depending on the job demands (i.e. teaching load) within different types of academic institutions. We did this by surveying management faculty at three types of US public business schools, namely

research, balanced and teaching institutions. We focused on two overarching research questions: (1) examining how job resources differ across school types and (2) investigating differences in job resources linked to research productivity at each of the three types of institutions.

This paper makes several contributions to the literature. Our study highlights a number of key differences in the resource profiles of the three types of institutions. Overall, we observe three unique models or archetypes of how institutions choose to manage the competing priorities of research, teaching and service demands. Indeed, the nuances of how large the differences are between institution types clearly indicates that school types, initially defined by us around a single characteristic (teaching load or demands), carry with them many differences that extend far beyond that single demand. We make no claim about whether differences originate in one characteristic vs another (which came first, the chicken or the egg?), but rather make note of the clear idiosyncratic profiles that exist within academia. While few, if any, would seek to argue that one school looks just like any other school regardless of their mission or focus, we do suggest that it is less obvious that the resources that drive outcomes in one school may *not* be the same resources that drive outcomes in other schools. Of note, while gender was not related to research productivity when looking at each type of school separately, the gender balance varied across the three types. Specifically, our participants were predominantly male at research schools and predominantly female at teaching schools. This discrepancy is consistent with research that has found gender differences in research productivity at prestigious journals (Mayer and Rathmann, 2018).

We also add to prior work on academic research performance by identifying specific resources that might help faculty publish given different levels of teaching demands. Specifically, we found that job resources linked positively to research productivity included time allocated to research (for balanced and teaching schools), summer pay (for research schools), and travel funding, conference attendance, and grants (for balanced schools). We also found there was no single correlate of research productivity across all three types of institutions, and that tenure difficulty (i.e. research demands) was the only one that approached significance across all three. In the end, our focus on the relationship of job resources as dependent upon

institution type provides only mixed support for prior work (e.g. Bergeron *et al.*, 2014; Hedrick *et al.*, 2010; Ruscio, 1987; Tien and Blackburn, 1996), which suggests that various resources such as salary and research support relate to one's research productivity. We find that such conclusions are too simple because the resources that matter will change depending on the demands placed upon faculty. And, of course, the demands vary depending on the institution type and its chosen focus. This is also consistent with the idea that some demands can provide challenges, rather than hindrances, thus resulting in positive outcomes (e.g. Bakker and Demerouti, 2017; Crawford *et al.*, 2010).

A somewhat counterintuitive finding was that the number of professional service activities (i.e. an aspect of the service demands) was positively related to research productivity at research institutions. This is interesting because it suggests that professional service, such as editorial board membership and reviewing for journals, either stimulates research ideas and potential research collaboration or that such service opportunities result from research success (the direction of causality is an opportunity for future work), especially for faculty at research institutions. This may also be the case because professional service activities at research schools tend to be more prestigious in nature than those at teaching or balanced schools. However, this is consistent with the JD-R model, in that professional service activities, at least for faculty at research schools may be considered a challenge demand instead of a hindrance demand (e.g. school or university service demands), which could thus have a positive impact on performance (e.g. Crawford *et al.*, 2010).

Overall, this paper contributes to the JD-R model (Bakker and Demerouti, 2007, 2017; Demerouti *et al.*, 2001) by exploring resources that are most valuable for performance depending on varying job demands within the same profession. As mentioned earlier, our paper speaks to the importance of seeking to find the best possible faculty for a specific type of business school profile. In other words, this paper contributes to the fit literature (e.g. Kristof-Brown *et al.*, 2005) and the attraction-selection-attrition model (Schneider, 1987), especially our finding that different types of institutions involve different types of resources and demands. Although there are various other factors to consider (e.g. geographical preference, family situation, etc.), faculty will try, to the greater extent possible, to find the type of institution that

provides the balance of demands and resources that fit their profile the best (Kristof-Brown *et al.*, 2005). On the other end, as much as possible, academic institutions will seek to populate themselves with faculty who will be expecting to receive such job resources to attend to their teaching, research and service demands (Schneider, 1987). As such, this paper contributes to the academic recruitment literature (Finch *et al.*, 2016) by helping academic institutions understand what resources are most appropriate at the three different types of institutions to attract and retain faculty given the teaching demands at that specific institution.

Practical implications

Our findings also have a number of practical implications, both at the institutional level (i.e. schools and their leaders) and at the individual level (i.e. faculty). First, this study is useful to schools that wish to solidify their identity, or craft a new identity, as they transition from one type of institution to another. Indeed, our findings provide a rough profile of what schools might want to look like in terms of the mix of job and institutional resources to send signals to potential applicants, while also successfully influencing research outcomes. Relatedly, our findings further inform schools about the resources that are most relevant for research productivity at their specific type of school, especially as it comes to recruiting and retaining the right people by using the right resources (Schneider, 1987).

Additionally, understanding institutional resources has been deemed one of the most essential challenges of efficiency improvement (White *et al.*, 2012) and "the most central challenge in productivity research" (K€apyl€a *et al.*, 2010, p. 615). Therefore, another key suggestion implied by our findings is that school leaders will benefit from learning which resources are related to research productivity, depending on their type of institution, so that they can then deploy these critical resources. For example, while institutions often deploy "axiomatic" finances (e.g. travel funding, internal research grants, etc.), such choices do not always relate to greater productivity at specific institutions. As such, schools should consider which resources matter the most to their faculty, both in terms of productivity and faculty preference. Administrators and faculty at certain schools might agree, for instance, that research presentations (brown bags) are less important than some other practices that are

linked more strongly to productivity and job satisfaction. Resource expenditures like travel funding can be more nuanced as it seems to positively relate to productivity, but only up to a point (about the cost of one academic conference). Avoiding ineffective practices should also be paired with instilling effective ones. Practices that seem to be effective include, for instance, research institutions protecting untenured faculty from extensive service and providing summer pay. Balanced and teaching institutions seem to be better served by allocating a larger percentage of faculty time to research. Balanced institutions might also encourage conference attendance, grants and avoidance of consulting as these are each related to productivity at this type of school.

The implications of our findings are also important for individual scholars. Undeniably, while scholars compete for limited space in academic journals, some academics suggest (e.g. Runyan *et al.*, 2013) that faculty members at teaching or balanced institutions have inferior resources when it comes to conducting research as compared to higher tier institutions. In contrast, faculty at institutions with a lower teaching load, and more research-oriented resources, tend to have an advantage when attempting to publish. As such, perhaps, the most direct recommendation derived from our findings is that faculty should try to understand what job resources are most useful for them in terms of research productivity, based upon their type of institution. For example, if faculty seek to be productive at balanced institutions, they should submit their working papers to conferences and request travel funding to attend these conferences.

Limitations and future research

Although our study makes important contributions to the literature, it also has limitations. One such limitation is that we focused our data collection on management faculty at public business schools in the United States, which might limit the generalizability of our findings. Future research should extend our work by investigating not only management faculty but also faculty in other disciplines at both public and private universities in the US Furthermore, because tenure does not exist in every country or academic system (Hedrick *et al.*, 2010), or that the meaning of tenure varies depending on the system (Dean *et al.*, 2011), we encourage future

research to investigate the nature and role of job demands and resources at academic institutions in other countries. For example, it could be interesting to study which resources are unique in terms of performance in other countries, taking into account the specific tenure (or non-tenure) context of that country and academic system. Relatedly, while we were not able to account for union status of the faculty or the various institutions, it is possible that it would indirectly influence research productivity (e.g. via salary) and that this impact might vary by country.

A second limitation relates to our application of the JD-R model. Although the demands associated with teaching, research and service lend themselves well to studying burnout among faculty (e.g. Watts and Robertson, 2011), we focused on objective academic research performance. However, we did not collect information about individuals' level of burnout. This could be a great avenue for future research, which would extend our paper and findings, by identifying not only what resources are most important for performance, but also what resources are most helpful to buffer the risks associated with burnout.

In RQ1, we explored what the types of institutions "look like" without attention to whether the differentiating characteristics are the result of institutions seeking legitimacy through mimicry, or whether they are motivated by the desire to improve performance outcomes. We leave this important question for future research. Our study includes institutional job resources, but research performance is at the individual level. Future research can gain a richer understanding of departmental dynamics by examining productivity at the departmental level, and perhaps also assessing organizational culture. Importantly, while we offer a few theory-driven causal suggestions, based on the JD-R model, the nature of our cross-sectional data does not allow for causal claims when interpreting our data. This is an important area for future work, which could draw causal inference by tracking research performance outcomes across a greater timeframe.

Regarding the outcomes found at teaching institutions (RQ2), we note that the scarcity of results may be due to a small sample size (*N* 559 from teaching schools) in this institutional

category and a resultant lack of statistical power. We suspect that we reached a representative number of faculty at teaching schools, but those with no research expectations, following survey prompts, appropriately excluded themselves from the study, as we sought input only from faculty that have a meaningful portion of their work effort allocated to research. We acknowledge that this cutoff is a subjective self-reported one, but one that we consider relevant to our overarching goal of investigating faculty members that consider themselves to be research active to at least some degree.

Finally, to prevent our survey from being too long, and because the focus of our study was on job resources related to research productivity, we did not measure individual differences, such as personality traits or motivation, which can serve as personal resources to address the various job demands (e.g. Xanthopoulou *et al.*, 2009). We also felt that these individual factors have received attention in prior work on research productivity (e.g. Chen *et al.*, 2006; White *et al.*, 2012). Nevertheless, it would be interesting for future research to examine a combination of personal and job resources, and thus extend our findings by comparing the effects of personal vs job resources on research productivity.

Conclusion

While prior research has studied correlates of research productivity across a variety of fields such as higher education (Dundar and Lewis, 1998), information science (Abramo *et al*., 2017), management (Valle and Schultz, 2011) and in general (Wahid *et al.*, 2021), our paper extends this work by showing that correlates of research productivity are not equally relevant across the different types of institutions. Specifically, by building on the JD-R model and considering different levels of teaching demands, we show that correlates of research productivity vary by the type of school, categorized by teaching load, a key job demand. As such, research- critical resources available to faculty are likely to vary depending on the degree of teaching demands at their school. Furthermore, our data points to a variety of differences across institution types that go far beyond teaching load, which we describe in some detail. Finally, we found that no single job resource or job demand consistently related to research productivity across all three institution types, with tenure difficulty being the closest to

being universally significant.

Note

1. We recognize that many scholars consider two-two as "balanced" and that only below that is one truly "research-focused." We depart from this terminology in light of the relative infrequency of this type of school. Furthermore, while examining the data, we observed that schools with a two-two teaching load are far more similar to schools with a two-zero or two-one teaching load than to schools with a three-three or three-two teaching load.

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Appendix

Table A1. Variable descriptions

Variable	Description
Research productivity (5 year)	5 Year cumulative SCImago journal rankings þ 0.1 for pubs not in SJR þ 0.1 for each non-journal item
Demographics	
Gender	0: Female, 1: Male
Age	Years since birth
Rank	0: Assistant, 1: Associate, 2: Full
Faculty	# In department
Junior faculty ratio	Assistants/(associates + full)
Job demands	
Research %	Personal official research effort allocation, 0.0–1.0
Teaching %	Personal official teaching effort allocation, 0.0–1.0
Service %	Personal official service effort allocation, 0.0–1.0
Teaching Credits	Annual credit hours personally assigned
Overloads	# Courses above assigned taught annually
Service items (school)	Count of department or school service responsibilities
Service items (university)	Count of university service responsibilities
Service items (professional)	Count of professional service responsibilities
Consulting hours	# Hours monthly
Tenure difficulty	Sum of research requirements to achieve tenure, official or implicit, in terms of # of pubs by categories ("top" = 5 SJR; "high" = 2 SJR; "other" =0.3 SJR; non-journal items 50.1 SJR). Example, 3 top, 2 high 5=3*5 + 2*2 = 19
Accreditation	0: None, 2: AACSB, 1: Other
PhD program	0: No, 1: Yes
Job resources	
Protect untenured	0: No, 1: Yes
Brown bag	# Annually
PhD productivity	Cumulative school scores (2012-16) from UT-Dallas and TAMU
Salary	$10,000's annual
Summer pay	$10,000's annual
Rsrch. asnt. Hours	# Weekly hours dedicated to individual Grants received (log)
Grants received (log)	Combined internal/external $ last 5 years
Travel funding	$10,000's annual
Research funding	$10,000's annual
Conference attendance	Average per year over last 5 years