

An Intra-organizational Ecology of Individual Attainment*

Christopher C. Liu
Rotman School of Management, University of Toronto
105 St. George Street
Toronto, Ontario M5S 3E6 Canada
chris.liu@rotman.utoronto.ca

Sameer B. Srivastava
Haas School of Business, University of California, Berkeley
2220 Piedmont Ave, Berkeley, CA 94720
srivastava@haas.berkeley.edu

Toby E. Stuart
Haas School of Business, University of California, Berkeley
2220 Piedmont Ave, Berkeley, CA 94720
tstuart@haas.berkeley.edu

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* Direct all correspondence to Toby Stuart: tstuart@haas.berkeley.edu; 617-895-8707. All three authors contributed equally.

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Abstract

This article extends niche theory to develop an intra-organizational conceptualization of the niche that is grounded in the activities of organizational members. We construe niches as positions in a mapping of individuals to formal and informal activities within organizations. We posit that positional characteristics in this activity-based system are critical determinants of members' access to information and relationships—two of the vital resources for advancement in organizations. Because activities are difficult to observe, we propose a novel empirical strategy to depict niches: we exploit a census of memberships in electronic mailing lists. We assess three niche dimensions—competitive crowding, status, and diversity—and show that these attributes affect the allocation of rewards to employees. Propositions are tested in two empirical settings: an information services firm and the R&D division of a biopharmaceutical company. Results indicate that people in competitively crowded niches had lower levels of attainment, whereas those in high status and diverse niches enjoyed higher attainment levels. We conclude with a discussion of email distribution lists as a tool for organizational research.

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I. Introduction

Careers in organizations often are described with allusions to *ladders*, *fast tracks*, and *glass ceilings*. These analogies reflect a widely documented fact in organizational life: wittingly or not, organizations are agents of stratification. For instance, specific job titles within organizations often are completely or nearly segregated by sex, with many implications for individuals' compensation and career prospects (Baron 1984; Barnett, Baron, and Stuart 2000). Likewise, job ladders may reach to different heights based on the sociodemographic backgrounds of their climbers (Kanter 1977), and informal interactions in organizations may be particularly subject to exclusionary processes (e.g., Turco 2010; Kleinbaum, Stuart, and Tushman 2013). Indeed, the stratification of opportunities begins well before any actual employment relationship is underway, as institutionalized, exclusionary hiring practices and implicit restrictions on access to the social networks over which recruitment takes place differentially sort individuals with certain, non-merit-based characteristics into specific job vacancies (Fernandez and Friedrich 2011; Fernandez and Fernandez Matteo 2006).

This paper extends the literature on social structure within organizations and its effects on individual attainment. However, the theoretical lens we adopt is non-traditional in the stratification literature: we apply ecological theories of the niche (Freeman and Hannan 1983; McPherson 1983; Hannan, Carroll, and Polos 2003; Popielarz and Neal 2007) to study how different structural features of realized "niches" inside organizations contour the rewards that employees garner. While organizational ecologists have a decades-long interest in the intersections of ecological reasoning and labor market phenomena (e.g., Haveman and Cohen 1994; Sorensen 1999; Baron 2004), little of this work elaborates implications of ecological reasoning within organizations. Here, we consider how niche properties can help us to understand the variation in discretionary rewards managers allocate to employees.

Theories of the niche have been influential in the literature on inter-organizational dynamics. Although a recent formalization of niche theory has highlighted some discrepancies in logics across branches of the literature (Hannan, Carroll, and Polos, 2003), the idea of a niche as a position in a multidimensional resource space has animated a substantial body of empirical work in organizational

studies. This research shows that population dynamics, including organizational births (Hannan and Freeman 1987), growth and mortality rates (Barron, West, and Hannan 1994), resource partitioning processes (Carroll 1985; Dobrev, Kim, and Hannan 2001), and status differences (Podolny, Stuart, and Hannan 1996), depend on multiple aspects of the resource spaces that host organizational populations. Moreover, niche theory has been extended to a range of social phenomena that broadly can be framed in terms of markets, including occupations vying for professional jurisdiction (Abbott 1988), the emergence of forms in an institutional identity space (Ruef 2000), and even musical tastes (Mark 1998).

In this article, we bring niche theory to *intra*-organizational analysis. We find many points of correspondence between inter- and intra-organizational ecologies. At the broadest level, just as the organizations in a population experience competitive and symbiotic interactions in a confined resource space, employees in an intraorganizational ecology compete and cooperate to obtain scarce resources. In population ecology, organizations vie for customers, employees, financial capital, and legitimacy. Analogously, inside an organization, individuals compete to obtain information, social capital, budget allocations, advancement opportunities, and so on. Likewise, just as the finiteness of resources available to support any given organizational form creates a carrying capacity that shapes vital rates, resource constraints force many tradeoffs among employees in organizations. Finally, one can draw close parallels between intraorganizational processes and recent reformulations of the niche in terms of form-defining identity codes and the lenses of audience engagement and appeal (Hannan, Carroll, and Polos 2003).

While niche theory has not been extensively applied to intraorganizational dynamics, we believe this lacuna in the literature has been caused by data (un)availability, rather than the inapplicability of the theory to pertinent phenomena. The operative question, therefore, is: how can the researcher observe and measure employees' niches in an intraorganizational ecology? We believe that any useful approach to measuring intraorganizational niches will need to consider individuals' positions in both the formal and informal structure of an organization. There is simply too much theory and evidence that informal structure matters to solely rely on the formal structure as the empirical scaffold to the niche space (Blau

and Scott 1962; Allen 1977; Krackhardt and Hanson 1993; most recently, Biancani, McFarland and Dahlander 2014; McEvily, Soda, and Tortoriello 2014).

In light of this, one reasonable approach would be to consider the resource space defined by the multitude of recurring “activities” (broadly considered) in organizations. A focus on activities appeals to us because the set of them bridges the formal, semi-formal, and informal structures of organizations. Some activities (e.g., departmental meetings) parallel the formal reporting structure; however, many others assemble the organization’s informal social and interest groups, or members of its myriad project teams. In addition to spanning the continuum from formal-to-informal modes of organization, an emphasis on activities is consistent with classic definitions of niche. For instance, Elton (1927; p. 63) defined “niche” as, “a term to describe the status of an animal in its community, to indicate what it is *doing*” Similarly, in our framework, intraorganizational niches arise from activities that reveal what employees are doing and with whom they are interacting while performing those activities.

Specifically, we construct niches from a dual-mode network that maps individuals to the activities in which they participate. Much like Feld’s (1981) observation that the intersection of people in common interests gives rise to clusters of interaction, we witness the (presumed) networks and information flows that occur when groups of individuals participate in the same activities. Conceptually, this activity-focused affiliation network encapsulates multiple dimensions of an organization’s social structure, but pragmatically, it is very difficult to observe. The solution we implement relies on a novel data source that has potentially broad application in organizational analysis: the census of electronic mailing lists in an organization. If we construe each mailing list as a membership roster for a distinct “activity,” the full set of mailing lists is a dual-mode network with disjoint sets of elements: employees and activities. In the two organizations we study, e-mail distribution lists provide an extraordinarily detailed window into the complex ways in which work actually gets done. We find them for everything from office locations to function memberships to standing cross-functional teams, to ad hoc task forces, the “kitchen cabinets” of organizational leaders, professional interest groups, as well as social groups, such as the softball league or

employees in common ethnic groups. It is in this sense that the activities revealed by mailing lists run the gamut from formal organization structures, to semi-formal team structures, to informal social groups.

In the analysis to follow, we demonstrate the utility of the framework and the data source. First, we measure three properties of niches—competitive crowding, status, and niche diversity—and show that these characteristics affect employee attainment in the directions theory suggests. Second, we construct intraorganizational ecologies in two very different organizations: a private-sector biopharmaceutical laboratory and a large information services company. The findings are remarkably consistent across the two settings, which bolsters the external validity of the results. Third, we test our hypotheses exploiting two complementary measures of individual attainment: annual bonus and performance rating. We find strong concordance in the results between these two outcome variables. Taken together, the findings are consistent with the proposed conceptualization and measurement of intraorganizational niches.

II. Theory: Niches in an Intraorganizational Ecology

Ecological theories begin with a distinction between the fundamental and the realized niche. Drawing on Hutchison (1957), Hannan and Freeman (1989) define the fundamental niche of an organizational population as the region of a resource space in which the population will experience a non-negative rate of growth. The realized niche of an organizational population is the subset of the fundamental niche that is actually occupied, given the presence of competitive interactions with rivalrous populations.

Much of the empirical work on ecological dynamics has examined the structure of *realized* niches. We build on this vein of the literature. Two conceptual aspects of this work guide our development of a theory of intraorganizational niches. First, as in classic theories of social structure (Simmel 1902), ours rests on an analytical distinction between actor and position—positions or niches can be characterized in general terms; they are independent of any specific occupant. Put differently, social structure is an abstraction based on ongoing, recurrent relationships among actors (cf. Breiger 1974; Breiger and Mohr 2004). Of course, this assumption underlies ecological analyses of all sorts. For instance, the notion that niche width moderates the strength of audience appeal is a proposed relationship

between an abstraction (niche width) derived from positional characteristics (the span of an organization across segments of a market) and an outcome of interest (audience appeal).

Second, implicit in the concept of a realized niche is the *relational* nature of its definition: realized niches are elaborated through ongoing interactions among the inhabitants of a resource space. Therefore, intraorganizational niches arise from a process akin to endogenous population structuring (Hannan and Freeman 1977). Like Carroll's (1985) resource partitioning theory or as in models of size-localized competition (e.g., Baum and Mezias 1992), we argue that positions in the intraorganizational niche space, in part, emerge from endogenous interactions among employees inside organizations.¹ Positions are endogenous to the day-to-day jockeying that is routine in organizational life.

Many studies have linked organizations' positions in a niche space to their life chances. McPherson's (1983) development of a competition matrix for a group of organizations represents a seminal contribution to this area. McPherson (1983) defined niches of voluntary organizations in terms of their locations in a resource space comprising the population distribution of possible joiners in the ranges of sociodemographic variables targeted by the organizations under study (see also Baum and Singh 1994; Popielarz and McPherson 1995). Much of the follow-on work in the ecology-of-affiliation tradition, however, implicitly has examined niches in some form of an activity space. For instance, Podolny, Stuart and Hannan (1996) demarcated technological niches of organizations based on the overall patent citation network in the semiconductor industry. This creates an affiliation network defined by firms' choices to become active in some technical areas, but not others. The properties of organization-specific niches are then derived from the relational structure of the affiliation network: two firms compete insofar as their participation in technical activities overlap. Therefore, the network is defined by the mapping of

¹ The idea that niches arise from endogenous population structuring does raise thorny theoretical and empirical issues: in the context we study, niches are partially endogenous in that they in part are determined by deliberate choices employees make about which groups to join. We will return to this issue in the Discussion section. Here, we simply note that the same is generally true of the literature on the realized niche. In that case, organizations make strategic choices about which products and services to offer, which market segments to enter, which employees to hire, and so forth. At the same time, their choices are greatly constrained, especially in already resource-partitioned markets, in which pre-existing audience tastes determine and delimit viable organizational choices. Thus, in most existing studies of the realized niche, measured niche positions are aggregations of endogenously and exogenously determined factors.

companies to fine-grained areas of technology. A similar conception of niche is presented in Dobrev, Kim and Hannan (2001). In their article, technological niches are constructed from the range of engine sizes that automobile manufacturers choose to produce (see also Dobrev, Kim, and Carroll 2002).

In this article, we distill properties of intraorganizational niches in the recurrent activities of the organization. Why focus on employee niches in a broadly defined activities space? Our primary rationale stems from a belief that activities are the stage on which collaborative and competitive interactions translate into heterogeneous career outcomes. Put simply, activities are the “what and where” of the allocation of individuals’ time in organizations. If this is indeed the case, then how—and with whom—employees are embedded in the activities that occur in an organization will strongly influence individuals’ access to two critical resources that are known to affect career outcomes. These resources, which we describe next, are information and relationships.

The Resource Space: Information and Relationships

Niches are positions in a resource space. Consider, for instance, resource partitioning theories. In these, often-geometric conceptions of the niche, organizations are metaphorically assumed to be presences (i.e., shapes) in a Euclidean space (e.g., Carroll 1985; Peli and Nooteboom 1999). In empirical studies, of course, the specification of the resource space depends on the nexus of the population under study and the availability of data. For instance, Baum and Singh (1994) define niches of day care centers in terms of the age ranges of the children they admit, because this defines the group of would-be members for whom centers compete. What, then, are the pertinent resources in an intraorganizational ecology? We posit that two, related categories of resources are vital to employees as they maneuver to advance in organizations. First, individuals may gain an advantage if they cultivate unique positions in the flow of information in an organization. Second, advancement hinges on social capital: time and again, studies have shown that possessing the right relationships and sponsors is critical to rapid career progression.

A great deal of work, which spans a dozen or more subfields in organization theory, considers the role of information in social organization. The diversity of this research extends from information processing theories of organizations themselves (Weick 1979) to typologies of coordination when

information is distributed across individuals or units in organizations (Thompson 1967) to the challenges of moving information across organizational boundaries (Allen 1977). One of the streams of this work also considers the role of information in the advancement of individuals' careers in organizations.

In fact, ideas about information-based advantages in career outcomes connect to the voluminous literature on social capital. Most notably, Ronald Burt's (1992) work develops the idea that actors in brokerage networks are ideally situated to gain access to information that provides them with an advantage in competitive situations. An "information advantage" may exist for individuals in network structures that convey prompt or broad access to strategic information. This is one social mechanism thought to underlie the many empirical associations between egocentric networks and career outcomes.

Of course, the fact that certain networks facilitate being "in the know" is only one potential benefit of a deep social network. From decades of research in organization sociology, we also know that having the right relationships in organizations is necessary for employees to assemble the support that facilitates career advancement: mentoring, task advice, the development of a coherent identity, the buy-in of individuals in positions of authority, political support—are all network-dependent resources (e.g., Blau 1955; Kanter 1977; Ibarra 1995; Podolny and Baron 1997; Srivastava 2015). In fact, many studies in the job search literature establish the value of the right network before the employment relationship even begins: often, the right contacts are vital to securing jobs, in the first instance.

Abstracting from the many nuances in these literatures, we argue that a distillation of the properties of employee niches in the activities of an organization amounts to identifying individuals' positions in a resource space comprising information and relationships. The social networks and the exchange of tacit knowledge that occurs in and emerge from these activities inform levels of access to these critical resources, and therefore individual attainment levels. In short, we focus on employee niches in the activities space because we believe that positions in this space will strongly influence employees' access to information and ability to form important, career-enhancing alliances.

Hypotheses

We describe intraorganizational niches in three dimensions: competitive crowding, status, and diversity. Competitive crowding refers to the density of actors who occupy similar niche positions. The status of a niche varies with the extent to which it offers access to colleagues who are in positions of authority in the organizational hierarchy. Finally, a niche's diversity gauges the extent to which it provides access to employees in different functional areas and hierarchical levels of the organization.

Niche Crowding. In the empirical literature on the realized niche, ecologists have gauged variation in competitive crowding across niches in terms of "overlap densities" (McPherson 1983), or the count of organizations that participate in a given niche (Baum and Singh 1994). When overlap density is high, organizational life chances have been shown to be compromised. Beginning with DiMaggio (1986), social networks researchers noted the resemblance between measures of structural equivalence in a network and of ecological niche overlap (Burt 1987; Podolny, Stuart, and Hannan 1996). This parallel arises because structural equivalence itself is a measure of overlap in a relational structure; two perfectly equivalent elements in a network are, by construction, substitutes: one node may replace the other without consequence to the network's shape. Thus, network-based similarity measures are a means to quantify the competitive intensity of niches. A literature has since evolved in which the intensity of competition between actors is a function of the similarity between them in a resource space, such as recruitment patterns in a labor market (Sørensen 1999), a supplier-buyer network (Burt 1982), a geographic area (Lomi 1995; Baum and Haveman 1997; Sorenson and Audia 2000; Audia and Kurkoski 2012), a technology or scientific space (Podolny, Stuart, and Hannan 1996; Stuart and Ding 2006), or many different formulations of a product features space (Dobrev, Kim, and Hannan 2001; Reis *et al.* 2013).

The general idea that competition has consequences for individual attainment is also a long-running theme in research on careers. Studies of workforce demography, for instance, have found that employees who enter organizations in large cohorts may face greater competition for senior-level jobs (Stewman and Konda 1983; Barnett and Miner 1992) and lower rates of mobility. Likewise, crowding may reduce individuals' ability to realize the potential gains from opportunities for brokerage (Burt 1997)

or increase their proclivity to pursue risky career strategies (Bothner, Kang and Stuart 2007). Human capital theorists have noted that women frequently enter occupations requiring general skills that do not atrophy amidst temporary exits from the labor market. The result of this process is a crowding of female workers into occupations with this feature and a reduction in the wages attached to such jobs (Bergmann 1986; Barnett, Baron, and Stuart 2000).

Competitive crowding thus has been linked to adverse outcomes in both relational ecologies of affiliation and in labor market settings. Why do we anticipate the same in an assessment of the competitive crowding of positions in the intraorganizational activity space? We argue that occupants of crowded niches will be less effective in accessing valuable information or building effective networks, *ceteris paribus*. The literature on information advantages from social networks hinges on distinctions of access and timing. Advantage comes from knowing what others do not, or at least knowing things before the pertinent information diffuses to a broader audience, at which point its ubiquity eliminates its strategic value. From the standpoint of information access, crowded positions imply redundancy in exposure. What one person knows, so too do a number of structural equivalents. In a similar vein, relationships are based on mutual benefit, and occupants of crowded niches will have less distinctive resources to bring to bear in forging new relationships. Put differently, in facing many structural equivalents in the activities of the organization, individuals in competitively crowded niches will have fewer opportunities to carve out positions of unique value to the organization. We hypothesize:

Hypothesis 1 (H1): Employees in competitively crowded intraorganizational niches will experience lower levels of attainment than employees in niches that are less crowded.

Niche Status. Crowding, therefore, concerns the level of competitive differentiation between the actors in a social system. Status, conversely, references their social standing in hierarchical orderings. The sociological literature demonstrates many benefits of status. For instance, high status actors garner greater recognition for a given quality of product (Merton 1968; Podolny 1993); they obtain the broadest range of choice among potential partners (Stuart 1998); they experience accelerated rates of growth (Podolny and Phillips 1996); and status facilitates entry into new market segments (Jensen 2003).

One of the defining features of status is that it “leaks” (Podolny 2005). Within an organization, for example, an individual’s, a work group’s, or even a full department’s reputation is a function of those who associate with that person or collectivity. In this sense, status is always rooted in the relationships that embed actors into the rank and expertise distribution in an organization, as these relationships form the tributaries of status leakage. This occurs because other community members infer status from affiliations: a focal actor’s social status depends on the statuses of his or her affiliates. As a few among many examples in the literature, academicians derive status from their affiliations with particular departments and universities (Merton 1968); law firms accrue status from the prestige of the universities their staff attended (Phillips and Zuckerman 2001); and young companies derive status from their investors and strategic alliance partners (Stuart, Hoang, and Hybels 1999). Likewise, in an intraorganizational ecology, certain niches are high status because the activities that define them confer privileged access to those in positions of power and prestige in the organization.

A central conclusion of this literature is that status begets access to socially constructed and socially transmitted resources. We argue that occupants of high status niches are more likely to form relationships with high status alters because their niche sets the stage for multiple opportunities to interact with such individuals. Furthermore, once an individual has—or even is just perceived to have—relationships with high status alters, that person is more likely to gain exposure to valuable information because of the positive status spillovers they receive from these affiliations. We therefore hypothesize:

Hypothesis 2 (H2): Employees in niches that confer access to high status actors will experience higher levels of attainment than employees in niches that do not confer access to high status actors.

Niche Diversity. Much of the seminal work in the social networks literature concerns how the shape of a network influences the dissemination of information. The arcs of the social network in a community determine the distribution of information within it. This is particularly true for tacit or proprietary information that is not easily or willingly transferred through public broadcast channels.

There are a few types of arguments about the potential advantages that accrue to occupants of niches that provide access to a diverse array of contacts. First, strategic theories of control in social

networks describe the potential gains from intermediating transactions among disconnected alters, including the option to broker relationships among one's contacts. Second, information-based theories of opportunity posit that individuals with broad contact networks gain exposure to more varied streams of ideas and information, and therefore they are ideally positioned to identify untapped opportunities or to experience the creative spark that comes from the recombination of synergistic knowledge inputs arriving from alters in a diverse contact network (e.g., Brass 1995; Burt 2004; Fleming, Mingo, and Chen 2007; Tortoriello, Reagans, and McEvily 2012).

We argue that the breadth of access to diverse contacts also distinguishes intraorganizational niches. Some niches limit their occupants to relatively closed networks, in the sense that homogenous groups of individuals engage in the activities that define the niche. Others types of activities, by contrast, unite a diverse array of participants and therefore serve as gateways to a range of information and relationships with others of different rank, expertise, or social capital profiles. Occupants of diverse niches are exposed to and therefore more likely to form relationships with people from functional areas and vertical levels other than their own. These relationships are more likely to serve as conduits to information and ideas that are unknown in the focal actor's organizational unit. Likewise, diverse niches are useful for building a focal employee's reputation across the organization and for facilitating opportunity recognition beyond the confines of a specific job role. Because broader niches provide exposure to a range of information and relationships, we hypothesize:

Hypothesis 3 (H3): Employees in niches that confer access to a diverse range of contacts will experience higher levels of attainment than employees in niches that do not confer access to a diverse range of contacts.

III. Method

Research Sites and Study Populations

We tested these three hypotheses in two, quite different organizational settings: an information services provider, which we label ISCO, and a biopharmaceutical company, which we call BTCO. At the

time of data collection, there were 4,661 employees in the ISCO sample and 916 employees in the BTCO sample. Although these organizations were typical for their industries, they varied in many dimensions, including size, geographic dispersion, the demographics of the respective workforces, layers in the organizational structure, and internal mobility patterns. By assessing whether the hypothesized effects are evident in both settings, we seek to enhance the external validity of the findings.

The two organizations slightly differed in the precise data they made available to us. For example, ISCO provided us access to employee performance ratings but not bonuses, whereas BTCO granted access to both ratings and bonus amounts. Table 1 summarizes the differences between the two organizations and the nature of the data we were able to acquire from each.

- Table 1 about here -

The global information services provider, ISCO, was the largest business unit of a conglomerate. At the time of data collection, ISCO had a workforce of 10,000 in over 100 offices and generated \$4 billion in revenue. Our study population included all of its nearly 5,000 U.S.-based employees. The company's domestic operations were organized along functional lines including product development, marketing, sales, finance, legal, and human resources. In addition, the company had a small number of integrated organizational units that combined functional resources and were accountable for the profitability of an entire line of products and associated services.

The study population at BTCO included all members of the nearly 1,000-person Research Division. These employees were located in spatially proximate buildings in one metropolitan area. This unit of the company conducted basic and applied scientific research to supply the company's drug development pipeline. Employees in R&D worked across a range of biological disciplines and methods. The division was modeled after an academic research center, with senior scientists directing the work of junior researchers and staff in a decentralized, laboratory setting. Given the scientific nature of its purpose, the workforce at BTCO was very highly educated, with many doctoral degree holders on staff.

Data, Measures, and Estimations

From both organizations, we collected email distribution lists and human resource records. Each distribution list is a collection of associated email addresses. In both organizations, email addresses were encrypted to preserve employee privacy. In addition, ISCO encrypted distribution list names before sharing the data with us. Therefore, we could identify the names of all email distribution lists at BTCO, but not at ISCO. We collected email lists from both organizations at frequent intervals for several months. Because there was not a great deal of variation in the list composition or members over this short window of time, we chose to analyze the data as a cross-section.² In both organizations, distribution lists served to facilitate communication among groups of employees who have occasion to interact frequently.

Based on interviews and our own review of the list names in BTCO, we identified three general categories of lists: (a) formal organizational or geographic work units, such as departments and office locations, (b) social groups, such as the company softball team; and (c) work-related teams or professional interest groups, such as groups for specific molecules under investigation, or specific disease areas. As we describe subsequently, the majority of email distribution lists at BTCO were constructed for work-related activities and prescribed job functions, but it is clear too that these lists also map individuals to a wide variety of informal work and social groups.

In addition to the distribution lists, we collected encrypted employee records from the human resource systems of both companies. We used the same encryption algorithm across both data sets (distribution lists and human resource records) so the datasets could be readily merged at the person-level via a common, hashed identifier. From these records, we obtained information on employees' sex, tenure, hierarchical rank, organizational affiliation subunit, supervisor identification number, annual performance rating, and target bonus paid (the latter only at BTCO). Because annual performance ratings and bonuses reflect contributions made in the prior year of service, we collected the human resource data in the year after the one from which we drew distribution list data.

² In ISCO, there was 88% membership overlap between the distribution lists in use over a six-month period. In BTCO, the overlap was 82%. Given the limited amount of change in the lists, we performed our analyses in the cross section. Of course, this will limit our ability to make any causal claims from the analyses to follow.

Dependent Variables. At ISCO, our measure of attainment is based on the performance rating given to an employee by his or her supervisor. Ratings range from 1 (does not meet expectations) to 5 (exceeds all expectations). We then created an indicator, *High Performance*, which was set to 1 for employees receiving a 4 or 5 rating (48% of employees in the sample).³

At BTCO, we obtained both performance ratings and bonuses, which are highly correlated. We chose annual bonus as the dependent variable because it is more directly tied to individual attainment. Specifically, in BTCO’s compensation plan, the HR department used a formula to provide supervisors with a target bonus for each of the manager’s direct report. Supervisors then had discretion to adjust this target bonus based on their evaluation of the employee’s performance in the prior year. We report the ratio of actual bonus divided by target bonus. This was formulaically centered near one based on the firm’s compensation policy: the “average” performer achieved the target under the bonus plan guidelines.

Niche Characteristics-Crowding. To measure characteristics of intraorganizational niches, we first created, for each organization, a person-by-distribution list, two-mode matrix, $\mathbf{A}_{i,k}$:

$$a_{i,k} = 1 \text{ if } i \in k; 0 \text{ otherwise}$$

where i indexes actors and k indexes lists. To define niche crowding, we converted the two-mode matrix, $\mathbf{A}_{i,k}$, into a one-mode matrix, $\mathbf{O}_{i,j}$, of overlapping distribution lists between actors, i , and alters, j . The entries of $\mathbf{O}_{i,j}$ are given by:

$$o_{i,j} = \sum_k a_{i,k} * a_{j,k}$$

Next we defined a matrix of supervisor overlap, $\mathbf{S}_{i,j}$, between i and j . The entries of $\mathbf{S}_{i,j}$ are given by:

$$s_{i,j} = 1 \text{ if } i, j \text{ share same supervisor, } z; 0 \text{ otherwise}$$

Competitive crowding of the niche occupied by actor i is then defined:

$$\text{Competitive Crowding}_i = \frac{\sum_{j \neq i} \frac{o_{i,j} * s_{i,j}}{\sum_k a_{i,k} + \sum_k a_{j,k}}}{\sum_{j \neq i} s_{i,j}}$$

³ We have also treated the raw performance ratings as the dependent variable in ordered logistic regressions. In these specifications, we found the proportional odds assumption to be violated. Therefore, we transformed the variable into a binary indicator. We obtained comparable results to those reported in Table 4 when using the 1-5 performance rating and a generalized ordered logit (using the “gologit2” command in STATA) estimator. For ease of presentation, we have opted to report only the results from the logistic regressions using the binary indicator.

In this equation, the numerator represents the number of email lists shared between actor i and a given alter j , conditional on both reporting to a common supervisor, z . This measure is then weighted by the sum of distribution lists to which i and j each belong, and summed across all alters, j . Finally, we weight the resulting measure by the number of alters, j , with whom i shares a supervisor. Translating this equation to words, competitive crowding rises for a focal actor i when colleagues j who report to actor i 's supervisor are structurally equivalent to actor i in the overall activity space. To flexibly identify people occupying highly crowded niches, we created an indicator, set to 1 for people in the top quartile of the distribution of competitive crowding and to 0 otherwise.⁴

Niche Characteristics-Status. We measured niche status based on an individual's exposure, through list co-memberships, to high-ranking colleagues. These individuals, who were all in well-compensated senior management or executive positions, comprised fewer than 10% of the employees in each organization.⁵ We defined a vector, \mathbf{E} :

$$e_i = 1 \text{ if } i \text{ is high ranking; } 0 \text{ otherwise}$$

Next, we calculated for each list, k , the proportion, p_k , of high-ranking individuals on the list:

$$p_k = \frac{\sum_i a_{i,k} * e_i}{\sum_i a_{i,k}}$$

The status of the niche occupied by actor, i , is then given by:

⁴ This simple spline offers greater flexibility than a linear effect and does not introduce the correlation of a quadratic specification. In all of the analyses, we use the 75th percentile as the cut point. Although it is necessary to make an arbitrary choice for a cut point, we have replicated all of the regressions using the 90th percentile as the cut point for each covariate. All niche covariates exhibit right skew. Therefore, as a robustness check, we have also estimated models with log (continuous) niche covariates (see Table 4, Model R-7, and Table 5, Models R-9 and R-10) and obtained comparable results—with a primary exception. In the full ISCO model, Crowding is negative but not significant, in the log specification. Also, like in the full BTCO model with the 75th percentile spline, the two log (continuous) niche diversity measures (which are highly correlated with one another) are estimated more cleanly when introduced separately. The diversity effects are strongly statistically significant when entered separately, and shy of statistical significance when entered jointly.

⁵ In ISCO, a high-ranking employee was defined as someone in an executive-level salary band. These individuals represented the top 5% of employees in ISCO. In BTCO, a high-ranking employee was defined as a laboratory-head. 9% of BTCO employees were in Lab Head roles. We also constructed a second, network-based measure of status. In addition to executive rank, we obtained electronic mail data that enables us to calculate each employee's centrality in the internal email network. We are able to use these data to compute status-weighted measures of the niche. In the equation above, simply replace e_i with an indicator variable that actor i is in the top 5% of the indegree centrality scores in the overall corporate email network, versus the current, rank-based measure. When we do this, we obtain nearly identical results. Complete tables are available on request.

$$Status_i = \frac{\sum_k p_k}{\sum_k a_{i,k}}$$

That is, the status of an actor's niche in the activity space increases in the mean proportion of high-ranking colleagues across all lists to which the actor belongs. We again created an indicator, which is set to 1 for people in the top quartile of this distribution, and to 0 otherwise.

Niche Diversity. Activities vary in the extent to which they bring together individuals who are otherwise unlikely to interact. We constructed two, separate measures of the diversity of employees' niches. The first reflects an individual's exposure, through list co-membership, to colleagues from different organizational units. The second gauges exposure to colleagues at different hierarchical levels of the organization, regardless of the level. In other work on intraorganizational communication patterns, it has been clearly shown that there is very limited, direct communication between individuals in different divisions, functions, and organizational levels (e.g., Han 1996; Hinds and Kiesler 1995). Therefore, both measures reflect the extent to which individuals' activities in the company expose them to broad cross sections of organizational members, which they are otherwise unlikely to be in communication with (Kleinbaum and Stuart 2014; Kleinbaum, Stuart and Tushman 2013; Srivastava and Banaji 2011).

The measures we use are based on the "Blau index" of heterogeneity (Blau 1977a; 1977b). For each list, k , we calculate the proportion of members, p_u , across all U , which indexes either organizational units or hierarchical levels. The resulting measure is:

$$"Blau" \text{ Diversity}_i = \frac{\sum_k \frac{1 - \sum_u p_u^2}{\sum_i a_{i,k}}}{\sum_k a_{i,k}}$$

That is, for each distribution list, we sum the squares of proportions of members from each organizational unit or hierarchical level, which we then subtract from one. We then divide this quantity by the size of the distribution list. We chose to denominate by the size of the list for substantive reasons: larger lists, such as ones that encompass all employees or an entire division of the organization, represent less meaningful social groups than smaller ones. Insofar as the mechanisms of action involve exposure to information and relationships from co-participation in organizational activities, we believe that particularly when diverse actors are involved, meaningful communication and relationship building is

likely to occur only in small groups.⁶ Finally, we compute the mean of this measure across all lists of which person i was a member. We again create indicators based on these measures, set to 1 for people in the top quartile of the distribution, and to 0 otherwise.

Control Variables. To interpret the effects of individuals' niches, it was necessary to control for employees' overall level of engagement with the activities in the firm. To account for the skewed distribution of this measure, we created indicators for individuals in each quartile of the distribution of list memberships. We included this highly flexible specification to guard against the possibility that the coefficients for any of the other niche characteristics pick-up a misspecification of the functional form of the relationship between the volume of work in which employees participated and the outcome variables.

In addition, we include an indicator for sex (set to 1 for females) and multiple dummy variables for employee rank and for job function. We also control for employee tenure using linear and quadratic terms, following convention in the estimation of earnings equations. Finally, in all regressions using the BTCO data, we include indicators for employees' highest educational degree attained. (Educational attainment was not available for employees of ISCO.)

For analyses of attainment at ISCO, where the dependent variable was a binary indicator of whether or not an employee received a high performance rating, we estimated logit regressions with robust standard errors. For analyses of attainment in BTCO, the dependent variable, the proportion of target bonus actually paid, is normally distributed. We conducted these estimations using OLS regressions with robust standard errors, which we clustered at the laboratory level because the lab head was the primary decision-maker in setting individual bonuses.

IV. Results

Table 2 reports descriptive statistics. Of the 4,661 employees in the data from ISCO, 53.2% were female.

The mean tenure in the organization was 8.5 years. The mean performance rating was 3.5 on a 5-point

⁶ Our operative assumption is that in large groups, there is ample opportunity for members with common backgrounds and organizational affiliations to band together, so that relatively homogenous sub-groups may form in large activities. When diverse participants actively engage in a small group, however, we anticipate that a greater amount of mixing will occur.

scale. Of the 916 employees in BTCO's research division, 51% were female. The mean tenure at BTCO, 6.8 years, was slightly lower than at ISCO. Despite the many differences between the two organizations, we found surprising consistency in employees' levels of participation in the activities space. At ISCO, the average employee was a member of 12.2 distribution lists. Remarkably, at BTCO, the typical staff member also belonged to 12.2 lists.

- Table 2 about here -

Because these data have not been previously used in organizational analysis, we describe in Table 3 the composition of the mailing lists in BTCO in some detail. Based on a review of list names and our knowledge of the BTCO organization, we identified three categories of distribution lists: social, organizational, and workflow.⁷ Social lists included a broad range of recreational activities and pragmatic interest groups, such as the running club and carpools. Organizational lists included same-building occupants and members of formal organizational units. Given our focus on the R&D organization, workflow lists often assembled people into science-based specializations and interests, such as lists for specific drug targets and molecular pathways. On average, organizational and social list membership rosters were considerably larger than those of workflow lists. Not surprisingly, organizational lists matched the overall demographics of the research division. In contrast, social lists comprised younger, ethnically more diverse, and less-well-educated members. Workflow lists, by contrast, were male- and White-dominated, with an older membership, a higher fraction of doctoral degree holders and a high degree of functional and rank diversity. Thus, we observe a first-order correspondence between workplace demography and the organization's activities space, as revealed by distribution lists.

- Table 3 about here -

We report a separate regression table for each of the two organizations: Table 4 reports results corresponding to ISCO, and Table 5 presents an analogous table for BTCO. In Model 1 in Table 4, the baseline regression, *Female* is positive and statistically significant, as are the indicator variables

⁷ In many instances, the title of a mailing list did not definitively indicate its type. For instance, some lists had uninterpretable titles like, "6789-f". We chose to be conservative in assigning lists to categories: we categorized lists only when we were highly confident in our ability to know their type. Based on conversations with the company, however, we believe that the majority of the unclassified lists would fall in the workflow category.

representing the two largest quartiles of distribution list membership. Female employees and those deeply engaged in the organization's many activities were more likely to receive high performance ratings than males and those with limited involvement in internal activities. In Model 2, consistent with Hypothesis 1, the indicator variable for an employee's occupancy of a crowded niche at ISCO is negative and significant, suggesting that individuals in crowded regions of the activity space experienced lower performance ratings. Model 3 shows that the indicator variable for occupying an especially high status niche is positive and statistically significant, which accords with Hypothesis 2. In Models 4 and 5, in support of Hypothesis 3, the indicator variables for occupying diverse niches, based on the measures of functional and rank diversity, respectively, also are positive and statistically significant.

We estimated a final, full specification, which simultaneously entered all covariates (Model 6). When the effects are estimated jointly, the indicator variables for competitive crowding, status, functional diversity, and rank diversity indicator all are significant and all have the hypothesized signs. Using the parameter estimates in Model 6, the effects also are consequential in magnitude. The odds that employees in crowded niches receive a stellar performance rating are 14% lower than the odds for employees in less crowded niches. By contrast, the odds that individuals in high status niches receive a high performance rating are 35% higher than the odds of those in lower status niches. Likewise, occupying positions of high functional and rank diversity correlates with 30% and 21% higher odds of a stellar performance rating, respectively, for employees in functional- and rank-diverse niches. In sum, the results reported in Table 4 support the three hypotheses and indicate substantively meaningful effect sizes.

- Table 4 about here -

Table 5 turns our attention to niche characteristics for the second organization, BTCO. In a baseline model, just as we found at ISCO, we observe that individuals who were more engaged in intraorganizational activities, as measured by membership in a greater number of distribution lists, receive higher bonuses.⁸ Greater educational attainment also is positively associated with higher year-end bonus

⁸ Recall that the dependent variable in Table 4, ISCO, is receiving a high performance evaluation. The dependent variable in Table 5 is an actual measure of the size of each person's bonus. Hence, coefficient magnitudes between the two tables should not be directly compared.

(Model 1), which comes as little surprise in an R&D organization. Model 2 indicates support for Hypothesis 1. Individuals who were in especially crowded niches received bonus payouts that were less than those received by their peers. Consistent with Hypothesis 2, individuals in high status niches earned bonus payouts that were higher than those of employees in lower status niches (Model 3). In accord with Hypothesis 3, Models 4 and 5 indicate that occupying especially functional- or rank-diverse niches is positively associated with bonus payments.

With the exception of rank diversity, the full model for BTCO (6) yields similar coefficients to the separately estimated effects, although the indicators for both high status niche and rank diversity are less precisely estimated in Column (6). In subsequent investigations, we find that the imprecision in the coefficient estimates in the full model is introduced because of a high correlation between the two niche diversity measures at BTCO, coupled with lower statistical power in this dataset. In Models 7 and 8, we present regressions that simultaneously include niche crowding, status, and *either* rank (Model 7) or function (Model 8) diversity, but not both. Without the introduction of correlation between these two variables, all findings are as hypothesized, and all effects are statistically significant. Using the results in Model 7 to illustrate magnitudes, crowding reduced bonus payouts by 5.4%, status increased bonus payouts by 15.5%, and level diversity increased payouts by 5.7%. We conclude that the results at ISCO and BTCO are highly compatible with one another and that they corroborate the hypotheses.

- Table 5 about here -

V. Concerns about Causality and Econometric Identification

Although the results are consistent with the theory, the limitations of the data create a number of empirical concerns. Most significantly, because the number and memberships of distribution lists at both research sites changed only modestly during the observation window, the regressions are run in the cross-section. Therefore, we cannot eliminate the possibility that unobserved individual differences influence both the niches individuals occupied in the emergent activity space and their attainment levels. In short, standard concerns about omitted variables certainly apply here. Likewise, the possibility exists that niche positions also correlate with unobserved points of organizational priority. It is conceivable, for instance,

that mailing lists that incorporate diverse members of an organization are more likely to be assembled to pursue significant objectives, and employees are more likely to be rewarded when they are involved in these salient teams. In short, do niche characteristics have a causal effect, or do they simply reflect the social processes that underlie the matching process between individuals and lists?

We undertook two supplemental analyses to *partially* address this question. First, we re-estimated regression models on two subsamples of employees, (i) those with limited organizational tenure and, separately, (ii) those who held non-leadership positions in the formal hierarchy. We reasoned that relative to more senior and longer-tenured employees, individuals in these subsamples would have had fewer opportunities and less discretion to proactively maneuver themselves into desirable niche positions. These employees were more likely to be channeled into specific niche positions based on their specific roles in the organization. Table 6 reports results from these analyses for both research sites. For ease of comparison, we reproduce in this table the full models based on the full samples from both companies. The previous, full-sample results for ISCO are in Column 1, which is included to compare to Columns 2 and 3. Column 2 is a regression in which the data are subset on short-tenured employees at ISCO, and Columns 3 subsets on lower rank employees. Columns (2) and (3) largely confirm the results from the full sample model in Column 1—although in the restricted samples some effects drop to p values $<.10$.

The results for BTCO, which appear in Columns 5-8 in Table 6, are once again less precisely estimated because of small sample sizes, especially when we subset on low tenure and lower rank employees. The imprecision in the estimates notwithstanding, comparing the full model using the complete sample from BTCO, which is reproduced as Model 5 in Table 6, to Columns 6 and 7, we see that the coefficients broadly are in line. The signs are identical in the restricted samples, even if some of the effects fall shy of statistical significance.

- Table 6 about here -

As we consider alternative interpretations for the findings in this paper, we believe that the most uncertain result concerns the effect of niche status. This finding is drawn into question because we know that high status groups preserve their status by maintaining exclusive membership criteria. In the typical

case, only individuals who stand in the good graces of the elites in the organization are asked to participate in the activities that create high status niches. In fact, it would be entirely consistent with our general understanding of status processes if much of the effect of memberships in high status lists is due to an underlying, unobserved assignment process that matches individuals with certain, desirable characteristics to activities that include high status members. In short, the issue is one of reverse causation: do individuals accelerate onto the fast track because they move into high status niches, or do they earn their place in such activities because they are on the fast track?

In our measurement of the status of niches, changes in person-specific niche characteristics result from a few different processes. They occur when new distribution lists are created and no-longer-used ones are culled; when there are changes to the membership rosters of existing lists; *and when there are changes to the employment statuses (promotions, departmental reassignments, etc.) of the members of pre-existing lists.* We believe that empirical support for a causal effect of niche status is stronger if the econometric identification of the status coefficient for a focal employee is solely based on variation in niche status that occurs when already existing members of that employee's distribution lists experience promotions, are singled out for bonuses, or experience some other form of an increase in status. Estimations based on this empirical strategy exclude the variation that arises when individuals are assigned to high status lists for reasons we cannot observe and thus provide a more conservative test.

The challenge in implementing this empirical strategy is, once again, the short time frame spanned by the distribution list data, and therefore the limited number of promotions that occur within the observation window. Nonetheless, when we conducted this analysis, we found in both organizations that when promotions to positions of high status are earned by co-participants in the activities in which a focal individual engages, that person experiences higher performance appraisals. These findings appear in Models 4 (ISCO) and 8 (BTCO) in Table 6, in which we add a covariate labeled, "Status, Rising Star of Alters". This result lends credence to the test of Hypothesis 2.

Although these robustness checks corroborate our main findings, we acknowledge that we cannot cleanly identify causal effects with these data. In fact, the coefficients in many of the regressions are

large, and it would not be a surprise to discover that the magnitudes are partly attributable to unobserved correlates of niche positions. In thinking through this issue, it is useful to make a general distinction in the literature in estimating treatment effects in observational data. Let us distinguish between, (i) the process by which a focal actor (employee or organization) comes to occupy a particular niche; that is, how he or she is assigned to a specific treatment condition, and (ii) the causal effect of a niche characteristic on relevant outcomes. In developing the arguments in the paper, we have focused on (ii) and ignored (i). We hope that we have convinced readers that, in theory, ecological conceptions of competition in a finite resource space, and the specific measures of niche characteristics that organizational ecologists have developed in their past work, have potential explanatory power in an intra-organizational context.

In ignoring the process of assignment of individuals to niches, however, we have a weak claim to clean identification. What are the prospects for addressing this weakness in subsequent work? Future research designs can improve upon our suggestive results in several respects. For instance, longitudinal distribution list data may enable the researcher to model the matches of individuals to mailing lists, and to exploit the understandings that emerge to estimate a causal effect of list memberships on subsequent outcomes (cf. Azoulay, Liu and Stuart 2014).

Another, compelling identification strategy would be to exploit the information available in list type. We assume that membership in many workflow lists and all social lists are voluntary. Conversely, memberships on organizational lists are prescribed. If this is correct, in the short term, niche positions in organizational lists are exogenous, whereas positions in workflow lists are self-selected. For example, let us assume that every employee is assigned to exactly one physical office location; that there is a distribution list for each office; and that office locations are assigned randomly, conditional on rank and organizational unit. In this scenario, people will be quasi-randomly assigned to offices that lead to differential access to information and social capital. For example, if an individual happens to be assigned to an office that is co-inhabited with high status actors, he/she is more likely to develop relationships that provide value for career advancement. This is exactly the type of partitioning of variance that future

projects can use to more cleanly identify effects; one can imagine separately computing niche measures based on exogenous (employer-determined) and endogenous (self-selected) activities.

This discussion of exogeneity also raises an important difference between intra- and inter-organizational contexts—the different processes by which actors are assigned to niches. We can debate how much discretion there is in the classic ecological context: much of what the ecological perspective has taught us is that entrepreneurs face genuine constraints on new venture creation due to legitimacy constraints and the need to appeal to pre-defined audience tastes, though recent formulations have acknowledged that these constraints are “fuzzier” than once thought (Hannan, Polos and Carroll 2007; Bogaert *et al.*, 2014). For instance, in resource partitioning theory, the success of organizations depends on a correspondence between identity claims and consumer perceptions of value and authenticity. We know from this work that social and economic resources are funneled into particular configurations based on societal values and audience tastes, and this defines which organizations acquire enough resources to thrive. But these are admittedly invisible hands, and in the intra-organizational context we study, there is a heavier, visible one. The meta-mechanisms in our analysis are competition and social recognition, similar to ecological studies of niches, but the organizational actor plays a more central role in the construction of niches than does the invisible hand of the market. Thus, it is arguably the case that intra-organizational niches are more exogenously determined than are interorganizational niches, and we must keep this distinction and its implications in mind as we think about the generalization of ecological theory to the intra-organizational context.

VII. Conclusion

The goal of this article has been to focus an ecological lens on intraorganizational attainment. Drawing on ecological insights about how niche characteristics script competitive and symbiotic dynamics in populations of organizations, we argue that individuals within firms occupy niche spaces that influence the resources they obtain. These intra-organizational niches are defined by positioning individuals in recurring organizational activities, which sometimes correspond to the organization’s formal structure, but also derive from how employees situate in the cross-functional project teams, task forces, and

informal work and social groups that crisscross the formal structure. We identified three niche characteristics and theorized about their relationship to individual attainment. These features are the extent to which a person-specific niche is, (1) competitively crowded, (2) a gateway to high status actors in the organization, and (3) a conduit to individuals in possession of dissimilar knowledge, skills, and ranks. We then proposed a novel solution to the empirical challenge of this line of inquiry: How does the analyst observe the myriad forms of recurring activity that occur in organizations? Our approach is to characterize niche positions based on an affiliation network derived from the complete roster of electronic mailing lists within organizations.

The findings in the paper are remarkably consistent across two, quite-different empirical settings, and two distinct but related measures of attainment. We find that people who occupied competitively crowded niches achieved lower levels of attainment, whereas those who occupied high status niches received more positive performance appraisals and bonuses. Likewise, using two different measures of niche diversity, we find that individuals who were exposed to a broader cross section of members of their organization's rank hierarchy and landscape of organizational units were evaluated more positively.

This article makes two primary contributions. First, it builds our understanding of ecological processes in intra-organizational settings. Whereas prior research has considered the interplay of ecology and organizational change (e.g., Amburgey, Kelly, and Barnett 1993), our study demonstrates that the same niche characteristics that influence the outcomes of resource competition in populations of organizations also affect the attainment of individuals within organizations. Second, we introduce a novel data source that has broad applicability in organizational research. Email distribution lists may provide a means for researchers to “dust the fingerprints of informal organization” (Nickerson and Silverman 2009: 538). In addition to the potential to use the details of these data, such as a classification of list by types, to hold a magnifying glass over the informal organization, the data promise an efficient and unobtrusive means to gather very rich information about the inner workings of even large, complex organizations. In sum, this study lays a conceptual and empirical foundation for future research on the effects of intraorganizational niches and for deeper investigation into their origins and dynamics.

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Table 1: Comparison of ISCO and BTCO

	ISCO	BTCO
Organizational Features		
Industry	Information Services	Biotechnology
Function	All functional areas	R&D only
Organizational structure	Many hierarchical layers; promotions relatively frequent	Relatively flat; promotions relatively infrequent and tend to occur within lab units
Educational Background	Wide range of educational backgrounds	Mostly research scientists; high concentration of PhDs
Geography	Multiple sites across the US	Single site
Career Mobility (horizontal)	Extensive: career paths tend to cross functional lines	Limited: scientists typically advance within a given lab
Available Data		
Attainment	Performance rating only	Performance rating and annual bonus
Email List Names	Encrypted	Identified

Table 2: Descriptive Statistics

	ISCO				BTCO			
	Mean	Std. Dev	Min	Max	Mean	Std. Dev	Min	Max
Attainment*	3.502	0.715	1	5	1.056	0.265	0	2.5
Competitive Crowding – Same Supervisor	0.062	0.098	0	1	0.087	0.095	0	0.467
Status – Seniority	0.229	0.131	0	1	0.094	0.051	0.027	0.406
Diversity – Function	0.051	0.111	0	2.843	0.142	0.223	0.001	2.001
Diversity – Level	0.178	0.249	0	5.664	0.241	0.314	0.001	2.723
Female	0.532	0.499	0	1	0.510	0.500	0	1
Number of Lists	12.220	6.786	2	65	12.244	6.484	2	47
Tenure	8.549	6.611	0.523	42.3	6.759	6.042	1	31

Note: N=4661 for ISCO and 916 for BTCO; *Attainment was based on performance rating at ISCO and target bonus payments at BTCO.

Table 3: Distribution List Descriptive Statistics – BTCO

	Social Lists <i>(e.g., Sports, Commuting)</i>	Organizational Lists <i>(e.g., Depts, Labs, Buildings)</i>	Workflow Lists <i>(e.g., Molecules, Molecular Pathways)</i>
Avg. # of list members	20.8 (31.2)	21.3 (29.1)	8.9 (12.7)
Mean age	36.0 (4.6)	38.8 (3.7)	42.3 (5.3)
Mean tenure	4.7 (2.4)	5.5 (2.7)	7.4 (5.3)
Mean % married	48 (24.2)	64 (22.7)	74 (27.3)
Mean % female	50 (17.4)	53 (23.4)	35 (29.8)
Mean % White	47 (30.4)	54 (23.9)	64 (32.9)
Mean % PhD	33 (19.7)	51 (31.0)	74 (26.3)
Mean Status – Senior Colleagues	.006 (.013)	.006 (.016)	.060 (.105)
Mean Functional Diversity	.065 (.045)	.062 (.093)	.085 (.091)
Mean Rank Diversity	.068 (.048)	.084 (.078)	.135 (.090)
Total # of unique individuals	278	802	342
Total # of lists	18	84	71

Note: Where indicated, list means are shown, with standard deviations in parentheses. There are no statistics for competitive crowding, as there is not an obvious, list-level analogue to this.

Table 4: Logit Regressions of High Performance Rating on Covariates & Robustness Check (ISCO)

	(1)	(2)	(3)	(4)	(5)	(6)	(R-7)
Crowding-Same Supv. (Top 25%)		-0.217** (0.072)				-0.150* (0.074)	-0.092 (0.078)
Status-Senior Colleagues (Top 25%)			0.418*** (0.076)			0.303*** (0.080)	0.328*** (0.099)
Diversity-Function (Top 25%)				0.412*** (0.077)		0.259** (0.083)	0.291** (0.111)
Diversity-Level (Top 25%)					0.302*** (0.082)	0.192* (0.087)	0.175* (0.080)
Female	0.305*** (0.060)	0.309*** (0.060)	0.348*** (0.061)	0.326*** (0.061)	0.317*** (0.061)	0.360*** (0.061)	0.356*** (0.061)
Tenure	0.016 (0.015)	0.010 (0.015)	0.018 (0.015)	0.020 (0.015)	0.022 (0.015)	0.019 (0.015)	0.023 (0.015)
Tenure - Squared	-0.001 (0.000)	-0.001 (0.000)	-0.001* (0.000)	-0.001* (0.000)	-0.001* (0.000)	-0.001* (0.001)	-0.001* (0.001)
No. Lists- 25-50%	0.057 (0.093)	0.070 (0.093)	0.035 (0.093)	0.025 (0.093)	0.025 (0.093)	0.009 (0.093)	-0.103 (0.097)
No. Lists- 50-75%	0.271** (0.100)	0.271** (0.100)	0.214* (0.101)	0.196 (0.101)	0.192 (0.102)	0.131 (0.103)	-0.015 (0.112)
No. Lists- 75-100%	0.574*** (0.109)	0.562*** (0.109)	0.396*** (0.114)	0.362** (0.116)	0.370** (0.122)	0.174 (0.127)	0.035 (0.141)
Constant	-0.519*** (0.089)	-0.414*** (0.096)	-0.558*** (0.089)	-0.553*** (0.089)	-0.564*** (0.090)	-0.524*** (0.098)	0.795** (0.288)
X^2	87.4	96.2	115.7	113.9	99.7	137.2	138.0
Prob > X^2	.000	.000	.000	.000	.000	.000	.000
N	4661	4661	4661	4661	4661	4661	4661

Note: Robust standard errors. † p < .10; * p < .05; ** p < .01; *** p < .001 (two-tailed tests). Coefficients for function indicators not reported. Model R-7 represents a robustness check with logged continuous niche covariates rather than the Top 25% spline.

Table 5: OLS Regressions of Bonus on Covariates & Robustness Checks (BTCO)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(R-9)	(R-10)
Crowding-Same Supv. (Top 25%)		-0.035* (0.016)				-0.025 (0.017)	-0.053* (0.025)	-0.054* (0.025)	-0.020** (0.007)	-0.021** (0.007)
Status-Senior Colleagues (Top 25%)			0.079** (0.029)			0.074** (0.028)	0.150** (0.055)	0.155** (0.055)	0.141*** (0.037)	0.140*** (0.035)
Diversity-Function (Top 25%)				0.082** (0.027)		0.067* (0.029)	0.072* (0.027)		0.039*** (0.009)	
Diversity-Level (Top 25%)					0.061* (0.027)	0.028 (0.029)		0.057* (.028)		0.040*** (0.009)
Female	-0.004 (0.017)	-0.004 (0.017)	-0.004 (0.017)	-0.004 (0.017)	-0.005 (0.017)	-0.004 (0.017)	-0.004 (0.016)	-0.004 (0.017)	-0.004 (0.017)	-0.004 (0.017)
No. Lists- 25-50%	0.026 (0.018)	0.030 [†] (0.018)	0.029 (0.018)	0.023 (0.018)	0.022 (0.018)	0.026 (0.018)	0.022 (0.018)	0.020 (0.018)	-0.016 (0.021)	-0.030 (0.021)
No. Lists- 50-75%	0.045** (0.015)	0.045** (0.015)	0.041** (0.016)	0.031* (0.015)	0.033* (0.017)	0.024 (0.017)	0.025 (0.016)	0.026 (0.017)	-0.033 (0.022)	-0.045* (0.022)
No. Lists- 75-100%	0.175** (0.024)	0.172** (0.024)	0.163** (0.024)	0.118** (0.025)	0.126** (0.030)	0.093** (0.029)	0.101** (0.026)	0.104** (0.031)	0.038 (0.031)	0.029 (0.031)
Tenure	0.007 (0.005)	0.006 (0.005)	0.005 (0.005)	0.005 (0.005)	0.006 (0.005)	0.003 (0.005)	0.002 (0.005)	0.002 (0.005)	-0.003 (0.005)	-0.003 (0.005)
Tenure-Squared	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Highest degree-MA	0.052* (0.025)	0.051* (0.025)	0.043 [†] (0.025)	0.046 [†] (0.024)	0.048 [†] (0.025)	0.036 (0.025)	0.038 (0.025)	0.039 (0.025)	0.033 (0.025)	0.034 (0.025)
Highest degree-PhD	0.120** (0.022)	0.112** (0.022)	0.089** (0.023)	0.116** (0.022)	0.116** (0.022)	0.081** (0.023)	0.086** (0.023)	0.085** (0.022)	0.051* (0.023)	0.055* (0.023)
Constant	0.923** (0.030)	0.942** (0.030)	0.929** (0.030)	0.929** (0.030)	0.928** (0.030)	0.950** (0.031)	0.999** (0.040)	1.000** (0.039)	1.465*** (0.113)	1.442*** (0.109)
Observations	916	916	916	916	916	916	916	916	903	903
R-squared	0.17	0.17	0.18	0.18	0.17	0.19	0.20	0.19	0.21	0.21
# of lab clusters	148	148	148	148	148	148	148	148	146	146

Note: Robust standard errors (clustered by laboratory for BTCO). [†] p < .10; * p < .05; ** p < .01; *** p < .001 (two-tailed tests). Model 9 and 10 represent robustness checks with logged continuous niche covariates rather than the top 25% spline. Because they are highly correlated, neither Diversity-Function nor Diversity-Level is significant when both are entered simultaneously as logged continuous niche covariates.

Table 6: Robustness Checks – OLS Regressions of Bonus on Covariates and Logit Regressions of High Performance on Covariates – Subset of Employees with < 3 yrs. of tenure and in Non-Leadership Roles; Alternative Measure of Status

Setting	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dataset	ISCO Int. Model	ISCO Tenure < 3 yrs.	ISCO Non- Leader	ISCO All	BTCO Int. Model	BTCO Tenure < 3 yrs.	BTCO Non- Leader	BTCO All
Status-Rising Status of Alters (Top 25%)				0.418*** (0.071)				0.064** (0.024)
Crowding-Same Supv. (Top 25%)	-0.150* (0.074)	-0.520*** (0.147)	-0.435*** (0.104)	-0.141 [†] (0.073)	-0.025 (0.017)	-0.077 [†] (0.041)	-0.038 (0.026)	-0.038 (0.026)
Status-Senior Colleagues (Top 25%)	0.303*** (0.080)	0.367 [†] (0.197)	0.479 [†] (0.256)	0.254** (0.080)	0.074** (0.028)	0.099 (0.070)	0.097** (0.031)	0.218** (0.071)
Diversity-Function (Top 25%)	0.259** (0.083)	0.689** (0.217)	0.585*** (0.164)	0.223** (0.084)	0.067* (0.029)	0.094 (0.070)	0.064* (0.031)	0.058* (0.029)
Diversity-Level (Top 25%)	0.192* (0.087)	0.489 [†] (0.258)	0.444** (0.164)	0.220** (0.086)	0.028 (0.029)	0.113 (0.087)	0.019 (0.030)	0.015 (0.030)
Female	0.360*** (0.061)	0.349** (0.132)	0.437*** (0.100)	0.355*** (0.613)	-0.004 (0.017)	-0.011 (0.042)	0.016 (0.023)	0.002 (0.016)
No. Lists- 25-50%	0.009 (0.093)	0.285 [†] (0.146)	-0.171 (0.121)	-0.132 (0.094)	0.026 (0.018)	0.013 (0.051)	-0.014 (0.031)	0.016 (0.018)
No. Lists- 50-75%	0.131 (0.103)	0.504* (0.226)	-0.248 [†] (0.137)	0.099 (0.103)	0.024 (0.017)	0.017 (0.047)	-0.011 (0.027)	0.020 (0.017)
No. Lists- 75-100%	0.174 (0.127)	0.275 (0.558)	-0.412* (0.108)	0.160 (0.128)	0.093** (0.029)	0.112 (0.095)	0.079 [†] (0.041)	0.076* (0.030)
Constant	-0.524*** (0.098)	-0.804*** (0.155)	-0.351** (0.111)	-0.715*** (0.093)	0.950** (0.031)	0.946** (0.151)	0.997** (0.056)	0.991*** (0.041)
R-squared					0.19	0.37	0.19	0.23
X^2	137.2	84.4	75.4	165.6				
Prob > X^2	.000	.000	.000	.000				
Observations	4661	1051	1891	4661	916	107	550	916
# of lab clusters					148	52	110	148

Note: Status-Rising Status of Alters is the proportion of list-members who, in the prior year, received a promotion and salary increase (for ISCO) and a high performance rating (for BTCO). Robust standard errors (clustered by laboratory for BTCO). Coefficients for rank, tenure, education, and function indicators not reported. [†] p < .10; * p < .05; ** p < .01; *** p < .001 (two-tailed tests).