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When Does Employee Turnover Matter? Dynamic Member Configurations, Productive Capacity, and Collective Performance

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Keywords
turnover, performance, organizational learning, groups, time, retention, human resources

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1. Introduction

An enduring question in the organizational sciences concerns the extent to which employee turnover affects the productive capacity of groups, work units, and organizations. In theory, turnover disrupts operations, destabilizes organizational routines, slows organizational learning, and depletes human and social capital (Argote and Epple 1990, Dess and Shaw 2001, Price 1977, Staw 1980). All of these factors suggest that employee turnover negatively affects performance, and indeed, higher turnover rates are associated with lower levels of productivity (Batt 2002), customer service (Kacmar et al. 2006), and profits (Ton and Huckman 2008). At the same time, however, turnover-consequence relationships are not universally supported (Huselid 1995, Sacco and Schmitt 2005) and are sensitive to contextual factors that qualify whether and when effects will be found (Arthur 1994, Rao and Argote 2006).

Given these mixed findings, and the fundamental importance of the general question, this paper aims to offer a novel conceptualization of turnover to explain why some groups or organizations easily manage collective departures whereas others find the effects so debilitating that they struggle to survive. We contend that the ability to operate productively in the face of turnover depends on a number of underlying properties that have been mostly overlooked in past research. When these properties are addressed explicitly, in combination and in temporal context, we argue that turnover's potential performance effects will be more visible and, hence, better understood. As we will explain, traditional approaches to capturing aggregate turnover via "turnover rates," although valuable, conceal variation in key causal factors that ultimately determine how turnover shapes performance. In short, value lies in specifying the fundamental structure of organizational turnover and the means by which it is assessed.

As we have alluded, our focus relates to understanding turnover as a "collective construct." Collective constructs are defined as conceptual abstractions used to explain actions of an interdependent and goal directed collection of individuals, groups, departments, organizations, or institutions (Morgeson and Hofmann 1999). *Collective turnover*, specifically, refers to aggregate employee departures that occur within entities such as groups, work units, or organizations (Hausknecht and Trevor 2011). A key feature of this definition is that although individual turnover behaviors necessarily contribute to its formulation, the construct takes on meaning beyond the simple aggregation of individual departures. At higher levels, turnover affects collective- level functioning and performance, suggesting influence that is independent from the acts that give rise to it (Morgeson and Hofmann 1999). Thus, conceptually, collective turnover is not simply the sum of individual acts (although they remain important). Rather, properties emerge at higher levels that, when addressed, may better explain how turnover influences performance.[1]

Our first goal is to summarize traditional approaches to studying turnover. We maintain that although classic perspectives have taken us far, a new approach accounting for complex organizational turnover patterns is needed. The second objective is to explain the properties believed to alter the turnover-performance relationship. We describe these characteristics, their relevance, and how they reveal nuanced patterns of turnover, and we illustrate with examples. In doing so, we introduce a "capacity-based" conceptual perspective as an alternative to existing rationales grounded in separation or instability. Third, we offer a novel approach that captures turnover properties and provides researchers with a theoretically grounded alternative to traditional operationalizations. We lay the foundations for a capacity index, explain its merits,

and discuss potential applications. Finally, we discuss implications for research and practice. We include propositions throughout to formalize our arguments and ideas.

2. Traditional Approaches to Turnover

Dominant methodological approaches to studying aggregate turnover involve calculations of turnover rates. Two basic formulations characterize past research, labeled here *separation* and *instability* (Price 1977). Although these perspectives are useful for tracking the number of leavers, neither approach is well suited to capturing the properties that we will describe (note that neither approach was designed to address such characteristics). After discussing separation and instability, we outline our capacity-based approach. It is important to emphasize that we are not the first to challenge the notion that all turnover rates are created equally. In this sense, we acknowledge and aim to build on existing work that has sought to refine turnover rate content and meaning (Abelson 1987; Abelson and Baysinger 1984; Dalton et al. 1981,1982; Hollenbeck and Williams 1986; Krackhardt and Porter 1986).

2.1. Separation

Separation-based approaches comprise the dominant mode of investigation to date. Under this logic, turnover rates are calculated such that the numerator reflects all departures across the study window, whether by original members or their replacements. The denominator typically reflects the group's average size or its size at the beginning, middle, or end of the study period. The resulting "separation rate" can exceed 100% because multiple departures can occur within

and across positions in any given group. Occasionally, researchers have focused on specific types of turnover in the same study (e.g., voluntary, involuntary, and/or reduction in force; see McElroy et al. 2001), but more often, all departures have been combined into a total separation rate.

2.2. Instability

In contrast to separation, instability-based perspectives define turnover rates such that the numerator includes only original members who leave during the study window and restrict the denominator to the number of original members. Replacements, and any external movement among them, play no role in the calculation. A ceiling of 100% is imposed on "instability rates" because only original cohort members can contribute to the numerator and denominator. Moreover, by definition, instability rates ignore turnover voluntariness, because the basic question is whether an original member remains at the end of the period. Thus, studies that adopt instability rates do not distinguish between turnover types.

In a subsequent section (§3.7), we revisit these classic formulations as they relate to our proposed alternative conceptualization. As we will explain, a key limitation of separation and instability rates is that they focus exclusively on the quantity, and not the qualities, of departures. However, the qualities of departures, outlined below in terms of five "turnover properties," can add to our understanding of how turnover affects collective performance.

3. Missing from Traditional Approaches: Turnover Properties

In explaining turnover properties, we take as a starting point the traditional view that a greater proportion of departures generally signals higher human capital loss, greater disruption, slower learning, and so on, and that these factors hamper organizational performance. Thus, the *quantity* of departures—the currency of classic approaches—is clearly fundamental to any argument regarding turnover's effects. However, we contend that the same levels of turnover (i.e., identical turnover rates) can have very different meanings (and thus consequences) depending on the properties of departures as they take shape at higher levels. In particular, we outline five turnover properties and argue that, beyond the higher costs associated with increased departures, collectives will endure greater difficulties when (a) the collective loses its most proficient members (versus its most novice), (b) turnover occurs all at once (versus occurring sporadically), (c) turnover affects numerous positions within the collective (versus being isolated to a few positions), (d) the remaining members of the collective are themselves novice (versus proficient), and (e) the general and firm-specific human and social capital of leavers exceeds newcomers' general human capital. Formally defined, the five properties are (1) *leaver proficiencies* (the extent to which the group is losing proficient versus novice members), (2) *time dispersion* (the extent to which departures are concentrated within versus dispersed across time periods), (3) *positional distribution* (the extent to which departures are concentrated within versus distributed across positions), (4) *remaining member proficiencies* (the extent to which remaining members are proficient versus novice), and (5) *newcomer proficiencies* (the general human capital of incoming group members). We expand on these points later but emphasize here that in classic formulations of total turnover rates, where the number of individual departures is

summed and divided by group size, all leavers are deemed equal, and little or no attention is given to the remaining properties. However, ignoring such dimensions misses important group-level emergent properties that explain how the phenomenon actually unfolds and, thus, how it might affect performance.

Note that our perspective assumes that some level of interdependence, cooperation, and/or coordination is required within the entities under investigation and that these process dimensions take time to develop. High levels of turnover may have lesser impact on groups or organizations if performance is determined solely by the net general human capital of leavers and replacements rather than a combination of individual and collective capabilities that are both general and firm specific.[2] In addition, we generally focus on entities that are nested within organizations (teams, groups, units, departments, stores, and so on) rather than across a broad spectrum of organizations or industries. The turnover properties that we describe may be more difficult to isolate in macrolevel contexts.

We illustrate the properties in Table 1 with sample scenarios showing three different patterns of employee turnover. Each scenario assumes a hypothetical group or unit containing five positions over a six-month observation period.[3] All three scenarios indicate that five departures occur over the period (i.e., loosely, “100% turnover”). However, differences along the properties will reveal why performance is more or less affected based on the particular configuration of turnover within each scenario. We maintain that turnover’s effect on performance is a function of the interdependent linkages between *when* the turnover occurs; *how many* departures take place; *what* positions are vacated; and exactly *who* leaves, remains, and enters. We use the term “dynamic member configurations” to refer to the notion that any

collective's exact array of proficiencies will vary at any given point in time as a result of turnover.

3.1. Leaver Proficiencies

The first property relates to varying levels of proficiency loss associated with those who leave. Proficiency losses may come in the form of human capital losses, social capital losses, or both. The human capital perspective suggests that workers add value to a firm because they possess capabilities (e.g., knowledge, skills, and abilities) that support organizational functioning and productivity. Turnover negatively affects performance because it depletes this collective-level knowledge and experience (Batt 2002, Kacmar et al. 2006, Koys 2001). Ultimately, turnover erodes the organization's potential return on investment, particularly when human capital is firm specific rather than general (Dess and Shaw 2001, Huckman and Pisano 2006).

A second form of proficiency loss stems from social capital losses associated with the departure of members central to intraorganizational social networks (Dess and Shaw 2001). As Shaw et al. (2005b, p. 595) stated, "If social capital at the collective level is created when relationships facilitate instrumental action among people (Coleman 1988), it is also lost when these relationships among people are dissolved." Leana and Van Buren (1999, p. 544) also emphasized the critical importance of stability in creating organizational social capital, arguing that "organizations wishing to enhance their stores of social capital can do so through employment practices that promote stability among members." Taken together, these perspectives suggest that rising turnover creates problems for collectives because it is a proxy for increasing losses of human and social capital that ultimately curbs collective performance.

Insert Table 1 Here

Although quantity-focused arguments explain why rising absolute turnover levels affect performance, they often imply that leavers are of equal value. Indeed, only a handful of group-level studies differentiate leaver value—e.g., by performance level or network positioning (Argote et al. 1997, Shaw et al. 2005b, Shaw and Gupta 2007, Shaw et al. 2009). However, departures by members who possess firm-specific proficiencies and who make sustained contributions to group function over time should be more costly than departures initiated by relative novices (Abelson and Baysinger 1984, Dalton et al. 1981, Dess and Shaw 2001, Hollenbeck and Williams 1986). The impact of novice departures on collective function is less because novices make relatively fewer contributions while they work to develop task and role knowledge through observation and coworker exchanges (Ostroff and Kozlowski 1992). For example, in their study of semiconductor manufacturing teams, Hatch and Dyer (2004) described how novices made virtually no contributions to group performance because they lacked firm-specific knowledge and skills (see also Groysberg and Lee 2009). Additional evidence supports the logic that identical turnover rates may have varying consequences depending on the levels of firm-specific human and social capital associated with leavers (Huck- man and Pisano 2006; Shaw et al. 2005a, 2005b, 2009; Sieben and Zubanov 2009). This line of research indicates that when collectives lose novice workers, productivity impacts are less severe than when leavers have accumulated greater firm-specific proficiencies.

Proposition 1. *Turnover damages performance more when leavers are proficient rather than novice.*

3.2. Time Dispersion

The second property concerns the extent to which departures are dispersed over time. Collectives may manage periodic ("time-dispersed") departures more effectively because, by definition, a greater proportion of the collective will be proficient at the time of any given departure (Scenarios 1 and 2 of Table 1 illustrate time-dispersed turnover). These proficiencies enable the collective to handle disruption and meet role demands until newcomers achieve proficiency themselves. By extension, turnover's effects on performance should be weaker when departures are spaced over time because at any given point, at least some members of the collective would be proficient.

On the other hand, when departures occur simultaneously ("time-restricted"), turnover imposes greater costs because remaining members' ability to buffer against performance deficiencies is limited (i.e., proficiency losses and disruption are more severe). Scenario 3 of Table 1 depicts time-restricted departures, whereby all or most of the collective's members leave at approximately the same time. An example of such mass exodus and evidence of its possible effects was seen recently when the 118-year-old San Francisco law office, Heller Ehrman, closed its doors after 15 of its top intellectual property attorneys suddenly left the firm (Dinkelspiel 2008). The case illustrates that time-restricted turnover can be so crippling to an organization that it actually ceases to exist. Moreover, these mass exodus events may be more common than one would expect. Groysberg and Abrahams (2006) documented numerous examples of strategic "lift outs"—the hiring away of intact teams of high performers—as a means to rapidly acquire and deploy talent; as they noted, "a good lift out can inflict financial or competitive damage on a

rival" (p. 134). These examples bolster the point that departure timing helps explain why the same level of turnover can have substantially different performance effects.

A second factor concerns the exact temporal location of departures within the study period. Given the time frames that characterize past research (e.g., one year or six months), the occurrence of departures early or late in the observation period tempers their influence on the collective as it might relate to subsequent performance. Collectives losing multiple members early on operate with relative novices for more of the study period and incur associated performance deficits, whereas collectives losing multiple members late in the observation period derive performance advantages from retaining proficient members for more time. Siebert and Zubanov (2009) argued such a rationale and developed an alternative measure to capture the number of hours lost to turnover events. When linking annual turnover with labor productivity among retail stores, they found that the time-sensitive indicator better predicted performance. In sum, turnover-performance effects are sensitive to the time dispersion and temporal location of departures, suggesting again the need to account for more than departure quantities in turnover research.

Proposition 2. *Turnover damages performance more when departures are time restricted rather than time dispersed.*

Proposition 3. *Turnover damages performance more when departures occur earlier in the observation period rather than later.*

3.3. Positional Distribution

The third property concerns the degree to which departures are distributed across positions. In some collectives, the same position turns over repeatedly (meaning that a stable core remains intact), whereas in others, departures are spread across positions. For instance, consider 10 sales associate positions within a retail store. Turnover could be isolated to a single position (e.g., 1 of 10 sales associate positions turns over five times while the other 9 positions remain filled by the same individuals). Conversely, turnover could be distributed across positions (e.g., 5 of 10 sales associate positions turn over once, meaning that only five positions remain filled by the same individuals). In both cases, five departures occur, but in the former, the collective retains greater levels of proficiency. That is, when turnover is isolated to a single position or a small number of positions ("position restricted"), it is less costly because relative novices repeatedly exit. Scenario 1 of Table 1 illustrates position-restricted departures. In this case, proficiency losses are relatively contained, and remaining members can serve as a buffer to the challenges typically associated with high turnover, both of which mitigate its effect on performance. Factors such as strong in-group norms or demographic heterogeneity may contribute to position-restricted turnover whereby existing members remain stable for long periods while new hires "come and go," perhaps because of poor fit or lack of integration with the established core (Jackson et al. 1991). Position-restricted turnover suggests that some collectives will maintain a stable nucleus of employees even in the face of numerous departures. By extension, these proficiency accumulations should enhance the likelihood of superior performance.

On the other hand, when the same number of departures is distributed across multiple positions ("position- distributed"), it should be more damaging, because turnover robs the collective of its most proficient members. Scenario 2 of Table 1 illustrates position-distributed turnover. Factors such as inadequate compensation, extensive downsizing, or indiscretion over work methods can contribute to widespread turnover within the collective (Batt 2002, Shaw et al. 1998, Trevor and Nyberg 2008). Position-distributed turnover can also emerge from "snowball effects" or "turnover contagion." Snowball effects describe how turnover occurs in clusters because of factors related to role similarities and workers' communication networks (Krackhardt and Porter 1986). Turnover contagion describes how the behaviors that are antecedent to a person quitting "spill over" onto others (Felps et al. 2009). Such perspectives challenge the conventional assumption that turnover is strictly an individual-level phenomenon and help explain why position-distributed turnover may (or may not) emerge.

Except perhaps in the special case of highly standardized work that requires no coordination or interdependence, position-distributed departures should quickly erode performance as a result of compounded proficiency losses. For example, in retail settings—a large and important sector plagued by high turnover—service researchers have argued that such a situation creates a debilitating "cycle of failure" (Schlesinger and Heskett 1991, p. 75):

> With fewer, less knowledgeable salespeople on the floor, customers will get less and lower quality help. Impatient, dissatisfied customers have no reason to hide their feelings from employees. And since discontent breeds discontent, sooner or later even the most conscientious salespeople become demotivated. Then the best leave, the mediocre hang on until they are fired, and the cycle starts over with a new crop of recruits who are likely to be even less capable than the people they have replaced.

Thus, turnover can be especially problematic when position-distributed departures create a situation where novices comprise all or most of the collective. In this case, collectives lack proficient members who can socialize and train new members while meeting task-related job demands. Conversely, the same level of turnover will have a lesser influence when departures are position restricted because a steady core of proficient members can both buffer turnover and attend to ongoing role obligations. In support of this idea, Hausknecht et al. (2009) found that work units with higher newcomer concentrations—a proximate consequence of position-distributed departures—had more trouble maintaining service quality levels in the face of additional turnover.

Proposition 4. *Turnover damages performance more when departures are position distributed rather than position restricted.*

3.4. Remaining Member Proficiencies

To this point, we have focused mainly on departure configurations, yet it is also important to consider the proficiencies of remaining members as they relate to managing turnover's impact. Any level of turnover directly affects the collective's ability to operate as a coordinated and efficient whole. With regard to remaining members, we use the general term "proficiencies" to capture the set of capabilities that enable collectives to function at high levels—streamlined communication patterns, mutual performance monitoring, efficient workload allocation, adaptability to changing task demands, and so forth—that develop through member interactions that take place in sequence and over time (Kozlowski et al. 1999). Turnover

impedes proficiency development and requires that remaining members engage in activities that do not directly contribute to productivity, such as socializing newcomers and compensating for their inexperience, revising communication patterns, reconfiguring work flows, and so on (Batt 2002, Hatch and Dyer 2004, Kozlowski et al. 1999, Shaw et al. 2005b, Staw 1980).

Although remaining member proficiencies develop over time, they differ from tenure calculations because they eventually reach a ceiling such that additional time offers little or no benefit (Huckman and Pisano 2006). Furthermore, the average proficiency of other group members may affect the speed with which new firm- specific proficiencies can be acquired by novice members. To the extent that the group itself is proficient, it should transmit knowledge and develop relationships within the group at a quicker pace than less proficient groups. Proficiency accumulation may also be affected by how much "slack" remaining members must pick up because of previous departures. When remaining members have to make large rather than small compensatory efforts to offset turnover's negative consequences, group proficiency should increase more slowly. Thus, the rate at which proficiency increases, although affected by tenure, is also subject to feedback effects stemming from previous proficiency accumulations as well as challenges bom of previous departures. Finally, remaining member proficiencies are not strictly the product of turnover that takes place in prior periods. Apart from turnover, reductions in force, workforce expansions, and staffing reallocations can affect proficiency distributions. In sum, remaining member proficiencies—distinct from tenure and not wholly predetermined by prior turnover levels—condition the impact of turnover on performance. Turnover effects should be sensitive to the buffering capability that remaining members may provide such that the burden turnover imparts is inversely related to the proportion of the collective capable of managing its impact.

Proposition 5. *Turnover damages performance more when remaining members are novice rather than proficient.*

3.5. Newcomer Proficiencies

The final property we consider—the proficiencies of newcomers—is largely unaddressed yet critical in delineating the effects, both positive and negative, of turnover at higher levels of analysis. Although most conceptions of turnover explicitly focus on exits or assume "average" newcomer proficiency, when the phenomenon is reconsidered as "*movement across the membership boundary of a social system*" (Price 1977, p. 4, italics in original), it becomes clearer that the effects of turnover are as contingent on who comes into an organization as they are on those who leave. Indeed, it is hardly a new concept that the functional consequences of turnover are reliant on the quality of newcomers filling recently vacated positions compared with those vacating them (Boudreau and Berger 1985, Dalton et al. 1981, Price 1977, Staw 1980).

Here, we consider the proficiencies of entering and exiting members while discussing the collective-level effects of differences in proficiency levels between newcomers and leavers. Newcomer proficiencies are necessarily constrained to general human capital, because firm-specific knowledge and firm-specific social capital cannot be acquired until newcomers actually enter an organization, often through informal group-level interactions with organizational insiders (such as existing members of the collective) as well as through the development of a network of working relationships with the same (Fang et al. 2011). Analysis of newcomers' general human capital in comparison to the sum of general human capital, firm-specific human capital, and firm-specific social capital possessed by leavers helps explain the mechanisms by

which *positive* effects of turnover may accrue (e.g., Abelson and Baysinger 1984, Dalton and Todor 1979, Dalton et al. 1982). To the extent that newcomers' general human capital exceeds the general and firm- specific human capital and firm-specific social capital held by leavers, the performance effects of turnover for collective function will be positive. Notably, this benefit accrues not only directly through increased performance within roles but also through feedback effects to which the collective is subject. That is, newcomers with relatively higher general human capital should reduce the amount of slack that must be made up for by other members (Summers et al. 2012), allowing the collective as a whole to focus more attention on proficiency accumulation (e.g., the development of firm- specific human and social capital) and in-role as well as collective performance. Given that collective performance is a result of the interactions of collective members and not merely the sum of individual contributions (Ostroff 1992), positive differences between newcomer and leaver proficiencies may lead to the emergence of larger and more valuable improvements in collective function. Also, given that newcomers bring only general human capital with them into an organization, positive effects are more likely to arise when the bulk of collective function is reliant on general human capital allocations.

Such arguments hinge upon the organization's ability to source applicants of sufficient quantity and quality. For example, desirable firms may attract an abundance of very proficient employees, suggesting that both leavers and newcomers are proficient. If newcomers are functionally productive upon entry (i.e., requiring little or no further development to contribute to collective function), then the negative effects of turnover should be minimized. One example may be found in highprofile law firms employing "up-or-out" promotion policies. Despite regular exits among relatively proficient employees across these firms, they continue to perform well due largely to the presence of an abundant and qualified (i.e., near-proficient) labor pool as

well as a heavy reliance on externally developed general human capital stocks (i.e., law degrees) that may be immediately and productively employed upon entry into the firm (Lepak and Snell 1999).

Conversely, when an abundant and qualified labor pool is not available or collective function is largely determined by firm-specific knowledge and processes— i.e., the human capital necessary for optimal performance ranks high in terms of "uniqueness" (Lepak and Snell 1999, p. 35)—collectives are more likely to experience negative effects of turnover. Furthermore, when firm-specific capital is critical to performance, firms are likely to encounter a situation that requires social as well as economic exchange. More specifically, such a situation is likely to represent "unspecified, broad, and open- ended obligations... an investment in the employee's career within the firm" and require such duties as "assisting junior colleagues... and, in general being willing to consider the unit's or the organization's interests as important as core job duties" (Tsui et al. 1997, p. 1092). Notably, where social exchange is of consequence, Price predicts "reduced integration" (1977, p. 101) among employees as a result of turnover and, potentially, the diminution of group-focused job duties as important to individual employees, which in turn leads to reduced group-level performance.

Group-level performance reduction is driven by the emergence of higher-level feedback effects resulting from differences in leaver and stayer proficiencies, although these differences now represent deficits as opposed to gains. Specifically, newcomer proficiency deficits not only suggest an immediate and negative impact but also suggest the emergence of negative effects at higher levels as a result of remaining members having to make larger compensatory efforts to maintain collective function (e.g., getting the new member up to speed), which themselves reduce the effort and attention the collective can devote to proficiency accumulation and

performance. Also, if collective function is largely the result of firm-specific proficiencies and these proficiencies, by definition, cannot be held by newcomers and take time to develop (Shaw 2011), negative feedback effects can be expected to emerge into the longer term.

Therefore, we expect turnover to be least damaging when collective function is largely determined by general human capital and an abundant and qualified labor pool is available and most damaging when such a labor pool is not present and optimal collective function is reliant on firm-specific knowledge and relations. Where a qualified labor pool is available and collective function is determined by firm-specific proficiencies, turnover's effects are such that collectives are likely to experience longer ramp-up times to optimal performance. Finally, when collective function is determined by general human capital, but a qualified labor pool is absent, turnover's effects are also likely to be negative because newcomers, although they possess immediately deployable general human capital, do not exist in sufficient quantity for proper collective function. In this final case, immediate performance detriments should give rise to negative, and possibly persistent, feedback effects.

> Proposition 6. *Turnover damages performance more when the sum of general human capital of newcomers is less than the sum of general human capital, firm- specific human capital, and firm-specific social capital of leavers.*

3.6. Key Employee Groups

Although not strictly a turnover property, we recognize the potential for differential impacts to arise from turnover of positions within core groups of employees versus those considered peripheral. In describing "core" and "peripheral" employees, our aim is to include the myriad of settings in which different employee groups are of differential relative importance to collective function (Carley 1992)—e.g., professional versus clerical employees, managers versus frontline employees, customer-facing versus noncustomer-facing employees, faculty versus staff, and the like. In so doing, we follow Humphrey et al. (2009) in delineating members as core to the extent that they "(a) encounter more of the problems that need to be overcome in the team, (b) have greater exposure to the tasks that the team is performing, and (c) are more central to the work flow of the team" (p. 50) while extending this rationale to collectives more generally.

A key factor in determining turnover's effects, then, is the relative value—i.e., "the ratio of strategic benefits obtainable from human capital relative to the costs incurred" (Lepak and Snell 1999, p. 44)—of respective employee groups. When members depart from relatively valuable groups, the collective will experience amplified disturbance with respect to its ability to efficiently coordinate activities and perform at an optimal level (Summers et al. 2012). Thus, a relatively small turnover rate, constrained to a core group, may have a much larger negative effect on function than rampant turnover constrained to a peripheral group. It is noteworthy that although the effects of core employee turnover may supersede the effects of higher turnover rates among peripheral employees, core employee effects are still subject to the interaction of the aforementioned properties. Specifically, turnover in core groups, although particularly damaging to begin with, should be even more so to the extent that leavers are proficient rather novice,

departures are time restricted and position distributed, and remaining members lack the proficiency necessary to effectively buffer against negative impacts.

Although larger negative effects may occur, collectives may also see larger positive effects dependent on the proficiency differential between departing employees and newcomers in core groups. Specifically, collectives should experience relatively large detriments to functional capability immediately following core employee departures. However, if newcomer proficiencies are larger than those possessed by leavers, a given collective would reap the benefits of the new additions, and those benefits would be subject to the same amplification as their counterpart negative effects. Acquisition of such newcomers into core employee groups represents a wise investment by making possible significant performance gains based on the greater potential impacts associated with key roles (Humphrey et al. 2009). It is noteworthy that given that the proficiency necessary to successfully navigate the complexities inherent in a core role is likely firm specific in nature and thus requires time on the job to develop fully, positive effects arising from replacements in core groups are more likely to manifest in the long, rather than the short, term. In cases where the relative proficiencies held by newcomers are less than those of departing members—a more likely situation given the increased complexity and task demands in core groups—the negative impacts of departures are strengthened (Summers et al. 2012). Thus, turnover concentrated in core positions effectively "raises the stakes" for collectives in terms of potential impacts in both negative and positive directions.

Proposition 7. *The impacts of turnover, negative and positive, will be amplified when departures are concentrated in core rather than peripheral job groups.*

3.7. Revisiting Separation and Instability

Before discussing how the aforementioned properties inform our development of a capacity-based perspective on turnover, it is helpful to consider classic perspectives (separation and instability) once again. Separation rates were not designed to address the positional distribution of departures (any leaver enters the calculus, regardless of position), nor do they capture time dispersion (temporal spacing of departures within or across positions is ignored) or remaining member and newcomer proficiencies. To illustrate, returning to the scenarios in Table 1, separation rates are equal across the three scenarios (i.e., 5/5, or 100%), yet the collective shown in Scenario 1 (when turnover is position restricted and time dispersed) is at an advantage relative to those in Scenario 2 (when turnover is position distributed and time dispersed) and Scenario 3 (when turnover is position distributed and time restricted). However, because the separation rate is identical across all three groups, each scenario is analytically indistinguishable from the next despite variability in the underlying properties. Thus, although they clearly capture leaver quantities, separation rates can obscure assessment of potential performance effects when applied in empirical research, which may explain why numerous studies report no relationship between turnover and performance (Huselid 1995, Sacco and Schmitt 2005, Simons and Roberson 2003, Sun et al. 2007).

In contrast, instability rates coarsely capture the positional distribution of departures. This can be seen in Table 1, where the instability rate in Scenario 2 (100%) implies greater proficiency losses and less disruption than that shown in Scenario 1 (20%). Given this, instability rates may better detect groupwide disruption and cumulative proficiency losses and, therefore, better predict performance relative to separation rates. Indeed, several studies using instability

rates find relationships with performance (Baron et al. 2001, Gelade and Ivery 2003, Meier and Hicklin 2008), suggesting that the more precise the turnover rate specification, the greater the likelihood that hypothesized effects will be detected. However, instability rates do not capture the full set of turnover properties and share limitations similar to separation rates. They do not adequately account for the time dispersion of departures nor is any allowance made for leaver characteristics or remaining member and newcomer proficiencies. It is important to note that instability rates also ignore any turnover that occurs among individuals who are hired to replace original members. With these limitations in mind, we propose an alternative perspective.

4. Reconceptualizing Turnover: A Capacity-Based Perspective

We begin by defining *capacity* in terms of the proportion of human and social capital utilization achieved by a given collective in a given period. Capacity implies that collectives possess a theoretical maximum potential that is depleted by turnover of its members (Steiner 1972). When referring to "utilization," we mean only to establish a hypothetical ceiling on the "realistically sustainable maximum" (Corrado and Mattey 1997, p. 152) level of function for a given collective to which its actual function may be compared. Following from our previous arguments, we contend that capacity depends on the temporally variable and simultaneous influences of leaver characteristics, time dispersion, positional distribution, remaining member proficiencies, and newcomer proficiencies (as well as leaver quantities). Unlike approaches grounded in separation or instability, which collapse information across time, the capacity perspective aims to capture the multiple turnover properties in a temporal context.

We build on Steiner's (1972) broad discussion of "process"—the set of individual and collective actions taken by group members when confronted with a task— wherein he argues that process breakdowns create discrepancies between potential and actual productivity of an otherwise capable and well-resourced group of individuals. Suboptimal correspondence between potential and actual productivity may result from misunderstanding, disagreement, or poor coordination. Following this, we contend that turnover is a leading cause of process inefficiencies that limit a collective's capacity to operate at maximum performance levels, and furthermore, that the scale of the damage to collective function is dictated by the temporal and spatial configuration of the collective's proficiency distributions when turnover occurs. Such a focus on capacity and its key drivers explains why two different collectives with the same number of leavers (i.e., identical turnover rates) experience relatively more or less capacity loss, which in turn shapes their actual levels of performance.

The capacity perspective is also consistent with time-sensitive conceptualizations of group effectiveness that outline several progressive and transitional phases that must occur before a collection of individuals can coalesce into a coordinated, more efficient whole (Kozlowski et al. 1999). Turnover disrupts this developmental sequence, effectively returning groups to earlier stages when its members depart. In early stages, newcomers focus on developing interpersonal relationships, understanding group norms, and resolving ambiguities before they turn attention to performance demands (Kozlowski et al. 1999). Hence, higher newcomer concentrations, an immediate by-product of turnover, implies reduced capacity (Hatch and Dyer 2004, Hausknecht et al. 2009). At the other extreme, when members have had time to master individual task performance and develop collective-level proficiencies, the group will be more likely to approach maximum capacity. Stated simply, regularly changing membership

constrains the collective's ability to function at high levels (Argote et al. 1995, Lewis et al. 2007).

Under the capacity approach, collective-specific proficiencies approach an asymptotic ceiling and do not increase in linear fashion ad infinitum. That is, the remaining members' ability to mitigate the negative departure effects increases over time to some maximum but eventually reaches a point where additional time does little to increase proficiency. Thus, turnover effects do not persist indefinitely (because newcomers eventually attain task and collective proficiencies), nor do collectives generate monotonically increasing benefits via retention of experienced members (because at some point the collective approaches maximum capacity). Rather, a focus on capacity captures the complex and offsetting effects produced by individuals who remain, leave, and enter a given collective, and it suggests that change in productive capacity is a joint function of the quantity, time dispersion, and positional distribution of departures, as well as leaver, newcomer, and remaining member proficiencies.

An important characteristic of the five properties outlined here is that, taken together, they are complex— i.e., the properties, as a set, are irreducible (Miller and Page 2007). Thus, relationships between the properties are neither strictly additive nor multiplicative, and therefore they cannot be modeled or accurately discussed as such. Although these properties emerge from individual departures, they are inextricably linked with one another, resulting in nonlinear behavior. Such nonlinearities, however, do not preclude discussion of their effects. For instance, one can rightly conclude that time-dispersed departures impose reduced costs. However, exact influences of specific patterns of time-dispersed departures cannot be determined in isolation from the remaining properties or from the collectives in which they arise. Thus, in practice,

turnover cannot be deconstructed into individually estimable components, because doing so sacrifices the framework's broader value.

Nonetheless, testing these ideas calls for viable measurement strategies that match and extend our arguments. We develop one possibility here—a "capacity index"—as an avenue for empirical investigation. Its basic elements are roughly analogous to separation and instability rates insofar as the denominator, in part, scales for group size and the numerator captures departure information; however, we extend these approaches by refining both elements of the ratio. In general, our formulation aims to capture the properties' impacts both across and within observation and quantitatively account for the theoretical ambiguities surrounding complex and offsetting interactions arising from competing forces that may amplify or dampen each other's effects.

To illustrate, we return to Table 1. Recall that Scenarios 1, 2, and 3 each yield a 100% separation rate despite substantially different departure patterns. In addition, Scenarios 2 and 3 reveal identical instability rates, indicating that although instability logic brings a unique perspective, it still falls short of fully capturing turnover's impacts. Thus, in Table 2, we recreate these scenarios while also accounting for the five properties. As before, the scenarios each depict five positions, a six-month observation period, and five departures.

In contrast to Table 1, where all turnover and retention events have equal importance, in Table 2 the underlying properties of such events (or non-events) are depicted as they occur in time. In particular, lighter-shaded circles indicate that when a member leaves and is replaced, the newcomer possesses minimal firm-specific human and/or social capital. Consistent with the notion that these firm- specific proficiencies take time to develop (Huckman and Pisano 2006, Leana and Van Buren 1999), we show that, over time, the member accrues proficiency

(illustrated with darkening circles) until reaching an asymptotic maximum. Also revealed are the effects of time dispersion and positional distribution. In Scenario 1, the benefits of maintaining a stable and mostly proficient employment base across most positions more than compensate for the costs imposed by departures (who tend to be relative novices). By comparison, Scenarios 2 and 3 exhibit higher costs when departures are spread across positions, as evidenced by the lower proportion of dark circles in each. Specifically, because the collective does not maintain a stable employee base, remaining members' ability to buffer collective departure costs is lessened. At the same time, because relatively more proficient employees are departing, the costs of future departures do not decrease as occurs in Scenario 1.

Insert Table 2 Here

The capacity index captures these varying effects by taking account of the exact array of departure events themselves. However, in this case we replace the shaded circles with corresponding numerical values that are based on the time to proficiency—in these examples, six months—for a position within the collective. Table 3 shows a sample lattice and corresponding values for Scenario 2 (departure events appear in boxes). Borrowing concepts from statistical mechanics (e.g., Sethna 2006), departures are reconceived as a rectangular lattice of N sites, i, with dimensions based on the number of positions and time in months.

A "site" is a cell in the lattice that may or may not be populated by a turnover event, "×," in Tables 1 and 2. Each site takes a value based on whether a turnover event has or has not occurred. When a turnover event occurs, a value equal to the leaving member's proficiency multiplied by —1.00 is counted; if not, a value proportional to the employee's accumulated

proficiency is counted instead (this value is unaffected by the total number of employees). If newcomers join the group, their proficiencies are also counted.

The numerator ($\Sigma_i s_i$) therefore consists of a summation term capturing the offsetting influences of leaver, remaining member, and newcomer proficiencies. When a member remains, the capacity index increases, not only through increased collective proficiencies but also through increased buffering capability. If maximum proficiency is reached by all remaining members, this benefit remains stable. Conversely, when a member departs, a penalty is imposed for the departure itself as well as the cost imposed for the lost proficiency that also departs. Thus, similar to separation or instability rates, departure quantities are counted, but unlike these metrics, the capacity index also adjusts for member proficiencies. The summation term thus calculates the net benefit or cost arising from turnover. In doing so, the numerator also accounts for the complex effects of positional distribution and time dispersion by imposing penalties for time-restricted and position-distributed departures.

4.1. Operationalizing Capacity

Values of the capacity index are bounded by +1.00 (the collective functions at full capacity for all time periods, and concordantly, no departures occur) and —1.00 (the very unlikely case where all positions are departed in every period by fully proficient employees). A negative value indicates losses large enough to not only deplete collective capacity but also severe enough to potentially impose costs outside of the collective (e.g., upon the entire organization). Thus, “average” capacity—a state in which the collective operates at a middling level—is denoted by a value of +0.50.

Insert Table 3 Here

As mentioned previously, the denominator (N) scales for group size (similar to the calculation of instability and separation rates) and number of time periods. In the examples provided, there are five positions and six time periods, and thus, for the entire observation period, the proportion of capacity attained is assessed by dividing the summation term by $N = 5 \times 6 = 30$. The summary capacity index (i.e., across all observation periods) for Scenario 2 (as illustrated in Table 3) is computed as

$$Capacity\ Index = \left(\sum_i s_i\right)/N = 10.33/30 = 0.34.$$

Recalling Table 2, the collectives in Scenarios 2 and 3 should be worse off than that in Scenario 1, and indeed, we find this. We calculated an overall capacity index of 0.63 for Scenario 1, suggesting near-average capacity, whereas in Scenarios 2 and 3, we obtain smaller values of 0.34 and 0.28, respectively. Although Scenarios 2 and 3 yield identical instability rates and both display identical positional distribution of departures, Scenario 3 suffers greater losses because departures are time restricted. Thus, the collective in Scenario 3 should be the worst off, and in fact, this is reflected by its lower index value. Notably, however, the collective in Scenario 3 maintains stable employment after the mass exodus event and rebounds relatively quickly, nearly overtaking that in Scenario 2 in terms of summary capacity.

An examination of capacity profiles over time illustrates how and why this occurs. In Figure 1, month- specific capacity indexes are illustrated for the three scenarios shown in Table 2. Examining Scenario 3, we see that a particularly damaging month of turnover may hinder collective functioning. Specifically, the collective in Scenario 3 suffers substantial losses

immediately following the mass exodus, but given stable postexodus employment, recovers to relatively high capacity by the end of the period. Thus, a more temporally specific examination indicates that this low value is driven by a single "bad month," and in fact, the collective in Scenario 3 eventually outperforms that in Scenario 2 (which is still beset by recurring position-distributed turnover). By comparison, in Scenario 1, when departures occur among novice members repeatedly filling a single position, the calculated extra costs of departures are relatively lower than when more experienced members depart. Furthermore, capacity is more volatile in certain scenarios (despite identical separation rates) because of greater fluctuation in the "extra" costs of departure associated with the proficient exits.

Notably, the profiles in Figure 1 fall in line with Price's prediction that "successively higher amounts of turnover will be found ultimately to produce, more often than not, successively lower amounts of effectiveness at a decreasing rate" (1977, p. 119) and further confirm Price's view that the "net balance" of positive and negative results is critical in determining turnover's impact. Again, the profiles reveal how and why this decreasing negative effect emerges at the group level and how, when the net balance of turnover effects is considered, its negative effects may be mitigated. Specifically, in Scenario 1, turnover is restricted to a single position, effectively decreasing the negative impact of departures such that after the departure in month 1, the cost of future departures is reduced as newcomers repeatedly exit. This decreasing negative effect, combined with the increasing proficiencies of remaining members, reveals a positive net gain in proficiency despite regular turnover and demonstrates how the negative impacts of turnover can become nonlinear at the group level.

Insert Figure 1 Here

Similarly, in Scenario 2, where turnover is distributed across several positions, we see a negative but decreasing effect in those months in which departures occur consecutively (i.e., from month 1 through month 3 and from month 5 to month 6). Specifically, the collective in Scenario 2 suffers a relatively large detriment when the first of consecutive departures occur—i.e., the monthly capacity index decreases by 0.20 from the start point to month 1 and decreases by 0.30 from month 4 to month 5 (see Table 3). However, as further consecutive departures occur, cost in terms of absolute proficiency levels decreases, although it remains negative—for instance, the monthly capacity index decreases by only 0.07 from month 5 to month 6—and in some cases, the decreasing negative effects of turnover are overcome by the net positive effects generated by increasing proficiency of remaining members as demonstrated by the increase in the capacity index of 0.03 from month 1 to month 2. Thus, we see how turnover effects that are linearly negative at the individual level become nonlinear at the collective level as they are offset by replacement members and the accruing proficiency of remaining members.

5. Discussion

Despite widespread interest in understanding how turnover affects organizational performance, empirical evidence to date has been mixed. In particular, extant turnover-performance research, which is based exclusively on separation or instability rates, reveals wide variability in reported relationships. For example, in studies that have related turnover rates (i.e., separation or instability rates) to customer satisfaction, correlations of —0.65 (McElroy et al.

2001), —0.10 (Koys 2001), and +0.03 (Simons and Roberson 2003) can be found. Similar variability exists for other operational and financial performance indicators, as noted earlier (e.g., Sacco and Schmitt 2005, Ton and Huckman, 2008). Although it is not the only potential explanation for divergent effects, we suggest that, going forward, a more nuanced conceptualization and measurement of the turnover construct itself may help explain variability in these relationships. Should the underlying turnover properties operate as theorized, studies that address them may begin to yield more-consistent empirical results. To this end, our goals were to articulate an expanded view of turnover, explain why current practices may be insufficient to capture underlying critical properties, and offer a new perspective that better captures these properties.

5.1. Research Implications

From a conceptual standpoint, our approach begins to address the complexities inherent in conceptualizing turnover as a higher-order construct. Although it emerges from individual departures, the collective turnover construct takes on new meaning and enables researchers to study dynamic configurations of departures and their effects on collective functioning and performance. Properties that apply only at higher levels (e.g., time dispersion, positional distribution) become critical to explaining when and why turnover affects performance. The capacity-based perspective addresses these properties and suggests that both turnover quantities *and* qualities matter when predicting such outcomes. The approach accounts for departure sequence and timing and incorporates important information about leaver and remaining member proficiencies, all of which should strengthen inferences regarding turnover's consequences.

Another useful line of inquiry is to study the antecedents of capacity. Although we suggested reasons why certain patterns may emerge (e.g., causes of position-restricted versus position-distributed turnover), our focus was mainly on addressing turnover-consequence relationships. Such an outcome-based focus is often a critical initial step because justifications for studying turnover's antecedents presume that turnover negatively affects organizational performance. Thus, along with addressing turnover consequences under a capacity-based approach, we suggest that studying antecedents represents an interesting avenue for additional research.

Another key issue surrounds the predictability of turnover (Price 1977). Variability in turnover generally and unanticipated, voluntary departures specifically may affect collective function differently than those that are, to some extent, planned (e.g., involuntary terminations, dismissal of seasonal employees). Planned departures may be less costly but are not cost-free, because even expected turnover implies some disruption, as well as social and human capital loss. Hence, turnover may not always be equally damaging, and organizations may take steps to mitigate its influence on performance. Specific interventions and their relative efficacy deserve additional attention in future research.

The capacity-based perspective outlined here, although couched in the tradition and terminology of turnover research, may have implications for the broader groups and teams literature. The properties described here can apply to groups irrespective of turnover (e.g., member proficiencies), and the inflows and outflows of members could be considered in research settings where members leave or join a group or team but remain with the organization (e.g., "fluid teams" in Huckman et al. 2009, "group membership change" in Lewis et al. 2007). We encourage applications and extensions to these and related research domains.

From a methodological standpoint, gathering the necessary data to test the capacity perspective does not require extensive effort beyond what is required in a typical turnover study. Organizational records that include hire and separation dates, coupled with a defensible estimate of time to proficiency (e.g., from qualitative interviews or publicly available databases such as 0*NET), provide the information necessary to calculate a capacity index. We do not suggest that separation and instability rates should be abandoned, but rather we argue for their appropriate application to the research question at hand. When connecting turnover with replacement costs, separation rates remain a valuable tool. Similarly, instability rates are relevant when researchers ask questions about longer-term performance outcomes that cannot be achieved quickly but rather take time to be realized. In addition, for certain research designs (e.g., organization-level survey research), separation or instability rates often are the most feasible option. We also note that use of a capacity index may reveal overlap between some properties (e.g., leaver proficiencies and positional distribution) and employees' status as core. We encourage future research to explore this possibility.

5.2. Practical Implications

The ideas presented here may offer organizations a more strategic means for tracking turnover and designing potential interventions. Our analysis suggests that absolute levels of turnover calculated under separation or instability perspectives may not hold the diagnostic potential once believed. Clearly, some organizations operate productively and profitably even in the face of extremely high turnover. In these instances, high turnover rates may suggest a problem that does not actually exist (leading to Type I errors). In contrast, existing measures may

be too coarse to detect potentially dangerous situations involving time-restricted and position-distributed departures that ultimately contribute to a "retention problem" that requires intervention (leading to Type II errors). Approaches that track capacity may yield more sensitive metrics that alert decision makers to problematic groups or subunits.

In a general sense, although a summary capacity index and a temporally specific capacity index are both informative, the greatest value for managers arises from simultaneous consideration. Regarding the interpretation of and practical lessons arising from capacity index values, it is important to keep in mind that the basis against which these numbers are computed is from the ideal state of a realistically sustainable maximum where no members have left over the period of observation and all have attained "full" proficiency. Therefore, the summary capacity index values computed here can be interpreted as a collective operating at 63%, 34%, or 28% of its possible maximum over a six-month period.

Low values serve as a warning sign to managers and would be key in singling out collectives warranting investigation—for instance, through examination of temporally specific profiles. Notably, because the summary capacity index is, from a mathematical perspective, equal to the mean of monthly indexes, it is subject to the same pitfalls that apply when the mean of any set of numbers is taken—namely, it is particularly sensitive to extreme high or low values. Just as the collective in Scenario 3 is particularly susceptible to having its summary index driven down by a single "bad month," another collective may be similarly affected by a single "good month" followed by a large number of exits, resulting in a summary value that obscures more recent events. Thus, the capacity profile is best suited for determining how and why a particular collective is functioning the way it is, whether good or bad, and would generate the bulk of practical lessons regarding drivers of suboptimal or near-optimal performance. Whereas

summary indexes will still prove valuable when comparing across collectives within an organization, capacity profiles will prove more valuable when (a) managers want to know what drives the summary index value or (b) are focusing managerial efforts and appropriate human resource interventions within a single collective. Finally, then, summary capacity indexes may be useful for senior leaders whose main charges are larger scale and more strategic, whereas capacity profiles may be helpful to managers closer to the front line whose chief concerns are more operational.

Last, our review suggests several terminological clarifications. Past studies reveal that turnover and retention have too often been considered as simple obverses and the two terms have been used interchangeably. This practice is defensible at the individual level, where the decision to remain with or leave an organization is binary with the result that one outcome is inevitably the obverse of the other—a flipped coin that is not heads must be tails. However, simple examples disprove this convention when turnover and retention are aggregated to higher levels. As we have shown, different turnover rates can be calculated using the same pattern of employee movement, and the same turnover rate can be applied to qualitatively different departure patterns. Calculating retention rates by subtracting turnover rates from 100% obfuscates meaning and interpretation, reaffirming the idea that there is no directly interpretable meaning of a "turnover rate" or "retention rate" (Dalton and Todor 1979).

As a topic of investigation, employee turnover maintains impressive cross-disciplinary appeal. However, conceptual understanding of the construct remains limited, and alternative theoretical perspectives have been slow to develop. The present analysis recasts turnover through the lens of "capacity" to explain why the same turnover rate can have very different performance consequences depending on the configuration of five underlying properties. Greater attention to

these dimensions in future research should lead to a more complete understanding of when turnover “matters” for groups and organizations.

Endnotes

[1]The scholarly literature contains additional terms that are generally synonymous with collective turnover (e.g., *aggregate turnover, group turnover, turnover rates, unit-level turnover*). For ease of presentation, we use *turnover* throughout the paper.

[2]In parts of our discussion, it is important to distinguish between *general human capital*, i.e., codifiable and explicit knowledge and skills that are portable and valuable across firms (Hitt et al. 2001); *firm-specific human capital*, i.e., knowledge and skills, sometimes tacit, specialized to the firm in which it was developed and generally not transferrable to other firms (Hatch and Dyer 2004); and *firm-specific social capital*, i.e., "essentially a network of communication and relationship ties among workers" (Gittell 2000, p. 518) by which task interdependencies are managed by members of a collective (Gittell et al. 2008).

[3]At this point in our discussion, we assume that no status, rank, or value is implied by the term "position." Rather, position refers to any utility-enhancing job or role that can be occupied by a group member. Thus, we distinguish generic and interchangeable "positions" from differences in the respective value or relative contribution of certain employee groups to collective function (i.e., core versus peripheral employee groups), which we discuss later.

Table 1

Table 1 Turnover Configurations for Three Hypothetical Scenarios

	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Scenario 1						
Position 1	○	○	○	○	○	○
Position 2	○	○	○	○	○	○
Position 3	○	○	○	○	○	○
Position 4	○	○	○	○	○	○
Position 5	×	×	×	○	×	×
Scenario 2						
Position 1	×	○	○	○	○	○
Position 2	○	×	○	○	○	○
Position 3	○	○	×	○	○	○
Position 4	○	○	○	○	×	○
Position 5	○	○	○	○	○	×
Scenario 3						
Position 1	○	×	○	○	○	○
Position 2	○	×	○	○	○	○
Position 3	○	×	○	○	○	○
Position 4	○	×	○	○	○	○
Position 5	○	×	○	○	○	○

Notes. Individual departures or "turnover events" are indicated by " × ." Individuals who remain in a given position ("retention events") are shown in circles. Separation rates are 100% for Scenarios 1, 2, and 3. Instability rates are 20% for Scenario 1 and 100% for Scenarios 2 and 3.

Table 2

Table 2 Turnover Configurations After Accounting for Leaver Characteristics, Time Dispersion, Positional Distribution, and Remaining Members' Proficiencies

	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Scenario 1						
Position 1	○	○	●	●	●	●
Position 2	○	○	●	●	●	●
Position 3	○	○	●	●	●	●
Position 4	○	○	●	●	●	●
Position 5	×	×	×	○	×	×
Scenario 2						
Position 1	×	○	○	○	○	●
Position 2	○	×	○	○	○	○
Position 3	○	○	×	○	○	○
Position 4	○	○	●	●	×	○
Position 5	○	○	●	●	●	×
Scenario 3						
Position 1	○	×	○	○	○	○
Position 2	○	×	○	○	○	○
Position 3	○	×	○	○	○	○
Position 4	○	×	○	○	○	○
Position 5	○	×	○	○	○	○

Notes. Individual departures or "turnover events" are indicated by " × ." Individuals who remain in a given position ("retention events") are shown in circles. Lighter circles indicate relatively more novice members (newcomers). Darker circles indicate members with greater proficiency. Together, shading indicates both leaver characteristics (as seen within position prior to a departure event) and remaining member proficiencies (as seen across positions in any given month). Period-specific and across-period calculations account for time dispersion and positional distribution of departures. Separation rates are 100% for Scenarios 1, 2, and 3. Instability rates are 20% for Scenario 1 and 100% for Scenarios 2 and 3. Capacity index values are 0.63, 0.34, and 0.28 for Scenarios 1, 2, and 3, respectively.

Table 3

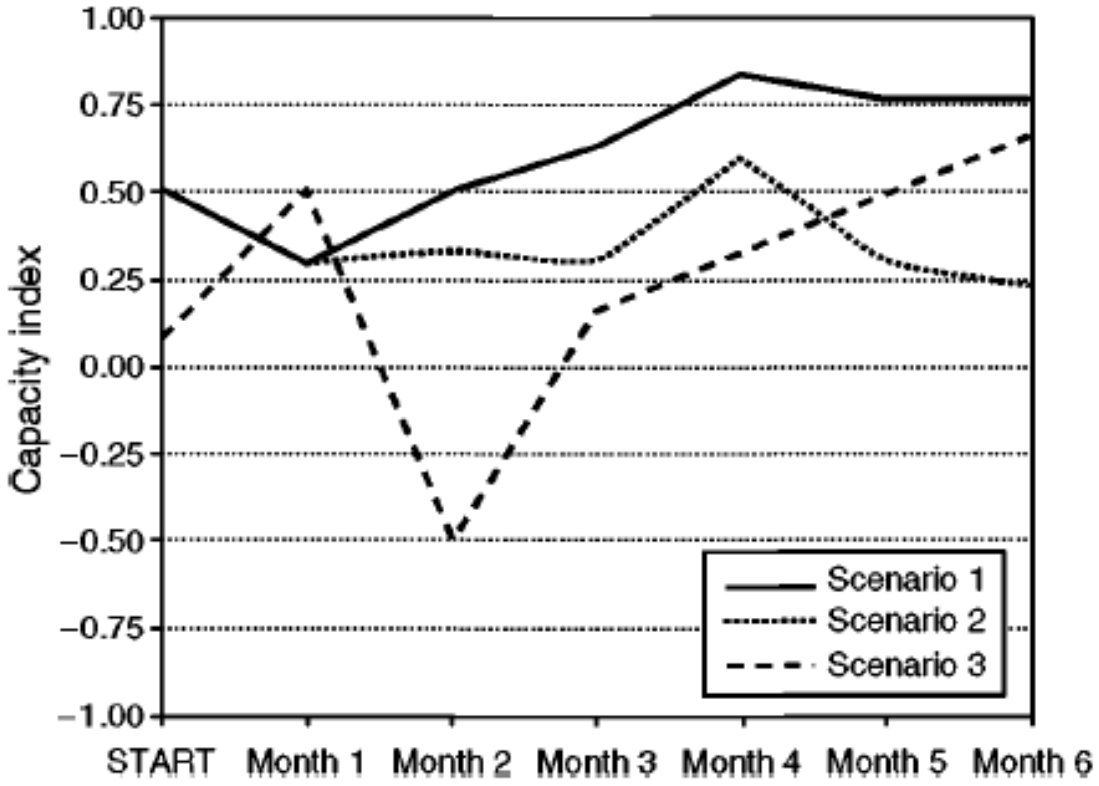
Table 3 Sample Lattice Illustrating Capacity Index Calculation for Position-Distributed Turnover

Scenario 2	START	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Position 1	1/2	**−1/2**	1/6	1/3	1/2	2/3	5/6
Position 2	1/2	1/2	**−1/2**	1/6	1/3	1/2	2/3
Position 3	1/2	1/2	2/3	**−2/3**	1/6	1/3	1/2
Position 4	1/2	1/2	2/3	5/6	1	**−1**	1/6
Position 5	1/2	1/2	2/3	5/6	1	1	**−1**
Monthly CI:	0.50	0.30	0.33	0.30	0.60	0.30	0.23
Summary CI:	0.34						

Notes. Turnover events from Scenario 2 are reconsidered as a lattice of N sites i defined by positions, p_n, and months, m_n. For the entire lattice and summary capacity index (CI), $N = 30$ (5 positions × 6 months); for monthly capacity index values (CI_m), $N_m = 5$ (5 positions × 1 month). When departures do not occur, sites take a value, s_i, based on accumulated proficiency such that employees need six months to become fully proficient (i.e., for s_i to equal 1). When departures occur (boxed values), sites take a value equal to the leaver's proficiency, $s_{i,m-1}$, multiplied by −1 (i.e., $s_i = s_{i,m-1} \times -1$); thus, a penalty is imposed for the departure itself (i.e., the "missing" positive value) as well as the cost imposed on the collective associated with lost proficiency (i.e., the negative "boxed" value). For the provided examples, $s_i = \{-1, -5/6, -2/3, -1/2, -1/3, -1/6, 1/6, 1/3, 1/2, 2/3, 5/6, 1\}$. In this example, newcomers are assumed to enter with a minimally acceptable level of proficiency (i.e., $s_i = 1/6$).

Figure 1

Figure 1 Capacity Profiles Across Time



Notes. Separation rates equal 100% in all three scenarios. Instability rates equal 20% (Scenario 1) and 100% (Scenarios 2 and 3). Summary values of the capacity index equal 0.63 (Scenario 1), 0.34 (Scenario 2), and 0.28 (Scenario 3).

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