© Academy of Management Journal
2016, Vol. 59, No. 3, 906–929.
http://dx.doi.org/10.5465/amj.2013.0546

# A TWO-PHASE LONGITUDINAL MODEL OF A TURNOVER EVENT: DISRUPTION, RECOVERY RATES, AND MODERATORS OF COLLECTIVE PERFORMANCE

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**Blending theory on collective turnover and group adaptability, this paper develops a two-phase longitudinal model that explains how and why an individual-level turnover event has effects on collective performance. Phase 1 (disruption) is marked by a sudden and negative change in unit-level performance, while Phase 2 (recovery) entails a gradual increase in unit performance over time. We further propose that the positional distribution (manager or employee) of the turnover event and the amount of interdependence within the collective will influence the consequences of a turnover event. Using a sample of 524 branches of a U.S. bank, the results largely support the hypotheses as a turnover event leads to an immediate and negative change in branch-level performance. Notably, there is an interaction between manager and employee turnover events that significantly decreases performance. In the recovery period, branches recover more quickly after losing an employee than they do after losing a manager. However, the moderating effect of branch-level interdependence depends on the position, and there is no statistically significant recovery from a manager turnover event within our performance window. These results highlight the insights of our two-phase model and the need to study collective turnover dynamics over time and across different positions.**

A great deal of research has begun to consider the nature and consequences of collective turnover (Hausknecht & Trevor, 2011; Shaw, 2011). Meta-analyses have suggested that collective turnover rates generally have a negative relationship with unit-level outcomes (Hancock, Allen, Bosco, McDaniel, & Pierce, 2013; Heavey, Holwerda, & Hausknecht, 2013; Park & Shaw, 2013). Recent theoretical work has now begun to examine the nature and consequences of collective turnover in a more nuanced manner, by linking it to the individual-level characteristics of employees who comprise the aggregate turnover rate (Hausknecht & Holwerda, 2013; Hausknecht, Trevor, & Howard, 2009; Nyberg & Ployhart, 2013).

One question that has received little attention is the *collective*-level consequences that may occur when an *individual* employee leaves. Collective turnover research has not directly addressed this question because, by definition, turnover rates summarize multiple turnover events across a specific span of time; hence, the consequences occur at the individual-level and may not generalize to the collective level (Shaw, 2011). Existing research has also been relatively silent about how long the consequences of a turnover event should last and whether the consequences differ depending on the interdependence of members within the unit and the leaver's position or role within the unit (Hausknecht & Holwerda, 2013; Summers, Humphrey, & Ferris, 2012).

The purpose of this study is to address the void between collective and individual-level turnover research by examining the longitudinal relationship between an individual turnover event and collective performance. A *turnover event* is defined as the

This research was supported by a grant from the SHRM Foundation to Robert E. Ployhart and William Shepherd. The authors thank Editor Jason Shaw and three anonymous reviewers for their invaluable suggestions and guidance. We also thank D. J. Schepker for his assistance in running supplemental analyses, and the doctoral students in the management department at USC for reading earlier drafts.

voluntary or involuntary separation of an individual from the unit (e.g., Hausknecht & Holwerda, 2013). Recent theory (e.g., Hausknecht & Holwerda, 2013; Nyberg & Ployhart, 2013) has suggested that the consequences of a turnover event are usually negative but will vary depending on other factors. One such factor is the degree to which members work interdependently. Context-emergent turnover (CET) theory (Nyberg & Ployhart, 2013), as well as groups and teams literature more generally (e.g., Burke, Stagl, Salas, Pierce, & Kendall, 2006; Summers et al., 2012), has predicted that a turnover event will be more disruptive when the unit members are more interdependent. A second factor is the position or role held by the person who leaves. Turnover of more central or core employees, such as managers, is expected to have greater consequences (Hausknecht & Holwerda, 2013; Kacmar, Andrews, Van Rooy, Steilberg, & Cerrone, 2006; Shaw, Duffy, Johnson, & Lockhart, 2005; Summers et al., 2012).

We blend these theoretical perspectives to develop a model which argues that units adapt to a turnover event in two distinct phases. Phase 1 (disruption) is marked by an immediate change in collective performance caused by the disruption that occurs when an employee leaves the organization. Phase 2 (recovery) is marked by a gradual increase in collective performance as remaining employees adapt to the loss of the employee. The amount of interdependence and the position or role (manager or employee) of the person who leaves are hypothesized to further influence performance disruptions and recovery rates.

This study thus tests key theoretical propositions to advance the turnover literature in three important ways. First, responding to calls to better explain the duration and temporal dynamics of events such as turnover (Boudreau & Berger, 1985; Hausknecht & Holwerda, 2013), we model both the disruption and duration needed to recover from a turnover event. Second, we test hypotheses about the moderating effect of member interdependence (i.e., coordination and synchronization of worker interactions) on the relationship between individual turnover events and unit performance, such that turnover is hypothesized to be more consequential when there is greater interdependence (Dess & Shaw, 2001; Nyberg & Ployhart, 2013; Shaw et al., 2005). Finally, we contribute to the small but growing literature that examines the effects of turnover events for employees from different functional roles and positions (Hausknecht & Holwerda, 2013; Kacmar et al., 2006; Staw, 1980). In terms of practical implications, this study offers new insight into important questions such as, "What is the initial impact of a turnover event on unit performance?" "How long do the consequences of the turnover event last?" and "What explains differences in disruption and recovery rates?"

To examine these questions, we study 3,113 employees and 524 managers nested within 524 bank branches. The service-oriented nature of these branches leads us to focus on branch sales as the collective performance measure. We study the effects of turnover events over a 12-month period. The context and sample of this study offer some important benefits (e.g., common set of policies and practices to isolate the turnover effects), but they also necessarily place boundaries that need to be recognized. First, we follow the broader literature (Hancock et al., 2013; Heavey et al., 2013; Park & Shaw, 2013) and mainly discuss situations in which a turnover event is negatively related to collective performance. Second, we are unable to model the quality of replacements, and we have only limited information on the quality of leavers and those that remain after a turnover event. Consequently, this study does not examine the quality of replacements nor the quality of human capital, and it should be recognized that we are primarily examining the quantitative elements of a turnover event.

## THEORY AND HYPOTHESES

### Theoretical Foundation

A *turnover event* occurs when an individual voluntarily or involuntarily leaves a unit (Hausknecht & Holwerda, 2013). Although measured as the turnover of an individual, it is the remaining collective that experiences and must adapt to the turnover event (Dess & Shaw, 2001; Summers et al., 2012). A turnover event is the bridge between individual-level choices and collective consequences (e.g., Steel & Lounsbury, 2009). Understanding how and why an individual turnover event influences collective performance is thus a bottom-up process that requires a blending of both individual and collective theory. It also requires an appreciation that the individual is embedded within a larger social and task context.

CET theory (Nyberg & Ployhart, 2013) provides a useful framework for understanding these contextual elements. A turnover event depletes or disrupts the unit's capacity for action (Hausknecht & Holwerda, 2013; Shaw, Park, & Kim, 2013); thus, it typically produces lower collective performance (Hancock et al., 2013; Heavey et al., 2013; Park & Shaw, 2013). CET theory emphasizes the broader multilevel organizational and temporal context within which turnover occurs. The multilevel perspective is important because "only productivity losses are observable at the individual level; coordination and efficiency losses can only be detected at higher levels" (Nyberg & Ployhart, 2013: 116). Indeed, CET proposes that consequences of turnover become larger as the coordination demands of the unit become greater. Time is also an important element and the flows of people into and out of the unit can produce effects that vary from those observed cross-sectionally (Boudreau & Berger, 1985; Reilly, Nyberg, Maltarich, & Weller, 2014).

However, CET theory has not explained why an *individual* turnover event may produce a bottom-up effect on *collective* performance. To address this neglect, we integrate the collective turnover frameworks with the literature on team adaptability and change (Burke et al., 2006; Kozlowski, Gully, Nason, & Smith, 1999; Summers et al., 2012). Team adaptation theories are highly relevant for understanding individual turnover events because they explain why collective performance is transformed in response to change.

First, this research has suggested that a change event will disrupt collective states and processes, defined as unit-level phenomena that have been transformed from individual characteristics due to member interaction (Marks, Mathieu, & Zaccaro, 2001). Collective states are shared characteristics of the unit (e.g., cohesion, shared knowledge) that direct and shape unit processes (routines, coordination, interaction, and interpersonal relationships) (Kozlowski & Ilgen, 2006; Marks et al., 2001). In general, units with more synchronous states and processes manifest greater team performance (Kozlowski & Ilgen, 2006; Marks et al., 2001). A change event such as turnover disrupts these states and processes. Summers et al. (2012: 315) suggested that "teams experiencing disruptive events are more likely to mindfully examine their patterns of interaction for potential changes (Zellmer-Bruhn, 2003)." The nature of collective states and processes is heavily shaped by member interdependence (Kozlowski & Ilgen, 2006).

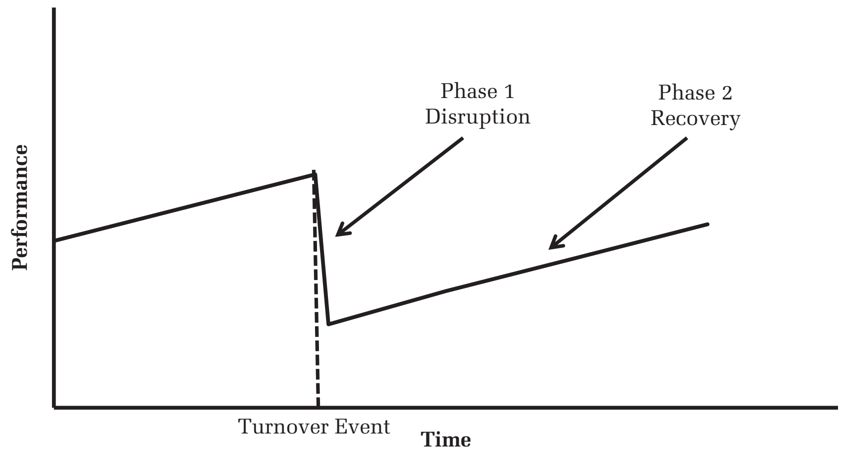
Second, the functional position or role (these terms are used interchangeably in this study) of different members within collectives also strongly affects the nature of subsequent collective states and processes (Ilgen, Hollenbeck, Johnson, Jundt, 2005; Kozlowski & Bell, 2003; Mathieu, Maynard, Rapp, & Gilson, 2008; Summers et al., 2012). Two key roles in organizational settings include managers and employees who report to the manager (Cohen & Bailey, 1997; Ilgen et al., 2005; Kozlowski & Bell, 2003; Summers et al., 2012). In this study, the term *employee* refers to workers who are not managers in a branch. Managers have the positional power to structure or revise work schedules, determine staffing levels, and influence collective states and processes (Carley, 1992; Staw, 1980). Managers comprise the "strategic core" of the unit because they are more central to structuring the unit's work flow, have greater responsibilities across the range of the unit's activities, and are more central to the unit's network, tasks, and goals (Lepak & Snell, 1999; Summers et al., 2012). Hausknecht and Holwerda (2013: 216) referred to turnover events by individuals in different functional roles as *positional distribution*, and suggested that "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."

Finally, team adaptation theories posit that members experience two distinct phases stemming from a change event (Burke et al., 2006; Kozlowski et al., 1999; Summers et al., 2012). Phase 1 is "disruption," and occurs shortly (if not immediately) after the change event. Disruption is "the degree to which routines and expertise from the pre-change period are immediately transferred to the changed task" (Lang & Bliese, 2009: 415). This disruption introduces "flux in coordination" (Summers et al., 2012), such that prior states and processes become disordered and performance decreases accordingly (Baard, Rench, & Kozlowski, 2014). Phase 2 is "Recovery," and is the ability to reconfigure or adapt collective states and processes to improve performance after the initial disruption. Recovery involves longer-term adaptation because members acquire new knowledge, socialize replacements, adapt their social relationships, and establish different routines and interaction patterns (Messersmith, Lee, Guthrie, & Ji, 2014). Figure 1 provides an overview of the two-phase model.

### Phase 1: Disruption

The onset of the *disruption phase* occurs when team members experience the turnover event, and it generally lasts until team members begin to address or react to the turnover event (Summers et al., 2012). Existing theory has not provided a precise estimate of the duration of the disruption phase, but it is generally assumed to be a rather short-term phase occurring immediately after the change event (Burke et al., 2006; Lang & Bliese, 2009).

**FIGURE 1**
**Hypothesized Two-Phase Turnover Event Model. Note that the disruption phase is considered to occur immediately or very shortly after the turnover event, and to have a much shorter duration than the recovery phase**




Although it is possible that a turnover event may lead to higher levels of individual job performance (such as when the turnover is functional [Dalton, Todor, & Krackhardt, 1982]), this consequence is more typically negative at the collective level. Team adaptation research has suggested that the reason for this is that losing a member disrupts collective states and processes. First, the turnover event may disrupt shared or tacit knowledge and require members to devote additional attention to learning new knowledge (e.g., transactive) about replacements (e.g., Huckman & Pisano, 2006; Messersmith et al., 2014). Second, a turnover event can erode the relationships and social capital that are needed to achieve higher levels of collective performance (Boudreau & Berger, 1985; Huckman & Pisano, 2006; Shaw et al., 2005). Third, a turnover event disrupts work routines and increases the job demands of those who remain (Reilly et al., 2014). Individual performance of members may be diminished as they have to assume additional responsibilities. Even if the employee is immediately replaced with a higher-quality replacement, new-member socialization takes time and resources from other members, and it will also take time for the replacement to learn the specific job function, routines, and branch-specific skills and knowledge (Kacmar et al., 2006; Messersmith et al., 2014; Shaw, 2011). Indeed, most empirical research has suggested that the collective-level effects of turnover or a change event are negative (e.g., Batt, 2002; Heavey et al., 2013; Kacmar et al., 2006; Morrow & McElroy, 2007; Park & Shaw, 2013). It is worth noting that most of this prior research has neglected to consider situations in which replacements of sufficient quality were ready to be deployed into the vacant position—possibly contributing to most of the turnover consequences being negative.

Such negative collective effects of a turnover event are particularly likely in a bank branch environment. Most bank branches are essentially small teams with members having specialized functions. Bank tellers comprise the majority of branch employees and perform tasks that primarily relate to customer transactions. Customer service, speed, and accuracy are critical. It is common for tellers to coordinate their activities as a means to accommodate differences in customer flow and demands. Larger branches may also have members fulfilling other specialized functions, such as personal finance or business-to-business transactions. All branches have managers, who are critical to the branch's operations. Managers are responsible for staffing levels and coordinating and structuring branch activities. Branch managers also resolve any customer issues that cannot be addressed by other staff, and will jump in to assume other roles (such as teller) if customer demands require it.

Thus, bank branches are similar to what Nyberg and Ployhart (2013) referred to as "reciprocal" types of workflow structure. In such a context, a turnover event disrupts the branch states and processes that have been developed over time to handle customer demands and flows. It requires members to accommodate more work (Reilly et al., 2014), which is likely to increase wait times and lower customer perceptions of quality. This, in turn, may impact the branch's ability to generate revenues because as customer wait times and frustration increase, they are less likely to visit the branch or explore other revenue-generating products or services (e.g., talk with a financial planner).

While the negative effects of a turnover event should occur for both managers and employees, multiple streams of theory have predicted that these disruptive effects should be interactive (Dess & Shaw, 2001; Hausknecht & Holwerda, 2013; Price, 1977; Staw, 1980). Specifically, the disruptive effects of an employee turnover event should be even greater when there is also a manager turnover event because managers are core employees responsible for coordinating the unit. As Staw (1980: 256) argued, "the chief moderator of whether turnover causes an operational disruption is the centrality of the particular role to the organization's functioning. In general, the higher the level of the position to be filled the greater is the potential for disruption." Managers are charged with planning, directing, and coordinating the branch, leading Dess and Shaw (2001: 449) to note that "managers primarily add value by coordinating people." Managers have more specialized knowledge of the branch and its operations, including knowledge of direct reports, customers, suppliers, and other organizational units. The loss of core employees such as managers is more disruptive to branch planning, directing, and coordination, compared to the loss of lower-level staff. Hausknecht and Holwerda (2013: 216) suggested that "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."

Therefore, losing a manager is more than just losing another employee within the branch. The manager's centralized (core) role will make the disruption caused by employee turnover disruption even greater because of the lost ability to coordinate and respond to the employee turnover event (Kacmar et al., 2006). For example, a branch manager can fill in for an employee who has left, but an employee can generally not fill in for a manager. Similarly, coworkers can cover some of an employee's responsibilities, but few of the manager's responsibilities. The lack of a centralized response to an employee turnover event can drain resources and exceed the capacity of the unit to perform even basic activities (Hausknecht & Holwerda, 2013; Nyberg & Ployhart, 2013; Reilly et al., 2014).

*Hypothesis 1a. In the disruption phase, an employee turnover event will negatively influence branch sales performance.*

*Hypothesis 1b. In the disruption phase, a manager turnover event will negatively influence branch sales performance.*

*Hypothesis 2. In the disruption phase, an employee turnover event and a manager turnover event will interact. The negative effect of an employee turnover event on branch sales performance will be greater when there is also a manager turnover event.*

The more interaction required among members, the greater the (usually negative) consequences of turnover (Nyberg & Ployhart, 2013). The reason for this is that interdependence contributes to the formation of collective states and processes such as coordination, teamwork, and cohesion (Hoegl, Weinkauf, & Gemuenden, 2004; Marks et al., 2001; Wageman & Gordon, 2005). The reciprocal workflow structure in bank branches requires a fair amount of member coordination and interaction to optimally serve customers in an efficient and accurate manner. However, the amount of coordination demanded is likely to differ across branches (e.g., Huckman & Pisano, 2006). Even though branches share similar responsibilities and companywide policies, they differ with respect to the nature of their customers, branch size, and the specific members within each branch. For example, smaller branches often have more intimate service relationships with customers than larger branches do (Hausknecht et al., 2009).

Thus, interdependence should moderate the effects of a turnover event on collective performance. When a branch experiences a turnover event, branch membership changes and the collective states, processes, and coordination activities (for managers) described in developing Hypotheses 1a and b will be disrupted. However, branches with higher levels of interdependence will experience even larger disruptions because collective performance in those branches is based more strongly on collective states and processes.

*Hypothesis 3a. Branch interdependence will moderate the relationship between an employee turnover event and sales performance disruption, such that branches with higher levels of interdependence will experience greater reductions of performance immediately after the turnover event.*

*Hypothesis 3b. Branch interdependence will moderate the relationship between a manager turnover event and sales performance disruption, such that branches with higher levels of interdependence will experience greater reductions of performance immediately after the turnover event.*

**Phase 2: Recovery**

The period following the disruption phase is known as the *recovery phase*. The rate of branch performance change after the turnover event is referred to as the *recovery rate*. The recovery rate estimates whether post-turnover performance is changing faster or slower than pre-turnover performance. When a turnover event produces a drop in branch performance, faster recovery rates mean that branches more quickly reach pre-turnover performance levels than branches with lower recovery rates do.

Extant theory (Boudreau & Berger, 1985; Nyberg & Ployhart, 2013) has paid explicit attention to the consequences of the timing and flows of collective turnover, but has not made specific propositions about the intra-unit nature and duration of the recovery. However, the team adaptability literature has found that the recovery phase is usually marked by a gradual increase in collective performance (Burke et al., 2006; Kozlowski et al., 1999; LePine, 2003). The recovery is gradual because employees that remain will now be required to adapt or develop different collective states and processes (e.g., coordination, routines) to effectively accommodate expanded responsibilities and workloads (Messersmith et al., 2014; Reilly et al., 2014). Even though the majority of work relationships may be intact, the manner in which these members coordinate and interact will change to some degree to accommodate the responsibilities of the employee who has left. Learning different relationships in order to adapt to the disruption and fill the gap created by the turnover event takes time and cannot be compressed, particularly because much of this knowledge is tacit or social (Huckman & Pisano, 2006; Kacmar et al., 2006; Kozlowski et al., 1999). Thus, performance will gradually increase over time.

Note that this "rebundling" of team states and processes occurs regardless of whether the individual employee is replaced. If the employee is not replaced, then performance should gradually increase (but perhaps not return to pre-turnover levels) as members learn and adapt to each other in new ways (Dess & Shaw, 2001; Messersmith et al., 2014; Shaw et al., 2005). If a replacement is made, then the new employee will need to learn job, branch, and coworker-specific knowledge and routines, and branch employees will need to adapt (at least to some degree) to the new person (Nyberg & Ployhart, 2013; Summers et al., 2012). It will take time for the new employee to be socialized into the team and for the team to acclimate to the new employee (e.g., Chen, 2005). Summers et al. (2012: 320) went as far as to argue that even though "some of a team's coordination patterns remain," when a member leaves, the "remaining linkages and routines become obsolete when a new member enters the team." Then, as the new employee learns his or her job and is integrated into the branch, incumbent employees may shift their attention back to the fulfillment of their own job tasks (Reilly et al., 2014). Thus, the processes may differ slightly depending on whether there is a replacement, and recovery rates may be slower or unlikely to return to pre-turnover levels if no replacement is made (the quality of replacements should matter as well, but we do not use measures of quality in this study).

A managerial turnover event should produce consequences that are distinct from an employee turnover event (Kacmar et al., 2006; Price, 1977; Staw, 1980). As core employees who occupy more central positions within the branch, the disruption caused by a manager turnover event should produce a distinct (and likely slower) recovery rate than an employee turnover event (Hausknecht & Holwerda, 2013; Kacmar et al., 2006; Shaw et al., 2005). The specialized human and social capital of core employees will take longer to rebuild because much of this capital is tacit and based on relationships with other people (e.g., Dess & Shaw, 2001; Kacmar et al., 2006; Summers et al., 2012). This means that a manager turnover event and an employee turnover event should both have positive yet distinct recovery rates.

Beyond these direct (main) effects, theory has suggested an interaction between the manager and employee turnover events on recovery rate (Hausknecht & Holwerda, 2013; Staw, 1980). The gradual recovery rate for manager turnover will further slow the recovery rate for employee turnover. First, the loss of centralized coordination due to managerial turnover will lessen the remaining members' ability to effectively accommodate the additional workload of the coworker who has left (Reilly et al., 2014). Second, existing routines and coordination are more likely to be disrupted by a manager turnover event, and hence require greater learning (and likely mistakes) on the part of remaining employees, which takes more time (Messersmith et al., 2014; Summers et al., 2012). Third, the additional workload created by both manager and employee turnover events may overwhelm available resources of remaining employees, who must now operate on diminished capacity and hence perform poorly until the capacity is rebuilt through replacements or new learning (Hausknecht & Holwerda, 2013; Messersmith et al., 2014). Finally, it takes time to accommodate replacements and rebuild human and social capital (Chen, 2005; Dess & Shaw, 2001). Such time will be even greater when a manager must be replaced because the manager's centralized role requires rebuilding relationships with all employees and customers (i.e., more relationships and a larger number of relationships requires more time to establish) (Summers et al., 2012).

For example, branch managers are responsible for ensuring the unit adapts to employee turnover, as well as finding replacements. Indeed, branch managers assume primary responsibility for hiring a termed employee. However, when the manager turns over, such hiring will obviously not occur until someone fills the role of the manager. Hence, the recovery rate following employee turnover will be slower when a manager also leaves.

*Hypothesis 4a. In the recovery phase (the time period following the initial disruption due to an employee turnover event), branches will experience a gradual increase in sales performance over time.*

*Hypothesis 4b. In the recovery phase (the time period following the initial disruption due to a manager turnover event), branches will experience a gradual increase in sales performance over time.*

*Hypothesis 5. In the recovery phase (the time period following the initial disruption), an employee turnover event and a manager turnover event will interact. The gradual increase in branch sales performance over time following an employee turnover event will be slower when there is also a manager turnover event.*

The recovery rate from a turnover event should not occur equally in all branches. Following the theoretical arguments involving interdependence (Hypotheses 3a and b above), branches with higher levels of interdependence will take longer to recover relative to their previous levels of performance. The recovery rate will be slower because more interdependent branches have more shared states and processes that will take more time to rebuild post-turnover (Burke et al., 2006; Messersmith et al., 2014; Nyberg & Ployhart, 2013). The building of team processes occurs in stages, and movement to a later stage does not occur until there is mastery of an earlier stage (Kozlowski et al., 1999). Thus, the greater the interdependence that exists within a branch before a turnover event, the longer it will take to recover from a turnover event.

*Hypothesis 6a. Branch interdependence will moderate the relationship between an employee turnover event and recovery rate, such that sales performance in branches with higher levels of interdependence will recover at a slower rate.*

*Hypothesis 6b. Branch interdependence will moderate the relationship between a manager turnover event and recovery rate, such that sales performance in branches with higher levels of interdependence will recover at a slower rate.*

## METHOD

### Sample and Procedure

Our sample consists of employees ($n$ = 3,113) nested within branches ($n$ = 524) in a large regional bank in the Midwestern United States. The employees included in the sample are branch employees who interact directly with customers and each other to fulfill banking and financial service needs. These employees open accounts, take deposits, provide withdraws, answer questions, and provide other services needed in a traditional branch-banking environment. Although a branch employee's primary duty is to interact directly with customers, the job does require a considerable interactive component with coworkers and supervisors. The reason for this is that banks compete by offering an increasingly complex array of packages and services, and employees need to cross-sell and refer customers to other bank employees as needed. Indeed, the U.S. Government's O*Net occupational classification system has suggested that "communicating with supervisors, peers or subordinates" and "establishing and maintaining interpersonal relationships" are core work activities, and that "work with work group or team" is a key feature of this work context (http://www.onetonline.org). Branches have an average of 5.94 employees (range = 3 to 15). All employees were administered a survey in December of 2009 by an outside vendor to ensure responses were anonymous to the organization. One portion of the survey focused on employee's perceptions of their work unit, including interdependence. The survey included other dimensions that are not discussed because they are not as relevant to this study.

Within the 12-month timeframe of our study, 67% of the branches experienced at least one turnover event; the employee turnover rate was 25% and the manager turnover rate was 13%. The turnover rate was well below U.S. averages for the same time period, which hovered between 36 and 40% (U.S. Department of Labor Bureau of Labor Statistics, 2011). However, managing the turnover process and lowering turnover rates were a priority within the bank (indeed, meta-analytic results show banking, as an industry, as among those suffering the most negative consequences from a turnover event [Park & Shaw, 2013]).

### Measures

***Sales performance.*** Branch performance is based on branch-level sales. Sales are measured monthly for the period February 2010 to January 2011. During the month of the turnover event, branch-level results are based on partial month employment. For example, if an employee leaves on the 15th of the month, performance for the first half of the month will be based on full staffing levels while performance for the second half of the month will be based on partial staffing. We do not have the ability to differentiate sales performance before and after the turnover event within a given month; therefore, we lag branch performance by one month in order to avoid the noise created by partial month employment.

The actual measure is an index of how well the branch met its sales goal each month. The measure has a range of 0–150% and represents the percentage of the branch sales goal that was achieved in a particular month. For example, mean sales over the 12 months were .76, meaning that branches on average attained 76% of their sales target. Sales goals are set at the corporate level based on size of market, number of employees, and previous branch performance. The goals are revised annually, which means the goals did not change within the timeframe of our study. The metric includes sales performance across multiple categories, including businesses and households (e.g., new accounts opened and new loans booked). This type of "percent to goal" measure is common in customer service research (e.g., Batt, 2002; Maxham, Netemeyer, & Lichtenstein, 2008). This measure is well suited for the purpose of this study for two reasons. First, it controls for factors outside of the scope of interest and allows us to isolate changes in performance due to the turnover event. Second, we are interested in relative performance and the percent to goal metric is a direct measure of relative performance before and after the turnover event. The percent to goal metric has the added benefit of veiling the bank's raw sales, which protects competitively sensitive information.

***Interdependence.*** Interdependence was measured in December 2009 using two survey items ("The people I work with cooperate to get the job done" and "People in my work branch help me out when my workload is high"). The $\alpha$ value for the measure is .71, the mean $r_{wg}$ is .85 ($SD$ = .18), Intraclass correlation (ICC)1 is .16, and ICC2 is .52. The ICC1 is rather large and indicates that a significant amount of variation in individual interdependence perceptions is attributable to branch membership (see LeBreton & Senter, 2008). The $r_{wg}$ (an index of agreement) is greater than .70 and indicates a high degree of agreement among branch employees' perceptions of branch interdependence. Combined, these results support aggregation of individual scores to create a branch-level metric of interdependence. The ICC2 (the reliability of branch-level interdependence scores) is moderate, but this is due primarily to the small branch size (see Bliese, 2000) and is consistent with other research conducted on naturally occurring groups of similar size (e.g., Liao & Chuang, 2007; Salanova, Agut, & Peiro, 2005; Simons & Roberson, 2003). The low ICC2 makes it more difficult to detect relationships between the average level of interdependence and other constructs; however, this also makes the analyses more conservative (Bliese, 2000; Chen & Bliese, 2002; Kozlowski & Hattrup, 1992; Liao & Chuang, 2007).

The items were developed for the sponsoring organization by a well-respected science-based consulting firm employing several experts with doctoral education in measurement, psychometrics, and survey design. The scale was developed specifically for the organization, but the items capture elements of similar constructs previously published. However, to further ensure that this measure of interdependence fits within the hypothesized nomological network, we surveyed a separate sample on which we validated the scores on the interdependence measure. In order to conduct the validation, we surveyed a sample of 157 undergraduate and master's students in a large U.S. university who were actively engaged in class project teams. These teams were meaningful for the students because performance in the teams had a strong influence on their overall final grades. The average age of the validation sample was 23 and 48% were female.

To evaluate convergent validity, participants rated their project teams on our measure of interdependence and established measures of interdependence (Wageman & Gordon, 2005) and coordination (Hoegl et al., 2004). Scores on these measures should theoretically be related because they sample behaviors that reflect "orchestrating the sequence and timing of interdependent actions" (Marks et al., 2001: 363). In order to evaluate divergent validity, participants rated their project teams on an established measure of social support (Morgeson & Humphrey, 2006), as well as gender and work experience. Social support and work experience should theoretically have modest relationships with interdependence because they may exist irrespective of the amount of interdependence required (although they may contribute to successful performance in interdependent contexts). There is no theoretical reason to expect a relationship between gender and interdependence. All correlations were corrected for unreliability according to standard practice (Hunter & Schmidt, 2004). The corrected convergent correlations were $r = .81$ with interdependence (Wageman & Gordon, 2005) and $r = .93$ with coordination (Hoegl et al., 2004). The corrected discriminant correlations were $r = .23$ with social support (Morgeson & Humphrey, 2006), $r = .06$ with gender, and $r = .08$ with work experience. Together, these findings support the construct validity of the interdependence scores by showing hypothesized relationships within the theorized nomological network (these analyses are available from the first author upon request).

We also performed exploratory factor analysis (EFA) using the items from our measure and the items from Wageman and Gordon (2005) and Hoegl et al. (2004). We completed this in two steps. First, we ran EFAs (using maximum likelihood estimation) on our measure with the items from Wageman and Gordon (2005) because of their close correspondence. The EFA produced only one factor with an eigenvalue greater than 1.00, and only one factor was retained by the proportion criterion. Both questions in our interdependence measure had factor loadings greater than .5, which is larger than two of the six items in the Wageman and Gordon scale. These results are indicative of a single factor between the two scales. We also ran an additional EFA (maximum likelihood estimation) using our measure of interdependence, the six items from Wageman and Gordon (2005), and the three items from Hoegl et al. (2004). Two factors had an eigenvalue greater than 1.00 and were retained by the proportion criteria. Our items had factor loadings greater than .5 and loaded on the first factor, as did items from Wageman and Gordon (2005) and Hoegl et al. (2004) (only one item from Hoegl et al. [2004] failed to load on the first factor). Thus, there appears a common factor among the scores. However, we revisit some potentially important concerns about this measure in the Limitations section.

***Turnover event.*** In order to isolate a single branch-level turnover event for employees, we focused on the first turnover event during our sample period within each branch. We coded the turnover event by assigning a value of 0 to each branch for any month prior to the initial turnover event and a value of 1 for the month of turnover and any subsequent months in the sample. The coding of the turnover events is consistent with prior research on adaptation at the individual level (Lang & Bliese, 2009), but the actual metric is novel within the collective turnover literature. However, it is consistent with the theoretical and phenomenological effects we are interested in observing. The manager turnover event was coded using the same methodology. We coded the turnover event by assigning a value of 0 to each branch for any month prior to the manager turnover event and a value of 1 for the month of turnover and any subsequent months in the sample.

The theory section argued that an employee turnover event should affect branch sales, in part, because it disrupts coordination, interaction, and customer service delivery. To provide some support for these inferences, we correlated the turnover event with customer wait times and quality perceptions, as obtained from a monthly customer survey administered to 15 random customers from each branch. The results found that an employee disruption was positively correlated with wait time ($r = .09$, $p < .05$) and negatively correlated with customer quality perceptions ($r = -.07$, $p < .05$). Thus, a turnover event negatively affects the customer experience.

***Turnover recovery rate.*** The recovery rate for employees or managers was coded by assigning a value of 0 to any month prior to and including the month of the initial turnover event. For all subsequent months, the value of the recovery rate variable increased by one (i.e., 1, 2, 3, etc.). This variable captures the change in linear performance after a turnover event. The turnover event coding is consistent with the discontinuous growth modeling methodology used in Lang and Bliese (2009).

***Controls.*** We controlled for factors that could affect the hypothesis tests but are not of central interest to this study. First, we controlled for the initial *number of employees* in each branch. Branches with more employees generate more sales, but also have different coordination dynamics and may more effectively buffer the loss of a single employee because they have more human-capital-related resources to apply (Hausknecht et al., 2009). The number of employees is a control on the initial level of sales performance (the intercept). Second, research has suggested that flows of people in and out of the branch are a conceptually distinct construct (Boudreau & Berger, 1985; Nyberg & Ployhart, 2013; Reilly et al., 2014). Therefore, we also controlled for the changes in headcount (*flow*) each month. The *employee flow* variable is the number of branch employees present in each month. Employee flow includes those who leave and those who are hired. This variable captures changes in employee headcount that occur each month; hence, there is variability in this measure and it is not redundant with beginning headcount. The employee flow variable captures changes in performance due to changes in the number of employees over time; the disruption variable captures the effect of a turnover event that occurs above and beyond the change in employee headcount. We expect that within-unit changes in employee headcount will be positively related to sales performance because increasing staff means greater capacity (Boudreau & Berger, 1985; Reilly et al., 2014). The number of employees working in each branch was captured via personnel records from January to December 2010.

Employee flow should account for changes in headcount due to additional turnover or hires, but we also controlled for the second turnover event in a branch to ensure any additional subsequent turnover effects are captured. Given the first turnover event disrupts branch-level coordination, we did not expect, nor did we find, a significant effect for this control.

### Analytical Method

Because the hypotheses include effects that vary within branch, between branch, and across time relative to a discontinuous (turnover) event, we used discontinuous random coefficient growth models (RCGM) (Lang & Bliese, 2009; Singer & Willett, 2003). Discontinuous RCGM are a special case of RCGM that allow us to look at performance growth functions before (pre-turnover), during (disruption), and after (recovery rate) a turnover event. RCGM (also known as hierarchical linear modeling) allow us to examine within-branch (Level 1) changes in sales performance and between-branch (Level 2) differences in sales performance, while capturing the correlated error structure in the nested observations. This approach mirrors the method employed by Lang and Bliese (2009) to investigate individual-level adaptation. We followed the procedures and model-testing approach common in the organizational literature (Bliese & Ployhart, 2002; Lang & Bliese, 2009; Singer & Willett, 2003). All analyses utilized SAS Proc Mixed (version 9.3) and used restricted maximum likelihood (REML). Pseudo $R^2$ values were estimated by comparing the residual variance between each model and the null model without predictors (Singer & Willett, 2003; Xu, 2003); they do not have corresponding significance tests.

Table 1 presents a summary of the variable coding and interpretation used in the analyses. Note that the table illustrates the coding by showing a single scenario in which an employee turnover event occurs in month six, a manager turnover event occurs in month four, and a second employee turnover event occurs in month eight. The specific timing of each of these events varies by branch. The coding of the disruption variables means that the coefficient estimates the immediate change in performance due to a turnover event. A statistically significant and negative (positive) coefficient means that branch sales performance decreases (increases) at the time of a turnover event. A statistically insignificant result would indicate that a turnover event has no impact on sales performance. The coding of recovery rate means that the coefficient estimates whether the post-turnover linear growth rate is different from the pre-turnover linear growth rate within branches that experience a turnover event. A statistically significant and positive (negative) coefficient for recovery rate means that the linear growth rate is faster (slower) for branches after a turnover event. If the recovery rate parameter is not statistically significant, it means growth rates are essentially the same before and after the turnover event. Appendix A lists all models and equations used to test the hypotheses.

In this bank, there has historically been a seasonal dip in sales during the holiday season (October to January), when customers tend to focus on their current financial products as opposed to acquiring new ones. This means that sales are expected to approximate an inverted "U-shaped" curve across the 12 months examined in this study. Further, the U.S. economy was slowly coming out of a recession during 2010. To control for these effects, we include

**TABLE 1**
**Coding and Interpretation of Change Variables in the Discontinuous Mixed-Effects Growth Models (example for manager turnover in month 4, first employee turnover event in month 6, and second employee turnover event in month 8)**

| | Measurement Occasion | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | Meaning |
| Linear Growth | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | Linear growth rate of unit performance |
| Quadratic Growth | 0 | 1 | 4 | 9 | 16 | 25 | 36 | 49 | 64 | 81 | 100 | 121 | Quadratic growth rate of unit performance |
| Employee Disruption | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | Immediate impact due to turnover event |
| Employee Recovery | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | Linear growth rate of performance after initial turnover event impact |
| Manager Disruption | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | Immediate impact due to manager turnover |
| Manager Recovery | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Linear growth rate of performance after initial manager turnover |
| Second Turnover Event | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | Immediate impact due to second turnover event |

a linear and quadratic growth term for all models. The linear and quadratic growth terms control for bank-wide trends in sales performance over time (e.g., seasonality or the economic recovery). Although some econometric models will control for these effects by including a dummy variable for each month, standard practice for RCGM requires modeling such seasonality using a combination of a nonlinear functions and correlated residuals. Therefore, we use a quadratic growth term because: (a) there is an a priori reason why sales should follow an inverted u-shaped pattern, (b) modeling linear and quadratic terms keeps random variation between months from showing up as a signal in the model, (c) we are able to model the time effect with two parameters instead of 11 (which results in a more parsimonious and interpretable model), and (d) the correlated residuals should model short-term seasonal fluctuations. Thus, seasonality and macroeconomic trends are modeled using typical RCGM practices (Bliese & Ployhart, 2002).

## RESULTS

Table 2 shows the means, standard deviations, and correlations of the variables. Notice that interdependence is negatively related to number of employees. This provides some support for the expectation that interdependence captures interaction and coordination, because units with more employees face greater challenges with coordination (Hausknecht et al., 2009). In addition, note that the correlations seem large between the disruption and recovery variables, but this is to be expected, given

**TABLE 2**
**Means, Standard Deviations, and Correlations**

| Variable | Mean | *SD* | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|
| 1. Sales Performance | 0.76 | 0.21 | — | | | | | | |
| 2. Branch-level Interdependence | 3.94 | 0.52 | 0.03* | — | | | | | |
| 3. Employee Disruption | 0.43 | 0.49 | –0.04* | –0.11* | — | | | | |
| 4. Employee Recovery | 1.95 | 3.02 | –0.01 | –0.05* | 0.73* | — | | | |
| 5. Manager Disruption | 0.07 | 0.26 | –0.11* | –0.01 | 0.10* | 0.08* | — | | |
| 6. Manager Recovery | 0.27 | 1.20 | –0.08* | –0.01 | 0.10* | 0.12* | 0.78* | — | |
| 7. Number of Employees | 5.94 | 2.28 | 0.11* | –0.16* | 0.05* | 0.11* | 0.02 | 0.04* | — |

*Notes:* Branch level $n = 524$; Time = 12 months. Sales performance is the average sales performance per month. Branch-level interdependence is the aggregate of individual interdependence scores within a branch. Employee and manager disruption are nominal variables ranging from 0 to 1 (see Table 1) and in this table represent the percentage of months in which branch performance is measured after a turnover event (e.g., across the combination of branches and time, 43% of the observations occurred after an employee turnover event and were hence coded as "1"). Employee and manager recovery are nominally coded variables (see Table 1) and in this table represent the number of months since a turnover event. Number of employees is the average number of employees per month and therefore the average of the employee flow variable.

* $p < .05$

that they are highly related (e.g., a recovery only exists in the presence of a turnover event).

Tables 3 and 4 show the results of the hypotheses tests. When predicting sales performance in the baseline model (Model 1; Table 3), the fixed effects for the intercept, the linear growth rate (Time) and the quadratic growth rate (Time*Time) were all included in the model (intercept [58.80, $p < .05$]; linear growth [3.37, n.s.]; quadratic growth [–.30, $p < .05$]). These hypotheses contain interaction effects, so we report significance tests for all hypotheses based on Type 1 SS because this is preferable in the presence of interactions (Aiken & West, 1991; Cohen, Cohen, West, & Aiken, 2003). These results indicate that there is a bank-level increase in sales performance for the first half of 2010 and a slight decrease in sales performance for the second half of 2010. These effects are consistent with the expected seasonal trends. To account for branch-level endogenous effects (such as market size), we also allowed the branch-level intercept to vary between branches by including a variance component for the intercept term (128.23, $p < .05$). The baseline model also controlled for the initial number of employees and the flow of employees over time. As expected, the flow of employees into the branch was positively related to sales performance (.22, $p < .05$). The autoregressive (AR) residual term (AR1) is also significant, indicating that performance at any given time period is related to performance in the previous time period.

Hypothesis 1a (1b) predicted that sales performance would decrease immediately following an employee (manager) turnover event. Model 1 in

**TABLE 3**
**Discontinuous Growth Model Results for Baseline Model and Disruption Phase**

| Variable | Model 1 Coef. | Model 1 *SE* | Model 2 Coef. | Model 2 *SE* | Model 3 Coef. | Model 3 *SE* | Model 4 Coef. | Model 4 *SE* |
|---|---|---|---|---|---|---|---|---|
| Fixed Effects | | | | | | | | |
| Level 1 Model | | | | | | | | |
| Intercept | 58.80* | 4.89 | 58.73* | 4.89 | 55.57* | 5.23 | 58.53* | 4.92 |
| Linear Growth | 3.37 | 0.29 | 3.34 | 0.29 | 3.35 | 0.28 | 3.35 | 0.28 |
| Quadratic Growth | –0.30* | 0.02 | –0.30* | 0.02 | –0.30* | 0.02 | –0.30* | 0.02 |
| Employee Flow | 0.22* | 0.36 | 0.22* | 0.36 | 0.25* | 0.36 | 0.26* | 0.36 |
| Employee Disruption | −4.73* | 0.91 | −4.41* | 0.93 | 2.98* | 5.29 | −4.70* | 0.94 |
| Second Turnover Event | −1.33 | 1.09 | −1.26 | 1.08 | −1.29 | 1.11 | −1.20 | 1.11 |
| Employee Recovery | 0.44* | 0.17 | 0.46* | 0.17 | 0.49* | 0.18 | 0.48* | 0.18 |
| Manager Disruption | −6.22* | 1.74 | −3.50* | 2.18 | −6.30* | 1.89 | −10.13* | 11.85 |
| Manager Recovery | 0.38 | 0.36 | 0.54 | 0.37 | 0.46 | 0.37 | 0.48 | 0.37 |
| Employee Disruption X Manager Disruption | | | −5.30* | 2.57 | | | | |
| Level 2 Model | | | | | | | | |
| Number of Employees | 1.13* | 0.46 | 1.14* | 0.46 | 1.13* | 0.46 | 1.11* | 0.46 |
| Interdependence | 1.19 | 1.11 | 1.18 | 1.11 | 2.00 | 1.20 | 1.25 | 1.12 |
| Interdependence X Employee Disruption | | | | | −1.98 | 1.34 | | |
| Interdependence X Manager Disruption | | | | | | | 0.97 | 2.98 |
| Random Effects (variance components) | | | | | | | | |
| Intercept | 128.23* | 10.58 | 128.31* | 10.58 | 122.54* | 10.73 | 122.40* | 10.73 |
| Employee Disruption | | | | | 19.54* | 11.19 | 20.05* | 11.24 |
| Manager Disruption | | | | | 35.91 | 27.84 | 36.89 | 28.34 |
| AR(1) | 0.23* | 0.02 | 0.22* | 0.02 | 0.21* | 0.02 | 0.21* | 0.02 |
| −2 Res Log Likelihood (REML)[a] | 54011.30 | | 54003.30 | | 54000.70 | | 54001.10 | |
| AIC | 54017.30 | | 54009.30 | | 54010.70 | | 54011.10 | |
| Pseudo $R^2$ | 0.03 | | 0.03 | | 0.04 | | 0.04 | |

*Notes:* $n = 524$ branches; *SE* = coefficient standard error; AR(1) = autoregressive residual structure; REML = restricted maximum likelihood. Employee disruption and manager disruption variance components are only estimated when these terms interact with Level 2 interdependence. Significance values are based on Type I tests (sequential sums of squares) due to the presence of interactions. The differences in log likelihoods between the models reported here and models without random effects are statistically significant, $p < .01$.

* $p < .05$

**TABLE 4**
**Discontinuous Growth Model Results for Recovery Phases**

| Variable | Model 5 Coef. | Model 5 *SE* | Model 6 Coef. | Model 6 *SE* | Model 7 Coef. | Model 7 *SE* |
|---|---|---|---|---|---|---|
| Fixed Effects | | | | | | |
| Level 1 Model | | | | | | |
| Intercept | 58.80* | 4.89 | 55.38* | 5.09 | 58.27* | 4.91 |
| Linear Growth | 3.38 | 0.29 | 3.35 | 0.28 | 3.35 | 0.28 |
| Quadratic Growth | –0.30* | 0.02 | –0.30* | 0.02 | –0.30* | 0.02 |
| Employee Flow | 0.22* | 0.36 | 0.20* | 0.36 | 0.23* | 0.36 |
| Employee Disruption | −4.70* | 0.92 | −4.60* | 0.91 | −4.60* | 0.91 |
| Second Turnover Event | −1.31 | 1.09 | −1.21 | 1.10 | −1.10 | 1.10 |
| Employee Recovery | 0.41* | 0.18 | 2.29* | 0.94 | 0.41* | 0.18 |
| Manager Disruption | −6.08* | 1.76 | −6.68* | 1.76 | −6.72* | 1.76 |
| Manager Recovery | 0.21 | 0.49 | 0.56 | 0.44 | 0.46 | 2.95 |
| Manager Recovery X Employee Recovery | 0.03 | 0.06 | | | | |
| Level 2 Model | | | | | | |
| Number of Employees | 1.13* | 0.46 | 1.15* | 0.46 | 1.12* | 0.46 |
| Interdependence | 1.19 | 1.11 | 2.07 | 1.17 | 1.33 | 1.11 |
| Interdependence X Employee Recovery | | | –0.48* | 0.24 | | |
| Interdependence X Manager Recovery | | | | | 0.03 | 0.74 |
| Random Effects (variance components) | | | | | | |
| Intercept | 128.25* | 10.59 | 126.55* | 10.64 | 126.03* | 10.61 |
| Employee Recovery | | | 0.36 | 0.28 | 0.38 | 0.28 |
| Manager Recovery | | | 2.21* | 1.17 | 2.26* | 1.18 |
| AR(1) | 0.23* | 0.02 | 0.21* | 0.02 | 0.21* | 0.02 |
| −2 Res Log Likelihood (REML) [a] | 54014.60 | | 53998.00 | | 53999.80 | |
| AIC | 54020.60 | | 54008.00 | | 54009.80 | |
| Pseudo $R^2$ | 0.02 | | 0.04 | | 0.04 | |

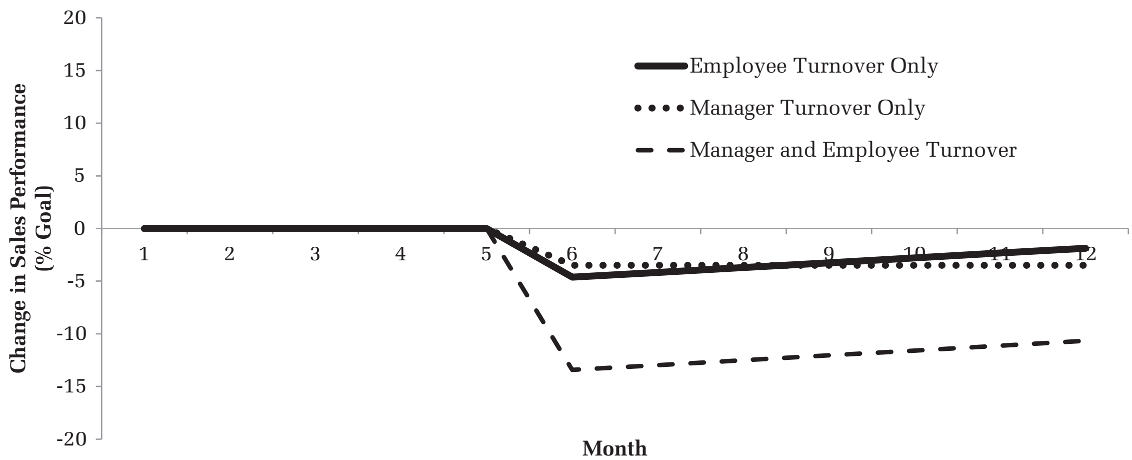
*Notes:* $n = 524$ branches; *SE* = coefficient standard error; AR(1) = autoregressive residual structure; REML = restricted maximum likelihood. Employee recovery and manager recovery variance components are only estimated when these terms interact with Level 2 interdependence. Significance values are based on Type I tests (sequential sums of squares) due to the presence of interactions. The differences in log likelihoods between the models reported here and models without random effects are statistically significant, $p < .01$.

* $p < .05$

Table 3 shows that the effect of a turnover event is negative and significant for an employee (–4.73, $p <$ .05) and manager (–6.22, $p < .05$). This means that sales performance drops by 4.73% immediately following an employee turnover event and by 6.22% immediately following a manager turnover event. Importantly, these effects are found with both turnover events in the model at the same time, suggesting that both types of turnover are independently important. Thus, Hypotheses 1a and 1b are supported.

Hypothesis 2 predicted that the disruption from a manager turnover event would moderate the relationship between employee turnover and sales performance such that branches that experience both a manager and employee turnover event experience a larger drop in sales performance. Model 2 in Table 3 shows that the effect of the manager disruption and employee disruption interaction is negative and significant (–5.30, $p < .05$), indicating that the presence of both an employee and manager turnover event hurt performance in a multiplicative manner. To further examine whether this was due to differences in positional distribution (Hausknecht & Holwerda, 2013) versus just a second turnover event, we entered an interaction term between employee disruption and the second employee turnover event. This effect was not significant. These findings cumulatively suggest that the interaction between employee and manager turnover is qualitatively different than simply two turnover events. Therefore, Hypothesis 2 is supported. Figure 2 shows that changes in sales performance from either an employee or manager turnover event are significantly negative, but the impact of having an employee and manager turnover event is almost twice as negative.

**FIGURE 2**
**Disruption Phase: Modeled Relationship (Statistically Significant Effects) Between an Employee Turnover Event, a Manager Turnover Event, and Branch-Level Sales Performance. The figure illustrates the change in predicted sales performance for branches that experience a turnover event in month 5 (pre-turnover performance is a flat line because we depict only the change due to a turnover event, and change after the turnover event is shown without replacement)**




Hypothesis 3a predicted that branch-level interdependence would moderate the relationship between employee disruption and sales performance, such that branches with a higher level of interdependence would experience greater disruption. Model 3 in Table 3 shows that this interaction is not significant, even though the variance component was significant (19.54, $p < .05$). Hypothesis 3b predicted that branch-level interdependence would moderate the relationship between manager disruption and sales performance, such that branches with higher levels of interdependence would have a larger disruption. In Model 4 in Table 3, the variance component for manager disruption is not significant. This is fairly common because tests for variance components have low power (Snijders & Bosker, 1999). Indeed, Lang and Bliese (2009: 422) suggest that "others recommend testing cross-level effects in the absence of significance, when there is a theoretically solid rationale" Following their guidance, we tested for the interaction but found that it was not significant. We also tested whether the difference between the moderation regression coefficients was significant; it was not ($z = .95$, n.s.). Hypotheses 3a and 3b are therefore not supported. We also tested the three-way interaction between interdependence, manager disruption and employee disruption, but the effect was not statistically significant.

Hypothesis 4a predicted that sales performance would increase following an employee turnover event. In Model 1 in Table 3, the effect of employee recovery is positive and significant (.44, $p < .05$). This means that branch sales performance recovers after the initial drop due to employee disruption. Hypothesis 4b predicted that sales performance would increase following a manager turnover event. In Model 1 in Table 3, the effect of manager recovery on sales performance is positive but not significant. This means that within our performance window, the negative effect of manager turnover persists without a statistically significant recovery. Stated differently, a manager turnover event has a negative impact on branch sales performance and branch performance does not recover to pre-turnover levels during the 12-month period we are able to observe. Thus, Hypothesis 4a is supported but Hypothesis 4b is not.

Hypothesis 5 predicted that manager recovery would interact with employee recovery on sales performance, such that employee recovery rate during manager recovery would be slower. Model 5 in Table 4 shows that the interaction between manager and employee recovery is not significant, meaning that the rate of recovery following an employee turnover event is not affected by the recovery from a manager turnover event. Hypothesis 5 is thus not supported. Given the results of our analyses for hypothesis 4b, that there is not a significant recovery from manager turnover; this is not surprising, as the impact of a manager turnover event lingers over the entire 12 months of our sample frame.

Hypothesis 6a predicted that branch-level interdependence would moderate the rate of recovery after an employee turnover event, such that branches with high levels of interdependence would experience slower recovery. Model 6 in Table 4 shows that the variance component for employee recovery is not significant. However, as outlined earlier, a non-significant variance component does not necessarily indicate an absence of between-branch variability in the variable of interest (Lang & Bliese, 2009). Indeed, the interaction between branch-level interdependence and employee recovery is negative and significant (–.48, $p < .05$). This means that sales performance in branches with higher levels of interdependence will recover more slowly after an employee turnover disruption. Therefore, Hypothesis 6a is supported, as per the results shown in Figure 3. As expected, higher interdependence is associated with a slower recovery rate.

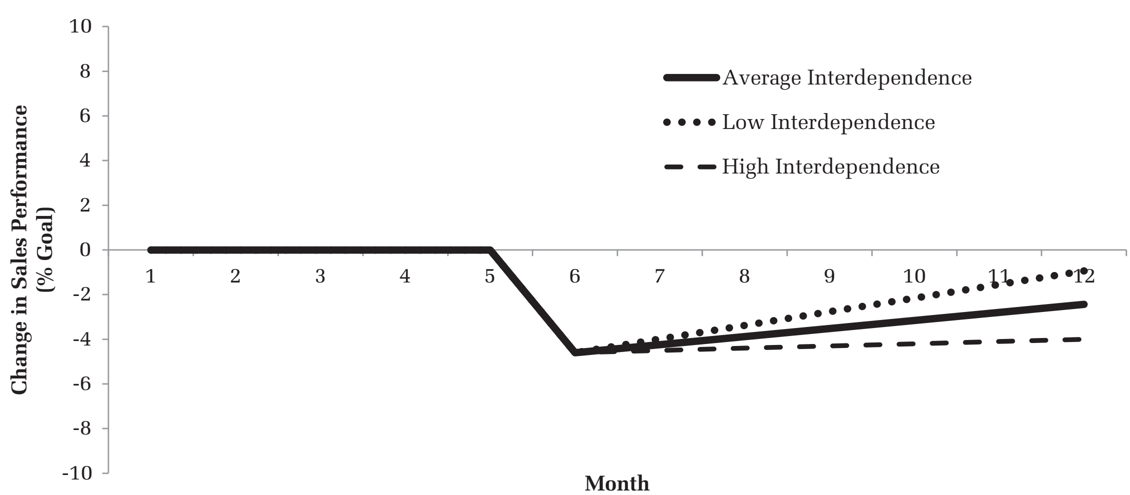
Hypothesis 6b predicted that branch-level interdependence would moderate the relationship between manager recovery and sales performance, such that branches with higher levels of interdependence would experience slower recovery. Model 7 in Table 4 shows that the variance component for manager recovery is significant (2.26 $p < .05$). However, the interaction between branch-level interdependence and manager recovery is not significant. Therefore, Hypothesis 6b is not supported. We also tested the three-way interaction between interdependence, manager recovery, and employee recovery. The effect was not statistically significant.

## Supplemental Analyses

Several additional analyses were run to consider plausible alternative explanations and to provide deeper insight into the findings. First, we chose discontinuous RCGM because the technique is flexible and fits the analytic problem well. However, the analysis is complex and less frequently used in the macro literature. In order to gain confidence in the results and demonstrate the consistency of the findings, we utilized generalized least squares (GLS) models, including a branch-level fixed effect (as defined in the GLS literature). Hausman tests were conducted (as appropriate) and were significant—a conclusion consistent with the RCGM analyses finding that intercepts vary across branches (i.e., the branch-level fixed effect is analogous to allowing the intercept to vary randomly in RCGM). GLS models do not allow us to independently model the predictors of branch-level fixed effects, but they do provide additional evidence regarding the findings. In these analyses (available upon request), we followed the same modeling steps as in our discontinuous RCGM analysis. The results are substantively similar. First, sales performance follows a statistically significant quadratic pattern. Second, employee (–4.19, $p < .05$) and

**FIGURE 3**

**Recovery Phase: Modeled Relationship Between a Turnover Event, Branch-Level Interdependence, and Branch-Level Sales Performance. The figure compares predicted sales performance for branches that experience a turnover event in month 5 (pre-turnover performance is a flat line because we are depicting only the change due to a turnover event, and change after the turnover event is shown without replacement)**



manager (–4.23, $p < .05$) turnover both disrupt branch-level sales performance. Third, the interaction between an employee and manager turnover event is negative and significant (–6.66, $p < .05$), such that branches experience a much larger decrease in sales performance when manager and employee both leave the branch. Fourth, interdependence moderates the relationship between employee recovery and sales performance, such that branches with higher levels of interdependence recover at a slower rate. The only substantive difference between the two models is in the recovery phase. In the GLS model there is a statistically significant recovery from both the employee (.33, $p <$ .05) and manager (.64, $p < .05$) turnover events (in RCGM, only employee recovery was significant), such that it takes over 12 months to recover. These results, using a different analytic technique, produce similar results and lend additional confidence to our findings (i.e., RCGM found fewer significant effects than GLS).

Second, collective turnover theory suggests that the quality of leavers could moderate the impact of a turnover event (Hausknecht & Holwerda, 2013; Nyberg & Ployhart, 2013; see also Boudreau & Berger, 1985). Based on the data captured by the organization, we were able to evaluate organizational tenure and performance ratings as separate proxies for leaver quality (employee and manager). We therefore ran additional models to examine the moderating effect of the departing employee's (or manager's) tenure or performance rating on the relationship between a turnover event and branch sales performance. Using the branch average tenure or performance ratings, we also examined whether the quality of remaining employees moderated the relationship between a turnover event and sales performance. The same procedure used to evaluate the moderation hypotheses above was used here. None of these interactions were significant, suggesting that neither the leaver's tenure or performance, nor the remaining branch employees' tenure or performance, moderates the relationship between a turnover event (employee or manager) and its impact on sales performance. However, these analyses are limited in that we could only examine organizational tenure (not job or branch tenure), the performance ratings had limited variability (as is typical in administrative ratings), and many employees or managers lacked performance ratings because they had only recently been hired. In addition, from a theoretical perspective, focusing on the quality of leavers lacks comprehensiveness without knowing the quality of replacements (Boudreau & Berger, 1985; Hausknecht & Holwerda, 2013; Nyberg & Ployhart, 2013). Unfortunately, we do not have information on characteristics of the incoming employees.

Finally, in order to understand the robustness of the moderation findings, we simultaneously tested all moderation hypotheses in a single model, using both discontinuous RCGM and GLS with branch-level fixed effects. Model 8 in Table 5 contains the results of this model using discontinuous RCGM.

**TABLE 5**
**Discontinuous Growth Model Results for Disruption and Recovery Phases Combined**

| Variable | Model 8 Coef. | *SE* |
|---|---|---|
| Fixed Effects | | |
| Level 1 Model | | |
| Intercept | 55.01* | 5.26 |
| Linear Growth | 3.34 | 0.28 |
| Quadratic Growth | –0.30* | 0.02 |
| Employee Flow | 0.20* | 0.36 |
| Employee Disruption | −2.45* | 6.58 |
| Second Turnover Event | −1.14 | 1.11 |
| Employee Recovery | 2.17* | 1.16 |
| Manager Disruption | −10.12* | 14.35 |
| Manager Recovery | 0.98 | 3.78 |
| Employee Disruption X Manager Disruption | −5.32 | 2.90 |
| Employee Recovery X Manager Recovery | 0.07 | 0.08 |
| Level 2 Model | | |
| Number of Employees | 1.17* | 0.46 |
| Interdependence | 2.12 | 1.21 |
| Interdependence X Employee Disruption | –0.48 | 1.68 |
| Interdependence X Manager Disruption | 1.64 | 3.58 |
| Interdependence X Employee Recovery | –0.44 | 0.29 |
| Interdependence X Manager Recovery | –0.14 | –0.94 |
| Random Effects (variance components) | | |
| Intercept | 123.75* | 10.76 |
| Employee Disruption | 13.97 | 12.11 |
| Manager Disruption | 18.36 | 28.21 |
| Employee Recovery | 0.21 | 0.30 |
| Manager Recovery | 1.96* | 1.18 |
| AR(1) | 0.21* | 0.02 |
| −2 Res Log Likelihood (REML) [a] | 53982.40 | |
| AIC | 53996.40 | |
| Pseudo $R^2$ | 0.05 | |

*Notes:* $n$ = 524 branches; *SE* = coefficient standard error; REML = restricted maximum likelihood. Significance values are based on Type I (sequential sums of squares) test due to the presence of interactions. The difference in log likelihoods between the model reported here and a model without random effects is statistically significant, $p < .01$.

* $p < .05$

The interactions from Hypothesis 2 and 6a are not statistically significant at the $p < .05$ level. However, the effect sizes for these interactions in Models 8, 2, and 6 differed by only .02 to .04. Thus, from a practical perspective, the effect sizes were nearly identical and the lack of statistical significance may perhaps be attributed to lower statistical power. When running a similar model using GLS with branch-level fixed effects, the interaction between employee and manager disruption were negative and significant (–7.40, $p < .05$), while the interaction between interdependence and employee recovery was negative and marginally significant (–.49, $p = .057$). Together, these findings show that the effect sizes of the interactions are similar (but not identical) across multiple analytic methodologies.

## DISCUSSION

The purpose of this study was to examine the theoretical and empirical relationship between a turnover event and branch-level performance over time. Blending collective turnover and team adaptability theories led to the development of a two-phase model of turnover that provides a more thorough temporal understanding of the impact of a turnover event on collective performance. The model also provides a framework to investigate the role of interdependence and positional distribution in determining the immediate and longer-term impact of a turnover event. The study yields several key findings. First, there is an immediate and negative change in branch performance due to a turnover event. The disruption caused by employees and managers is not redundant, but interactive. Second, after the initial drop in performance due to a turnover event, there is a recovery period where branch performance begins to gradually improve. However, the recovery rate for manager turnover is not significant, indicating that branch performance does not greatly improve in our performance window. Third, branches with higher levels of interdependence have a more difficult time recovering from an employee turnover event, but not a manager turnover event. By considering the role of time in a more substantive manner, this study provides a more complete understanding of how, why, and for how long a turnover event affects overall branch performance.

### Theoretical Implications

This study has broad theoretical implications for the turnover literature. First, the model provides a theoretical framework in which to study the branch-level impact of a turnover event across time. Hausknecht and Holwerda (2013) called for more in-depth examinations of temporal turnover processes within units, and our empirical results highlight the need for such a model in the turnover literature. When examined longitudinally, the overall impact on branch performance lasts significantly longer for branches with high levels of interdependence. In addition, a longitudinal perspective allows us to see that, in Model 1, the longitudinal impact of a manager turnover event lasts much longer than that of an employee turnover event. Time is fundamental to understanding the nature of turnover.

Second, the two-phase model can form a basis for research that explores the functionality of a turnover event across time. Several theoretical perspectives have suggested that turnover can be functional (i.e., produce a net benefit) for organizations (Abelson & Baysinger, 1984; Bowen, 1982, Dalton et al., 1982; Siebert & Zubanov, 2009). Among other reasons, turnover can be functional because replacement hires have higher levels of human capital (Nyberg & Ployhart, 2013), are better performers (Bowen, 1982; Dalton et al., 1982), or have a better fit with the organization (Abelson & Baysinger, 1984). Conversely, it is possible that some turnover events are disproportionately dysfunctional. A growing body of research (e.g., Aguinis & O'Boyle, 2014) has suggested that star employees contribute a disproportionate amount of value. If a star employee leaves, it is possible that the disruption will be larger and the recovery rate will be slower (and will limit the ability of the unit to reach pre-turnover levels of performance). The two-phase model offers a platform from which to investigate the functionality of turnover in these different cases. Future research can examine whether the functionality of turnover reduces the level of disruption (or causes it to be positive), or simply speeds up the rate of recovery.

Third, the results show that prior levels of interdependence have different effects in the disruption and recovery phases (however, see the Limitations section for some important caveats about the interdependence measure). This finding underscores the need to model the impact of turnover events across time, but it also indicates that the distinction between phases is important in understanding the way in which branch-level states and processes might moderate the trajectory of performance after a turnover event. This has important implications for the way scholars should conceptualize the linkages between other individual-level and branch-level constructs and the impact of a turnover event on collective performance. In particular, the two-phase model allows us to make more theoretically precise predictions. For example, it may be that cohesion helps diminish the performance disruption after a turnover event, while trust helps speed up the recovery rate. The ability to theorize about the impact of collective states and processes in specific phases of the model will ultimately lead to a better understanding of the theoretical antecedents and moderators of the turnover–collective performance relationship. Research by Marks et al. (2001) and studies on team adaptive performance (Burke et al., 2006; Kozlowski et al., 1999; LePine, 2003) are particularly relevant for informing this research.

Finally, the two-phase model integrates theory from collective turnover and the groups and teams literature. We believe that such integration is important because collective turnover is inherently a multilevel and dynamic process, which is exactly the kind of process studied within the groups and teams literature (e.g., Kozlowski et al., 1999; Marks et al., 2001; Van der Vegt, Bunderson, & Kuipers, 2010). Future research can draw on our model to examine other theoretical linkages between the impact of turnover and other collective-level constructs and outcomes (e.g., collective efficacy, transactive memory systems, team mental models). In particular, the team adaptability literature has primarily studied change in terms of an abrupt variation in the team's task, and has scarcely examined change from the perspective of a member leaving the team (Summers et al., 2012). More fully integrating the collective turnover literature with the groups and teams literature could therefore generate new insights into team adaptability as well. For example, does turnover affect the emergence of collective processes? Which processes are most susceptible to member turnover, and does positional distribution influence the magnitude of these effects?

## Managerial Implications

These results have several implications for managers. For example, in Model 1 (Table 3), we find that it will take 10 to 11 months to recover from an employee turnover event. Given these results, managers must understand that the impact of a turnover event on branch performance lingers for several months after the turnover event takes place (Boudreau & Berger, 1985), even after controlling for number of replacements. Managers also need to comprehend the breadth of this impact when calculating the cost of turnover and when planning for performance after a turnover event takes place. Second, managers must appreciate that turnover is a multi-level phenomenon (Nyberg & Ployhart, 2013). In order to mitigate the branch-level impact of turnover, managers must manage the individual employees and the dynamics of the branch as a whole. If branches have developed valuable branch-level collective states and processes, then managers should be aware that turnover can disrupt these resources and adversely impact performance. Third, branches with higher levels of interdependence may take longer to recover from a turnover event. Managers should be conscious of this impact and proactively work to balance interdependence (perhaps by using cross-training) so that members can fulfill multiple responsibilities. Lastly, higher-level managers should be aware that the disruption caused by branch manager and employee turnover is multiplicative. When the branch manager leaves, higher-level managers need to swiftly take action to reduce the impact of the manager turnover event. Otherwise, an employee turnover event has the potential to reduce sales performance by more than 5%.

## Limitations and Directions for Future Research

This study has a number of limitations that need to be considered when interpreting the results and implications. First, while interacting with other team members is a vital part of the branch employee's job, it is not necessarily the main determinant of performance. For example, a key part of the teller's job is processing transactions in an efficient and friendly manner. Thus, the degree of interdependence observed in this study is not as great as might be found in other occupational contexts or work flow structures (e.g., highly interactive teams such as surgery teams). To the extent that other contexts require greater coordination, our study should represent a conservative test of the moderating role of interdependence in the recovery phase (see Nyberg & Ployhart, 2013). Future research needs to consider this possibility by studying units with greater and lesser amounts of interdependence. In addition, managers coordinate action and therefore have the ability to influence the degree of interdependence. We were unable to test whether managers influence interdependence in our current sample, but we suspect that manager characteristics will influence structure and climate, which could have a direct effect on the severity and duration of a turnover event's disruption level and rate of recovery. Future research should examine turnover in conjunction with the role of manager qualities, climate, and activity within different occupational contexts.

Second, the measure of interdependence has some potentially important limitations. By design our measure of interdependence is broad and may fail to pick up nuances in the relationship between other interdependence-related constructs and their moderating effects on branch performance. However, interdependence is only one construct. Team adaptation theory and the groups and teams literature has more broadly suggested that other collective states and processes (e.g., team mental models, transactive memory systems, and collective efficacy) may play a moderating role in the relationship between a turnover event and branch-level performance over time. Our study also does not have repeated measures of interdependence. As a result, we were not able to measure the relationship between change in interdependence and change in branch performance over time. Repeated measures of branch-level interdependence would enable a stronger causal inference to be drawn about the relationship between branch-level interdependence and branch-level performance. Future research can employ a design in which interdependence and other branch-level characteristics are measured over time, using different measures of interdependence.

Third, our independent and dependent variables are measured monthly. Monthly measurement means that intra-month (or daily) impacts of a turnover event are obscured. Given that we are interested in immediate and lasting impacts of the turnover event, more fine-grained data would allow us to measure the impact more precisely relative to the turnover event. However, this is less of a concern since we still find immediate consequences of a turnover event at the monthly level. While 12 months of data provide a robust performance window, it limits our ability to see the longer-term consequences of a turnover event. However, outside of this window, branch-level sales goals are reset by the organization, which makes it difficult to add additional months. Further, our sample only has an average of five to six months of data after the initial turnover event. Because a turnover event impacts branch performance for many months, the long-term impact of a turnover event outlasts our performance window. It is possible, for example, that involuntary turnover has a positive impact on longer-term branch-level performance. In addition, one might expect that the recovery phase would occur at a positive, but decreasing, rate. We were not able to examine the potentially curvilinear shape of the recovery function given the length of the performance window. Future research should examine longer windows of performance in order to better understand the long-term effects of a turnover event and the moderating role of unit-level interdependence. Research should also examine these effects in different economic periods, as this study was conducted as the United States was recovering from the Great Recession, and hence tight labor markets may have constrained individual job choices (Steel & Lounsbury, 2009). Altogether, such research would be helpful in identifying whether the effect sizes and pseudo-$R^2$ values observed in this study are small, medium, or large.

Fourth, we tested our model in a single organization with branches that are performing similar job tasks. This design has the benefit of reducing extraneous variability; however, it does not allow us to test contextual factors (such as work system [Batt & Colvin, 2011; Siebert & Zubanov, 2009]) that might moderate the relationships being tested. Theoretically, the two-phase model should generalize to other cultures, contexts, and job tasks. However, characteristics of the job tasks and the broader cultural, organizational, or industry environment may moderate the impact of a turnover event or its relationship to interdependence. In order to fully understand the generalizability of our findings, we encourage future researchers to examine the two-phase model across different contexts. For example, organizations that experience high levels of turnover on a regular basis may develop a capability that helps them deal with the disruption created by a turnover event. As a consequence, organization or business unit-level turnover rates may moderate the level of disruption or the speed of recovery.

Fifth, the variance component for the employee recovery variable was not significant. This could be the result of low power significance tests (Lang & Bliese, 2009) or an indication that a small percentage of the overall variance in between-branch performance is driven by the employee recovery rate. Regardless, the interaction between interdependence and employee recovery rate was significant and the interaction has practical significance in this context (although recall that some of the statistical significance for Hypotheses 2 and 6a became non-significant when including all moderator terms in Model 8). Future research can examine whether context plays a role in determining how much between-unit variation is driven by recovery from a turnover event.

Sixth, future research should also examine the discontinuous nature of turnover events using other analytical approaches. We used discontinuous RCGMs because they can model the longitudinal, discontinuous, and nested nature of turnover events.

However, several statistical models and modeling choices exist for handling data of this type. These models will differ in their assumptions, statistical power, estimators, and related factors. For example, it is unclear as to the extent to which modeling random intercepts in RCGM accounts for all forms of unobserved heterogeneity, as indicated in GLS models and Hausman tests. At present, there is not much guidance on which analytical method (e.g., econometric, random coefficient, etc.) is preferable for data such as those examined in this study. Future research should consider both the substantive and methodological benefits of different analytical approaches.

Finally, our study only measures the cost side of a turnover event using a percent to goal metric. CET theory and theory on turnover valuation focuses on the net difference between leaver and rehire performance (or utility [e.g., Boudreau & Berger, 1985]). Given our data limitations, we were not able to capture the net difference in leaver and stayer quality. Therefore, the current study was not able to test a key component of CET theory. In addition, our lack of replacement information (e.g., quality or salary) and a percent to goal metric keeps us from demonstrating the net financial impact of a turnover event (Boudreau & Berger, 1985). However, our model, along with recent theory (Hausknecht & Holwerda, 2013; Nyberg & Ployhart, 2013), suggests that turnover has financial consequences that are incremental to the change in individual-level utility. Unit-level interdependence (Nyberg & Ployhart, 2013) and the nature of other turnover events (manager vs. non-manager [Hausknecht & Holwerda, 2013]) contribute to the consequences of a turnover event. Future research can better articulate the full cost of a turnover event in a way that captures these recent theoretical insights and provides managers with a more comprehensive valuation of individual-level turnover events.

## CONCLUSION

This study blended collective turnover and team adaptation theories to develop a two-phase model of the effect of an individual turnover event on collective performance. We further expected that the amount of interdependence and positional distribution (manager or employee) would influence the turnover event effects. These hypotheses were empirically tested within 524 branches across 12 months. Summarizing across all analyses, an individual turnover event disrupts the performance of the collective, and this disruption is greatest when both a manger and an employee leave. Greater interdependence within a branch also slows the recovery rate from an employee turnover event. Together, these findings suggest that future research needs to move beyond broad collective turnover rates, and the literature on team adaptability offers many insights that can be better leveraged to understand turnover's collective consequences.

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## APPENDIX A

## ANALYTICAL MODELS

The hypotheses were tested across several models according to standard practice (Bliese & Ployhart, 2002). The first set of analyses examined a baseline model including all hypothesized main effects and control variables. Model 1 (Table 3) includes parameters for linear (Time) and quadratic ($Time^2$) growth and the controls for branch size, employee flow, interdependence, and a second turnover event. The equation for Model 1 is represented below ($t$ = time period; $i$ = branch; $b_4$ tests Hypothesis 1a; $b_7$ tests Hypothesis 1b; $b_6$ tests Hypothesis 4a; $b_8$ tests Hypothesis 4b):

Level 1

$$\begin{aligned} Y_{ti} = b_{0i} &+ b_1 Time_{ti} + b_2 Time^2_{ti} \\ &+ b_3 Employee\ Flow_{ti} \\ &+ b_4 Employee\ Disruption_{ti} \\ &+ b_5 2nd\ Turnover\ Event_{ti} \\ &+ b_6 Employee\ Recovery_{ti} \\ &+ b_7 Manager\ Disruption_{ti} \\ &+ b_8 Manager\ Recovery_{ti} + e_{ti} \end{aligned}$$

Level 2

$$\begin{aligned} b_{0i} = \gamma_{00} &+ \gamma_{01} Number\ of\ Employees_i \\ &+ \gamma_{02} Interdependence_i + u_{0i} \end{aligned}$$

In the baseline Model 1, all Level 1 effects except the intercept are fixed. In contrast to econometric models, the terms "fixed" and "random" are used differently in RCGM. In the present case, a *fixed effect* means that the parameter estimates are constant across branches. A *random effect* means that the parameter estimates vary across branches. In the baseline Model 1, the intercept is operationalized as a random effect, meaning that intercept values vary across branches. This is why the variance of the intercept exists in the Level 2 (between-branch) part of the model, and variance in intercepts is estimated by a variance component ($u_{0i}$). Because the Time and $Time^2$ terms are operationalized as polynomials, the intercept refers to average sales at the first time period (conditioned on other terms in the model). A random intercept means the average level of starting sales performance differs between branches. The differences between branch intercepts capture the endogenous characteristics of branches that make them either "high performing" or "low performing" on average. The branch-level difference in intercepts is similar to a branch-level "fixed effect" found in other analytic methods such as GLS (it is unfortunate that the terms "random effect" and "fixed effect" hold almost opposite meanings between RCGM and econometric models. This often creates confusion; here we use the terms from the perspective of RCGM unless otherwise noted). When estimating the RCGM models, we also account for the nested structure of the data by including an autoregressive (AR[1]) residual correlation structure. The AR(1) structure captures the within-branch correlation between performance in subsequent periods.

The second set of analyses examine the hypothesized moderators in the disruption phase. In order to evaluate the effects of the employee and manager disruption, we created independent models for each hypothesized relationship. Model 2 (Table 3) includes the interaction between employee and manager disruption and is represented by the following equations ($b_9$ test Hypothesis 2):

Level 1

$$\begin{aligned} Y_{ti} = b_{0i} &+ b_1 Time_{ti} + b_2 Time^2_{ti} \\ &+ b_3 Employee\ Flow_{ti} \\ &+ b_4 Employee\ Disruption_{ti} \\ &+ b_5 2nd\ Turnover\ Event_{ti} \\ &+ b_6 Employee\ Recovery_{ti} \\ &+ b_7 Manager\ Disruption_{ti} \\ &+ b_8 Manager\ Recovery_{ti} \\ &+ b_9 Employee\ Disruption_{ti\ X} Manager\ Disruption_{ti} + e_{ti} \end{aligned}$$

Level 2

$$\begin{aligned} b_{0i} = \gamma_{00} &+ \gamma_{01} Number\ of\ Employees_i \\ &+ \gamma_{02} Interdependence_i + u_{0i} \end{aligned}$$

Model 3 (Table 3) includes the interaction between employee disruption and interdependence. Note that because interactions with interdependence represent cross-level interactions (Aguinis, Gottfredson, & Culpepper, 2013), the variance component for employee disruption is modeled in the Level 2 equation (we also include manager disruption, as it will be used in the subsequent model). The random terms for employee and manager disruption allow the within-branch disruption to vary depending on between-branch characteristics. Model 3 is shown below ($\gamma_{41}$ tests Hypothesis 3a):

Level 1

$$\begin{aligned} Y_{ti} = b_{0i} &+ b_1 Time_{ti} + b_2 Time^2_{ti} \\ &+ b_3 Employee\ Flow_{ti} \\ &+ b_{4i} Employee\ Disruption_{ti} \\ &+ b_5 2nd\ Turnover\ Event_{ti} \\ &+ b_6 Employee\ Recovery_{ti} \\ &+ b_{7i} Manager\ Disruption_{ti} \\ &+ b_8 Manager\ Recovery_{ti} + e_{ti} \end{aligned}$$

Level 2

$$b_{0i} = \gamma_{00} + \gamma_{01} Number\ of\ Employees_i + \gamma_{02} Interdependence_i + u_{0i}$$
$$b_{4i} = \gamma_{40} + \gamma_{41} Interdependence_i + u_{4i}$$
$$b_{7i} = \gamma_{70} + u_{7i}$$

Model 4 (Table 3) includes the interaction between manager disruption and interdependence and is represented by the following equations ($\gamma_{71}$ tests Hypothesis 3b):

Level 1

$$Y_{ti} = b_{0i} + b_1 Time_{ti} + b_2 Time_{ti}^2 + b_3 Employee\ Flow_{ti} + b_{4i} Employee\ Disruption_{ti} + b_5 2nd\ Turnover\ Event_{ti} + b_6 Employee\ Recovery_{ti} + b_{7i} Manager\ Disruption_{ti} + b_8 Manager\ Recovery_{ti} + e_{ti}$$

Level 2

$$b_{0i} = \gamma_{00} + \gamma_{01} Number\ of\ Employees_i + \gamma_{02} Interdependence_i + u_{0i}$$
$$b_{4i} = \gamma_{40} + u_{4i}$$
$$b_{7i} = \gamma_{70} + \gamma_{71} Interdependence_i + u_{7i}$$

The next set of analyses examine the hypothesized moderators of the employee and manager recovery phases. To evaluate the moderators of employee and manager recovery, we created independent models for each hypothesized relationship and included random terms for employee and manager recovery. The random terms for employee and manager recovery allow the rate of within-branch recovery (Level 1) to vary depending on between-branch characteristics (Level 2). However, Model 5 (Table 4) first examines only the within-branch interaction between employee and manager recovery ($b_9$ tests Hypothesis 5):

Level 1

$$Y_{ti} = b_{0i} + b_1 Time_{ti} + b_2 Time_{ti}^2 + b_3 Employee\ Flow_{ti} + b_4 Employee\ Disruption_{ti} + b_5 2nd\ Turnover\ Event_{ti} + b_6 Employee\ Recovery_{ti} + b_7 Manager\ Disruption_{ti} + b_8 Manager\ Recovery_{ti} + b_9 Manager\ Recovery_{ti}\ x\ Employee\ Recovery_{ti} + e_{ti}$$

Level 2

$$b_{0i} = \gamma_{00} + \gamma_{01} Number\ of\ Employees_i + \gamma_{02} Interdependence_i + u_{0i}$$

Model 6 (Table 4) includes the cross-level interaction between employee recovery and interdependence ($\gamma_{61}$ tests Hypothesis 6a):

Level 1

$$Y_{ti} = b_{0i} + b_1 Time_{ti} + b_2 Time_{ti}^2 + b_3 Employee\ Flow_{ti} + b_4 Employee\ Disruption_{ti} + b_5 2nd\ Turnover\ Event_{ti} + b_{6i} Employee\ Recovery_{ti} + b_7 Manager\ Disruption_{ti} + b_{8i} Manager\ Recovery_{ti} + e_{ti}$$

Level 2

$$b_{0i} = \gamma_{00} + \gamma_{01} Number\ of\ Employees_i + \gamma_{02} Interdependence_i + u_{0i}$$
$$b_{6i} = \gamma_{60} + \gamma_{61} Interdependence_i + u_{6i}$$
$$b_{8i} = \gamma_{80} + u_{8i}$$

Model 7 (Table 4) includes the cross-level interaction between manager recovery and interdependence and is represented by the following equations ($\gamma_{81}$ tests Hypothesis 6b):

Level 1

$$Y_{ti} = b_{0i} + b_1 Time_{ti} + b_2 Time_{ti}^2 + b_3 Employee\ Flow_{ti} + b_4 Employee\ Disruption_{ti} + b_5 2nd\ Turnover\ Event_{ti} + b_{6i} Employee\ Recovery_{ti} + b_7 Manager\ Disruption_{ti} + b_{8i} Manager\ Recovery_{ti} + e_{ti}$$

Level 2

$$b_{0i} = \gamma_{00} + \gamma_{01} Number\ of\ Employees_i + \gamma_{02} Interdependence_i + u_{0i}$$
$$b_{6i} = \gamma_{60} + u_{6i}$$
$$b_{8i} = \gamma_{80} + \gamma_{81} Interdependence_i + u_{8i}$$