Research on organizational learning suggests that organizational behavior is guided both by routines that stem from experience (Nelson & Winter, 1982) and by performance feedback (Greve, 2003). Routines arise from the experience dedicated to a particular task. Greater experience with a specific routine provides opportunities to refine the routine and increases the probability of the routine being used. Underlying this perspective is the assumption that the learning process is largely independent of the performance outcomes of prior experiences (Levitt & March, 1988; Nelson & Winter, 1982). On the other hand, the view that learning stems from performance feedback, which is grounded in the Carnegie school of thought (e.g., Cyert & March, 1963), emphasizes the role of the performance outcomes of prior actions and suggests that these outcomes determine a firm’s future behavior (Greve, 2003).

Recent empirical research on organizational learning has significantly improved scholars’ understanding of the distinct effects of these two sources of organizational learning (e.g., Baum, Li, & Usher, 2000; Greve, 1998; Haunschild & Beckman, 1998; Ingram & Baum, 1997). However, although some theoretical work in the learning tradition has implied that these two sources of learning work together to influence firm behavior (Levitt & March, 1988), their combined effect has rarely been examined in an empirical setting. Further, no theoretical arguments have been proposed to guide research on how experience and performance feedback interact to impact learning outcomes. Our study addresses these important gaps in the organizational learning literature by investigating how experience, performance feedback, and their interaction affect firm behavior.

We examine these two forms of learning within the context of corporate acquisitions. A few acquisition studies have documented the effects of routines and have shown that prior acquisition experience affects subsequent acquisition behavior (Amburgey & Miner, 1992; Baum et al., 2000). However, the influence of prior acquisition performance on a firm’s future acquisition behavior is yet to be explored, and so understanding of whether firms modify their acquisition behaviors on the basis of performance feedback is limited. In addition, researchers do not know whether these two sources of influence—routines and feedback—interact to explain firm acquisition behaviors. To address these gaps in the acquisition literature, we distinguish here between the effects of acquisition experience and performance feedback and explicate the theoretical bases for their interaction in an attempt to understand the variance in acquisition behavior. We tested our research questions using longitudinal data (from the period 1988–2001) in a sample of...
acquisitions from the U.S. commercial banking industry.

**THEORY AND HYPOTHESES**

The Effect of Acquisition Experience on Acquisition Behavior

A central concept in behavioral learning theory is the organizational routine that arises from organizational experience (Levitt & March, 1988). Routines are programs of action that reflect the prior experience of an organization with a particular task (Nelson & Winter, 1982). Once routines are established through experience, they are subject to inertial pressures (e.g., Szulanski, 1996). The organizational literature offers ample evidence that the more experienced an organization’s members become with a particular strategic action or direction, the more likely they are to repeat it (e.g., Amburgey, Kelly, & Barnett, 1993; Gulati, 1995; Shaver, Mitchell, & Yeung, 1997). Routines can become a source of competitive advantage and often play a crucial role in the formulation of a firm’s strategic choices by supplementing, or even substituting for, calculative, formal strategic decision-making rules (March, 1999). As a firm accumulates experience in a certain organizational routine, it may gain competence and expertise in that routine. However, even as these acquired capabilities make the firm proficient in performing a particular task, they may also lead it to overestimate its chances of future success in that domain and to focus on exploiting existing capabilities instead of exploring new ones (March, 1991).

Persistence appears to be a pervasive force in organizations. Miller and Friesen (1980, 1982) argued that past practices and strategies tend to keep evolving in the same direction, perhaps eventually reaching dysfunctional extremes, a phenomenon they described as strategic momentum. Kelley and Amburgey (1991), in their study of the airline industry, found that firms that experienced strategic changes of a particular type were more likely to continue making changes of the same type. They argued that although prior models had focused on the effects of organizational size, age, and complexity on organizational inertia (Hannan & Freeman, 1984), a more complete understanding of persistence would require an examination of an organization’s history of experience. In the context of acquisitions, Amburgey and Miner (1992) reported results consistent with the strategic momentum argument. Specifically, they reported that acquirers that made acquisitions of a particular type were more likely to subsequently make the same type of acquisition. Similarly, Baum and his coauthors (2000) found that Canadian nursing home chains tended to acquire targets similar to those of their prior acquisitions, providing evidence that prior experience is an important predictor of future acquisition behaviors.

Research in organizational learning implies that once a firm has accumulated experience in a strategic action, not only favorable outcomes, but also unfavorable consequences of the action will increase the likelihood that the action will be repeated (Amburgey & Miner, 1992; March, 1981). Decision makers may not interpret poor performance as evidence that their strategies were inappropriate or fundamentally flawed, but rather may attribute it to poor execution of otherwise healthy strategies or to factors external to the strategies. In summary, acquisition experience will lead to the development of routines associated with making acquisitions, such as templates for selecting and evaluating targets or guidelines for postacquisition integration. That is, an acquisition routine, once in place, may gain a life of its own and persist regardless of the performance outcomes of prior acquisitions (Levitt & March, 1988), consequently increasing the likelihood of the acquirer making another acquisition. In view of these arguments, we propose the following hypothesis:

*Hypothesis 1. The greater an acquirer's acquisition experience, the higher the likelihood of the acquirer making a subsequent acquisition.*

The Effect of Recent Acquisition Performance on Acquisition Behavior

The behavioral theory of the firm provides a useful framework for understanding the effects of prior acquisition performance on future acquisition behavior. Surprisingly, this perspective, according to which firms exhibit adaptive behavior over time (Cyert & March, 1963: 123), has not yet been applied in the acquisition context. More specifically, firms are thought to demonstrate differing responses to good and bad performance outcomes (March, 1981): strong performance increases a firm’s likelihood of persisting in prior strategic actions (Miller & Chen, 1994), while poor performance increases the likelihood of strategic change and promotes exploration of new strategies (Boeker, 1989). From this viewpoint, it is insufficient to examine only the effects of the existence of prior acquisition experience, because the performance feedback from prior acquisitions should also have an impact on future acquisition behaviors (Levitt & March, 1988).
Prior work on corporate acquisition has generally treated acquisition performance as an outcome variable (King, Dalton, Daily, & Covin, 2003) and has examined the effects of firm, deal, and industry characteristics on acquisition outcomes (e.g., Bergh, 1997; Bergh & Lawless, 1998; Capron & Pistre, 2002; Chatterjee, Harrison, & Bergh, 2003; Ramaswamy, 1997). However, in this study, we conceptualized acquisition performance as an antecedent rather than an outcome variable and studied the influence of prior acquisition performance on future acquisition behavior.

In contrast to a learning perspective that emphasizes the development and execution of routines, a performance feedback approach to learning focuses more on the outcomes of prior behaviors and their influence on future behaviors. Specifically, poor performance can drive managers toward strategic change. Managers who detect poor performance will try to reevaluate their current strategies to identify what went wrong, and they will engage in “problemistic” search in an attempt to find an alternative strategy that might improve performance. In contrast, given initial success with an activity, an organization is likely to repeat the activity because it has learned skills and capabilities associated with it and finds it less risky and more rewarding to repeat it than to try alternatives with which organizational experience is limited (Levitt & March, 1988). The successful execution of a strategic action is a source of self-assurance that makes firms become more confident that they have the capabilities and knowledge required to be successful in a specific strategic domain. Thus, strong performance decreases the intensity of search and experimentation and promotes the persistent exploitation of strategies that have proven successful (Greve, 2003).

In keeping with the behavioral theory of the firm, empirical studies in the strategic change literature have shown that firms do react to past performance feedback and that they are more likely to respond with strategic change when firm performance is poor (Rajagopalan & Spreitzer, 1997). In contrast, strong performance leads to organizational persistence by inducing firms to believe they have gotten it right—that is, it makes organizations resistant to change in their strategies and routines (Miller & Friesen, 1984; Tushman & Romanelli, 1985). In support of these behavioral theory assertions, various firm contexts have demonstrated that strong performance is associated with organizational persistence (e.g., Audia, Locke, & Smith, 2000; Greve, 1998; Miller & Chen, 1994), but poor performance is related to many forms of organizational change, including CEO turnover (e.g., Denis & Denis, 1995; Puffer & Weintrop, 1991), strategic change (e.g., Boeker, 1989), and divestitures (e.g., Duhaime & Grant, 1984; Hamilton & Chow, 1993; Kaplan & Wiesbach, 1992; Ravenscraft & Scherer, 1987; Taylor, 1988).

We propose that the theoretical arguments and evidence on performance feedback developed in the broader strategic change literature are also applicable to the acquisition context. Firms that have done well with recent acquisitions interpret this as positive feedback and an endorsement of the appropriateness of their strategic choice. This reinforcement, in turn, increases the likelihood that they will persist and repeat the same behavior—that is, make more acquisitions. In contrast, firms that received negative feedback, as manifested in poor performance following prior acquisitions, are less likely to choose acquisition as a future strategic choice.

Learning from performance feedback requires a meaningful evaluation of the performance of prior acquisitions. Such an evaluation is a difficult task because varying performance levels of prior acquisitions may provide mixed signals to managers of an acquiring firm. Acquisitions are complex events in which the causal relationship between performance and the factors contributing to that performance is often ambiguous. Hence, assessing the pattern of performance of multiple prior acquisitions presents a cognitive challenge to managers. Behavioral researchers have suggested that under such conditions decision makers depend heavily upon the most recent information to reduce their cognitive burdens and simplify information processing (Hogarth & Einhorn, 1992; Steiner & Rain, 1989). The reliance on the most recent performance feedback may increase when the changes in the business environment diminish the validity of inferences drawn from past performance feedback (Argote, 1999; March, 1999).

Taking the above arguments together, we propose that performance feedback from a firm’s most recent acquisition (referred to as the focal acquisition) will influence the likelihood of the firm’s making a subsequent acquisition:

Hypothesis 2. The stronger the performance of an acquirer’s focal acquisition, the higher the likelihood of the acquirer making a subsequent acquisition.

The Effect of the Interaction between Acquisition Experience and Performance on Acquisition Behavior

In our first two research hypotheses we identified two distinct mechanisms—routines and per-
formance feedback—that may independently affect the future acquisition behavior of firms. In this section, we propose that these two distinct sources of learning may interact to produce effects that explain further variance in acquisition behavior.

Although greater acquisition experience provides opportunities to refine existing routines associated with making acquisitions, these routines may be challenged when performance feedback signals decision makers that it may be undesirable to persist with current routines (Baum et al., 2000). Poor acquisition performance may eventually lead to the decay of an acquisition routine, suggesting that performance feedback can either reinforce or weaken the effects of routines in driving subsequent acquisition behaviors. Hence, we argue that the positive effect of acquisition experience on the likelihood of making future acquisitions will be even more pronounced when it is accompanied by stronger acquisition performance.

The combined effect of routines and performance feedback is also consistent with the theoretical idea of a competency multiplier. Specifically, success with a particular routine reinforces the experiential lessons learned from using the routine, which increases the likelihood of further adoption of the routine (March, 1981). In the acquisition context, a firm may develop an acquisition routine as it accumulates experience. Greater acquisition experience may make the firm a better acquirer by providing opportunities to refine its existing routines and develop more competencies in acquisition, encouraging it to further exploit those routines in the future. For several reasons, the effects of routines will be reinforced when acquirers receive strong performance feedback from their recent acquisitions. First, the positive performance feedback obtained from recent acquisitions signifies the effectiveness of their existing routines. Second, it validates their assumption that they have developed competencies required to successfully execute routines associated with acquisitions. Finally, it elevates the confidence of decision makers in making further acquisitions.

By contrast, poor acquisition performance may challenge the appropriateness of an existing acquisition-related routine and signal managers that their current routine may require major modifications to be effective, which can lead them to review their acquisition programs. It may also erode the legitimacy of the acquisition routine as a valid strategic choice and discount the perceived effectiveness of experiential lessons embedded in it. Thus, performance feedback will moderate the effects of routines in such a way that strong performance reinforces the effects of routine-based persistence and poor performance dampens the effects of routine-based persistence. Taken together, these arguments lead to our (final) interaction hypothesis:

Hypothesis 3. The positive effect of acquisition experience on the likelihood of an acquirer’s making a subsequent acquisition will be stronger at higher levels of focal acquisition performance.

METHODS

Research Setting

We investigated our research questions in the context of the U.S. commercial banking industry during the period between January 1, 1988, and December 31, 2001. We collected data on all of the acquisitions made by all publicly traded banks and bank holding companies that reported to the Federal Reserve Board (FRB) during this period, but we limited our sample to the whole-bank acquisitions that did not receive government assistance. Whole bank acquisitions were defined as those in which the acquiring bank assumed complete ownership of the target bank. We excluded purchases of only the partial assets of other banks, such as individual branches or loans, because such transactions do not result in a change in the ownership of the target banks, and they generally represent a routine management practice rather than an important strategic event that may have a significant impact upon future firm behavior and market valuation. Among the whole bank acquisitions that were announced during the study period, 232 deals were terminated prematurely without being completed and thus were dropped from the sample. The final sample used in the study tracked 2,523 completed, whole bank acquisitions made by 579 publicly traded banks and bank holding companies.

1 Government-assisted acquisitions refer to acquisitions in which a failing bank is merged with another bank with financial assistance from a regulatory agency such as the Federal Deposit Insurance Corporation (FDIC). Such acquisitions were excluded from the sample because they do not represent voluntary strategic actions. We also limited our sample to stand-alone independent banks; no sell-offs were included in our sample.

2 Each of the 579 banks entered the sample at a different time, depending upon when it made its first acquisition after the beginning of the study period (January 1, 1988). Each bank could also have exited from the sample before the end of the study period (December 31, 2001) if it failed or was acquired by another bank. Hence, the total...
Data on acquisitions were collected from the M&A module of the SNL Financial database. Data on acquisition performance were measured with abnormal returns around the announcement date and were calculated from data drawn from the Center for Research in Securities Pricing (CRSP). Finally, demographic and financial data on banks in the sample were obtained from the regulatory banking data maintained by the FRB.

The empirical models built on these large-scale archival data could provide systematic evidence on the hypothesized causal relationships as well as findings with greater generalizability, but we discerned that they might not be able to fully capture the fine-grained, intermediate processes that contribute to the relationships and other context-specific boundary conditions. We therefore conducted continuous, iterative exploratory qualitative data collection to inform and systematize our theories and empirical models (Eisenhardt, 1989; Strauss & Corbin, 1998). We conducted a series of exploratory semistructured interviews with bank managers and executives at eight major commercial banking institutions that had made at least one acquisition during our study period and six industry experts who worked for major government agencies. Because our study was deductive, these qualitative insights were not used to develop theories. Rather, we used these insights to (1) close potential gaps between our theories and empirical models, (2) check the validity of assumptions embedded in our empirical models, (3) incorporate industry-specific boundary conditions or shared assumptions into our study, and (4) help interpret our findings.

Our empirical setting was particularly appropriate for exploring our research questions for several reasons. First, because our sample was drawn from a single industry, we were able to control for many industry-specific, exogenous factors (e.g., socioeconomic and technological conditions). Second, the series of regulatory changes implemented during the 1980s altered the competitive landscape in the U.S. commercial banking industry. In particular, the Garns–St. Germain Deposit Institutions Act of 1982 (GDIA) and the Competitive Equality Banking Act of 1987 (CEBA) reshaped the acquisition landscape by relaxing the regulations that limited interstate bank acquisitions. These regulatory changes not only opened the door for interstate acquisitions and promoted significant changes in acquisition practices but also resulted in an explosion of acquisitions in the banking industry. This naturally occurring experimental setting was particularly valuable to our study design because such discontinuity can alleviate potential biases that could be introduced by studying only a partial history of an industry.

Independent Variables

Acquisition experience. The benefits of prior experience may not increase monotonically with the amount of experience that an organization accumulates because old experience becomes less useful over time (Argote, 1999; Barnett, Greve, & Park, 1994; Hayward, 2002). The regulatory changes of the 1980s changed how acquisitions were understood and performed in the banking industry. Our qualitative data suggested that the regulatory changes forced banks to review their existing acquisition strategies, to modify their templates for making acquisitions, and to search for new practices. Because those regulatory changes marked significant shifts in the industry, a bank’s acquisition experience before the changes might not represent viable resources for future learning. Such experience might even have led banks to adopt outdated routines and harm their performance by encouraging them to replicate strategies that worked well under different circumstances (Barney & Hesterley, 1996). Following prior studies that have examined acquisition experience (Haunschild, 1993; Hayward, 2002), we measured acquisition experience as the total number of prior acquisitions that an institution in our sample made between 1988, the year following the last major regulatory change (CEBA) that had significant impact upon bank acquisition strategies, and the year of a focal acquisition.

Focal acquisition performance. The short-term importance of an event like an acquisition can be assessed by the price change in the acquirer’s security during a period surrounding the event; this price change is calculated as the difference between the observed and the predicted, or normal, return for the same security. Hence, the short-term impact of an event is measured by the part of the return that is unanticipated by an economic model of anticipated, normal returns. We measured focal acquisition performance using abnormal returns.

To do this, we used an improved measure of abnormal returns developed specifically for firms in the banking industry. Rather than comparing the return for a security of a firm in our sample with the number of spells in the data set (6,714) is smaller than the number of spells that would have been obtained if all banks had entered and exited the sample at the same time.
return on a general market index, we observed the return for a given bank’s security and predicted the normal return for the same security by assessing the performance of only other firms in banking. This refinement allowed for an industry-specific abnormal return, which eliminated extraneous noise that might have been brought in from firms outside the industry. Specifically, we assessed returns of a security against the return of a banking industry portfolio, using the following formula:

\[ E = R_{it} - (\alpha_i + \beta_i R_{mt}) \]

where \( E \) is the event, \( R_{it} \) is the return on stock \( i \) for day \( t \); \( R_{mt} \) is the return on the banking industry portfolio for day \( t \); \( \alpha_i \) is a constant; and \( \beta_i \) is the beta of stock \( i \).

To determine the influence of an event on a firm, we averaged abnormal returns over an event window beginning 5 trading days before and ending 15 trading days after the announcement of an acquisition event (–5, +15); a window of this duration is commonly used for measuring the performance of bank acquisitions (Hannan & Wolken, 1989; Rhoades, 1994). The mean cumulative abnormal return (CAR) was –0.01, and of the 2,523 acquisitions in the sample, 1,410 (56%) had negative CARs, and 1,113 (44%) had positive CARs. Our qualitative study also suggested that a medium-term event window (> 10 days) was preferable to a shorter event window in the banking industry because the market reaction to an acquisition announcement might not be initiated until regulatory concerns associated with the announcement were cleared.

Ex ante measures of acquirer abnormal returns have been found to be correlated with ex post measures of acquisition performance, demonstrating that event study methodology has predictive validity. In the finance literature, Healy, Palepu, and Ruback (1992) found a strong, positive relationship between abnormal stock returns at merger announcements and postmerger increases in operating cash flows. Kaplan and Weisbach (1992) also found that unsuccessful divestitures, as compared with successful ones, were associated with significantly lower acquirer returns at an acquisition announcement, suggesting that markets may reasonably forecast subsequent acquisition performance. In the strategy literature, Sirower (1997) found that acquirer returns at the time of an acquisition announcement were representative of long-term performance. Thus, extant evidence on event study methodology’s predictive validity is consistent with our assumption that abnormal returns are valid indicators of acquisition performance.

Although other strategic management studies have used accounting-based measures of acquisition performance such as return on assets (e.g., Ramaswamy, 1997), there were several reasons to believe that CAR was a more appropriate performance measure for our sample of aggressive acquirers in the banking industry during the study period (1988–2001). First, the effects of an acquisition are not immediately reflected in the financial statements of an acquirer because it usually takes six months to three years before the acquirer realizes the effects (Rhoades, 1994). During this period, many confounding factors, such as changes in product mix, investment strategy, and management, as well as execution of additional acquisitions, may affect firm performance. Hence, although event study methodology allowed us to distinguish among the performance effects of individual acquisitions made in close temporal proximity, accounting data would not have done so. Second, firms often acquire other firms for nonfinancial reasons. For example, banks increasingly engage in interstate acquisitions to expand their geographic scope. Such acquisitions often undermine acquirers’ financial performance by increasing operating costs, and thus may be considered failures from an accounting standpoint, but they are not failures if the acquirers achieve their strategic objectives. Finally, performance measures based on accounting measures could have been misleading because accounting procedures are not uniform across firms (Bentson, 1985). In keeping with these arguments, our systematic review of the empirical acquisition literature indicated that event study methodology (and, hence, cumulative abnormal returns) has been the most frequently used analytical approach for measuring acquisition performance (e.g., Capron & Pistre, 2002; Finkelstein & Haleblian, 2002; King et al., 2003; Rhoades, 1994).
Control Variables

Because we studied horizontal acquisitions within a single industry, our sampling strategy allowed us to control for both relatedness and industry effects. We also incorporated a series of control variables to rule out confounding factors related to an acquirer’s propensity to make future acquisitions. All the control variables except for deal characteristics were time-varying covariates that corresponded to each time period in which acquirers were at risk of making an acquisition. Because deal characteristics reflected the characteristics of each focal acquisition, they were measured at the time of the focal acquisition.

*Acquirer characteristics.* We included four control variables designed to capture acquirer characteristics that might influence an acquirer’s propensity to make acquisitions. Firm size tends to influence strategic choices in such a way that larger firms are subject to stronger inertial forces and thus are more likely to repeat their prior actions (Hannan & Freeman, 1989). Thus, we controlled for *acquirer size*, which was measured as the logarithm of an acquirer’s total assets. Prior research has suggested that a firm’s slack resources promote risk taking within the firm by encouraging managers to make potentially risky strategic moves such as acquisitions (Lang, Stulz, & Walkling, 1991), which implies that organizational slack may be positively related to the propensity to make acquisitions. Accordingly, we controlled for *acquirer slack resources*, which was measured as the ratio of an acquirer’s cash on hand that was not being used for operations to the total assets of the acquirer. We also controlled for *acquirer firm performance*, measuring it as the acquirer’s return on assets, because strong financial performance could encourage managers to pursue an aggressive acquisition strategy. Finally, we controlled for *acquirer financing capability*, measured as total interest expenses divided by average interest-bearing liabilities, because banks with a better financing capability are more likely to make acquisitions than those with a lower financing capability.

*Deal characteristics.* We used a set of three variables to control for the characteristics of each focal acquisition that might affect *future* acquisition likelihood. Prior studies have provided ample evidence that the relative sizes of a target and an acquirer affect acquisition outcomes (e.g., Asquith, Bruner, & Mullins, 1983). This ratio, called the relative size of a focal acquisition, may also influence the acquirer’s future acquisition likelihood by altering its perception of the importance of the acquisition and its interpretation of the performance and the experience associated with the focal acquisition. For example, because a larger acquisition may be perceived as a more important event than a smaller acquisition, successful completion of a large acquisition may raise the acquirer’s confidence more than a similar outcome obtained from a smaller acquisition—consequently, further promoting future acquisitions. Accordingly, we controlled for *relative acquisition size*, which was measured as the ratio of the target’s total assets to the acquirer’s total assets in a focal acquisition. The type of consideration offered in an acquisition has been found to influence acquisition outcomes (Datta, Narayanan, & Pinches, 1992). For example, postacquisition returns to an acquirer may decrease with the fraction of the premium paid in the acquirer’s stock because stock offers may send a signal that an acquiring firm’s management feels its stock is overvalued. Thus, the type of consideration implicitly indicates the acquirer’s performance in the financial market, which may influence its propensity for making future acquisitions. We controlled for *stock consideration*, which was measured as the percentage of the acquirer’s common stock paid for the equity of the target in a focal acquisition. The presence of a lock-up agreement, a legally binding contract that prohibits insiders from a firm from selling any share of stock for a specified period of time, may influence firms to make more acquisitions because the insiders may seek an alternative way to use the locked-up stocks. *Lock-up agreement* was coded 1 for a focal acquisition that was completed with a lock-up agreement, and 0 otherwise.

*Industry conditions.* The industry conditions at the time of a focal acquisition might affect acquisition behaviors and outcomes (Bergh, 1997), in that they could determine the attractiveness of acquisitions as strategic choices. Hence, as have the authors of prior work (e.g., Greve & Taylor, 2000; Haveman, 1992), we included three industry factors that could affect our dependent variable. *Industry revenue*, defined as the total amount of revenue of all banks during each year, was included to control for the effects of overall industry revenue changes over time. The intensity of acquisition activities in an industry is likely to affect the acquisition behavior of individual firms in the industry because firms frequently attempt to replicate popular strategic actions (Haunschild & Miner, 1997). Industry-level acquisition activities also have significant implications for the availability of viable

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6 Interest-bearing liabilities were calculated as the sum of deposits, federal funds purchased and repossessed, commercial paper, mortgage debt, subdebt, and other borrowed money.
targets within the market in which a focal bank operates. We controlled for the level of industry-level acquisition activities with industry acquisition density and industry total acquisition value, which were respectively measured as the total number of acquisitions and the sum of the total deal value of all the acquisitions in the market area in which a focal acquisition was made.\(^7\)

**Prior acquisition experience.** Banks’ acquisition experience prior to our study period might have some impact on the knowledge of institutions in our sample, although the series of regulatory changes that occurred during the 1980s could have made a substantial portion of such knowledge obsolete. Beginning in 1978, some state legislatures began to enact laws that allowed out-of-state bank holding companies to control banks within their states and thus opened the door for interstate bank acquisitions (Kane, 1996). We collected prior acquisition experience data from this point forward because the erosion of geographic restriction in bank acquisition had substantially changed the meaning of acquisition experience in the industry. Hence, we controlled for prior acquisition experience, 1978–87, measured as the total number of acquisitions that each institution in the sample made from 1978 to 1987.

**Analysis**

Our dependent variable, the likelihood of making a subsequent acquisition, was estimated as the hazard of a bank in the sample making a subsequent acquisition after a focal acquisition. A crucial issue in modeling the hazard rate of organizational events is selecting an appropriate functional specification for the duration dependence of an event’s occurrence. Our theoretical arguments required models that allowed for the effects of acquisition experience and focal acquisition performance to vary with the characteristics of firms that were at risk of making subsequent acquisitions, because the time-varying nature of firm-specific characteristics may affect the interpretation of acquisition experience and performance. Hence, we used the piecewise exponential model, which splits the time axis into predefined time segments and permits the hazard rate to vary in an unconstrained way across time periods (Blossfeld & Rohwer, 1995). This approach provides a flexible estimation of duration dependence and offers a clear understanding of how duration affects acquisition patterns.

Our qualitative interviews with bank executives indicated that serial acquirers often make many acquisitions within a three-to-four-year time frame that is followed by an extended period with no acquisition activity. Hence, we divided duration into four-year time periods. Given \( k \) time periods \((l_1 = [t_1 \leq t \leq t_1 + 1], l = 1 \ldots k)\), the hazard rate of the piecewise exponential model we estimated can be represented as:

\[
r(t) = \exp(\alpha_l + \beta \chi) \text{ if } t \in l,
\]

where \( \alpha_l \) is a constant coefficient associated with the \( l \)th time period, \( \beta \) is a row vector of covariates, and \( \chi \) is an associated vector of coefficients that do not vary across time periods.

The piecewise exponential model allowed for direct comparability to the Cox proportional hazards model, since a substantial difference in the results obtained from these two methods could represent evidence of an incorrectly parameterized underlying baseline model (Yamaguchi, 1991). When we compared our results from the piecewise model to estimates obtained from other functional specifications (including the exponential, Gompertz, and Weibull distributions), we obtained consistent results, and the piecewise exponential model provided the best fit, which supported the validity of our parametric assumptions.\(^8\)

The survival analysis we used has several advantages over alternative statistical methods, such as a random-effects logistic regression. Because it used the information provided by “right-censored” cases (Allison, 1984; Tuma & Hannan, 1984), it did not require an ad hoc time window to determine whether an acquirer made a subsequent acquisition after a focal acquisition. In addition, this modeling strategy provided the most complete picture of acquisition likelihood by taking into account the information on time elapsed since a prior acquisition.\(^9\)

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\(^7\) Our definition of market area was based on the geographic market area classification of the Federal Reserve Bank.

\(^8\) Because of space limitations, these comparisons are not included in this article but are available from the authors.

\(^9\) In addition to our event history analysis, we also estimated random-effects logistic regression models using a dependent variable that measured the likelihood of a subsequent acquisition within a two-year window after a focal acquisition for both a full-sample analysis and subsamples with only large acquisitions (10%, 20%, and 30% of target/acquirer equity). Results remained consistent across these analyses.
RESULTS

Table 1 provides the descriptive statistics and correlations for the variables used in the study.

Table 2 reports maximum-likelihood estimates from the piecewise exponential models for the analysis of subsequent acquisition likelihood. Model 1 included only the control variables. The three predictor variables (acquisition experience, focal acquisition performance, and their interaction) were added hierarchically in models 2, 3, and 4, respectively. To create the interaction term, we mean-centered the predictor variables to address the potential problem of multicollinearity (Aiken & West, 1991). The log-likelihood ratio tests showed that the addition of each predictor variable significantly improved the overall model fit.

The coefficients for acquisition experience were positive and significant \( p < .01 \) in all models, supporting Hypothesis 1, which states that acquisition experience is positively related to future acquisition likelihood. As Hypothesis 2 states, the coefficients for focal acquisition performance were positive and significant \( p < .01 \) in models 3 and 4. These estimates indicated that focal acquisition performance was positively related to future acquisition likelihood. Finally, Hypothesis 3 states that the interaction between acquisition experience and focal acquisition performance is significantly related to future acquisition likelihood. As shown in model 4, the coefficient for the interaction term was positive and significant \( p < .01 \). This result suggested that the positive effect of experience on the likelihood of making future acquisitions was strengthened at higher levels of a most recent acquisition’s performance, thus supporting Hypothesis 3.

To visually depict the interactive effect of the predictors on subsequent acquisition rates, we created a three-dimensional graph that illustrates the multiplier effects of acquisition experience relative to the levels of acquisition performance. Figure 1 presents this graph.\(^{10}\) The vertical axis of the figure is the multiplier of the rate, which is the combined influence of acquisition experience and acquisition performance on the hazard rate of an acquirer’s making subsequent acquisitions, as determined by other covariates. The horizontal axes represent acquisition experience and acquisition performance, respectively, within the data range one standard deviation below (low acquisition experience divided by performance) and above (high acquisition experience divided by performance) the mean of each predictor variable (Aiken & West, 1991; Cohen & Cohen, 1983). Supporting Hypothesis 3 and our findings from model 4, the plots showed that the positive effect of acquisition experience on subsequent acquisition rates was higher at higher levels of focal acquisition performance.

\(^{10}\)The multiplier of the rate represents the risk of experiencing events relative to the baseline hazard. The exponential hazard rate is represented as \( r(t) = h_0(t)\exp(\beta_x) \), where \( h_0(t) \) is the baseline hazard rate and \( \beta_x \) is the regression coefficient. Because \( h_0(t) \) is identical for all variables in the model, the relative effects between predictors can be assessed by comparing the multiplier of the rate, \( \exp(\beta_x) \), after setting the multiplier to 1 for the baseline hazard rate.

### TABLE 1
Descriptive Statistics and Correlations for Key Study Variables\(^a\)

<table>
<thead>
<tr>
<th>Variable(^b)</th>
<th>Mean</th>
<th>s.d.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Acquirer size</td>
<td>14.73</td>
<td>1.70</td>
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<tr>
<td>2. Acquirer slack resources</td>
<td>0.23</td>
<td>0.76</td>
<td>−.28</td>
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<tr>
<td>3. Acquirer firm performance</td>
<td>1.09</td>
<td>0.48</td>
<td>.13</td>
<td>.00</td>
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<tr>
<td>4. Acquirer financing capability</td>
<td>4.66</td>
<td>0.98</td>
<td>.08</td>
<td>.01</td>
<td>−.20</td>
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<tr>
<td>5. Relative acquisition size</td>
<td>0.17</td>
<td>0.25</td>
<td>−.33</td>
<td>.20</td>
<td>−.06</td>
<td>.04</td>
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<tr>
<td>6. Stock consideration</td>
<td>0.65</td>
<td>0.45</td>
<td>.16</td>
<td>−.06</td>
<td>.12</td>
<td>−.01</td>
<td>.02</td>
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<tr>
<td>7. Lock-up agreement</td>
<td>0.25</td>
<td>0.43</td>
<td>.13</td>
<td>−.09</td>
<td>.04</td>
<td>−.04</td>
<td>.20</td>
<td>.23</td>
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<tr>
<td>8. Industry revenue</td>
<td>2.84</td>
<td>6.28</td>
<td>−.13</td>
<td>.05</td>
<td>.12</td>
<td>−.05</td>
<td>.11</td>
<td>.05</td>
<td>.23</td>
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<tr>
<td>10. Industry total acquisition value</td>
<td>14.04</td>
<td>20.43</td>
<td>−.02</td>
<td>−.01</td>
<td>.09</td>
<td>.01</td>
<td>.06</td>
<td>.04</td>
<td>.13</td>
<td>.44</td>
<td>.03</td>
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<td>11. Prior acquisition experience, 1978–87</td>
<td>0.72</td>
<td>1.60</td>
<td>.21</td>
<td>−.06</td>
<td>.06</td>
<td>−.00</td>
<td>−.16</td>
<td>.07</td>
<td>−.04</td>
<td>−.11</td>
<td>.17</td>
<td>.06</td>
<td></td>
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<tr>
<td>12. Acquisition experience, since 1988</td>
<td>5.15</td>
<td>9.96</td>
<td>.49</td>
<td>−.10</td>
<td>.18</td>
<td>−.00</td>
<td>−.20</td>
<td>.16</td>
<td>.03</td>
<td>.11</td>
<td>.22</td>
<td>.07</td>
<td>.12</td>
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<tr>
<td>13. Focal acquisition performance</td>
<td>−0.01</td>
<td>0.07</td>
<td>−.11</td>
<td>.01</td>
<td>−.01</td>
<td>.03</td>
<td>−.06</td>
<td>−.11</td>
<td>−.14</td>
<td>−.02</td>
<td>.01</td>
<td>−.01</td>
<td>−.03</td>
<td>−.03</td>
</tr>
</tbody>
</table>

\(^a\) \( n = 6,714 \). Correlations greater than .03 are significant at \( p < .05 \), and correlations greater than .05 are significant at \( p < .01 \).

\(^b\) Industry revenue is expressed in trillions of U.S. dollars, and acquisition value is in billions.
TABLE 2
Maximum-Likelihood Estimates of Subsequent Acquisitions*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Controls</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acquirer size</td>
<td>0.21** (0.02)</td>
<td>0.09** (0.02)</td>
<td>0.10** (0.02)</td>
<td>0.10** (0.02)</td>
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<tr>
<td>Acquirer slack resources</td>
<td>-0.37** (0.09)</td>
<td>-0.35** (0.08)</td>
<td>0.35** (0.08)</td>
<td>-0.35** (0.08)</td>
</tr>
<tr>
<td>Acquirer firm performance</td>
<td>0.62** (0.06)</td>
<td>0.49** (0.06)</td>
<td>0.48** (0.06)</td>
<td>0.48** (0.06)</td>
</tr>
<tr>
<td>Acquirer financing capability</td>
<td>0.01 (0.02)</td>
<td>0.01 (0.02)</td>
<td>0.00 (0.02)</td>
<td>-0.01 (0.02)</td>
</tr>
<tr>
<td>Relative acquisition size</td>
<td>-1.07** (0.14)</td>
<td>-0.93** (0.14)</td>
<td>-0.89** (0.14)</td>
<td>-0.88** (0.14)</td>
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<tr>
<td>Stock consideration</td>
<td>0.45** (0.06)</td>
<td>0.37** (0.06)</td>
<td>0.38** (0.06)</td>
<td>0.38** (0.06)</td>
</tr>
<tr>
<td>Lock-up agreement</td>
<td>0.12* (0.06)</td>
<td>0.26** (0.06)</td>
<td>0.27** (0.06)</td>
<td>0.27** (0.06)</td>
</tr>
<tr>
<td>Industry revenue</td>
<td>-9.14** (0.62)</td>
<td>-1.11** (0.63)</td>
<td>-1.11** (0.63)</td>
<td>-1.08** (0.63)</td>
</tr>
<tr>
<td>Industry acquisition density</td>
<td>0.05** (0.00)</td>
<td>0.03** (0.00)</td>
<td>0.03** (0.00)</td>
<td>0.03** (0.00)</td>
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<tr>
<td>Industry total acquisition value</td>
<td>-3.88 (1.74)</td>
<td>-2.93 (1.61)</td>
<td>-3.11 (1.61)</td>
<td>-4.79** (1.70)</td>
</tr>
<tr>
<td>Prior acquisition experience, 1978–87</td>
<td>-0.01 (0.01)</td>
<td>0.01 (0.01)</td>
<td>0.01 (0.01)</td>
<td>0.01 (0.01)</td>
</tr>
<tr>
<td><strong>Duration since previous acquisition</strong></td>
<td></td>
<td></td>
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<tr>
<td>0–4 years</td>
<td>-8.54** (0.34)</td>
<td>-6.12** (0.36)</td>
<td>-6.33** (0.36)</td>
<td>-6.26** (0.36)</td>
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<tr>
<td>5–8 years</td>
<td>-8.29** (0.36)</td>
<td>-5.91** (0.38)</td>
<td>-6.01** (0.38)</td>
<td>-6.05** (0.38)</td>
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<tr>
<td>9–12 years</td>
<td>-8.22** (0.40)</td>
<td>-6.10** (0.41)</td>
<td>-6.20** (0.41)</td>
<td>-6.25** (0.41)</td>
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<tr>
<td>≥ 13 years</td>
<td>-8.42** (0.49)</td>
<td>-6.48** (0.50)</td>
<td>-6.56** (0.51)</td>
<td>-6.47** (0.51)</td>
</tr>
<tr>
<td><strong>Predictors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Acquisition experience since 1988</td>
<td>0.04** (0.00)</td>
<td>0.04** (0.00)</td>
<td>0.04** (0.00)</td>
<td>0.04** (0.00)</td>
</tr>
<tr>
<td>Focal acquisition performance</td>
<td>1.44** (0.38)</td>
<td>1.15** (0.39)</td>
<td>1.15** (0.39)</td>
<td>1.15** (0.39)</td>
</tr>
<tr>
<td>Experience × performance</td>
<td>0.06** (0.02)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Incremental likelihood-ratio chi-square</td>
<td>425.22**</td>
<td>14.28**</td>
<td>12.29**</td>
<td></td>
</tr>
<tr>
<td>df</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>Δdf</td>
<td>1</td>
<td>1</td>
<td>1</td>
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</tr>
</tbody>
</table>

*a n = 6,714. Unstandardized coefficients are reported, with standard errors in parentheses.

*b p < .01, two-tailed tests.

FIGURE 1
Interaction between Experience and Performance*

*a The actual lower-bound value of acquisition experience was -4.81 (5.15 – 9.96). Because acquisition experience could not be negative, we replaced the lower-bound value with zero.
DISCUSSION

We explored the effects of routines stemming from experience, performance feedback, and their interaction in the context of acquisitions made in the U.S. commercial banking industry. We tested the theoretical idea that, although routines that arise from experience with a particular task impact organizations, they also use performance feedback to update routines (Baum et al., 2000). We found support for our hypothesized main effects in that both acquisition experience and focal acquisition performance positively influenced the likelihood of a firm’s making a subsequent acquisition. We also found an interaction effect between these two predictors of acquisition behavior—the positive effect of acquisition experience on subsequent acquisition likelihood was even more pronounced when it was accompanied by stronger acquisition performance.

From a learning perspective, our results are consistent with the idea that organizational routines, once established, are subject to inertial pressures (Levinthal & March, 1993; March, 1981). We found that acquirers were more likely to make subsequent acquisitions as they gained acquisition experience. In addition, in keeping with learning theories that emphasize performance feedback, we found that firms adjust their behaviors in view of prior outcomes, because the likelihood of a future acquisition was positively related to recent acquisition performance. These findings suggest that managers respond to performance feedback by repeating rewarded behaviors but are less likely to persist in punished behaviors.

To the best of our knowledge, our study is the first to directly examine the interaction between experience and performance in predicting future behaviors. We found that the joint effect between these two variables was more pronounced when both acquisition experience and performance were high (i.e., positive). This finding implies that a high level of experience accompanied by strong recent acquisition performance sends a clear signal to a firm that it has developed the routines required to make successful acquisitions from its prior acquisition experience, which in turn increases its confidence in making subsequent acquisitions. However, poor performance of a focal acquisition weakens the effect of acquisition experience, presumably because it calls into question the decision makers’ belief that the acquisition routines that have arisen from their prior acquisition experience are appropriate strategic choices. Thus, our findings contribute to a more refined understanding of the influence of routines on organizational behavior because they show that while firms do persist in their routines, these routines appear to be sensitive to performance feedback, especially at highly positive levels of acquisition experience.

Our interaction results also reveal an interesting but potentially counterintuitive insight, that acquisition performance has a greater effect at a higher level of acquisition experience than at a lower level of acquisition experience. When recent acquisition performance is strong (x + 1 s.d.), the multiplier of the hazard rate of making a subsequent acquisition is 1.07 (e^{0.04x + 1.15x + 0.66x + 0.35}) at a low level of acquisition experience (x - 1 s.d.). However, the multiplier (for strong acquisition performance) is 2.07 (e^{0.06x + 1.15x + 0.66x + 0.35}) at a high level of acquisition experience. A similar pattern is observed when acquisition performance is poor. Some theorists would expect the opposite to be true—that is, they would expect performance to have a greater effect when a firm has little acquisition experience because it has less data to use in evaluating the effect of acquisition, and/or the organization is less inert. In contrast, we found that the effect is actually symmetric for both decreases and increases in acquisition performance, so that the acquisition rate responds more readily to acquisition performance at stronger levels of acquisition experience.11 This inference would seem to be contradictory to organizational inertia theory, which implies slower adjustment to performance as experience increases.

Our interviews also provided qualitative evidence to bolster the face validity of our empirical conclusions. The following illustrative quote from an executive at a bank holding company located in the Midwest supports our inference that performance feedback moderates the effects of routines on organizational learning:

Our bank is quite acquisitive. During the past two years, our unit alone made five acquisitions, and that figure does not even include branch acquisitions. All those acquisitions have made us better at making acquisitions over the years. We have built a comprehensive acquisition template from our experience that guides us through when making an acquisition. It makes the whole process much more efficient, and acquisition more attractive. I believe acquisition is here to stay as our primary growth strategy. The only thing that will slow us down in our acquisition program will be questionable results of an acquisition we make. If numbers go down [after an acquisition], we will be forced to review...

11 We thank an anonymous reviewer for bringing this point to our attention.
our strategy and make any necessary adjustment to our template because it tells us our template may be incorrect. But if numbers look good, we will be on another negotiation table shortly after.

In addition, our study is the first to show that recent acquisition performance influences subsequent acquisition behavior. Most prior acquisition studies in the organizational learning tradition have focused primarily on the impact of prior acquisition experience on acquisition performance by treating performance as an outcome. Yet the effect of prior acquisition performance on subsequent acquisitions has not been explored, despite its potential theoretical and practical importance. By treating recent performance as an independent variable, we investigated this unexplored question and found empirical support for our theoretical conjecture that researchers should take performance feedback from a prior acquisition into account to provide a more complete understanding of a firm’s subsequent acquisition behavior.

In conclusion, our study provides useful insights into the effects of learning from experience and performance in the context of corporate acquisitions. However, there are several ways in which our findings could be extended both theoretically and empirically. Although our empirical models focused on the organizational level of analysis and used archival data to measure organization-level variables, we did not directly examine the role of decision makers in the studied firms (e.g., Bergh, 2001). The characteristics of top management teams and boards of directors may have important moderating or mediating influences on the relationship between past acquisition performance and subsequent acquisition decisions. Future research that incorporates measures of managerial characteristics may help explain more variance in organizational decisions. In addition, although we examined the effects of acquisition experience, prior acquisition performance, and their interaction, we did not examine the processes that underlay our effects. It may be that for acquisition success firms need to manage their acquisition experience and have some corporate activity to facilitate its transfer to the next acquisition. A useful direction for future research would be to explore the ability of organizational skills or capabilities to explain additional variance in acquisition behaviors. Moreover, in keeping with prior work on acquisitions and the characteristics of our empirical context, we measured acquisition performance in terms of cumulative abnormal returns. However, other measures of acquisition performance, such as return on investment, Tobin’s Q, or acquisition survival, might be more appropriate in other industry contexts. Finally, we focused our study on a single industry in a particular historical period so that we could develop and test a more accurate empirical model. However, we recognize this focus may limit the generalizability of our findings to other industry contexts and time periods. Future research that examines our theoretical predictions in other empirical settings and time periods could help develop a more generalizable theory of organizational learning.

REFERENCES


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