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Following Radical Environmental Change

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Source: *The Academy of Management Journal*, Vol. 43, No. 5 (Oct., 2000), pp. 837-853

Published by: [Academy of Management](#)

Stable URL: <http://www.jstor.org/stable/1556413>

Accessed: 29/09/2011 11:10

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THE PARADOX OF SUCCESS: AN ARCHIVAL AND A LABORATORY STUDY OF STRATEGIC PERSISTENCE FOLLOWING RADICAL ENVIRONMENTAL CHANGE

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An archival study of the airline and trucking industries over a ten-year period and a laboratory study revealed that greater past success led to greater strategic persistence after a radical environmental change, and such persistence induced performance declines. The laboratory study also demonstrated that dysfunctional persistence is due to greater satisfaction with past performance, more confidence in the correctness of current strategies, higher goals and self-efficacy, and less seeking of information from critics.

Previous research has shown that past organizational success leads to strategic persistence—a tendency for firms to stick with strategies that have worked in the past (e.g., Lant, Milliken, & Batra, 1992; Miller & Chen, 1994). Typically, such persistence is beneficial. Success goes to those who develop, refine, and enhance key competencies that lead to sustainable competitive advantage (March, 1991). But when the environment changes, the success-persistence relationship may prove detrimental. Major shifts in competitive, technological, social, and legal conditions may render prior strategies ineffective (Haveman, 1992; Smith & Grimm, 1987). To ensure alignment with the new environmental context, organizations must anticipate or detect such changes and initiate strategic transformations. Yet, surprisingly, an evolving literature suggests that managers often do not respond to environmental signals that indicate the need for strategic change (Hedberg, 1981; Tushman & Ro-

manelli, 1985). Instead, managers often fall into a pattern of dysfunctional strategic persistence.

Past success itself may set the stage for dysfunctional persistence. It is easy to assume that a strategy that worked in the past will be the most effective strategy in the future (Pralhad & Bettis, 1986). Of course, managers are also exposed to forces driving toward strategic change, such as when dramatic environmental change occurs and past strategies begin to fail (e.g., Kiesler & Sproull, 1982). The question is, How do managers deal with these competing forces? After a period of success, do they still have the ability to recognize when it is time to change? Or is the pressure toward persistence created by past success so strong that it blinds them to early signals that past strategies may fail?

We addressed these questions in two studies. In the first study, we examined the airline and trucking industries in the United States over a ten-year period surrounding a discrete and radical environmental change, a deregulation. This study adds to previous research in two important ways. First, although previous research has established that past success leads to strategic persistence (Boeker, 1997; Lant et al., 1992; Meyer, Goes, & Brooks, 1993; Miller & Chen, 1994), it has not examined this relationship in the context of a discrete and radical environmental change. Second, there have been only limited efforts to document the dysfunctional consequences of strategic persistence after an environmental change.

In the second study, we took the analysis to a deeper level by examining a set of factors that may mediate and thus explain the effect of past success

We thank Susan Taylor, Jerry Hage, and Rick Guzzo for their useful suggestions during the development of this research. Thanks also to Chris Earley, Dennis Gioia, Peter Moran, Anand Narasimhan, Henry Tosi, Anne Tsui, and the three anonymous reviewers for their comments on earlier versions of this article. Special thanks to Amir Erez for statistical advice. We are also grateful for access to the airline database assembled by Min-Jer Chen, Martin Gannon, and Curtis Grimm and to the trucking database prepared by Tom Corsi. Financial support for the completion of this research was kindly provided by Bocconi University and the University of Maryland.

on strategic persistence. In contrast to prevalent accounts of inertia, which call into consideration a variety of structural constraints (Hannan & Freeman, 1984), our focus here is on psychological mediators. The idea that the psychological processes of organizational decision makers mediate strategic rigidity has not gone unrecognized (Hambrick & Finkelstein, 1987; Staw & Ross, 1987). For example, a number of investigators have argued that past success leads to complacency and the formation of rigid cause-and-effect beliefs (Kiesler & Sproull, 1982; Prahalad & Bettis, 1986). Others have pointed to the importance of external monitoring activities (Dutton & Duncan, 1987; Miller & Chen, 1994) and aspirations (Greve, 1998; Lant & Montgomery, 1987). However, no study to date has examined the actual psychological processes that underlie strategic persistence. Our second study was an attempt to fill this gap in the literature.

The two studies complement each other. The archival study explores the effects of past success on persistence and the effects of persistence on performance in real organizations experiencing a dramatic environmental change. However, this research was carried out without direct observation of the managerial decision-making process. In contrast, the laboratory study, while replicating salient features of the archival study, focuses directly on some of these decision processes in a controlled, simulated environment. Therefore, the archival study provides external validity and generalizability, whereas the laboratory study provides internal validity and control.

MACRO ANALYSIS OF THE EFFECT OF PAST SUCCESS ON DYSFUNCTIONAL STRATEGIC PERSISTENCE

Key Questions

Two questions have guided previous research on success and persistence. The first is, Does success affect persistence? Empirical evidence clearly lends support to a success-persistence causal link. In a study of the furniture and software industries, Lant, Milliken and Batra (1992) found that organizations with performance above the industry average over the period 1980–84 were less likely than other industry firms to reorient their strategies in the two-year period 1984–86. In a study of 450 California hospitals over a period of 11 years, Meyer, Goes, and Brooks (1993) found that high performance led to fewer strategic reorientations. Miller and Chen's (1994) study of the airline industry in the postderegulation period between 1979 and 1986 showed that a company's previous per-

formance was associated with higher levels of competitive inertia, measured as the number of changes in competitive practices compared to rivals' numbers of such changes. Boeker's (1997) study of 67 semiconductor producers over a 14-year period showed that high past performance made strategic changes less likely. Consistent with this pattern of findings, in a study of the radio broadcasting industry, Greve (1998) showed that, as an organization's performance increased, the probability of change decreased.

It must be noted that past performance is likely to cause persistence over a period of time only if organizations are consistently successful. If organizations experience a mixed series of increases and declines in performance, strategic persistence would not necessarily be expected. For this reason, when we use terms such as "success," "past success," or "history of success" in this article, we refer to a series of past, positive performance outcomes.

The second question that has guided relevant past research is, Why does success foster persistence? Previous research has proposed several explanations. One account, rooted in the reinforcement-expectancy model of learning, is that organizations tend to repeat actions that are associated with positive outcomes (Cyert & March, 1963; Prahalad & Bettis, 1986). A second explanation suggests that organizations become committed to retaining proven competencies, because doing so is more efficient than trying to develop new ones (Levitt & March, 1988). A third thesis is that organizations are not motivated to change when their performance meets or exceeds their aspiration levels (Greve, 1998; Lant & Montgomery, 1987). Obviously, these three explanations have much in common in that they all rest on an assumption that persistence stems from the thinking processes of strategic decision makers. A fourth account stresses instead the role of structural constraints. In this view, past success favors the development of rigid organizational structures and increases the pressure for stability coming from external stakeholders (Hannan & Freeman, 1984). Such constraints in turn stifle decision makers' ability to alter a current strategy.

Research on the success-persistence effect has somewhat neglected a third question, namely, What are the performance consequences of strategic persistence? Theory suggests that strategic persistence can be a double-edged sword for organizations (March, 1991). Under conditions of environmental stability, persistence can be highly advantageous. It facilitates the development of competencies that have proven valuable in the

past, increases efficiency and quality and, as a consequence, builds legitimacy with external stakeholders (Hannan & Freeman, 1984). Persistence also facilitates learning because in the absence of change, cause-effect relationships are clearer-cut (e.g., Levine, 1971). Furthermore, persistence reduces risks, both economic and social, stemming from low cohesion (Shaw, 1976), discouragement (Bandura, 1986), or distrust (Hollander & Julian, 1969).

Nonetheless, a persistence-success pattern of behavior may become self-destructive if it leads to persistence in the face of major environmental shifts, such as technological breakthroughs, regulatory changes, or alterations in trade barriers (Haveman, 1992; March, 1991; Smith & Grimm, 1987). After a period of prior success and persistence, organizations may be slow to recognize that it is time to change. Driven by the natural tendency to continue exploiting previously effective strategies, successful organizations may ignore the implications of major environmental changes until drastic performance declines compel new strategies (Tushman & Romanelli, 1985).

Surprisingly, most previous empirical research on the success-persistence relationship has overlooked the distinction between the beneficial effects of persistence under conditions of environmental stability and the detrimental effects of persistence under conditions of radical environmental change. Nonetheless, three studies have shown negative effects of strategic persistence on performance following a radical environmental change, though they did not examine the relationship between success and persistence. Smith and Grimm (1987) studied the effects of railroad deregulation on the strategy-performance relationship. They found that railroad companies that did not change their strategies after deregulation performed worse than those that did. Haveman (1992) found that persistence with past strategies on the part of savings and loan organizations after a radical environmental change decreased performance. Finally, Zajac and Kraatz (1993) found that strategic persistence in the educational programs of American liberal arts colleges in response to the cumulative effect of environmental changes decreased performance.

Hypothesis, Study 1

In sum, our review suggests that, although there is evidence showing that success leads to persistence and that persistence, in the context of a radical environmental change, has dysfunctional performance consequences, past research has not

examined the whole sequence, success-persistence-performance. To address this deficiency, we tested the following hypotheses in study 1 of this research:

Hypothesis 1a. Following a discrete and radical environmental change, organizations with a greater history of success are more likely to persist with their past strategies than those with a lesser history of success.

Hypothesis 1b. Following a discrete and radical environmental change, organizations with a high level of persistence with their past strategies are more likely to experience a reduction in their performance than those with less persistence.

MICRO ANALYSIS OF THE PROCESSES MEDIATING THE EFFECT OF PAST SUCCESS ON DYSFUNCTIONAL STRATEGIC PERSISTENCE

We noted above several accounts of the reasons why past success may lead to persistence. We now consider the mediating role of the individual psychological processes and behaviors of organizational decision makers, a causal link often overlooked in previous research on inertia. Some researchers consider information seeking the critical factor. They have suggested that success decreases information seeking and that less seeking of information reduces the ability of managers to recognize environmental changes (e.g., Miller & Chen, 1994). Others, however, are not entirely convinced that information seeking is sufficient to motivate change in strategy and have emphasized instead the role of cognitions. Adopting this view, some authors have suggested that people may gather information about environmental changes and still miss their impact on future performance because their rigid beliefs act as distorting filters (Kiesler & Sproull, 1982), whereas yet others have proposed that success facilitates the development of rigid mental maps that lock people into patterns of action that are hard to modify (Prahalad & Bettis, 1986).

Although these micro explanations give prominence to particular processes, some scholars have proposed broader arguments that comprise all the micro processes that seem to be involved in the success-persistence relationship, including those mentioned above and others such as complacency and overconfidence (Miller, 1993; Milliken & Lant, 1991). Surprisingly, however, as Milliken and Lant (1991) noted, very little research has examined the validity of any of these theoretical explanations. In

our second study, we addressed this gap. Grounding our analysis in previous research, we focused on concepts that are closely related to past performance and strategic rigidity. These concepts are satisfaction, beliefs, self-efficacy, goals, and information seeking.

When people succeed in attaining their objectives or values, they experience satisfaction, which we view, drawing on Locke and Latham (1990), as an affective response based on a subconscious value appraisal. Following success, individuals also develop beliefs regarding cause-effect relationships—that is, the connection between their actions and the outcomes achieved. Such beliefs include conclusions about what particular task strategies are effective in performance. People also develop beliefs about their own competence or self-efficacy. Past success enhances efficacy, and efficacy motivates them to set higher goals for the future (Bandura, 1986; Locke & Latham, 1990). It is not the case, however, that individuals focus only on the past when planning future actions. People have the power of forethought (Bandura, 1986, 1997). They can anticipate what will happen, for example, by seeking information about the future and projecting its implications. We now consider how past success can make these processes operate in a detrimental fashion.

Mediating Processes

Satisfaction with performance. It is well known that success in attaining one's goals leads to satisfaction (e.g., Bandura, 1986; Locke & Latham, 1990). The more the standard is surpassed, the stronger the feeling of satisfaction the person experiences. Satisfaction is pleasurable and can give individuals fuel for further action, but the danger is that these positive feelings reduce individuals' motivation to initiate new adaptations. Further, strong feelings of satisfaction can lead individuals to interpret warning signs as benign or positive, thus eliminating the possibility of questioning whether they are taking the correct actions (Isen & Baron, 1991). Complacency, a common correlate of satisfaction, is often mentioned as an explanation of the link between success and dysfunctional persistence. For example, Miller and Chen posited that "success can make managers so complacent, so content with the status quo, that they resist change" (1994: 3).

Confidence in the effectiveness of current strategies. Successful individuals, even if their past achievements were due to accidents of timing, can become confident about the effectiveness of their actions (March & Olsen, 1976) and so treat their

beliefs about strategy-performance links as fact. Past research suggests that high confidence in cause-and-effect beliefs increases individuals' effort and persistence (Vroom, 1964) and also leads them to persist with strategies that were successful in the past (Schwartz, 1982). Such confidence in the continued efficacy of previously successful strategies is beneficial if the conditions that produced success do not change but detrimental if conditions do change. The same holds for cause-and-effect beliefs about organizational strategies; cause-and-effect beliefs based on the past can inhibit future change because they can be retained even when they no longer apply (Kiesler & Sproull, 1982; Prahalad & Bettis, 1986).

Self-efficacy. In social cognitive theory, task-specific confidence is known as self-efficacy, the perception of one's capabilities to attain performance outcomes. Self-efficacy is a natural consequence of "enactive mastery" (Bandura, 1986, 1997). Thus, the better people perform on a task over a period of time, the higher their confidence in being able to perform well in the future. Previous research shows that higher self-efficacy has several beneficial effects: it facilitates high future performance, encourages the setting of high performance goals, strengthens commitment, fosters the selection of effective task strategies, and motivates positive responses to negative feedback (Bandura, 1997).

It remains unclear, however, whether the beneficial effects of self-efficacy apply to dynamic task environments. To be an accurate predictor of future performance, self-efficacy must be based on accurate feedback regarding past performance on the same task, performed under the same conditions. When the task changes, efficacy beliefs based exclusively on past performance may become an inaccurate guide to the future. If individuals anticipated changes in the task and reassessed their abilities in light of new task requirements, then they would avoid forming inaccurate efficacy beliefs. However, this may not happen because, as consecutive successes accumulate, past achievements become the primary influence in the formation of efficacy beliefs, and possibly counteracting influences lose their potency (e.g., Lindsley, Brass, & Thomas, 1995). Falsely assuming that what they did in the past will continue to work, individuals are likely to overestimate their ability to perform in the new situation.

Goals. Previous research indicates that, following success, people tend to raise their goals (Locke & Latham, 1990). This occurs because individuals assume that they have learned from successful experiences and, as a result, perceive themselves as

capable of additional improvement. Less is known about the effect of high goals on strategic persistence following a radical environmental change. Earley and Perry (1987) showed that hard goals enhanced the use of "primed" strategies, whether or not these were effective. A strategy is primed when the person who is choosing a strategy is given information that induces a certain mental set. Subjects with hard goals did better than subjects with "do-your-best" goals when the primed strategy was suitable. However, when the primed strategy was inappropriate to the task, subjects with hard goals did worse than subjects with do-your-best goals. Thus, successful individuals may stick to outdated strategies because past success has primed them to use what worked in the past. When higher future goals are linked with incorrect strategies, this lethal combination can cause performance to drop more rapidly than it would have if high goals had not been set.

Amount of information sought. Miller and Chen (1994) postulated that success may be interpreted as a sign that less vigilance and less environmental scanning are required. They hypothesized that reduced scanning decreases the motivation to undertake corrective adjustments. This argument is consistent with the literature on information seeking. Ashford and Cummings (1983) proposed that individuals' motivation to seek information depends on the value they place on additional information. This is affected by the importance placed on attaining a given goal as well as the degree of uncertainty over the behaviors appropriate for attaining a goal. Enduring success is likely to lead individuals to seek less information because success increases individuals' certainty that they are already doing the right thing. Because noticing changes in an environment depends, in part, on the amount of information sought (Daft & Weick, 1984; Kiesler & Sproull, 1982), it is expected that the less strategic decision makers seek information, the higher their persistence with past strategies following a radical environmental change will be.

Type of information sought. Less attention has been given to the potential mediating role of the type of information sought. It seems clear that executives who have had a long record of success will combine strong cause-and-effect beliefs with confidence that they can attain challenging goals using the strategies that worked in the past. Such confidence may lead them to seek to maintain their positive self-images (e.g., Ashford, 1989). They are thus more likely to disparage and reject those who question their competence and recommend that new strategies are in order. After all, great business leaders often achieve success because they used

their own judgments and ignored others' opinions. Such leaders will be prone to prefer the company and advice of those who agree with them and support the current strategies (Nystrom & Starbuck, 1984). Such an information-seeking pattern would reduce the quality of external monitoring activities and thereby lower executives' capacity to adjust to changing circumstances.

Hypotheses, Study 2

If study 1 were to establish that success leads to persistence and that persistence, in the context of a radical environmental change, is dysfunctional in terms of performance, then study 2 would need to first replicate these findings to allow examination of the potential psychological explanations. Thus, Hypotheses 2a and 2b replicate Hypotheses 1a and 1b from study 1, and Hypothesis 3 formulates the mediating role of the psychological processes discussed above.

Hypothesis 2a. Following a discrete and radical environmental change, individual strategic decision makers with a greater history of success are more likely to persist with their past strategies than those with a lesser history of success.

Hypothesis 2b. Following a discrete and radical environmental change, individual strategic decision makers who persist with their past strategies are more likely to experience a reduction in their performance than those with less persistence.

Hypothesis 3. The effect of past success on individual strategic decision makers' persistence with past strategies following a discrete and radical environmental change will be mediated by (a) greater satisfaction with the current level of performance, (b) greater confidence in the effectiveness of the current strategies, (c) higher self-efficacy, (d) higher goals, (e) a smaller amount of information acquired, (f) a greater amount of information acquired from favorable sources, and (g) a smaller amount of information acquired from unfavorable sources.

METHODS, STUDY I

Data

The airline industry. From 1938 to 1978, the Civil Aeronautics Board (CAB) controlled industry's entries, exits, and pricing. Deregulation in October 1978 removed such controls and was a dis-

continuous environmental change that affected the industry's competitive environment (Viotor, 1990). Following earlier studies (e.g., Smith, Grimm, & Gannon, 1992), in our analysis we relied on data from the U.S. Department of Transportation concerning certified air carriers. To identify different patterns of performance history and strategic persistence, the interval of time examined covered the five years preceding the deregulation, 1974–78, and the five years following it, 1979–83. The sample included 25 companies certified during the entire period.

Before the deregulation, carriers competed mainly by adding flights to the routes that they were currently serving and by increasing the quality of service. After the deregulation, airlines devised new strategies to take advantage of the new competitive context. New strategies included connecting flights at particular airports ("hubbing"), which allowed carriers to schedule itineraries with one-hour stopovers, gather traffic from diffuse sources, and increase the load factor on previously thin routes; offering low-cost, limited service for a low fare; and focusing on customers who could afford higher prices by emphasizing service, traffic control, and distribution.

The trucking industry. From 1935 to 1980, the Interstate Commerce Commission (ICC) regulated the motor carrier industry primarily with restrictive entry policies and controls on prices. By eliminating these constraints, the Motor Carrier Act of 1980 was a radical environmental change that significantly altered the competitive environment (Corsi & Stowers, 1991). Although the deregulation had severe consequences for the entire industry, experts suggest that it posed different threats to two types of companies: those that handled shipments weighing less than 10,000 pounds (less-than-truckload companies, or LTL) and those that handled shipments of a weight of more than 10,000 pounds (truckload companies, or TL) (Corsi & Stowers, 1991).

We examined the impact of deregulation on the LTL segment of the trucking industry. The analysis relied on data filed with the ICC and published annually as the *Motor Carrier Annual Report* by the American Trucking Association. Data concerned a ten-year period comprising the five years before the deregulation, 1976–80, and the five years after it, 1981–85. Furthermore, given the large number of companies in the LTL segment (over 2,000), many of which were very small, we analyzed only LTL companies with revenues higher than \$1 million for which data were available for at least nine of the ten years considered in the analysis. This procedure yielded a sample of 125 companies.

Before the deregulation, most companies attempted to attract customers either by concentrating on the quality of service or by specializing on the transportation of certain products. After the deregulation, as price competition spread through the industry, companies had to find ways to contain costs and improve their efficiency. New strategies included containing costs by increasing the use of company drivers, concentrating on high-density, long-haul corridors that allowed higher prices, and reducing labor costs by increasing use of independent truck owners.

Measures

Strategic persistence. Following Finkelstein and Hambrick (1990), we defined strategic persistence as the extent to which a firm's strategic profile remained stable over time and measured it by examining the stability of financial and operational ratios that express the strategic position of a company on specific issues. For example, R&D expenditure divided by total revenues is a classic indicator of a company's R&D intensity.

For both industries, we selected indicators that were expected to change in response to the deregulation. Strategic indicators used for the airlines were marketing expenses per mile, general expenses per mile, equipment expenses per mile, percentage of scheduled aircraft miles completed, first versus economy class, first-class revenue–passenger load factor, and coach-plus-economy revenue–passenger load factor. Strategic indicators for the trucking industry were less-than-truckload revenues versus other revenues, average revenue per ton mile, fuel expenses per mile, amount of services bought from independent truck owners as a percentage of operating expenses, average load, average length of haul, and total number of trucks divided by the total number in operation.

The measure of strategic persistence was then computed as follows: (1) for each strategic indicator, the variance was calculated over the five-year period following the deregulation; (2) variance scores were standardized and multiplied by -1 so that positive scores indicate greater persistence; and (3) the standardized indicators were summed to yield an overall measure.

Past performance. This study uses return on sales (ROS) as a measure of performance. Because sales are very visible to managers, they are likely to be used as an indicator of performance in small as well as in large companies. As a result, ROS is often used to evaluate a company's performance over time, to compare it with other companies, and to set future goals. For the trucking industry, we were

also able to compute a second measure of performance, using return on assets. We computed past performance using a procedure similar to that one adopted by Lant and colleagues (1992). First, past performance was calculated for the five years preceding the deregulation. Second, it was assumed that managers used the average performance of the industry as reference point to which they compared their own companies' performance. Thus, a firm's deviation from the industry median was computed in each of the five years and then averaged.

Change in performance after the environmental change. We adopted the same measure used for past performance to calculate performance in the five years after the deregulation. We then computed a difference measure by subtracting performance before deregulation from performance afterward.

Control variables. A critical control variable was organizational size. Larger organizations are expected to change their strategies less frequently because they are encumbered by greater structural inertia (e.g., Hannan & Freeman, 1989). We measured size using, for the trucking industry, the natural logarithm of total tons transported (Corsi & Stowers, 1991) and, for the airline industry, the natural logarithm of total assets (Kelly & Amburgey, 1991).

We also controlled for market diversity because organizations serving a variety of customers interact with a more heterogeneous environment and

thus collect more information that may enhance their capacity to react to external shifts (e.g., Miller & Chen, 1994). Given that airlines can carry any combination of passengers, mail, freight, and cargo, we measured market diversity by calculating the percentage that the largest product line contributed to the total product mix (Kelly & Amburgey, 1991). For the trucking industry, market diversity was measured as the percentage of revenues that derived from shipments of a weight of more than 1,000 pounds.

Finally, because changes in top management typically facilitate strategic change (e.g., Finkelstein & Hambrick, 1996), we included in our analyses change in chief executive officer in the year in which deregulation took place, that is, between 1977 and 1978 for the airline industry and between 1979 and 1980 for the trucking industry. There was one instance of CEO change in the airline industry, and there were seven cases in the trucking industry. We obtained this data for the airline industry from *Moody's Transportation Manual* and, for the trucking industry, from the *Executive and Ownership Report* published by the American Trucking Association.

RESULTS, STUDY I

Table 1 presents descriptive statistics and correlations, and Table 2 reports regression analyses

TABLE 1
Descriptive Statistics and Correlations, Study 1

(1a) Airline Industry ^a								
Variable	Mean	s.d.	1	2	3	4	5	6
1. Market diversity	0.12	0.06						
2. Size	13.19	1.88	.16					
3. CEO change, 1977-78	0.04	0.20	-.34	-.16				
4. Strategic persistence, 1979-83	0.00	4.26	.05	.74*	.10			
5. Past performance, 1974-78	0.00	0.08	-.41*	.15	.51*	.68*		
6. Change in performance	0.00	0.18	-.23	-.22	-.10	-.39*	-.36*	
(1b) Trucking Industry ^b								
Variable	Mean	s.d.	1	2	3	4	5	6
1. Market diversity	0.08	0.09						
2. Size	12.33	1.16	-.27*					
3. CEO change, 1979-80	0.05	0.23	-.13 [†]	-.09				
4. Strategic persistence, 1981-85	0.00	2.70	-.23*	.21*	.09			
5. Past performance, 1976-80	0.00	0.04	.03	.23*	-.09	.25*		
6. Change in performance	0.00	0.04	-.08	-.16*	-.13 [†]	-.12 [†]	-.44*	

^a $n = 25$.

^b $n = 125$.

[†] $p < .10$

* $p < .05$

TABLE 2
Results of Regression Analyses for Strategic Persistence and Change in Performance over the Five Years after Deregulation, Study 1

Variable	Airline Industry				Trucking Industry			
	Strategic Persistence		Change in Performance		Strategic Persistence		Change in Performance	
Market diversity	-.05	.11	-.42*	-.46*	-.17*	-.19*	-.12 [†]	-.14 [†]
Size	.62*	.43*	-.42*	.09	.18*	.12 [†]	-.18*	-.16*
CEO change	.18	-.24 [†]	-.27 [†]	-.13	.09	.10	.10	.11
Past performance		.83*				.24*		
Strategic persistence				-.82*				-.13 [†]
R^2	.40*	.82*	.25*	.64*	.09*	.14*	.05*	.07*
ΔR^2		.42*		.39*		.05*		.02

[†] $p < .10$

* $p < .05$

conducted to test Hypotheses 1a and 1b. For both industries, results indicate that the greater the performance over the five years prior to deregulation, the more organizations persisted with the past strategies in the five years following the deregulation (airline industry: $\beta = .83$, $p < .05$; trucking industry: $\beta = .24$, $p < .01$). This pattern of findings supports Hypothesis 1a. In the case of the trucking industry, we also conducted a supplemental regression analysis using ROA as a measure of performance. Results confirmed those obtained using ROS.

Results also reveal that the greater the strategic persistence after deregulation, the greater the decline in performance after deregulation, though this effect was only of borderline significance in the trucking industry (airline industry: $\beta = -.82$, $p < .05$; trucking industry: $\beta = -.13$, $p < .10$). Overall, these findings support Hypothesis 1b. The only control variable producing findings largely consistent with expectations was size. In both industries, size increased persistence and led to greater drops in performance after the deregulation, though the effect on change in performance became weaker after persistence entered the analysis. Market diversity decreased persistence in the trucking industry but not in the airline industry. Finally, after past performance was added to the analysis, CEO change had a weak, negative effect on persistence, but only in the airline industry.

METHODS, STUDY 2

The Business Simulation

To facilitate conducting a laboratory investigation of strategic persistence, the first author created an interactive, computer-based simulation, the Cel-

lular Industry Business Game, in collaboration with a software company, Perspective Visuals Inc. This game draws on events that occurred in the U.S. cellular telephone industry. Before playing the simulation, participants read an introductory case, *Douglas Cellular Inc.* The case provided background information concerning the cellular phone industry and the three-year history of Douglas Cellular Communication Inc. Participants played the role of Mr. Douglas, the founder/CEO and sole decision maker for the company, for 13 decision periods, each corresponding to a year of activity. Each participant acted as a separate company. Participants were told that their aspiration was to become market share leader in the northeast region by achieving a 25 percent market share; each started the simulation with a 7 percent market share. Although participants were told that the simulation was going to last 15 time periods, the experimenter (the first author) interrupted the game at the end of the 13th period to prevent endgame effects.

During each decision period, participants were required to make strategic decisions concerning the following areas of activity: pricing, research and development, advertising, cost containment, sales force, radio wave capacity, additional products, geographic scope, finance, and alliances with other companies. Within each area, participants were allowed to take various strategic actions. For example, in the sales force strategic area they could (1) specify the number of employees in the direct sales force as well as the number of dealers, (2) indicate the salary of the direct sales force as well as the commission for the dealers, and (3) allocate both direct sales force and dealers by market.

For each decision period, participants first implemented their strategic decisions and then ob-

tained performance feedback. Performance feedback was the result of previous strategic decisions. The business simulation included a complex set of formulas linking strategic actions to performance consequences. These formulas varied over time to reflect changes in the industry. For example, the impact of advertising expenditures on sales for each decision period was determined by a coefficient that varied depending on the stage of the industry.

In addition to making strategic decisions, in each decision period except the first one, participants were allowed to request five types of information: information from the Cellular Industry Association on topics like communications from the Federal Communications Commission (FCC) and the size of the market; information concerning the industry, about topics like new technologies and competitors' strategic actions; information on customers, such as their criteria for selecting cell phone service and hours spent using such services; confidential information and opinions on the effectiveness of specific strategies from industry executives who had been supportive of Mr. Douglas's ideas in the past; and confidential information and opinions concerning the effectiveness of specific strategies from executives who had questioned Mr. Douglas's judgment in the past. The first type of information covering any event considered essential for the industry was provided to each participant free of charge. The other four types of information were provided upon request, each at a cost of \$25,000. This information was the same for each participant and, over time, portrayed the different stages through which the industry evolved.

Evolution of the Cellular Service Industry

The evolution of the industry was predetermined in the game. As in the two industries examined in study 1, the discrete and radical environmental change occurring in the industry in the simulation was a deregulation. Participants were given several messages warning that deregulation was likely to occur. They received official communication about it from the FCC one decision period before it was implemented. Participants who were more active information seekers were exposed to alternative views about the potential impact of the environmental change.

During the first eight decision periods of the simulation, competition was restricted in the four regions (that is, the government awarded 20 licenses in each region), and the market was characterized by steady growth (a 20–30 percent increase in subscribers per year). Douglas Cellular Communica-

tions, like the other 19 companies operating in the northeast region, benefited from the growth of the industry by gaining new subscribers as well as by increasing revenues. However, to increase its market share, it had to achieve rates of growth larger than those of the industry (for instance, an annual 50 percent increase in subscribers). The effective strategies were buying licenses to operate in all five markets, acquiring additional radio wave capacity allowing it to carry more calls and avoid network jams, raising capital to finance those new investments, vigorously increasing sales force and advertising expenditures, and concentrating advertising efforts on business users rather than on private users.

In the last five decision periods, two important environmental changes altered the competitive context: the U.S. government eliminated the regional barriers and allowed competition across regions, and the rate of growth of the northeast region gradually declined from 30 percent to 12–14 percent. Because of these changes, competition became more intense and was focused on "stealing" subscribers rather than on acquiring new ones. Increases in sales force and advertising, which in the previous stage of the industry were the basic ingredients of success, resulted in smaller increases in subscribers, losses in market share, and large reductions in operating profits. Price cuts, a strategy that had been ineffective in the previous stage, and making alliances to ensure wider geographic coverage were the most effective strategies. In conclusion, owing to the combined effects of the deregulation and the slower growth of the industry, the strategies that had worked in the past were no longer effective.

Design and Participants

The study employed a one-by-three design with three levels of past performance (low, moderate, and high success). Participants, who were randomly assigned to the three conditions of the simulation, were 168 graduating seniors (77 women and 91 men) enrolled in a strategic management course at a large U.S. university. The experiment was conducted in a computer laboratory in seven sessions with 20–25 individuals in each. Each person worked individually in a work area separated from the others by partitions. Participants in the same session were randomly assigned to different performance conditions. The experimenter was not aware of the condition assigned to each participant.

The treatment consisted of providing participants at the beginning of the simulation with different levels of task knowledge, which led to dif-

ferent levels of success. Before beginning to play the role of Mr. Douglas, participants were given supplemental information consisting of his thoughts about the strategies that were most likely to be effective in the future. All participants were told to pay attention to advertising, sales force, and finance as crucial strategic areas for increasing their market shares in the following years. Participants assigned to the moderate and high success conditions also received other detailed suggestions. (Interested readers can obtain additional information on the experimental procedure from the first author.)

Although the first author provided tips about effective strategies in the first two decision periods, participants had considerable time to make their choices and to revise their strategies over time. At the end of time period 9, they were asked questions on satisfaction with performance, self-set goals, self-efficacy, and confidence in strategy-performance relationships. At the end of time period 13, which was also the end of the simulation, participants were asked to answer a question on their perception of environmental changes.

Measures

Experimental condition. The experimental treatment consisted of three levels of task knowledge provided at the beginning of the simulation that led to different levels of success. The three conditions were coded as follows: 1, low success; 2, moderate success; and 3, high success.

Persistence with past strategy. Although in study 1 our measure of strategic persistence referred to the overall strategic profile, in study 2 we were able to use a finer-grained measure. Because the effective strategies were predetermined in the simulation and were identical for all participants, we could directly examine participants' strategic actions. In the Cellular Industry Business Game, high performance in the interval between year 1 and year 8 resulted from a strategy consisting of entering new markets, buying additional radio wave capacity, and aggressively increasing sales force and advertising expenditures. After year 8, entering new markets and accumulating radio wave capacity lost relevance because licenses to operate in new markets were no longer available and most participants had accumulated spare radio wave capacity. Thus, after year 8, persistence with the past strategy primarily meant continuing to increase advertising and sales force at rates similar to those of the earlier stage.

Since success resulted from the use of an accelerated strategy, no change or a small change in sales

force and advertising represented nonuse or decreased use of the old strategy and, therefore, low persistence. Thus, we measured persistence with the past strategy by summing the standardized variance of advertising expenditure and sales force per million people served between years 8 and 13. A high score indicated high persistence with the old strategy, and a low score indicated low persistence.

A large variance score over the interval of time considered might also indicate a pattern of reduction in advertising investment and sales personnel. However, this was not the case in this simulation because participants displayed a tendency to increase or to hold steady their investments in sales force and advertising. In fact, the variance of the two strategic indicators used was positively correlated with their respective difference score (sales force, $r = .90$, $p < .01$; advertising, $r = .88$, $p < .01$). We preferred the sum of the standardized variance of the two strategies over the sum of the difference scores because it provided a finer-grained way to discriminate among participants.

Change in performance after the environmental change. Our measure was change in operating profits between decision period 8 and decision period 13. In our exploratory analyses, we also used change in return on sales between the same two periods. Since these two measures produced the same pattern of results, we decided to use change in operating profit for our main analyses because it was more directly linked to the use of previously effective strategies.

Mediating variables. We measured satisfaction by computing the means of responses (1 = not at all, 7 = totally) to these two questions ($\alpha = .94$): "I am very satisfied about last year's market share" and "I am very satisfied about last year's overall performance." Belief in current strategies was measured as the mean of two items expressing confidence (0–100; $\alpha = .78$) that increasing the sales force and increasing advertising expenditures would have a positive impact on market share in the future. Self-efficacy was the sum of the standardized responses to the following two items ($\alpha = .97$): "Assess your confidence in achieving the following thirteen levels of market share or higher in the next year by rating Y [yes], for each level, if you think you can achieve that level of market share or higher" (range of total number of yes answers, 0–13) and "Assess your confidence in achieving the following thirteen levels of market share or higher in the next year by using, for each level, a number between 0 and 100 to indicate how confident you are in achieving that market share level or higher." The variable goals was measured by the sum of responses to these two items ($\alpha = .96$):

“Indicate the level of market share that you are trying to attain next year” and “What is the minimum acceptable level of market share for the next year?” These items were filled out at the end of year 9 because that was when the deregulation started to affect the rules of competition. The total amount of information was obtained by summing the information requests made between years 9 and 13. Favorable information was the amount of information sought in those years from executives who had been supportive in the past. Unfavorable information was the amount of information sought in those years from executives who had been critical in the past.

Control variables. We used three participant characteristics as control variables: gender (male = 0, female = 1), class grade (C = 1, B = 2, A = 3), and grade point average.

Analyses

We verified the assumption that the measures of the concepts were distinct using confirmatory factor analysis. This procedure permits testing the significance of the number of factors in a data set as well as the structure of those factors. Confirmatory factor analysis, which utilizes covariance structure modeling, provides commonly accepted fit statistics: the comparative fit index (CFI), the incremental fit index (IFI), and the root-mean-square residual (RMSR) (Bentler, 1990; Bollen, 1988). We estimated covariance structure models using LISREL VII (Jöreskog & Sörbom, 1989). We tested Hypotheses 2 and 3 using hierarchical regression analysis.

RESULTS, STUDY 2

Treatment Checks

Manipulation checks for degree of success consisted of the two following questions: “How do you evaluate your current market share compared to your market share at year 1?” and “How do you evaluate your current overall performance compared to your overall performance at year 1?” (1 = very unsuccessful, 7 = very successful). Because responses to these questions were highly correlated ($\alpha = .94$), we used the mean to form a single measure. The means and standard deviations of this measure, taken at year 9, were 6.08 (1.16), 5.25 (1.90), and 2.63 (1.81) for the high success, moderate success, and poor performance conditions, respectively. An analysis of variance (ANOVA) revealed that these means were significantly different ($F_{2, 165} = 64.94, p < .01$).

To verify that the simulation provided sufficient information to reveal a radical environmental change over time, after participants had received the last performance feedback we asked them whether, in the last few decision periods, the FCC had made decisions that affected the entire industry (1 = strongly disagree, 7 = strongly agree). The distribution of the answers to this question was positively skewed ($\bar{x} = 5.31, s.d. = 1.98$) and so indicated that, on the average, the environmental change was noticeable. This item was not correlated to persistence with the current strategy. Nonetheless, we used awareness of the environmental change as an additional control variable in our mediation analyses.

Confirmatory Factor Analysis

We tested the following alternative models to explore the possibility that some of the concepts were not distinct: a model with all variables loaded on one factor (model 1); a hypothesized model (model 2); a model in which goals and self-efficacy items were loaded on one factor (model 3); a model where satisfaction and self-efficacy items were loaded on one factor (model 4); a model with satisfaction and goals on one factor (model 5); a model where all information items were loaded on one factor (model 6); and, finally, a model in which favorable information sought and unfavorable information sought were loaded on one factor (model 7). Confirmatory factor analysis revealed that model 2, the hypothesized model with nine distinct factors, had better fit indexes (CFI = .97, IFI = .97, RMSR = .03) than all the other models.

Test of Hypotheses

Table 3 shows means, standard deviations, and correlations. Table 4 reports results of the regressions conducted to test Hypotheses 2a and 2b and Hypothesis 3. Model 2 in Table 4 shows that, after the control variables had been included, past success had a significant effect on strategic persistence ($\beta = .40, p < .05$), thus confirming Hypothesis 2a. Furthermore, model 5 in Table 4 shows that persistence with old strategies decreased performance after the environmental change ($\beta = -.74, p < .05$), thus supporting Hypothesis 2b. Recall that it was necessary for us to replicate the conditions of study 1 to be able to investigate the psychological factors that mediate the success-persistence relationship.

To test Hypothesis 3, the mediation hypothesis, we used a procedure suggested by James and Brett (1984). In this procedure, variable *b* mediates the effect of variable *a* on variable *c* if all of the follow-

TABLE 3
Means, Standard Deviations, and Correlations, Study 2^a

Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12
1. Level of past performance	2.01	4.70												
2. Satisfaction	4.70	2.10	.56*											
3. Belief in current strategies	51.63	28.66	.31*	.51*										
4. Self-efficacy	0.00	0.99	.64*	.66*	.48*									
5. Goals	22.06	15.20	.71*	.61*	.44*	.82*								
6. Total information	5.83	5.63	.04	.08	.05	.01	.06							
7. Favorable information	1.02	1.54	-.09	.02	-.04	-.08	.01	.80*						
8. Unfavorable information	1.26	1.74	-.18*	-.11	-.08	-.15	-.12	.75*	.79*					
9. Grade point average	3.20	1.70	-.09	-.06	.07	.03	.00	.07	.03	.08				
10. Class grade	3.45	1.63	-.08	-.08	-.02	-.10	-.12	.00	-.06	.03	.41*			
11. Gender	0.46	0.50	-.08	-.12	.01	-.10	-.12	-.13	-.07	-.13	.12	.24*		
12. Persistence	0.00	1.41	.34*	.24*	.29*	.40*	.50*	.01	.05	-.11	.08	.01	.01	
13. Change in performance	-33.14	71.05	-.19*	-.19*	-.22*	-.26*	-.32*	-.07	-.11	.07	-.11	-.08	.06	-.73*

^a $n = 168$.

* $p < .05$

TABLE 4
Results of Regression Analyses for Persistence with Old Strategies and Change in Performance after a Radical Environmental Change, Study 2

	Persistence			Change in Performance	
	Model 1	Model 2	Model 3	Model 4	Model 5
Class grade	-.08	-.07	.03	-.07	-.13
Gender	-.06	-.03	-.09	.09	.05
Grade point average	.07	.11	.04	-.10	-.05
Accuracy of perception of external events	-.05	-.10	-.07	-.02	-.05
Level of past performance		.40*	.12		
Satisfaction			-.26*		
Beliefs in current strategies			.15 [†]		
Self-efficacy			.17 [†]		
Goals			.30*		
Total information sought			-.01		
Information from favorable sources			.44*		
Information from unfavorable sources			-.40*		
Persistence					-.74*
R^2	.01	.17*	.35*	.02	.56*
ΔR^2		.16*	.18*		.54*

[†] $p < .10$

* $p < .05$

ing conditions are satisfied: (1) a has an effect on b , (2) b has an effect on c , and (3) the effect of a on c vanishes when b is held constant. The first-order correlations in Table 3 reveal that success has a significant effect, in the expected direction, on the mediating variables, except for total information and favorable information. Table 3 also reveals that the hypothesized mediating variables, again with the exception of total information and favorable

information, have significant effects on persistence in the expected direction. Finally, model 3 in Table 4 shows that, when mediators are entered before past success, the effect of past success on persistence is vitiated ($\beta = .12$, n.s.).

Note that the beta coefficients of the mediators in model 3 must be interpreted as direct effects. A mediator can also affect success indirectly, through its effect on another mediator. This is, for example,

the case of self-efficacy, which, as Table 3 reveals, is positively associated with satisfaction, belief in current strategies, and goals. A simple way to detect total effects (the sum of direct and indirect effects) is to run regression models including control variables, past success, and one mediator at a time. These supplemental analyses, not reported here but available upon request, confirm the mediating effect of goals and information from unfavorable sources, show that the total effects of self-efficacy and belief in current strategies are much stronger than their direct effects ($p < .05$) and, more importantly, reveal that the total effect of satisfaction is positive ($\beta = .23, p < .05$), not negative like satisfaction's direct effect. In view of the links between satisfaction and goals, self-efficacy, and beliefs (see Table 3), this finding means that, overall, greater satisfaction leads to greater strategic persistence. Taken together, these findings show that, with the exception of the amounts of total and favorable information acquired, the intervening psychological processes identified in the proposed model mediate the effects of past success on individual strategic decision makers' strategic persistence. Thus, except for parts e and f, Hypothesis 3 was supported.

DISCUSSION

This research identifies an intriguing pattern that we call the paradox of success. The paradox lies in the fact that the very success that organizations strive to achieve plants the seeds of their possible future decline. Once organizations achieve success, their natural tendency is to continue to exploit the strategies that worked in the past. Indeed, skillful refinement and maximum exploitation of previously effective strategies are often at the heart of lasting success (March, 1991). Such success-persistence-success cycles, however, become self-destructive when radical external changes impose the need to use new strategies. After a period of success, organizations may lose the ability to recognize when it is time to abandon previously effective strategies. Consequently, they may experience larger drops in performance than organizations with lesser histories of success.

Study 1 demonstrates such detrimental effects of past success in the airline and trucking industries. After controlling for market diversity, size, and CEO change—three variables often associated with inertia—we found that success increased strategic persistence in the face of dramatic environmental changes and that this persistence had negative performance consequences. Study 2, in addition to replicating the paradox of success at the individual

level, shed some light on the underlying mechanisms, pointing to the psychological consequences of success for decision makers as one cause of this paradox. Our findings show that the detrimental effect of success is due not to any one particular process, such as restricted information seeking or development of rigid beliefs, but rather, to the combined effects of several processes.

As predicted, past success increased strategic decision makers' satisfaction, and satisfaction led decision makers to increase their use of past strategies. However, the effect of satisfaction is more complex than is generally thought. Typically, satisfaction is expected to lead to complacency—that is, drifting with no attempt at improvement (e.g., Miller & Chen, 1994). However, that did not occur here with respect to motivation to perform. First-order correlations revealed that higher satisfaction was associated with higher self-efficacy and higher goals. Satisfaction did lead to complacency, however, in another way. It was associated with stronger belief in the validity of current strategies, which increased strategic decision makers' tendency to stick to past strategies. As consecutive successes accumulated, past achievements led to a stronger conviction that the current course of action was correct.

Moreover, the higher level of self-efficacy and higher goals that accompany past success induced further dysfunctional persistence. This result apparently contradicts previous micro research that has consistently shown that high goals and high self-efficacy lead to higher-quality planning and better selection of effective strategies (Smith, Locke, & Barry, 1990; Wood & Bandura, 1989). The resolution of this enigma is that, if effective strategies are already known, then high goals and high self-efficacy increase the likelihood that such strategies will be used. But high goals and high self-efficacy will also increase the likelihood that ineffective strategies will be used if individuals believe, mistakenly, that they will work (cf. Earley & Perry, 1987). This is consistent with arguments made by Lindsley, Brass, and Thomas (1995), who suggested that when higher performance and higher efficacy build upon each other, creating an upward spiral, individuals expect easy results and so are less likely to adapt to a changing task environment.

Not all the psychological mechanisms leading to strategic persistence here were motivational. Information seeking also mediated the success-persistence relationship. However, such an effect did not involve the amount of information sought as such. Rather, it involved the type of information solicited. Following success, the amount of information

sought from unfavorable sources decreased. Such a pattern would tend to reinforce assumptions about the effectiveness of past strategies and undermine the ability to foresee the need to develop new ones. Our findings are consistent with those of Ashford and Tsui (1991), who found that failing to seek negative feedback fostered managerial ineffectiveness.

Implications for Future Research

Together, these findings are relevant to the literature on organizational inertia. Typically, organizations' lack of responsiveness to radical environmental changes has been seen as stemming from constraints that emanate from organizational structures, institutional pressures, organizational ideologies, investments in specialized assets, and so forth (e.g., Hannan & Freeman, 1989). Although authors have assumed that these constraints work through decision making (Child, 1972; Hambrick & Finkelstein, 1987), they have not directly examined the mediating effects of individual strategic decision makers' psychological processes. Our research addresses this gap by pointing to a path that is an alternative or, at least, a complementary path to inertia, a path that links organizational success to strategic rigidity through a well-identified set of psychological processes present in strategic decision makers.

In the context of micro explanations of macro organizational phenomena (Staw & Sutton, 1992), our research provides an interesting complement to the series of experimental and field studies conducted by Staw and his associates on the escalation of commitment (e.g., Staw & Ross, 1987). Although our studies focus on strategic persistence caused by past success, those of Staw and his associates focused on persistence in the face of failure. Staw's studies examined situations in which strategic decision makers have taken actions that lead to losses and, subsequently, rather than changing their behavior, stick to the current, losing course of action. His research shows that decision makers' motives, such as the desire not to admit failure, in combination with other factors, are responsible for these instances of pathological organizational persistence.

Whereas the escalation of commitment phenomenon is caused by the belief that a previously *losing* course of action will succeed in the future, the paradox of success is caused by the belief that a previously *winning* course of action will succeed in the future. In the first case, decision makers assume that conditions will be somehow different in the future, whereas in the second case, they assume

that the conditions will be the same. The sad irony of Staw's findings combined with ours is that both failure and success may be dysfunctional, though for different reasons. Although the escalation of commitment phenomenon is, at least in part, due to the fact that decision makers who are responsible for having chosen the current, failed strategies see the decision to abandon them as ego-threatening, the paradox of success phenomenon is due to the fact that decision makers become overconfident because of their past success.

There may also be other psychological processes mediating the effect of success on strategic decision makers' dysfunctional persistence, but we believe that more can be learned by widening the analysis to other organizational processes. Enduring success is likely to affect the strategy-making process through other causal paths. Past success may alter internal dynamics within top management teams by favoring the development and sharing of strong beliefs based on the past and by limiting dissent (e.g., Dutton & Duncan, 1987). Past success may also affect the political context of an organization by strengthening the power of its dominant coalition and creating a context in which demands for change are suffocated before they are voiced (Pfeffer, 1981).

The paradox of success, however, is not inevitable. Some successful organizations are able to generate streams of incremental innovation as well as innovation that redefines their own industry (Tushman & O'Reilly, 1997). The investigation of the factors that prevent such organizations from falling into a pattern of dysfunctional persistence strikes us as another important area for future research. For example, their long-lasting success might be due to the fact that their executives are endowed with skills that make them immune to the paradox of success. Future research could try to identify the individual skills that act as antidotes. Alternatively, their invulnerability might stem from the effective use of organizational processes such as executive turnover and board monitoring.

Managerial Implications

From a practical standpoint, our research suggests that successful strategic decision makers should develop routines to counteract the natural tendency to rely excessively on past achievements in their strategic assessments. More specifically, our findings point to information-seeking patterns as a major area of concern. Being open to information and advice from critics seems to be an effective way to increase one's adaptive capacity. Seeking and being open to critics' opinions, however,

should not necessarily imply the need to follow their advice. As noted, great business leaders typically succeed by ignoring critics and defying the status quo. Thus, it is critical that invalid criticism be distinguished from valid criticism. One way to do this is to check information coming from one source against views coming from different perspectives (Nystrom & Starbuck, 1984).

Another way to weaken the pernicious effect of success might be to redefine the concept of performance by adding new kinds of goals. We have shown that when a firm is performing extremely well on a salient performance dimension, the natural tendency is to use the same strategies. In these situations, executives can facilitate change by directing attention to other performance dimensions, for which current performance is inadequate. This shift in the allocation of attention can be achieved by setting new goals. At Boeing, for example, executives sought to reduce the perception of success derived from having the largest market share in the aerospace industry by focusing on a different type of market share—the proportion of new aircraft operated by airline companies (*Fortune*, 1994). The logic behind this new goal was that old airplanes, even if they were made by Boeing, could be the most dangerous competitors if airline companies put off buying new aircraft and decided to keep old planes in use. Since high prices were the main reason why airline companies postponed purchase decisions, this new goal reduced strategic inertia by favoring change initiatives aimed at obtaining drastic cost reductions.

Limitations

Like all research, our studies have limitations. One limitation pertains to the generalizability of the findings of study 1. Because we focused on two industries that underwent discrete and radical environmental changes, it is unclear whether our findings apply to industries undergoing different kinds of shifts, like high-technology industries that experience continuous and unanticipated changes. Nonetheless, the fact that we were able to obtain similar findings in both industries studied (airlines and trucking) and to replicate these findings in a laboratory setting gives us confidence that the paradox of success is a phenomenon worthy of additional research.

One should also be cautious in generalizing the findings of study 2 to executives. Some of the differences between undergraduates and executives, such as differences in age and job experience, may alter the success-persistence relationship. Clearly, future research should try to replicate the paradox

of success with other kinds of participants. However, until then, given the difficulties in gaining access to executives for in-depth examinations of the psychological dynamics behind strategic decision making, we think that our research is a useful first step that can guide and spur future research.

REFERENCES

- Ashford, S. J. 1989. Self-assessment in organizations: A literature review and an integrative model. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, vol. 11: 133–174. Greenwich, CT: JAI Press.
- Ashford, S. J., & Cummings, L. L. 1983. Feedback as an individual resource: Personal strategies of creating information. *Organizational Behavior and Human Performance*, 32: 370–398.
- Ashford, S. J., & Tsui, A. S. 1991. Self-regulation for managerial effectiveness: The role of active feedback-seeking. *Academy of Management Journal*, 34: 251–280.
- Bandura, A. 1986. *Social foundations of thought and action*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. 1997. *Self-efficacy: The exercise of control*. New York: W. H. Freeman.
- Bentler, P. M. 1990. Comparative fit indexes in structural models. *Psychological Bulletin*, 107: 238–246.
- Boeker, W. 1997. Strategic change: The influence of managerial characteristics and organizational growth. *Academy of Management Journal*, 40: 152–170.
- Bollen, K. A. 1988. A new incremental fit index for general equation models. *Sociological Methods and Research*, 17: 303–316.
- Child, J. 1972. Organizational structure, environment and performance: The role of strategic choice. *Sociology*, 6: 1–22.
- Corsi, T. M., & Stowers, J. R. 1991. Effects of a deregulated environment on motor carriers: A systematic, multi-segment analysis. *Transportation Journal*, 30 (spring): 4–28.
- Cyert, R. M., & March, J. G. 1963. *A behavioral theory of the firm*. Englewood Cliffs, NJ: Prentice-Hall.
- Daft, R. L., & Weick, K. E. 1984. Toward a model of organizations as interpretation systems. *Academy of Management Review*, 9: 284–295.
- Dutton, J. E., & Duncan, R. B. 1987. The creation of momentum for change through the process of strategic issue diagnosis. *Strategic Management Journal*, 8: 279–295.
- Earley, P. C., & Perry, B. C. 1987. Work plan availability and performance: An assessment of task strategy priming on subsequent task completion. *Organizational Behavior and Human Decision Processes*, 39: 279–302.

- Finkelstein, S., & Hambrick, D. C. 1990. Top management team tenure and organizational outcomes: The moderating role of managerial discretion. *Administrative Science Quarterly*, 35: 484–503.
- Finkelstein, S., & Hambrick, D. C. 1996. *Strategic leadership: Top executives and their effects on organizations*. New York: West.
- Fortune. 1994. Why to go for stretch targets. November 14: 145–155.
- Greve, H. R. 1998. Performance, aspirations, and risky organizational change. *Administrative Science Quarterly*, 43: 58–86.
- Hambrick, D. C., & Finkelstein, S. 1987. Managerial discretion: A bridge between polar views of organizations. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, vol. 9: 369–406. Greenwich, CT: JAI Press.
- Hannan, M. T., & Freeman, J. 1984. Structural inertia and organizational change. *American Sociological Review*, 49: 149–164.
- Hannan, M. T., & Freeman, J. 1989. *Organizational ecology*. Cambridge, MA: Harvard University Press.
- Haveman, H. A. 1992. Between a rock and a hard place: Organizational change and performance under conditions of fundamental environmental transformation. *Administrative Science Quarterly*, 37: 48–75.
- Hedberg, B. L. T. 1981. How organizations learn and unlearn. In W. H. Starbuck & P. C. Nystrom (Eds.), *Handbook of organizational design*, vol. 1: 3–27. New York: Oxford University Press.
- Hollander, E. P., & Julian, J. W. 1969. Contemporary trends in the analysis of leadership processes. *Psychological Bulletin*, 71: 387–397.
- Isen, A. M., & Baron, R. A. 1991. Positive affect as a factor in organizational behavior. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior*, vol. 13: 1–53. Greenwich, CT: JAI Press.
- James, L. R., & Brett, J. M. 1984. Mediators, moderators and tests for mediation. *Journal of Applied Psychology*, 69: 307–321.
- Jöreskog, K. G., & Sörbom, D. 1989. *LISREL VII: A guide to the program and applications*. Chicago: Scientific Software.
- Kelly, D., & Amburgey, T. L. 1991. Organizational inertia and momentum: A dynamic model of strategic change. *Academy of Management Journal*, 34: 591–612.
- Kiesler, S., & Sproull, L. 1982. Managerial response to a changing environment: Perspectives on problem sensing from social cognition. *Administrative Science Quarterly*, 27: 548–570.
- Lant, T. K., Milliken, F. J., & Batra, B. 1992. The role of managerial learning and interpretation in strategic persistence and reorientation: An empirical investigation. *Strategic Management Journal*, 13: 585–608.
- Lant, T. K., & Montgomery, C. 1987. Learning from strategic success and failure. *Journal of Business Research*, 15: 503–518.
- Levine, M. 1971. Hypothesis theory and nonlearning despite ideal S-R reinforcement contingencies. *Psychological Review*, 78: 130–140.
- Levitt, B., & March, J. G. 1988. Organizational learning. In W. R. Scott & J. F. Short, Jr. (Eds.), *Annual review of sociology*, vol. 14: 319–340. Palo Alto, CA: Annual Reviews.
- Lindsley, D. H., Brass, D. J., & Thomas, J. B. 1995. Efficacy-performance spirals: A multilevel perspective. *Academy of Management Review*, 20: 645–678.
- Locke, E. A., & Latham, G. P. 1990. *A theory of goal setting and task performance*. Englewood Cliffs, NJ: Prentice-Hall.
- March, J. G. 1991. Exploration and exploitation in organizational learning. *Organization Science*, 2: 71–87.
- March, J. G., & Olsen, J. P. 1976. *Ambiguity and choice in organizations*. Bergen, Norway: Universitetsforlaget.
- Meyer, A. D., Goes, J. B., & Brooks, G. R. 1993. Organizations reacting to hyperturbulence. In G. P. Huber & W. H. Glick (Eds.), *Organizational change and redesign*: 66–111. New York: Oxford University Press.
- Miller, D. 1993. The architecture of simplicity. *Academy of Management Review*, 18: 116–138.
- Miller, D., & Chen, M.-J. 1994. Sources and consequences of competitive inertia. *Administrative Science Quarterly*, 39: 1–23.
- Milliken, F. J., & Lant, T. K. 1991. The effect of an organization's recent performance history on strategic persistence and change. In P. Shrivastava, A. Huff, & J. E. Dutton (Eds.), *Advances in strategic management*, vol. 7: 129–156. Greenwich, CT: JAI Press.
- Nystrom, P. C., & Starbuck, W. H. 1984. To avoid organizational crises, unlearn. *Organizational Dynamics*, 12(4): 53–65.
- Pfeffer, J. 1981. *Power in organizations*. New York: Pitman.
- Prahalad, C. K., & Bettis, R. A. 1986. The dominant logic: A new linkage between diversity and performance. *Strategic Management Journal*, 7: 485–501.
- Schwartz, B. 1982. Reinforcement-induced behavioral stereotype: How not to teach people to discover rules. *Journal of Experimental Psychology: General*, 1: 23–59.
- Shaw, M. E. 1976. *Group dynamics: The psychology of small group behavior*. New York: McGraw-Hill.
- Smith, K. G., & Grimm, C. M. 1987. Environmental variation, strategic change and firm performance: A study of railroad deregulation. *Strategic Management Journal*, 8: 363–376.

- Smith, K. G., Grimm, C. M., & Gannon, M. J. 1992. *Dynamics of competitive strategy*. London: Sage.
- Smith, K. G., Locke, E. A., & Barry, D. 1990. Goal setting, planning, and organizational performance: An experimental simulation. *Organizational Behavior and Human Performance*, 46: 118–134.
- Staw, B. M., & Ross, J. 1987. Behavior in escalation situations: Antecedents, prototypes, and solutions. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior*, vol. 9: 39–78. Greenwich, CT: JAI Press.
- Staw, B. M., & Sutton, R. I. 1992. Macro organizational psychology. In J. K. Murnighan (Ed.), *Social psychology in organizations: Advances in theory and research*: 350–384. Englewood Cliffs, NJ: Prentice-Hall.
- Tushman, M. L., & O'Reilly, C. 1997. *Winning through innovation*. Boston: Harvard Business School Press.
- Tushman, M. L., & Romanelli, E. 1985. Organizational evolution: A metamorphosis model of convergence and reorientation. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior*, vol. 7: 171–222. Greenwich, CT: JAI Press.
- Vietor, R. H. K. 1990. Contrived competition: Airline regulation and deregulation, 1925–1988. *Business History Review*, 64(spring): 61–108.
- Vroom, V. 1964. *Work and motivation*. New York: Wiley.
- Wood, R., & Bandura, A. 1989. Impact of conceptions of ability on self-regulatory mechanisms and complex decision making. *Journal of Personality and Social Psychology*, 56: 407–415.
- Zajac, E. J., & Kraatz, M. S. 1993. A diametric model of strategic change: Assessing the antecedents and consequences of restructuring in the higher education industry. *Strategic Management Journal*, 14: 83–102.

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