

Marquette University

**e-Publications@Marquette**

---

Management Faculty Research and  
Publications

Management, Department of

---

1-1-2019

## **Not All Responses Are the Same: How CEO Cognitions Impact Strategy When Performance Falls Below Aspirations**

David B. Wangrow

Kalin Kolev

Margaret Hughes-Morgan

Follow this and additional works at: [https://epublications.marquette.edu/mgmt\\_fac](https://epublications.marquette.edu/mgmt_fac)



Part of the [Business Commons](#)

---

Marquette University

e-Publications@Marquette

**Management Faculty Research and Publications/College of Business Administration**

***This paper is NOT THE PUBLISHED VERSION; but the author's final, peer-reviewed manuscript.*** The published version may be accessed by following the link in the citation below.

*Journal of General Management*, Vol. 44, No. 2 (January 1, 2019): 73-86. [DOI](#). This article is © SAGE Publications and permission has been granted for this version to appear in [e-Publications@Marquette](#). SAGE Publications does not grant permission for this article to be further copied/distributed or hosted elsewhere without the express permission from SAGE Publications.

# Not All Responses Are the Same: How CEO Cognitions Impact Strategy When Performance Falls Below Aspirations

David B Wangrow

College of Business Administration, Marquette University, Milwaukee, WI

Kalin Kolev

College of Business Administration, Marquette University, Milwaukee, WI

Margaret Hughes-Morgan

College of Business Administration, Marquette University, Milwaukee, WI

## Abstract

This study integrates research on managerial discretion within the behavioral theory of the firm to examine how four CEO psychological traits serving as antecedents of managerial discretion—*ambiguity tolerance*, *cognitive complexity*, *locus of control*, and *commitment to the status quo*—moderate firm responses to poor performance. Using CEOs' responses to questionnaires, CEO ambiguity tolerance is found to positively moderate the relationship between negative attainment discrepancy and strategic change when performance is slightly below aspirations, defined as average market return for the firm's industry. Further, CEOs with greater cognitive

complexity are found to engage in more strategic change when performance is farther below aspirations. Thus, this study begins to unpack the role of CEOs' cognitive makeup on firm responses to performance shortfalls.

## Keywords

[ambiguity tolerance](#), [CEO psychological traits](#), [cognitive complexity](#), [negative attainment discrepancy](#), [strategic change](#)

## Introduction

One of the key theories in strategic management that focuses on firm risk taking and strategic change is the behavioral theory of the firm (BTOF) ([Cyert and March, 1963](#)). At its core, it is a theory of performance feedback that serves as an important driver of managerial decisions. In particular, managers assess their firm's performance relative to a predetermined aspiration level and act accordingly. When current performance falls below aspirations, managers are faced with a negative attainment discrepancy and begin problemistic search for solutions to close the performance gap ([Bromiley, 1991](#); [Greve, 2003](#)). As performance further deteriorates, managers are more likely to deviate from the status quo and undertake strategic change with the hopes of bringing the firm back to its predetermined aspiration levels. There is ample evidence from prior research that negative attainment discrepancy encourages various risky activities, such as research and development (R&D) initiatives ([Greve, 2003](#)), partnership ties ([Shipilov et al., 2011](#)), foreign market entry ([Shapira, 2017](#)), and risk taking ([Lim and McCann, 2014](#)).

An implicit assumption in performance feedback research has been that poor performance automatically drives strategic change and scholars have almost taken it for granted that performance below aspirations is sufficient to trigger a firm response. As a result, managers have been viewed as equally capable of responding to negative attainment discrepancy and their role in performance feedback has been overlooked. However, such an approach conflicts with the managerial discretion literature which posits that managers differ in their level of control over conceiving, deliberating, planning, and implementing strategic actions ([Hambrick and Finkelstein, 1987](#)). With greater discretion, managers are more able to recognize the need for change and implement the necessary actions for such change (see [Wangrow et al., 2015](#), for review).

To address this gap in performance feedback research—that managers differ in their ability to pursue strategic change in response to poor performance—this study integrates managerial discretion theorizing with the BTOF. To that end, this study is designed to examine how the four psychological traits (i.e. *ambiguity tolerance*, *cognitive complexity*, *locus of control*, and *commitment to the status quo* (CSQ)) identified by [Hambrick and Finkelstein \(1987\)](#) to impact managerial discretion affect his or her ability to implement strategic actions in response to poor performance. Examining the moderating effects of these four psychological traits goes beyond the traditional use of demographic indicators and addresses the call to peer into the real psychological processes that drive executive behavior (see [Hambrick, 2007](#); [Lawrence, 1997](#)).

This study seeks to make several contributions. First, integrating managerial discretion into the BTOF and examining the impact of CEO psychological traits on firm responses to performance cues address a relatively overlooked element in performance feedback research—the role of the executive in driving strategic change following poor performance. Thus, this study responds to calls for greater attention to the human element in BTOF research and its essential role in firm responses to performance cues ([Gavetti et al., 2007](#)). The second contribution is extending the BTOF towards a contingency view of performance feedback. While studies have examined how industry-level ([Wiklund and Shepherd, 2003](#)) and firm-level factors ([Audia and Greve, 2006](#); [Lim and McCann, 2014](#)) moderate the relationship between poor performance and strategic change, this study focuses on characteristics residing at the individual level of analysis. Third, by examining the moderating effects of four important psychological traits on the relationship between poor performance and strategic change,

managerial discretion research is extended into the “black box” of executive behavior. In doing so, this study considers not only how these psychological traits influence strategic responses to poor performance, but which traits may be associated with more rapid responses when performance falls just below aspirations and which traits may be associated with more extensive strategic change when performance is far below aspirations.

## Literature review and development of hypotheses

Researchers have argued that organizations in uncertain environments respond by making decisions based on their prior history ([Cyert and March, 1963](#); [Levitt and March, 1988](#)). This has led to an interest in how organizational characteristics and history determine the likelihood of strategic change under conditions of uncertainty ([Levinthal and March, 1993](#); [Miller and Chen, 1994](#); [Greve, 2003](#)). [Cyert and March's \(1963\)](#) influential BTOF was one of the first theoretical underpinnings to make predictions on when organizations are likely to make changes. A primary tenet of BTOF is *problemistic search*, which is initiated when the organization performs poorly and, thus, makes change more likely. In essence, the theory argues that poor performance serves as a catalyst to search for solutions and stimulates managers to break away from established organizational routines ([Bromiley, 2005](#)). As performance falls farther below aspiration levels, firms are faced with a greater necessity to undertake strategic change that could address performance shortfalls. For example, [Greve \(2003\)](#) finds that when performance falls below aspirations, firms are more likely to pursue R&D activities. Similarly, [Baum and colleagues \(2005\)](#) provide further support by showing that poor performance triggers the search for new partnerships in the banking industry. Other studies have also found that negative attainment discrepancy results in more strategic change in the form of risk taking ([Lim and McCann, 2014](#)), foreign market entry ([Ref and Shapira, 2017](#)), and divestitures ([Kuusela et al., 2017](#)). Consistent with these studies, a baseline hypothesis associated with negative attainment discrepancy and strategic change is developed. Formally stated:

Baseline hypothesis: Negative attainment discrepancy leads to greater strategic change.

Strategic change is fundamental in aligning the firm with its environment ([Andrews, 1971](#)) and represents a major source of firm survival ([Carpenter, 2000](#)), but it is also inherently uncertain and complex. Thus, its implementation is dependent on how executives perceive strategic change and whether they view it as a viable means to address their firm's problems. Prior research in the BTOF tradition has primarily focused on how negative attainment discrepancy impacts strategic change but pays little attention to the role of firm executives in that process, as well as whether executives with various cognitions, experiences, and risk preferences respond differently to poor performance. Examining the role of executives' psychological traits in the relationship between performance and action addresses this omission in prior research. Indeed, according to [Gavetti et al., \(2007: 10\)](#) “the recent and growing movement in strategy research...pursues an agenda in which the construct of cognitive representation plays a pivotal role.”

While the basic argument in this study is developed from the premise that executives respond to performance shortfalls, it is rather simplistic to expect a similar response by all executives. Prior research has shown that not all executives have the same level of discretion to pursue strategic choices and, thus, have latitudes of action that can vary greatly (e.g. [Crossland et al., 2014](#); [Hambrick and Abrahamson, 1995](#); [Key, 2002](#)). Hambrick and Finkelstein asserted that managerial discretion is determined by three forces: the task environment, the internal firm context, and the executive's personal characteristics. For example, scholars have found that greater industry growth, munificence, and dynamism lead to greater managerial discretion ([Hambrick and Abrahamson, 1995](#)). In contrast, more industry regulation and concentration limit the latitude of action available to firm executives ([Porter, 1980](#); [Thompson, 1967](#)). Furthermore, theory and prior evidence suggest that while larger, older, and more capital-intensive firms restrict managerial discretion ([Hambrick and Macmillan, 1985](#); [Hannan](#)

[and Freeman, 1977](#)), greater firm resources and organizational slack serve to enhance executives' latitude of action ([Barker and Duhaime, 1997](#); [Cyert and March, 1963](#)).

There are several reasons for examining executives' individual characteristics that affect managerial discretion. First, a greater understanding of the role of the human element in firm responses to performance cues is needed. Upper echelons theory holds that top managers, based on their own set of cognitions and experiences, make choices and decisions that shape a firm's competitive posture ([Carpenter, 2002](#); [Hambrick and Mason, 1984](#)). Hence, their cognitive makeup will also play a role in implementing strategic change. Focusing on these individual-level characteristics, rather than industry-level or organizational-level characteristics, enables a look into the remaining black box in current theoretical models. In addition, there has been a lack of agreement on the measurement and construct validity of managerial discretion when generalizations about the task environment or internal organization are used to measure managerial discretion (c.f. [Wangrow et al., 2015](#)). This study avoids such issues by relying directly on observable and validated measures of the four psychological traits posited by [Hambrick and Finkelstein \(1987\)](#) to serve as antecedents of managerial discretion. Furthermore, focusing on individual characteristics that determine managerial discretion facilitates a more intimate examination of executives' cognitions and behaviors when faced with performance shortfalls in their firms (e.g. [Hambrick et al., 2005](#)).

The model developed in this study focuses on the moderating effects of four important and minimally examined individual traits on the relationship of negative attainment discrepancy and strategic change. Consistent with the psychology literature on ambiguity tolerance (see [Frenkel-Brunswick, 1949](#); [McLain, 2009](#)), CEOs who tolerate ambiguity are expected to be more proactive and open to experimentation, suggesting that they would drive more immediate change in response to poor performance. Similarly, CEOs who possess greater cognitive complexity are expected to comprehend and integrate more frameworks when making decisions ([McGill et al., 1994](#); [Van Seggelen-Damen, 2013](#)) and be better equipped to adapt to environmental changes ([Bogner and Barr, 2000](#)). Thus, when necessary, CEOs with greater cognitive complexity are expected to drive broader and more extensive strategic change. Additionally, CEOs with a more internal locus of control (see [Hodgkinson, 1992](#); [Rotter, 1966](#)) are expected to feel that their decisions and actions have a greater impact on reversing poor performance than CEOs with a more external locus of control ([Judge et al., 1999](#)) and, thus, are expected to drive greater strategic change following performance shortfalls. Finally, CEOs who are committed to the status quo, embodied in psychological investments to the current state of affairs ([Hambrick et al., 1993](#); [Musteen et al., 2006](#)), are expected to be reluctant to initiate and promote strategic change when performance is below aspirations.

### Ambiguity tolerance and firm responses to performance shortfalls

The ambiguity tolerance construct developed by [Frenkel-Brunswick \(1949\)](#) contains many behavioral traits associated with proactive behavior, including the ability to reverse decisions and courses of action when conditions vary, the avoidance of prematurely selecting solutions in unclear situations, and an open-mindedness toward unfamiliar and unexpected environmental changes ([Furnham and Marks, 2013](#); [McLain, 2009](#)). [Budner \(1962\)](#) defined ambiguity tolerance as an individual's propensity to view ambiguous situations as nonthreatening and desirable, suggesting that ambiguous situations can be novel (i.e. situations with no familiar patterns) or complex (i.e. overly complex situations with too many patterns). A person with greater ambiguity tolerance perceives uncertain and complex situations as interesting and exciting, tends to think creatively, and approaches problems proactively with innovative perspectives ([McLain, 2009](#)).

Researchers have previously linked ambiguity tolerance with the ability to simultaneously manage multiple frameworks, arguing that the ability to do so encourages strategic thinking and improves overall decision-making ([Bonn, 2005](#); [Starbuck and Milliken, 1988](#)). Additionally, [Graetz's \(2002\)](#) study of a firm's future leaders

found that ambiguity tolerance was associated with the abilities to conceptualize a variety of ideas and synthesize proposals from multiple perspectives.

From theory and prior research, CEOs with greater ambiguity tolerance are expected to have a proactive bias in driving strategic change when performance is poor. Since they are not threatened by uncertain and challenging situations, such as deteriorating performance, these CEOs display a willingness to accept and endorse alternative courses of action, are capable of devising effective solutions to problems, and are better equipped to deal with the challenges associated with strategic change. In addition, such CEOs would be more likely to challenge comforting, but sometimes unrealistic, interpretations of firm performance held by the board or top management team ([Drummond, 2015](#)). These arguments extend previous research that has found a strong negative association between ambiguity tolerance and resistance to change (e.g. [Oreg, 2003](#)). Similarly, [Judge et al. \(1999\)](#) found that ambiguity tolerance was among the two psychological traits most strongly associated with executives' ability to cope with change. Indeed, while CEOs less tolerant of ambiguity may wait for significant performance drops before initiating changes, CEOs with higher ambiguity tolerance will be more likely to initiate change once firm performance dips below aspirations.

**H1:** Ambiguity tolerance will moderate the relationship between negative attainment discrepancy and strategic change, such that CEOs with higher ambiguity tolerance will initiate greater strategic change when performance is slightly below aspirations.

## Cognitive complexity and firm responses to performance shortfalls

Prior literature considers that cognitively complex executives are able to envision and execute a wider set of possible actions because they are minimally constrained by their intellectual aptitude, critical thinking skills, and perceptive abilities. Cognitive complexity suggests an executive's capacity to seek, differentiate, and integrate information ([Hogarth, 1980](#)); consider abstract ideas ([Neuliep and Hazelton, 1986](#)); and recognize and comprehend a wider range of perspectives when making decisions ([McGill et al., 1994](#); [Van Seggelen-Damen, 2013](#)). Scholars have argued that cognitively complex executives excel at strategic planning and formulation because they can adapt to changing environments by continually filtering and processing new information and reevaluating goals and strategies ([Hambrick et al., 1996](#); [McGill et al., 1994](#)). This ability to draw on an extensive range of information and personal evaluation skills, as well as greater information processing skills, has been shown to be positively associated with strategic thinking. Outcomes from strategic thinking associated with cognitive complexity include speedier and higher quality evaluation of options during strategic or operational planning ([Hitt and Tyler, 1991](#)), increased speed and quality for acquisition decisions ([Wally and Baum, 1994](#)), and a leader's performance relative to innovation ([Halbesleben et al., 2003](#); [Zander and Kogut, 1995](#)). Indeed, recent research has shown that cognitive complexity is one of the most critical personal competencies necessary for implementing strategic change ([Crossland et al., 2014](#)) and sustaining higher performance in dynamic environments ([Latukha and Panibratov, 2015](#)).

This study extends previous theory and research that links cognitive complexity and proactive behavior by arguing that, in cases of poor performance, cognitively complex CEOs will be better suited to comprehend changes in the internal and external environment and, in turn, be able to conceptualize and drive the necessary changes in their firm's strategies and actions. CEOs' proactive behavior will be driven by an honest and more accurate assessment of current strategies and a deeper understanding of their firm's businesses and how various internal functions are associated with current strategies and serving customers' needs.

**H2:** Cognitive complexity will moderate the relationship between negative attainment discrepancy and strategic change, such that CEOs with greater cognitive complexity will initiate greater strategic change when performance falls farther below aspirations.

## Locus of control and firm responses to performance shortfalls

[Levenson \(1974\)](#) refers to locus of control as the ability of individuals to differentiate between internality, powerful others, and external events, while [Rotter \(1966\)](#) and [Judge et al. \(1999\)](#) assert that locus of control is an individual's perception of his or her ability to exercise control over the environment. People who believe that their knowledge, skills, abilities, and actions have a strong influence on outcomes in their personal and professional lives are "internals." Conversely, those who believe that outcomes in their personal and professional lives are controlled by forces beyond their control are considered "externals" ([Hodgkinson, 1992](#)). Scholars have found positive relationships for CEOs having an internal locus of control with firm performance ([Boone et al., 1996](#)) and with developing their staff and inspiring them to accept a higher collective purpose ([Howell and Avolio, 1993](#)). Similarly, evidence suggests that "internal" CEOs take greater risks, pursue more innovation, and are less likely to imitate competitors ([Miller et al., 1982](#)) and that locus of control moderates the relationship between experience and decision maker uncertainty ([Ashill and Jobber, 2013](#)).

CEOs with a more internal locus of control, contrary to CEOs who more strongly feel that outcomes from their decisions and actions are related to exogenous events (i.e. "externals"), should be more proactive in taking actions to address poor performance. Indeed, CEOs with an "internal" predisposition are predicted to have a greater sense of urgency to initiate actions when performance is poor and will generate a broader range of initiatives to address problems because they feel that the actions they initiate and promote will drive firm outcomes.

**H3:** Locus of control will moderate the relationship between negative attainment discrepancy and strategic change, such that CEOs with a greater internal locus of control will initiate greater strategic change when performance falls farther below aspirations.

## CSQ and firm responses to performance shortfalls

CEOs who are more committed to the status quo have developed psychological investments in the current policies of their firm, along with a personal need to adhere to established industry norms ([Hambrick et al., 1993](#)). These psychological investments have previously been found to be caused by functional experience in dominant career tracks ([Geletkanycz and Black, 2001](#)), CEO industry tenure ([Hambrick et al., 1993](#)), and CEO firm tenure ([Musteen et al., 2006](#)), though mixed results from studies examining the relationship between past firm performance and CSQ (see [McClelland et al., 2010](#)) suggest that a combination of inertial pressures and psychological investments leads to a CEO being more committed to the status quo. CEO CSQ has been found to exhibit a positive effect on performance in low discretion industries, while having a negative effect on performance in high discretion industries ([McClelland et al., 2010](#)). Additionally, scholars have theorized that CSQ inhibits organizational evolution ([Tushman et al., 1986](#)), with studies showing that, if the CEO is newly appointed, CSQ inhibits his or her ability to pursue change ([Nakauchi and Wiersema, 2015](#)). As CSQ is an enduring and often excessive belief in the firm's current policies and strategies, the following hypothesis that CEOs who are more committed to the status quo will knowingly or unknowingly react less urgently to poor performance is offered.

**H4:** CSQ will moderate the relationship between negative attainment discrepancy and strategic change, such that CEOs who are more committed to the status quo will initiate less strategic change when performance falls slightly below aspirations.

## Methods

### Sample

The sample was drawn from 1017 publicly traded US firms across 28 states<sup>1</sup> in which the firm had been in existence before 2010 and had 2014 revenue greater than 20 million dollars. These firms operate in a wide range of industries, in which there is a substantial variation in competitive dynamics, financial and market performance, and life cycle stage. Questionnaires were sent to the 1017 CEOs, asking them to respond to 32 items associated with ambiguity tolerance, cognitive complexity, locus of control, and CSQ. One hundred seven completed questionnaires were received from the CEOs, resulting in a 10.5% response rate that is consistent with expected response rates from CEOs of large US firms ([Hambrick et al., 1993](#)). Eight of the 107 firms with responding CEOs were either acquired, went bankrupt shortly after the response was received, or operated in industries in which this study's dependent variable measure was not appropriate (e.g. banking, insurance). Thus, the final sample size was 99 publicly traded US firms.

The age of the 99 CEOs in the sample ranges from 43 years to 80 years, with an average age of 57.5 years. Twenty-one CEOs hold degrees from elite educational institutions,<sup>2</sup> while five CEOs are female, 17 CEOs are one of their firm's founders, and four CEOs have family members serving on the top management team. For the 99 CEOs, the median 2014 current compensation is US\$715,000 and their median 2014 total compensation is US\$2,590,000. The median ratio of CEOs' current compensation to their firm's next highest paid executive is 1.59.

### Dependent variable

Following prior research, *strategic change* is measured as the change in six key strategic choice variables: advertising intensity; R&D intensity; selling, general and administrative intensity; capital intensity; plant, property, and equipment (PP&E) newness; and leverage ([Crossland et al., 2014](#)). For each firm in the sample, the absolute values of the six strategic choice variables from 2014 to 2015 were calculated. Each strategic choice variable was then standardized. The six resulting measures were then averaged, providing a positive value in which higher scores indicate greater strategic change.

### Independent variable

Attainment discrepancy was operationalized as the difference between firm performance in year 2014 and its aspiration levels (based on firm performance in year 2013). Performance is based on industry-adjusted market return, which is derived by calculating shareholder equity divided by total assets for each firm and then subtracting the mean market return of all firms in its industry. Consistent with previous BTOF research that examines attainment discrepancies ([Greve, 2003](#); [Iyer and Miller, 2008](#)), a spline function was used to create positive attainment discrepancy (i.e. *market return above aspirations*) and negative attainment discrepancy (i.e. *market return below aspirations*). Thus, for positive attainment discrepancy, if industry-adjusted market return is greater than zero, then *market return above aspirations* equals industry-adjusted market return; otherwise, *market return above aspirations* is set to zero. Likewise, for negative attainment discrepancy, if industry-adjusted market return is equal to or less than zero, then *market return below aspirations* equals industry-adjusted market return; otherwise, *market return below aspirations* is set to zero.

### Moderator variables

Responses from questionnaires were used to develop the measures for the four moderator variables. For *ambiguity tolerance*, CEOs responded to a 13-item five-point Likert-type scale developed by [McLain \(2009\)](#) (see [Table 1A](#) for a list of the items). In developing his ambiguity tolerance scale, McLain paid close attention to how each item was worded, reducing potential confounding influences of references not related to the CEOs role. [Furnham and Marks \(2013\)](#) reviewed ambiguity tolerance scales dating back to [Budner \(1962\)](#) and

recommended using McLain's scale when participants are less likely to respond to longer scales or may be cognitively overloaded.

The responses from CEOs indicated strong internal consistency ( $\alpha = 0.84$ ), in line with the internal consistency found by McLain during testing with various groups of subjects. Ambiguity tolerance for each responding CEO was calculated by adjusting the reverse-coded items and computing the mean of the 13 equally weighted items. Since ambiguity tolerance represents a psychological trait that is firmly established by the time executives assume the CEO role and, thus, remains stable over time ([Judge et al., 2009](#); [Roberts et al., 2006](#)), it is unlikely that the current strategic posture and performance of the firm have influenced the CEOs' responses.

Cognitive complexity was derived from the number of functions that a CEO reported working in during his or her career. Career variety, whether it is defined as firms, industries, or distinct functions in which a CEO has worked during his or her career, enables a greater awareness of connections and impacts. Even if the CEO did not master a specific function (e.g. accounting, engineering, manufacturing), having worked in that function enhances the CEOs ability to conceptualize business situations and promote a wider array of solutions due to a more extensive cognitive stock ([Crossland et al., 2014](#); [Fiske and Taylor, 2013](#)). Responding CEOs reported working in as few as two functions and as many as nine functions during their careers. Because tests for skewness and kurtosis revealed a positive skew, the log of reported career functions was used for the *cognitive complexity* measure in the analysis.

For *locus of control*, CEOs responded to [Hodgkinson's \(1992\)](#) established 16-item five-point Likert-type scale (see [Table 2A](#) for a list of the items). Hodgkinson's scale is a more strategically oriented locus of control scale that is appropriate for studies of executives of for-profit firms because of its context specificity and no correlation with social desirability ([Hiller and Hambrick, 2005](#)). CEOs' responses to the 16 items indicated strong internal consistency ( $\alpha = 0.73$ ). Locus of control for each responding CEO was calculated by adjusting the reverse-coded items and computing the mean of the 16 equally weighted items. The composite scores ranged from 1 to 5, with higher scores indicating a more internal locus of control.

For CSQ, CEOs responded to a single reverse-coded item, "I can tolerate strategic and operational changes that are risky if they can potentially improve the performance of our firm," with scores ranging from 1 to 5 and higher scores indicating greater CSQ.

## Control variables

CEO tenure has been found to be positively associated with CEO influence over firm decisions ([Musteen et al., 2006](#)) and has been argued to be negatively associated with strategic change ([Miller, 1991](#)). Thus, *CEO tenure*, measured as the log of the number of years that the CEO has served in his or her role in the firm, was included as a control variable. Management scholars have long held the view that as firm size increases, significant inertial forces develop within firms ([Thompson, 1967](#)). Larger firms are more likely to have extensive bureaucracy ([Mintzberg, 1978](#)) and difficulty implementing change ([Aldrich, 2008](#)). Thus, *firm size*, measured as the log of average sales from 2013 to 2015, was included as a control variable. To control for the influence of larger institutional shareholders over firm actions, *blockholder share*, calculated as the total percentage of shares held by institutions that own at least five percent of the firm's outstanding shares, was included in the analysis. Additionally, since the volatility of the firm's industry may influence the degree of strategic change, the analysis controlled for *industry dynamism*. Following the method of [Dess and Beard \(1984\)](#) to measure *industry dynamism*, standard error was calculated from regressing 5 years of annual industry sales on a year counter variable. Furthermore, to control for other sources of power and possible mandates for change, whether the CEO was also a *founder* of the firm, held the title of board chairman (i.e. *CEO duality*), and had joined the firm within 12 months of attaining the CEO position (i.e. *outsider*) were included in the analysis. In each of these

three cases, the variable was coded as “1” if true for the CEO; otherwise, it was coded as “0.” Finally, consistent with prior BTOF research, positive attainment was included as an additional control variable.

To increase confidence that the results reflect causal relationships, the measurements of all independent and control variables are from the year prior to assessing strategic change.

## Analysis

Methods summarized in [Datta \(1991\)](#) were followed to test for potential nonresponse and late response bias, with the results showing no such problems in the sample. Descriptive statistics, including means, standard deviations, and correlations, are reported in [Table 1](#). The correlations do not suggest that collinearity is a problem, which was verified by determining the variance inflation factor (VIF) for each independent variable. VIF did not exceed 1.47 for any independent variable.

**Table 1.** Descriptive statistics and correlations.

	Mean	Standard deviation	Minimum	Maximum	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Strategic change	0.34	0.39	0.00	2.30													
2. CEO tenure	0.79	0.39	0.00	1.51	-0.050												
3. Firm size	8.95	0.59	7.67	10.56	-0.245*	-0.134											
4. Founder	0.17	0.38	0	1	0.066	0.449*	-0.155										
5. CEO duality	0.42	0.50	0	1	-0.002	0.381*	-0.020	0.368*									
6. Outsider	0.37	0.49	0	1	0.143	-0.144	-0.169	-0.186	-0.156								
7. Blockholder share	0.35	0.18	0.00	0.84	0.066	-0.236*	-0.065	-0.164	-0.084	0.118							
8. Industry dynamism	0.03	0.05	0.00	0.46	-0.040	0.025	0.146	0.003	0.153	-0.057	-0.023						
9. Market return above aspirations	0.08	0.11	0.00	-0.065	0.084	0.50	-0.143	0.145	0.055	-0.012	-0.088	-0.082					
10. Market return below aspirations	-0.06	0.12	-0.70	0.00	-0.269*	-0.059	0.084	-0.010	-0.021	-0.095	-0.163	-0.064	0.365*				
11. Ambiguity tolerance	3.74	0.49	2.54	4.85	0.133	0.029	0.111	-0.099	0.088	0.166	-0.011	-0.041	-0.093	-0.173			
12. Cognitive complexity	1.50	0.37	0.69	2.20	0.187	-0.062	-0.040	0.110	0.073	0.231*	0.064	0.012	0.025	0.012	-0.109		
13. Locus of control	3.69	0.38	2.69	4.69	-0.106	0.005	0.047	-0.109	-0.035	0.280*	0.061	0.047	0.004	0.067	0.301**	0.165	
14. CSQ	1.96	0.79	1.00	5.00	-0.200*	-0.251*	-0.070	-0.078	-0.137	0.013	0.110	-0.038	0.072	0.136	-0.351**	0.146	-0.162

Note: CSQ: commitment to the status quo. N = 99.

\*p < 0.05; \*\*p < 0.01.

**Table 1.** Descriptive statistics and correlations.

	Standard				1	2	3	4	5	6	7	8	9	10	11	12	13
	Mean	Standard deviation	Minimum	Maximum													
1. Strategic change	0.34	0.39	0.00	2.30													
2. CEO tenure	0.79	0.39	0.00	1.51	-0.050												
3. Firm size	8.95	0.59	2.67	10.56	-0.245*	-0.134											
4. Founder	0.17	0.38	0	1	0.066	0.449**	-0.155										
5. CEO duality	0.42	0.50	0	1	-0.002	0.381**	-0.020	0.368**									
6. Outsider	0.37	0.49	0	1	0.143	-0.144	-0.189	-0.186	-0.156								
7. Blockholder share	0.35	0.18	0.00	0.84	0.066	-0.236*	-0.065	-0.164	-0.084	0.118							
8. Industry dynamism	0.03	0.05	0.00	0.46	-0.040	0.025	0.146	0.003	0.153	-0.057	-0.023						
9. Market return above aspirations	0.08	0.11	0.00	0.50	-0.065	0.084	-0.143	0.145	0.055	-0.012	-0.088	-0.082					
10. Market return below aspirations	-0.06	0.12	-0.70	0.00	-0.269**	-0.059	0.084	-0.010	-0.021	-0.095	-0.163	-0.064	0.365**				
11. Ambiguity tolerance	3.74	0.49	2.54	4.85	0.133	0.029	0.111	-0.099	0.088	0.166	-0.011	-0.041	-0.093	-0.173			
12. Cognitive complexity	1.50	0.37	0.69	2.20	0.187	-0.062	-0.040	0.110	0.073	0.231*	-0.064	0.012	0.025	0.012	-0.109		
13. Locus of control	3.69	0.38	2.69	4.69	-0.106	0.005	0.047	-0.109	-0.035	0.280**	0.061	0.047	0.004	0.067	0.301**	0.165	
14. CSQ	1.96	0.79	1.00	5.00	-0.200*	-0.251*	-0.070	-0.078	-0.137	0.013	0.110	-0.038	0.072	0.136	-0.351**	-0.146	-0.162

Note: CSQ, commitment to the status quo. N = 99.  
 \*p < 0.05; \*\*p < 0.01.

The hypotheses were tested using ordinary least squares regressions, with results from testing the four hypotheses shown in [Table 2](#). While no specific problems were seen in the data, robust standard errors were used since they offer a more conservative measure of standard errors that can deal more effectively with minor problems regarding normality, outliers, and heteroscedasticity ([Rousseeuw and Leroy, 2005](#)). Supplementary analyses controlled for CEO gender, CEO age, CEO current compensation, and the ratio of CEO current compensation to his or her firm’s next highest paid executive. Since those variables were not significant and did not change the results, they were not included in [Table 2](#).

**Table 2.** Analysis using OLS regression.

Dependent variable: strategic change										
Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
CEO tenure	-0.106 (0.104)	-0.132 (0.104)	-0.139 (0.103)	-0.132 (0.105)	-0.106 (0.095)	-0.185 <sup>1</sup> (0.105)	-0.120 (0.106)	-0.127 (0.106)	-0.186 (0.114)	-0.185 (0.117)
Firm size	-0.147 <sup>1</sup> (0.087)	-0.139 (0.090)	-0.152 (0.093)	-0.145 (0.090)	-0.140 (0.091)	-0.118 (0.091)	-0.133 (0.084)	-0.132 (0.083)	-0.155 <sup>1</sup> (0.088)	-0.154 <sup>1</sup> (0.088)
Blockholder share	0.068 (0.346)	-0.030 (0.340)	-0.017 (0.340)	-0.061 (0.336)	0.002 (0.339)	-0.085 (0.292)	-0.016 (0.341)	-0.029 (0.347)	0.007 (0.334)	0.009 (0.331)
Industry dynamism	0.099 (0.188)	0.100 (0.188)	0.117 (0.188)	0.102 (0.187)	0.071 (0.174)	0.046 (0.150)	0.092 (0.182)	0.079 (0.185)	0.109 (0.181)	0.113 (0.172)
Founder	0.014 (0.083)	0.015 (0.082)	0.000 (0.086)	0.036 (0.082)	0.002 (0.079)	0.066 (0.078)	0.015 (0.082)	0.023 (0.079)	0.004 (0.079)	0.003 (0.081)
Duality	0.085 (0.100)	0.069 (0.097)	0.051 (0.100)	0.033 (0.099)	0.035 (0.085)	0.035 (0.085)	0.093 (0.103)	0.103 (0.105)	0.062 (0.093)	0.064 (0.092)
Outsider	-0.006 (0.312)	-0.157 (0.259)	-0.075 (0.328)	-0.488 (0.332)	-0.174 (0.257)	-0.255 (0.263)	-0.114 (0.266)	-0.050 (0.310)	-0.152 (0.269)	-0.162 (0.276)
Market return above aspirations		-0.038 (0.266)	-0.034 (0.262)	0.173 (0.273)	-0.037 (0.278)	0.131 (0.258)	-0.042 (0.271)	0.025 (0.278)	-0.009 (0.262)	-0.012 (0.261)
Market return below aspirations		-0.832 <sup>1</sup> (0.434)	-0.762 (0.468)	-8.132*** (2.345)	-0.842* (0.398)	3.018* (1.149)	-0.795 <sup>1</sup> (0.463)	2.339 (3.037)	-0.738 <sup>1</sup> (0.426)	-0.541 (1.215)
Ambiguity tolerance			0.096 (0.078)	0.230* (0.088)						
Cognitive complexity					0.163 (0.122)	-0.056 (0.104)				
Locus of control							-0.102 (0.130)	-0.174 (0.157)		
CSQ									-0.110* (0.053)	-0.114* (0.051)
<i>Interactions</i>										
Market return below aspirations × Ambiguity tolerance				1.776** (0.524)						
Market return below aspirations × Cognitive complexity						-2.794** (0.907)				
Market return below aspirations × Locus of control								-0.899 (0.897)		
Market return below aspirations × CSQ										-0.107 (0.667)

Constant	1.665 <sup>1</sup> (0.851)	1.611 <sup>1</sup> (0.878)	1.375 <sup>1</sup> (0.783)	0.791 (0.743)	1.361 (0.986)	1.540 (0.971)	1.915 <sup>1</sup> (1.080)	2.161 <sup>1</sup> (1.164)	2.004* (0.895)	2.004* (0.898)
R <sup>2</sup>	0.084	0.145	0.158	0.226	0.167	0.279	0.154	0.167	0.191	0.191

Note: CSQ: commitment to the status quo; OLS: ordinary least squares. N = 99. Robust standard errors are in parenthesis.  
<sup>1</sup>p < 0.01; \*\*\*p < 0.001.

Table 2. Analysis using OLS regression.

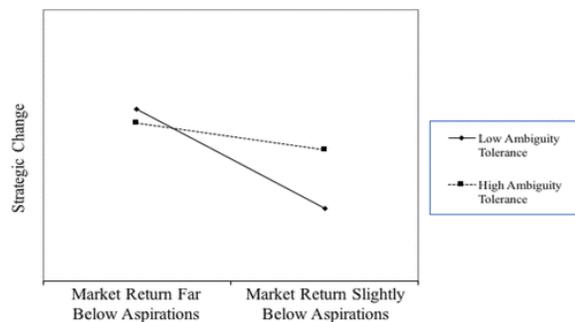
Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
CEO tenure	-0.106 (0.104)	-0.132 (0.104)	-0.139 (0.103)	-0.132 (0.105)	-0.106 (0.095)	-0.185 <sup>1</sup> (0.105)	-0.120 (0.106)	-0.127 (0.106)	-0.186 (0.114)	-0.185 (0.117)
Firm size	-0.147 <sup>1</sup> (0.087)	-0.139 (0.090)	-0.152 (0.093)	-0.145 (0.090)	-0.140 (0.091)	-0.118 (0.091)	-0.133 (0.084)	-0.132 (0.083)	-0.155 <sup>1</sup> (0.088)	-0.154 <sup>1</sup> (0.088)
Blockholder share	0.068 (0.346)	-0.030 (0.340)	-0.017 (0.340)	-0.061 (0.336)	0.002 (0.339)	-0.085 (0.292)	-0.016 (0.341)	-0.029 (0.347)	0.007 (0.334)	0.009 (0.331)
Industry dynamism	0.099 (0.188)	0.100 (0.188)	0.117 (0.188)	0.102 (0.187)	0.071 (0.174)	0.046 (0.150)	0.092 (0.182)	0.079 (0.185)	0.109 (0.181)	0.113 (0.172)
Founder	0.014 (0.083)	0.015 (0.082)	0.000 (0.084)	0.036 (0.082)	0.002 (0.079)	0.066 (0.078)	0.015 (0.082)	0.023 (0.079)	0.004 (0.079)	0.003 (0.081)
Duality	0.085 (0.100)	0.069 (0.097)	0.051 (0.100)	0.033 (0.099)	0.035 (0.085)	0.035 (0.085)	0.093 (0.103)	0.103 (0.105)	0.062 (0.093)	0.064 (0.092)
Outsider	-0.006 (0.312)	-0.157 (0.259)	-0.075 (0.328)	-0.488 (0.332)	-0.174 (0.257)	-0.255 (0.263)	-0.114 (0.266)	-0.050 (0.310)	-0.152 (0.269)	-0.162 (0.276)
Market return above aspirations		-0.038 (0.266)	-0.034 (0.262)	0.173 (0.273)	-0.037 (0.278)	0.131 (0.258)	-0.042 (0.271)	0.025 (0.278)	-0.009 (0.262)	-0.012 (0.261)
Market return below aspirations		-0.832 <sup>1</sup> (0.434)	-0.762 (0.468)	-8.132 <sup>***</sup> (2.345)	-0.842 <sup>1</sup> (0.398)	3.018* (1.149)	-0.795 <sup>1</sup> (0.463)	2.339 (3.037)	-0.738 <sup>1</sup> (0.426)	-0.541 (1.215)
Ambiguity tolerance			0.096 (0.078)	0.230* (0.088)	0.163 (0.122)	-0.056 (0.104)				
Cognitive complexity							-0.102 (0.130)	-0.174 (0.157)		
Locus of control									-0.110* (0.053)	-0.114* (0.051)
CSQ										
Interactions										
Market return below aspirations × Ambiguity tolerance				1.776 <sup>**</sup> (0.524)						
Market return below aspirations × Cognitive complexity						-2.794 <sup>**</sup> (0.907)				
Market return below aspirations × Locus of control								-0.899 (0.897)		
Market return below aspirations × CSQ										-0.107 (0.667)
Constant	1.665 <sup>1</sup> (0.851)	1.611 <sup>1</sup> (0.878)	1.375 <sup>1</sup> (0.783)	0.791 (0.743)	1.361 (0.986)	1.540 (0.971)	1.915 <sup>1</sup> (1.080)	2.161 <sup>1</sup> (1.164)	2.004* (0.895)	2.004* (0.898)
R <sup>2</sup>	0.084	0.145	0.158	0.226	0.167	0.279	0.154	0.167	0.191	0.191

Note: CSQ: commitment to the status quo; OLS: ordinary least squares. N = 99. Robust standard errors are in parenthesis.  
<sup>1</sup>p < 0.1; \*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001.

## Results

Model 1 shows the results with only the control variables included in the model. Model 2 adds the independent variables and models 3 through 10 add the moderating variables and interaction terms. The baseline hypothesis that negative attainment discrepancy drives more strategic change is generally supported ( $\beta = -0.832$ ;  $p = 0.058$  in model 2). Here, a negative coefficient for the independent variable, *market return below aspirations*, indicates that firms engage in strategic change as performance deteriorates.

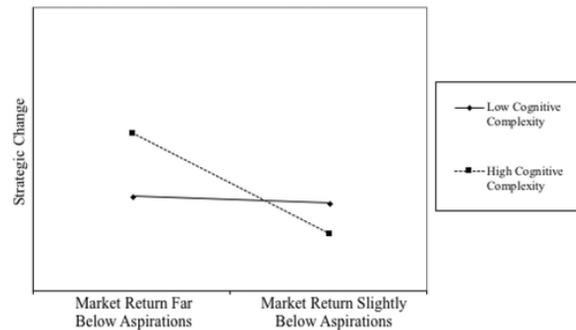
Hypothesis 1 argued that ambiguity tolerance will moderate the relationship between negative attainment discrepancy and strategic change, such that CEOs with higher ambiguity tolerance will initiate greater strategic change when performance is slightly below aspirations. As shown in model 4, the interaction term of *ambiguity tolerance* and *market return below aspirations* is positive and significant ( $p < 0.01$ ), providing support for hypothesis 1. This is further illustrated in [Figure 1](#), which shows that CEOs with higher ambiguity tolerance implement greater strategic change when performance is slightly below aspirations. CEOs who are less tolerant of ambiguity increase the degree of strategic change that they implement as performance deteriorates, with CEOs implementing roughly the same degree of strategic change, regardless of their tolerance for ambiguity, when performance is far below aspirations. This implies that a CEO with high ambiguity tolerance will react earlier to performance downturns, which could be critical to the long-term viability of the firm. Waiting until firm performance is significantly below aspirations could put the firm in the vicarious position of being unable to pivot to a new course of action before it is too late.



**Figure 1.** Interaction of ambiguity tolerance with market return below aspirations.

Hypothesis 2 stated that cognitive complexity will moderate the relationship between negative attainment discrepancy and strategic change, such that CEOs with higher cognitive complexity will initiate greater strategic change when performance falls farther below aspirations. As shown in model 6, the interaction term of *cognitive complexity* and *market return below aspirations* is significant ( $p < 0.01$ ), providing support for hypothesis 2. This is further illustrated in [Figure 2](#), which shows that CEOs with higher cognitive complexity increase the degree of strategic change that they implement as performance worsens, while CEOs with less cognitive complexity implement approximately the same degree of strategic change at all levels of performance below aspirations. The results suggest that a CEO's cognitive complexity can also be critical to the long-term viability of the firm, but in a different way than ambiguity tolerance. While the results suggest that greater ambiguity tolerance increases the likelihood of initiating strategic change sooner (i.e. when performance falls slightly below aspirations), the results also suggest that CEOs with greater cognitive complexity are more likely to implement broad

and extensive changes in many strategic dimensions (e.g. advertising, R&D investment, PP&E investment, leverage) when performance falls far below aspirations.



**Figure 2.** Interaction of cognitive complexity with market return below aspirations.

Hypothesis 3 stated that locus of control will moderate the relationship between negative attainment discrepancy and strategic change. As shown in model 8, the interaction term of *locus of control* with *market return below aspirations* is not significant. Hypothesis 3 is not supported.

Hypothesis 4 stated that CSQ will moderate the relationship between negative attainment discrepancy and strategic change. As shown in model 10, the interaction term of CSQ and *market return below aspirations* is not significant. Hypothesis 4 is not supported.

## Discussion

This study provides insight into an overlooked element of the BTOF, that of managerial cognitions in times of uncertainty (Greve, 2003). Thus, this study builds on BTOF by addressing the role of managerial discretion and psychological traits on the relationship between performance and action when the firm is performing poorly. In particular, the moderating effects of four psychological traits from Hambrick and Finkelstein's (1987) managerial discretion construct—*ambiguity tolerance*, *cognitive complexity*, *locus of control*, and *CSQ*—on the relationship between negative attainment discrepancy and strategic change were examined. The results reveal that specific executive characteristics, which influence the degree of discretion displayed by CEOs, are important contingencies to whether and when firms engage in strategic change. Thus, this study provides a strong support to the broad field of strategic leadership which centers around the idea that careful choice of leaders is critical to firm behaviors.

The results from testing hypothesis 1 suggest that CEOs with greater ambiguity tolerance are more likely to implement changes necessary to prevent further performance erosion. The psychology literature posits that individuals with higher ambiguity tolerance are more comfortable with reversing courses of action, are less likely to be trapped in maintaining existing routines, and are more open-minded toward unfamiliar and unexpected external environmental changes (Frenkel-Brunswik, 1949; McLain, 2009). Additionally, Judge et al., (1999) showed that executives who are more comfortable with ambiguity are better able to cope with change. The results from this study suggest that each of these facets of ambiguity tolerance may play a role in not only how CEOs interpret situations and implement actions, but whether they choose to do so. CEOs who are less tolerant of ambiguity may delay or forego evaluating, developing, and implementing alternative strategic directions.

Further, the results from testing hypothesis 2 show that CEOs with greater cognitive complexity implement more substantial changes as performance declines, potentially in a wider range of strategic

areas than CEOs with lower cognitive complexity. Consistent with the idea of bounded rationality ([March and Simon, 1958](#)), these results suggest that regardless of the situation's severity, some CEOs might be limited in the degree of change they can undertake because of their knowledge and ability to comprehend and adapt to various internal and external conditions. Restrictions on strategic change implemented by a CEO with lower cognitive complexity when performance is very poor may be the result of a series of additive limitations, since reduced cognitive complexity may constrain a CEO's field of vision and cause a CEO to be selective or biased when interpreting information. Additionally, a CEO's knowledge of alternatives and consequences of potential alternatives may also be constrained. While a few management scholars have examined the relationship of cognitive complexity with strategic choices, such as acquisitions ([Hitt and Tyler, 1991](#)) and the pace of decision-making ([Wally and Baum, 1994](#)), this study advances prior research by demonstrating that cognitive complexity serves to bolster strategic change when performance falls far short of expectations.

[Hambrick and Finkelstein \(1987\)](#) posit that both cognitive complexity and ambiguity tolerance are positively related to managerial discretion. In the context of a firm performing below board and shareholder aspirations, these findings are consistent with how these two traits function in Hambrick and Finkelstein's managerial characteristics force. These findings, however, also suggest that ambiguity tolerance and cognitive complexity are especially valuable in *different* circumstances. First, consider a firm that has consistently met performance expectations, but is currently experiencing a small performance decline. A CEO with less ambiguity tolerance might "stay the course." However, a CEO who is more tolerant of ambiguity is far more proactive and takes any necessary steps and makes changes to avoid further decline. Second, consider a firm that is performing considerably poorer than other firms in its industry. Customers may be dissatisfied and, thus, are switching to other providers, costs may be too high due to inefficiencies, and business development opportunities may be forsaken. The necessity for change is abundantly clear, but the degree of change necessary for dramatic turnaround requires a CEO who can conceptualize the nature of problems in most, if not all, of the firm's activities. However, conceptualization across many areas of the firm is not enough for turnaround. To implement dramatic strategic change, the CEO needs to be able to comprehend and accept sweeping changes associated with assets, management, and financial restructuring. Stated differently, the firm is better suited with a CEO who possesses greater cognitive complexity.

Given that previous research has found that CEOs with an internal locus of control will feel that their actions matter ([Judge et al., 1999](#)) and are more likely to trigger improvement and other positive outcomes ([Anderson and Schneider, 1978](#); [Howell and Avolio, 1993](#)), it was surprising that locus of control was not found to have any effect on the relationship of performance below aspirations and strategic change. One possible explanation is that more "external" CEOs may have self-selected more inertial firms (e.g. older, larger) or slower-paced, less dynamic industries that are more consistent with where they fall on the locus of control continuum ([Finkelstein et al., 2009](#)).

While no support was found for the moderating role of CSQ, the results showed a significant negative relationship for CSQ with strategic change. This is consistent with [Hambrick et al.'s \(1993\)](#) position that personal investment and strong belief in the correctness of current policies are positively associated with CSQ. But findings from Hambrick et al. suggest that CSQ is influenced by whether the firm operates in a low or high discretion industry, a notion further advanced by [McClelland et al., \(2010\)](#), who found that high CSQ CEOs are associated with better firm performance in low discretion industries and far worse performance in high discretion industries. Given that this study's sample spans a wide variety of

low, medium, and high discretion industries, it may be necessary to examine firms with similar industry-level discretion to gain visibility to how performance below aspirations interacts with CSQ.

## Limitations

While this study builds on previous theory and uses established measures for most constructs, it has limitations. First, four psychological traits were measured using CEOs' responses to questionnaires. While [McLain \(2009\)](#) and [Hodgkinson \(1992\)](#) worded items in their scales to reduce confounding influences found in psychological scales related and unrelated to management, there is still the potential for social desirability bias. CEOs may wish to be perceived as more open to alternative views and embracing novel and unclear situations, even if this is contrary to their psychological makeup. The method used for measuring cognitive complexity, CEOs reporting the number of functions that they have worked in during their careers, is less susceptible to social desirability bias, though there is some potential for CEOs to want to be perceived as having experience in more functional areas than they have worked.

Second, the measures of cognitive complexity and CSQ use a single response to proxy for each psychological construct. These limitations are the result of the authors' efforts to achieve a higher response rate, which required minimizing the number of items in the questionnaire. A more comprehensive scale for cognitive complexity, such as [Bieri's \(1966\)](#) 100-item scale, might be ideal, but would create validity problems due to CEOs' unwillingness to complete the questionnaire and lack of attention span when completing long questionnaires. Thus, the scales and items used in the questionnaire represent a compromise between length and depth. Still, in the case of cognitive complexity, relying on the number of functions that the CEO has worked during his or her career captures his or her functional expertise and skills of evaluating business problems and solutions ([Dearborn and Simon, 1958](#); [Waller et al., 1995](#)).

Third, the ability to generalize this study's findings to other contexts may be limited. As this study uses only publicly traded firms based in the United States, the results may not apply to privately held firms, family firms, or firms outside the United States. However, because the participating CEOs are from over 60 different industries, the findings are not constrained to a specific industry.

## Practical implications

Strategic change is necessary for firms to reverse poor performance or find new sources of competitive advantage. As the results from this study suggest, managerial discretion influences when and to what degree CEOs implement strategic change. Faced with the same situation, some CEOs will implement strategic change to try and improve performance, while others may pursue limited strategic changes or delay any change until performance falls far below aspirations. CEOs with higher ambiguity tolerance are more likely to implement strategic change early in response to performance downturns, while CEOs with greater cognitive complexity are more likely to implement more comprehensive and far-reaching strategic change in response to consistently deteriorating performance. With respect to the market for managerial talent, executives (and management teams) who are pre-dispositioned to strategically maneuver through firm-specific and industry-wide economic downturns will likely have a greater impact on future outcomes or, as seen during the financial crisis, perhaps even the viability of the firm itself. A board selecting or deciding whether to retain a CEO should emphasize whether the executive's

personality profile is appropriate, as this is likely to influence the firm's strategic change agenda and, in turn, the firm's long-term performance.

It is the authors' sincere hope that this study serves to kindle scholarly interest in how managerial characteristics influence firm-level strategic behaviors. For example, gender and racially diverse boards and top management teams may be associated with greater ambiguity tolerance and cognitive complexity, which, in turn, could promote strategic variety and change. These characteristics could also serve as moderators between attainment discrepancy and strategic change as diverse upper echelons, by their very nature, may attract executives who are more tolerant of ambiguity and have greater cognitive complexity. In addition, exploration of how managerial characteristics, such as cognitive complexity and ambiguity tolerance, impact other elements of firm strategy (e.g. innovation, diversification, acquisitions, competitive aggressiveness) could provide insights to boards regarding potential successor CEOs and next generation leaders who may be more likely to undertake the various strategic initiatives the board deems essential to firm success. By systematically examining a given firm's human and behavioral capital, it may be possible to glean new insights into the multiple drivers of firm initiatives and outcomes.

## Appendix 1

**Table 1A.** Ambiguity tolerance item list (from [McLain, 2009](#)).

Item

1. I don't tolerance ambiguous situations well.
2. I would rather avoid solving a problem that must be viewed from several different perspectives.
3. I try to avoid situations that are ambiguous.
4. I prefer familiar situations to new ones.
5. Problems that cannot be considered from just one point of view are a little threatening.
6. I avoid situations that are too complicated for me to easily understand.
7. I am tolerant of ambiguous situations.
8. I enjoy tackling problems that are complex enough to be ambiguous.
9. I try to avoid problems that don't seem to have only one "best" solution.
10. I generally prefer novelty over familiarity.
11. I dislike ambiguous situations.
12. I find it hard to make a choice when the outcome is uncertain.
13. I prefer a situation in which there is some ambiguity.

Note: Items 1, 2, 3, 4, 5, 9, and 11 are reverse-scored.

**Table 1A.** Ambiguity tolerance item list (from McLain, 2009).

---

Item

---

1. I don't tolerance ambiguous situations well.
2. I would rather avoid solving a problem that must be viewed from several different perspectives.
3. I try to avoid situations that are ambiguous.
4. I prefer familiar situations to new ones.
5. Problems that cannot be considered from just one point of view are a little threatening.
6. I avoid situations that are too complicated for me to easily understand.
7. I am tolerant of ambiguous situations.
8. I enjoy tackling problems that are complex enough to be ambiguous.
9. I try to avoid problems that don't seem to have only one "best" solution.
10. I generally prefer novelty over familiarity.
11. I dislike ambiguous situations.
12. I find it hard to make a choice when the outcome is uncertain.
13. I prefer a situation in which there is some ambiguity.

---

Note: Items 1, 2, 3, 4, 5, 9, and 11 are reverse-scored.

## Appendix 2

**Table 2A.** Locus of control item list (from [Hodgkinson, 1992](#)).

---

Item

---

1. There is little my company can do in order to change the "rules of competition" in our industry.
2. Many of the problems experienced by businesses can be avoided through careful planning and analysis.
3. To a great extent the competitive environment in which my company operates is shaped by forces beyond its control.
4. Becoming a successful company is a matter of creating opportunities, luck has little or nothing to do with it.
5. There is little point in the majority of companies taking an active interest in the wider concerns of their industry because only the larger more powerful companies have any real influence.
6. It is not always wise to make strategic plans far ahead because many things may turn out to be a matter of good or bad fortune anyhow.
7. My company can pretty much accomplish whatever it sets out to achieve.
8. Most companies can have an influence in shaping the structure of the market.
9. In regards to competing in the market place, most companies are the victims of forces they cannot control.
10. There is little point in engaging in detailed strategic analyses and planning because often events occur that my company cannot control.
11. Usually companies fail because they have not taken advantage of their opportunities.
12. My company is able to influence the basis upon which it competes with other firms.
13. Businesses who rarely experience strategic problems are just plain lucky.
14. There is a direct connection between the interest you take in your competitors' businesses and the success of your own company.
15. My company has a direct role in shaping the environment in which it competes.
16. Market opportunities in my industry are largely predetermined by factors beyond my company's control.

Note: Items 2, 4, 7, 8, 11, 12, 14, and 15 are reverse-scored.

**Table 2A.** Locus of control item list (from Hodgkinson, 1992).

Item
1. There is little my company can do in order to change the "rules of competition" in our industry.
2. Many of the problems experienced by businesses can be avoided through careful planning and analysis.
3. To a great extent the competitive environment in which my company operates is shaped by forces beyond its control.
4. Becoming a successful company is a matter of creating opportunities, luck has little or nothing to do with it.
5. There is little point in the majority of companies taking an active interest in the wider concerns of their industry because only the larger more powerful companies have any real influence.
6. It is not always wise to make strategic plans far ahead because many things may turn out to be a matter of good or bad fortune anyhow.
7. My company can pretty much accomplish whatever it sets out to achieve.
8. Most companies can have an influence in shaping the structure of the market.
9. In regards to competing in the market place, most companies are the victims of forces they cannot control.
10. There is little point in engaging in detailed strategic analyses and planning because often events occur that my company cannot control.
11. Usually companies fail because they have not taken advantage of their opportunities.
12. My company is able to influence the basis upon which it competes with other firms.
13. Businesses who rarely experience strategic problems are just plain lucky.
14. There is a direct connection between the interest you take in your competitors' businesses and the success of your own company.
15. My company has a direct role in shaping the environment in which it competes.
16. Market opportunities in my industry are largely predetermined by factors beyond my company's control.

Note: Items 2, 4, 7, 8, 11, 12, 14, and 15 are reverse-scored.

## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

## Notes

1. CEOs were included who were more likely to be familiar with or personally connected to the home university of one of the authors. A 750-mile radius from that author's home university to firms' headquarters was necessary to create a mailing list of CEOs from at least 1000 firms. This methodology is consistent with previous research showing that response rates can be increased when targeted respondents have a personal or geographic affinity to the researcher's institution ([Knight et al., 1999](#)). While the generalizability of any sample population is limited, prior

research supports the position that proximity does not limit the ability to generalize results for the entire set of public firms in the United States ([Smith et al., 1994](#)).

2. See [Finkelstein \(1992\)](#) for the list of elite educational institutions.

## References

Aldrich, H (2008) <i>Organizations and Environments</i> . CA: Stanford University Press.
Anderson, CR, Schneier, CE (1978) Locus of control, leader behavior and leader performance among management students. <i>Academy of Management Journal</i> 21(4): 690–698.
Andrews, KR (1971) <i>The Concept of Corporate Strategy</i> . Homewood: RD Irwin Inc.
Ashill, NJ, Jobber, D (2013) The effects of experience on managerial decision-making uncertainty. <i>Journal of General Management</i> 39(1): 81–110.
Audia, PG, Greve, HR (2006) Less likely to fail: low performance, firm size, and factory expansion in the shipbuilding industry. <i>Management Science</i> 52(1): 83–94.
Barker, VL, Duhaime, IM (1997) Strategic change in the turnaround process: theory and empirical evidence. <i>Strategic Management Journal</i> 18(1): 13–38.
Baum, JA, Rowley, TJ, Shipilov, AV. (2005) Dancing with strangers: aspiration performance and the search for underwriting syndicate partners. <i>Administrative Science Quarterly</i> 50(4): 536–575.
Bieri, J (1966) Cognitive complexity and personality development. In: Harvey, OJ (ed) <i>Experience Structure and Adaptability</i> . Berlin: Springer, pp. 13–37.
Bogner, WC, Barr, PS (2000) Making sense in hypercompetitive environments: a cognitive explanation for the persistence of high velocity competition. <i>Organization Science</i> 11(2): 212–226.
Bonn, I (2005) Improving strategic thinking: a multilevel approach. <i>Leadership and Organization Development Journal</i> 26(5): 336–354.
Boone, C, Brabander, B, Witteloostuijn, A (1996) CEO locus of control and small firm performance: an integrative framework and empirical test. <i>Journal of Management Studies</i> 33(5): 667–700.
Bromiley, P (1991) Testing a causal model of corporate risk taking and performance. <i>Academy of Management Journal</i> 34(1): 37–59.
Bromiley, P (2005) The behavioural foundations of strategic management. <i>International Journal of Leadership in Public Services</i> 1(1): 56–57.
Budner, S (1962) Intolerance of ambiguity as a personality variable. <i>Journal of Personality</i> 30(1): 31–50.
Carpenter, MA (2000) The price of change: the role of CEO compensation in strategic variation and deviation from industry strategy norms. <i>Journal of Management</i> 26(6): 1179–1198.
Carpenter, MA (2002) The implications of strategy and social context for the relationship between top management team heterogeneity and firm performance. <i>Strategic Management Journal</i> 23(3): 275–284.
Crossland, C, Zyung, J, Hiller, N. (2014) CEO career variety: effects on firm-level strategic and social novelty. <i>Academy of Management Journal</i> 57(3): 652–674.
Cyert, RM, March, JG (1963) <i>A Behavioral Theory of the Firm</i> . Englewood Cliffs, NJ: Prentice Hall.
Datta, DK (1991) Organizational fit and acquisition performance: effects of post-acquisition integration. <i>Strategic Management Journal</i> 12(4): 281–297.
Dearborn, DWC, Simon, HA (1958) Selective perception: a note on the departmental identifications of executives. <i>Sociometry</i> 21(2): 140–144.
Dess, GG, Beard, DW (1984) Dimensions of organizational task environments. <i>Administrative Science Quarterly</i> 29(1): 52–73.

Drummond, H (2015) How the hell could that happen?! A symbolic perspective on disaster. <i>Journal of General Management</i> 40(4): 3–21.
Finkelstein, S (1992) Power in top management teams: dimensions, measurement, and validation. <i>Academy of Management Journal</i> 35(3): 505–538.
Finkelstein, S, Hambrick, D, Cannella, A (2009) <i>Strategic Leadership: Theory and Research on Executives, Top Management Teams, and Boards</i> . New York, NY: Oxford University Press.
Fiske, ST, Taylor, SE (2013) <i>Social Cognition: From Brains to Culture</i> . London: Sage.
Frenkel-Brunswik, E (1949) Intolerance of ambiguity as an emotional and perceptual personality variable. <i>Journal of Personality</i> 18(1): 108–143.
Furnham, A, Marks, J (2013) Tolerance of ambiguity: a review of the recent literature. <i>Psychology</i> 4(09): 717–728.
Gavetti, G, Levinthal, D, Ocasio, W (2007) Perspective neo-Carnegie: the Carnegie school's past, present, and reconstructing for the future. <i>Organization Science</i> 18(3): 523–536.
Geletkanycz, MA, Black, SS (2001) Bound by the past? Experience-based effects on commitment to the strategic status quo. <i>Journal of Management</i> 27(1): 3–21.
Graetz, F (2002) Strategic thinking versus strategic planning: towards understanding the complementarities. <i>Management Decision</i> 40(5): 456–462.
Greve, HR (2003) A behavioral theory of R&D expenditures and innovations: evidence from shipbuilding. <i>Academy of Management Journal</i> 46(6): 685–702.
Halbesleben, JR, Novicevic, MM, Harvey, MG. (2003) Awareness of temporal complexity in leadership of creativity and innovation: a competency-based model. <i>The Leadership Quarterly</i> 14(4): 433–454.
Hambrick, DC (2007) Upper echelons theory: an update. <i>Academy of Management Review</i> 32(2): 334–343.
Hambrick, DC, Abrahamson, E (1995) Assessing managerial discretion across industries: a multimethod approach. <i>Academy of Management Journal</i> 38(5): 1427–1441.
Hambrick, DC, Cho, TS, Chen, MJ (1996) The influence of top management team heterogeneity on firms' competitive moves. <i>Administrative Science Quarterly</i> 41(4): 659–684.
Hambrick, DC, Finkelstein, S (1987) Managerial discretion: a bridge between polar views of organizational outcomes. <i>Research in Organizational Behavior</i> 9: 396–406.
Hambrick, DC, Finkelstein, S, Mooney, AC (2005) Executive job demands: new insights for explaining strategic decisions and leader behaviors. <i>Academy of Management Review</i> 30(3): 472–491.
Hambrick, DC, Geletkanycz, MA, Fredrickson, JW (1993) Top executive commitment to the status quo: some tests of its determinants. <i>Strategic Management Journal</i> 14(6): 401–418.
Hambrick, DC, Macmillan, IC (1985) Efficiency of product R&D in business units: the role of strategic context. <i>Academy of Management Journal</i> 28(3): 527–547.
Hambrick, DC, Mason, PA (1984). Upper echelons: the organization as a reflection of its top managers. <i>Academy of Management Review</i> 9(2): 193–206.
Hannan, MT, Freeman, J (1977) The population ecology of organizations. <i>American Journal of Sociology</i> 82(5): 929–964.
Hiller, NJ, Hambrick, DC (2005) Conceptualizing executive hubris: the role of (hyper-) core self-evaluations in strategic decision-making. <i>Strategic Management Journal</i> 26(4): 297–319.
Hitt, MA, Tyler, BB (1991) Strategic decision models: integrating different perspectives. <i>Strategic Management Journal</i> 12(5): 327–351.
Hodgkinson, GP (1992) Research notes and communications development and validation of the strategic locus of control scale. <i>Strategic Management Journal</i> 13(4): 311–317.

Hogarth, R (1980) <i>Judgment and Choice: The Psychology of Decision Processes</i> . New York: Wiley.
Howell, JM, Avolio, BJ (1993) Transformational leadership, transactional leadership, locus of control, and support for innovation: Key predictors of consolidated-business-unit performance. <i>Journal of Applied Psychology</i> 78(6): 891–902.
Iyer, DN, Miller, KD (2008) Performance feedback, slack, and the timing of acquisitions. <i>Academy of Management Journal</i> 51(4): 808–822.
Judge, TA, Piccolo, RF, Kosalka, T (2009) The bright and dark sides of leader traits: a review and theoretical extension of the leader trait paradigm. <i>The Leadership Quarterly</i> 20(6): 855–875.
Judge, TA, Thoresen, CJ, Pucik, V. (1999) Managerial coping with organizational change: a dispositional perspective. <i>Journal of Applied Psychology</i> , 84(1): 107–122.
Key, S (2002) Perceived managerial discretion: an analysis of individual ethical intentions. <i>Journal of Managerial Issues</i> 14(2): 218–233.
Knight, D, Pearce, CL, Smith, KG. (1999) Top management team diversity, group process, and strategic consensus. <i>Strategic Management Journal</i> 20(5): 445–465.
Kuusela, P, Keil, T, Maula, M (2017). Driven by aspirations, but in what direction? Performance shortfalls, slack resources, and resource-consuming vs. resource-freeing organizational change. <i>Strategic Management Journal</i> 38(5): 1101–1120.
Latukha, MO, Panibratov, AY (2015) Top management teams' competencies for international operations: Do they influence a firm's result? <i>Journal of General Management</i> 40(4): 45–69.
Lawrence, BS (1997) Perspective—The black box of organizational demography. <i>Organization Science</i> 8(1): 1–22.
Levenson, H (1974) Activism and powerful others: distinctions within the concept of internal-external control. <i>Journal of Personality Assessment</i> 38(4): 377–383.
Levinthal, DA, March, JG (1993) The myopia of learning. <i>Strategic Management Journal</i> 14(S2): 95–112.
Levitt, B, March, JG (1988) Organizational learning. <i>Annual Review of Sociology</i> 14(1): 319–338.
Lim, ENK, McCann, BT (2014) Performance feedback and firm risk taking: the moderating effects of CEO and outside director stock options. <i>Organization Science</i> 25(1): 262–282.
March, JG, Simon, HA (1958) <i>Organizations</i> . Oxford, UK: Wiley.
McClelland, PL, Liang, X, Barker, VL (2010) CEO commitment to the status quo: replication and extension using content analysis. <i>Journal of Management</i> 36(5): 1251–1277.
McGill, AR, Johnson, MD, Bantel, KA (1994) Cognitive complexity and conformity: effects on performance in a turbulent environment. <i>Psychological Reports</i> 75(3f): 1451–1472.
McLain, DL (2009) Evidence of the properties of an ambiguity tolerance measure: The multiple stimulus types ambiguity tolerance scale-ii (MSTAT-ii) 1. <i>Psychological Reports</i> 105(3): 975–988.
Miller, D (1991) Stale in the saddle: CEO tenure and the match between organization and environment. <i>Management Science</i> 37(1): 34–52.
Miller, D, Chen, MJ (1994). Sources and consequences of competitive inertia: a study of the US airline industry. <i>Administrative Science Quarterly</i> 39(1): 1–23.
Miller, D, Kets De Vries, MFR, Toulouse, J-M (1982) Top executive locus of control and its relationship to strategy-making, structure, and environment. <i>Academy of Management Journal</i> 25(2): 237–253.
Mintzberg, H (1978) Patterns in strategy formation. <i>Management Science</i> 24(9): 934–948.
Musteen, M, Barker, VL, Baeten, VL (2006) CEO attributes associated with attitude toward change: the direct and moderating effects of CEO tenure. <i>Journal of Business Research</i> 59(5): 604–612.

Nakauchi, M, Wiersema, MF (2015) Executive succession and strategic change in Japan. <i>Strategic Management Journal</i> 36(2): 298–306.
Neuliep, JW, Hazelton, V (1986) Enhanced conversational recall and reduced conversational interference as a function of cognitive complexity. <i>Human Communication Research</i> 13(2): 211–224.
Oreg, S (2003) Resistance to change: developing an individual differences measure. <i>Journal of Applied Psychology</i> 88(4): 680–693.
Porter, ME (1980) <i>Competitive Strategy: Techniques for Analyzing Industries and Competitors</i> . New York, NY: The Free Press.
Ref, O, Shapira, Z (2017) Entering new markets: the effect of performance feedback near aspiration and well below and above it. <i>Strategic Management Journal</i> 38(7): 1416–1434.
Roberts, BW, Walton, KE, Viechtbauer, W (2006) Patterns of mean-level change in personality traits across the life course: a meta-analysis of longitudinal studies. <i>Psychological Bulletin</i> 132(1): 1–25.
Rotter, JB (1966) Generalized expectancies for internal versus external control of reinforcement. <i>Psychological Monographs: General and Applied</i> 80(1): 1–28.
Rousseeuw, PJ, Leroy, AM (2005) <i>Robust Regression and Outlier Detection</i> . New York: John Wiley and Sons.
Shapira, Z (2017) Entering new markets: the effect of performance feedback near aspiration and well below and above it. <i>Strategic Management Journal</i> 38(7): 1416–1434.
Shipilov, AV, Li, SX, Greve, HR (2011) The prince and the pauper: search and brokerage in the initiation of status-heterophilous ties. <i>Organization Science</i> 22(6): 1418–1434.
Smith, KG, Smith, KA, Olian, JD. (1994) Top management team demography and process: the role of social integration and communication. <i>Administrative Science Quarterly</i> 39(3): 412–438.
Starbuck, WH, Milliken, FJ (1988) Executives' perceptual filters: What they notice and how they make sense. In: Hambrick, D (ed) <i>The Executive Effect: Concepts and Methods for Studying Top Managers</i> . Greenwich, CT: JAI Press, pp. 35–65.
Thompson, JD (1967) <i>Organizations in Action: Social Science Bases of Administrative Theory</i> . New Brunswick: Transaction Publishers.
Tushman, ML, Newman, WH, Romanelli, E (1986) Convergence and upheaval: managing the unsteady pace of organizational evolution. <i>California Management Review</i> 29(1): 29–44.
Van Seggelen-Damen, IC (2013) Reflective personality: identifying cognitive style and cognitive complexity. <i>Current Psychology</i> 32(1): 82–99.
Waller, MJ, Huber, GP, Glick, WH (1995) Functional background as a determinant of executives' selective perception. <i>Academy of Management Journal</i> 38(4): 943–974.
Wally, S, Baum, JR (1994) Personal and structural determinants of the pace of strategic decision making. <i>Academy of Management Journal</i> 37(4): 932–956.
Wangrow, DB, Schepker, DJ, Barker, VL (2015) Managerial discretion: an empirical review and focus on future research directions. <i>Journal of Management</i> 41(1): 99–135.
Wiklund, J, Shepherd, D (2003) Aspiring for, and achieving growth: the moderating role of resources and opportunities. <i>Journal of Management Studies</i> 40(8): 1919–1941.
Zander, U, Kogut, B (1995) Knowledge and the speed of the transfer and imitation of organizational capabilities: an empirical test. <i>Organization Science</i> 6(1): 76–92.