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Change or stability? A meta-analysis of organizational responses to social and historical performance feedback

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ABSTRACT

Performance feedback theory (PFT) proposes that performance shortfalls trigger problemistic search followed by strategic change. However, empirical studies report inconsistent results, suggesting that organizational responses depend on the type of feedback considered and the pathways through which firms attempt to restore performance. To reconcile these conflicting findings, we conducted a meta-analysis of 74 performance feedback studies and integrated PFT with regulatory focus theory to explain *when* and *how* organizations respond to performance shortfalls. Our findings show that historical shortfalls (comparisons with a firm's past performance) are associated with strategic change, whereas social shortfalls (comparisons with peers) lead to stability through increased R&D intensity. We also demonstrate that strategic change and R&D intensity represent distinct behavioral outcomes of the feedback process that vary independently rather than unfolding in a fixed sequence. These findings advance PFT by highlighting the differentiated impact of feedback types and provide practical insights for managers seeking to assess the performance of their firms.

1. Introduction

Performance feedback—defined as comparison between an organization's desired and actual performance—is a key determinant of strategic decision-making in organizations (Greve, 1998; Washburn & Bromiley, 2012; Greve & Zhang, 2022; Surdu et al., 2021). Organizational decision-makers typically use two sources of information to assess the performance of their organizations: historical and social performance feedback (Greve, 1998; Washburn & Bromiley, 2012). Historical performance feedback is based on the organization's past performance, while social performance feedback is based on the performance of comparable organizations (Cyert & March, 1963; Greve, 1998; Washburn & Bromiley, 2012). The performance feedback model assumes that when organizations perform worse than they did before (historical performance shortfall) or worse than their peers (social performance shortfall), they will engage in problemistic search[1] to identify solutions that restore performance to the desired level and subsequently implement strategic change once a satisfactory solution is identified (Cyert & March, 1963; Greve, 1998). Indeed, many studies assume that performance shortfalls trigger problemistic search followed by strategic change (e.g., Gavetti et al., 2012; Greve, 1998; Greve, 2003). For instance, research shows that performance shortfalls influence the likelihood that organizations enter new markets (Barreto, 2012; Ref & Shapira, 2017), expand internationally (Jiang & Holburn, 2018; Surdu et al., 2021), fund research and development (R&D; Bromiley & Washburn, 2011; Choi et al., 2019; Kotlar et al., 2014; Han, 2023; Lv, Chen, Zhu, & Hailin, 2019), and invest in innovation (Gaba & Bhattacharya, 2012).

The appeal of the original performance feedback model—which posits that performance shortfalls trigger problemistic search, followed by strategic change (Cyert & March, 1963; Greve, 1998; Greve, 2003)—has led to many insightful and valuable studies that have improved our understanding of organizational responses to performance feedback. At the same time, insights from behavioral strategy research show that

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[1] Although problemistic search is the theorized response to performance shortfalls (Cyert & March, 1963; Greve, 1998), the behavior commonly considered and observed in primary studies is search intensity: the level of resources invested by the organization to conduct problemistic search (Posen et al., 2018). Search intensity is typically operationalized by measuring the relative or absolute allocation of resources to research and development (R&D) activities. We therefore consider R&D intensity as the organizational response relevant to our meta-analytic synthesis of the performance feedback literature and will refer to search intensity as R&D intensity throughout the paper.

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organizational decision-making processes are strongly influenced by the way decision-makers think and how they allocate their attention (e.g., Back et al., 2020; Blettner et al., 2015; Kleinknecht et al., 2020; Wilms et al., 2019). Recent theoretical and empirical work on PFT, for example, suggests that organizations respond differently to historical and social performance feedback (Blettner et al., 2015; Eggers & Suh, 2018; Greve & Gaba, 2017; Kacperczyk et al., 2015; Kim et al., 2015). Decision-makers find historical performance feedback easier to interpret, as the information needed to draw causal inferences is more readily available (Greve, 2003a; Kim et al., 2015; Menon & Pfeffer, 2003). At the same time, social performance feedback is an important indicator for executives and directors to assess managerial effectiveness (Tuggle et al., 2010; Walsh & Seward, 1990). Despite the differences between historical and social performance feedback and their importance for organizations, it is still unclear if and how these differences change the original performance feedback model. In this study, we therefore seek to answer the question "How do organizational responses—specifically problemistic search and strategic change—differ when addressing historical versus social performance shortfalls?"

To answer this question, we enrich performance feedback theory (PFT; Cyert & March, 1963; Greve, 1998) and its performance feedback model with ideas drawn from Regulatory Focus Theory (RFT; Higgins, 1997, 1998). Like PFT, RFT is a behavioral perspective that builds on the premise that decision-makers are motivated to reduce performance discrepancies. It argues that there are two motivational systems that dictate the strategies people pursue to achieve their goals. The promotion-focused system favors eager strategies of advancement and change, while the prevention-focused system favors vigilant strategies of safety and stability (Higgins, 1998; Scholer & Higgins, 2008, 2012). RFT helps us to theorize about *when* and *why* decision-makers choose eager or vigilant responses to performance feedback, as well as about why and under what circumstances performance feedback activates prevention or promotion systems. We argue that historical performance shortfalls activate the promotion system of decision-makers because they perceive success against historical aspiration levels as the *presence of a positive outcome* (doing better than the year before). Furthermore, the low information requirements of the historical performance feedback mechanism reduce causal ambiguity about solutions that potentially ameliorate the performance discrepancy. Social performance shortfalls, in contrast, activate the prevention system because success in light of social aspiration levels is considered the *absence of a negative outcome* (avoiding performing worse than competitors). The activation of the prevention system is further strengthened by the comparatively high level of causal ambiguity surrounding social performance feedback.

To assess the effects of historical and social performance shortfalls on problemistic search and strategic change we conducted a theory-extending meta-analysis of 74 primary PFT studies. We chose a meta-analytic approach not only because a key challenge in the PFT literature is the variability of results across individual studies (e.g., Posen et al., 2018) but also because we believe it is a necessary step for theory advancement in this mature field. Alternative designs such as longitudinal studies, experiments, or narrative reviews provide valuable insights but cannot adjudicate across the highly dispersed body of findings that characterizes PFT: longitudinal studies remain context-specific, experiments simplify the richness of organizational settings, and narrative reviews cannot quantify the relative strength of effects. In contrast, meta-analysis—and meta-analytic structural equation modeling (MASEM) in particular—enables us to integrate fragmented primary studies into a single conceptual model and test whether PFT's conjectured interdependencies hold when tested against the broadest possible base of empirical evidence (Bergh et al., 2016; Borenstein et al., 2009; Hunter & Schmidt, 1990). Moreover, PFT has reached a late stage of development in which the task is no longer to establish whether its basic predictions hold, but to consolidate accumulated evidence and clarify the relative importance of its explanatory mechanisms. For this reason, meta-analysis serves as a critical pathway for answering our research question and bringing a mature theory such as PFT to its next stage of theoretical advancement.

The meta-analytic results of our study support the integrated model we propose and confirm that organizations implement eager strategies geared to advancement when historical performance shortfalls trigger the promotion system of decision-makers. This response involves increased strategic change and problemistic search. In contrast, organizations will enact vigilant strategies geared to stability when social performance shortfalls activate decision-makers' prevention system. This response is characterized by a steep decline in strategic change and a strong increase in problemistic search. While organizational responses to historical performance shortfalls thus seem to follow the original performance feedback model (Cyert & March, 1963; Greve, 1998), explaining organizational responses to social performance shortfalls requires an extension of current PFT reasoning.

Our study has three important theoretical implications for PFT and our understanding of organizational responses to performance shortfalls. First, it challenges the conventional PFT reasoning that organizations respond similarly to social and historical performance shortfalls (Cyert & March, 1963; Greve, 1998; Greve, 2003). While PFT predicts strategic change in response to both, our meta-analysis finds that firms increase strategic change only following historical performance shortfalls. Social performance shortfalls, in contrast, lead to greater stability. This finding aligns with previous studies showing that historical and social performance shortfalls indeed have different behavioral consequences— in terms both of valence (positive and negative) and of relative composition (R&D intensity and/or strategic change; e.g., Blettner et al., 2015; Eggers & Suh, 2018; Greve & Gaba, 2017; Kacperczyk et al., 2015; Kim et al., 2015; Ma et al., 2023; Ye et al., 2021). Second, we integrate insights from RFT (Higgins, 1998; Scholer & Higgins, 2008, 2012) to explain these differences, showing that historical shortfalls elicit a promotion-focused response (encouraging exploration and change), whereas social shortfalls activate a prevention-focused response (favoring caution and stability). This integration advances PFT by explaining not just when firms act, but how they choose specific strategic responses. Third, we refine PFT by demonstrating that problemistic search and strategic change do not follow the same response pattern. An important implication of this finding for the PFT literature is that strategic change and search intensity are distinct strategic outcomes that vary based on the type and valence of the performance feedback considered by organizational decision-makers.

This study provides two key practical insights. First, it helps boards of directors and senior managers assess firms' strategic responses by recognizing the differences between historical and social performance feedback. Moreover, it shows that search intensity in the form of R&D investments and strategic change are different strategic outcomes of the performance feedback process. Understanding these differences enables them to evaluate strategic decision-making more effectively. Second, by integrating PFT and RFT, this study provides a deeper understanding of how organizational decision-makers interpret performance discrepancies. Historical shortfalls trigger a promotion-focused mindset, leading decision-makers to pursue strategic change. Conversely, social shortfalls activate a prevention-focused mindset, leading them to favor stability. While regulatory focus is often considered a stable trait, this study indicates that situational performance feedback can shift decision-making tendencies, leading to markedly different strategic responses.

2. Theory and hypotheses

Since the development of a behavioral perspective on organizational decision-making (Cyert & March, 1963; March & Simon, 1958), management scholars have considered a mismatch between aspired to and realized performance as a strong cue for organizational action. Possible organizational responses to negative performance typically range from new market entry (Barreto, 2012; Ref & Shapira, 2017), international expansion (Jiang & Holburn, 2018; Surdu et al., 2021), the selection of

alliance partners (Baum et al., 2005; Han, 2023; Shipilov et al., 2011), and CEO turnover (Jiang et al., 2017) to investments in R&D (Bromiley & Washburn, 2011; Choi et al., 2019; Kotlar et al., 2014; Lv, Chen, Zhu, & Hailin, 2019) and innovation (Gaba & Bhattacharya, 2012). Boards of directors use the difference between aspired to and actual performance to assess managerial effectiveness (Walsh & Seward, 1990) and to determine whether they should monitor a firm more closely (Tuggle et al., 2010). In sum, these examples show that organizational decision-making is inextricably tied to performance feedback. To clarify how such feedback translates into action, we next outline the mechanisms that connect performance feedback with organizational responses.

2.1. Organizational responses to historical and social performance feedback

According to PFT, decision-makers use two types of aspiration levels to determine whether the performance of their organizations is adequate: historical and social aspiration levels. First, historical aspiration levels enable performance evaluation by comparing a firm's current performance with its past performance. They have good forecasting properties because they are rooted in internal information, and they provide a stable indication of how well the organization can perform (Greve, 2003a, 2003b). Second, social aspiration levels compare the performance of a focal firm with that of a group of comparable organizations. The performance of comparable organizations serves as a useful benchmark, because it reflects the environmental pressures and competitive dynamics that are shared by the entire reference group (Greve, 2003b). The necessary information to establish an accurate social aspiration level is more difficult to collect, however, and harder to interpret because competitively valuable information is rarely reported externally (Greve, 2003b).

A comparison of actual performance with historical or social aspiration levels can trigger two subsequent responses (Cyert & March, 1963; Greve, 2003b): (problemistic) search and strategic change. These two responses are discussed in turn. First, when organizational performance falls below (social or historical) aspiration levels, decision-makers might engage in problemistic search, defined as "the level of resources invested by firms to search for a solution that will bring performance back to the desired level" Cyert & March, 1963). Performance feedback scholars typically capture problemistic search by measuring the relative or absolute allocation of resources to research and development (R&D) activities (e.g., Chen, 2008; Chrisman & Patel, 2012; Greve, 2003a). Second, when organizational performance falls below (social or historical) aspiration levels, decision-makers might engage in organizational strategic change, defined as any strategic action taken by the organization's decision-makers to improve performance that permanently changes the organization or its activities (Cyert & March, 1963). Since strategic change involves significant deviations from current behavior, PFT scholars often suggest that organizational change is a consequence of an intense search process—implying that problemistic search and strategic change are causally and temporally related (Posen et al., 2018).

Specifically, R&D intensity and the probability of strategic change increase when performance falls further below (social and historical) aspiration levels (Cyert & March, 1963; Greve, 1998). Change is less likely to occur when performance is above the aspiration level because decision-makers then neither have to correct for a performance shortfall nor search for solutions. Since the necessity to change rapidly declines when performance surpasses the aspiration level, an increase in the level of positive performance feedback has a stronger effect on the reduction of R&D intensity and organizational change than a similar decrease in the level of negative feedback. A graphical representation of this "changing-slope response" (Greve, 1998, p. 62) is displayed in Fig. 1.

In sum, PFT predicts that a deviation from historical and social aspiration levels will lead organizations to engage in problemistic search, which—in turn—will lead to strategic change to restore performance back to the desired level. While this is the core prediction of PFT, accumulating evidence suggests that actual organizational responses are more complex. The following section highlights inconsistencies in these responses.

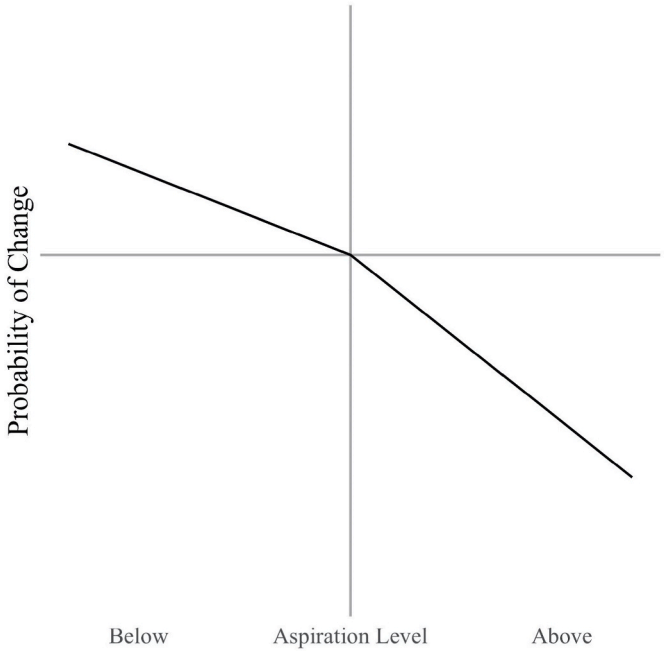

Fig. 1. Changing slope response to performance feedback (Greve, 1998).

2.2. Inconsistencies in organizational responses to performance feedback

The changing-slope model (Fig. 1) has inspired a prolific line of research, and PFT has developed into one of the most vibrant "indigenous" organization theories currently available (Lounsbury & Beckman, 2015). At the same time, however, behavioral strategy research has shown that organizational decision-making processes are strongly influenced by the way decision-makers think (managerial cognition; e.g., Back et al., 2020; Wilms et al., 2019), formulate goals (aspiration formation; e.g., Luo & Shinkle, 2025; Shinkle, 2012), and choose which information to attend to (attention allocation; e.g., Blettner et al., 2015; Kleinknecht et al., 2020). In addition, as PFT has matured, scholars have uncovered empirical and theoretical complexities suggesting that the performance feedback process is not always as unidimensional or sequential as originally proposed. We identified three areas of inconsistency supporting this observation.

2.2.1. Different aspiration types, different behavioral responses

First, in contrast with the assumption that historical and social performance feedback result in similar organizational response patterns, recent studies have suggested that different types of feedback engender different responses (Bromiley & Harris, 2014; Greve & Gaba, 2017; Harris & Bromiley, 2007; Kim et al., 2015). For instance, Blettner and colleagues (2015) find that early in their life cycle and as they age, organizations tend to focus more on their own aspirations; however, at the verge of bankruptcy, they increase their attention to competitors' performance. Eggers and Suh (2018) show that negative feedback in new domains is particularly damaging to subsequent organizational performance; in contrast, negative feedback in experienced domains can produce positive outcomes by encouraging action to search for both local solutions to correct the problem and distant solutions to expand the firm's opportunities. Finally, Kim et al. (2015) find that firms' acquisition behavior varies significantly depending on whether historical or

social comparisons are used, where high variability in the previous acquisition performance of a firm intensifies the relationship between acquisition performance relative to aspirations and the probability of the firm making acquisitions below historical and social aspirations, but attenuates the relationship above such aspirations. In sum, it is for this reason that scholars call for a deeper understanding of different types of aspirations as a motivation for organizational action (Bromiley & Harris, 2014; Greve & Gaba, 2017).

2.2.2. Co-occurrence of problemistic search and strategic change

Second, the organizational response to underperformance is usually conceptualized as a sequential process, in which problemistic search and organizational change are causally linked and temporally separated (Posen et al., 2018). Yet organizations often simultaneously allocate resources to problemistic search and organizational change. Even though researchers have examined the effect of performance shortfalls on R&D intensity (e.g., Chen, 2008; Hu et al., 2023; Vissa et al., 2010) and organizational change (e.g., Han, 2023; Ref & Shapira, 2017; Tyler & Caner, 2016), we do not yet know how organizations adjust the relative salience of these responses. Early ideas for their co-existence include the notion that organizational change is driven by solutions instead of problems, which occur without an intense search process (Cohen et al., 1972; Levinthal & March, 1981). Search, in turn, does not necessarily lead to organizational change (Greve, 2003b), because organizations continuously generate and test alternative solutions, without any guarantee that they will be implemented.

2.2.3. Mixed empirical findings across the performance feedback theory literature

Finally, the empirical evidence presented in the PFT literature does not unequivocally show that historical and social performance shortfalls trigger an intense search process and organizational change. Posen and colleagues (2018) show that studies alternatively report positive, statistically nonsignificant, and negative effects of (historical and/or social) performance shortfalls on search and/or change. These contradictory findings appear across the entire literature, irrespective of aspiration type or performance measurement. If we used these findings to redraw the slopes of Fig. 1, we would need to include positive, negative, and near-zero slopes. It appears that organizations sometimes prefer to change in response to negative performance feedback, whereas at other times they prefer stability. This variability across the PFT literature, therefore, indicates that the changing-slope response is not always an accurate prediction of organizational behavior. Taken together, these inconsistencies suggest the need for a more comprehensive theoretical framework. We therefore turn to an integration of PFT with RFT.

2.3. Addressing the inconsistencies with an integrative theoretical framework

In sum, recent literature on PFT suggests that organizational responses to performance shortfalls are not always as unidimensional and sequential as originally predicted. Social and historical performance can trigger different response patterns, and search intensity and strategic change do not always go hand in hand. In this paper, we integrate PFT with RFT to address these inconsistencies. We build our argument in two steps. First, we describe how RFT complements PFT. While PFT explains why organizations respond more strongly to performance below the aspiration level, RFT explains the different strategies that organizational decision-makers use to resolve performance discrepancies (Higgins, 1997, 1998). Second, we incorporate insights from RFT, arguing that promotion- and prevention-oriented motivational systems provide distinct pathways linking social and historical performance feedback to behavioral outcomes. Fig. 2 offers an integrative overview of this conceptual framework. The framework distinguishes between historical and social performance shortfalls (Fig. 2A), which influence the extent to which organizations engage in problemistic search and strategic change (Fig. 2C). We draw from RFT to argue that historical performance shortfalls activate the promotion motivational system of decision-makers (Fig. 2B), and social performance shortfalls, in contrast, activate the prevention motivational system (Fig. 2B). Building on this integrative framework, the next section elaborates on how RFT complements PFT and helps explain the variability in organizational responses.

2.4. Integrating regulatory focus theory with performance feedback theory

Let us now turn to regulatory focus theory, which complements PFT in that it explains the strategies that people use to resolve performance discrepancies (Higgins, 1997, 1998). As we will argue, the assumptions of PFT and RFT are well aligned. We also show that their theoretical integration offers a fitting explanation of the variability among organizational responses to historical and social performance shortfalls. There are three reasons that RFT augments our current understanding of organization-level PFT. First, RFT explains when and why decision-makers prefer search or change in response to performance shortfalls. While both PFT and RFT argue that decision-makers are motivated to reduce performance discrepancies, RTF also describes the motivational systems governing the response—prevention and promotion motivational systems, which we will further define below. Third, RFT shows that there are two ways of interpreting success: as a gain or as a non-loss. RFT argues that there are two motivational systems, which are found to differing degrees in all individuals (Higgins, 1998; Scholer & Higgins, 2008). People with a *promotion focus* see their goals as ideals that should be strived for. They are motivated by the presence or absence of positive outcomes and assertively employ eager strategies

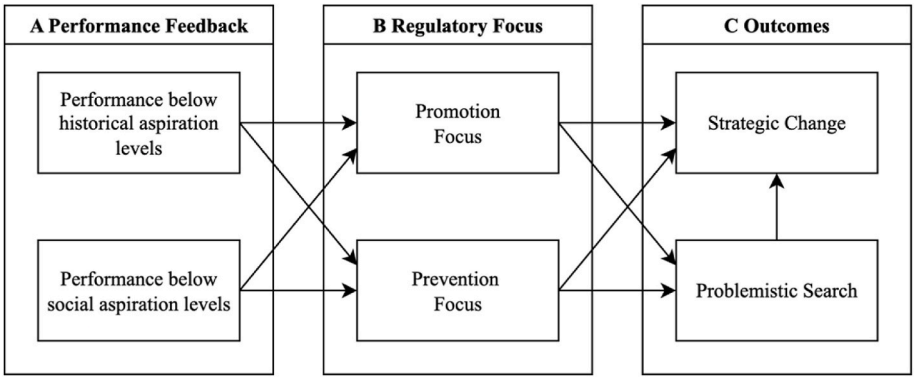

Fig. 2. Integrative conceptual model linking aspiration types, motivational systems, and behavioral outcomes.

that ensure "hits" and avoid "misses" (Crowe & Higgins, 1997). People with a *prevention focus* think of their goals as duties that must be fulfilled. They are motivated by the presence or absence of negative outcomes and prefer cautious strategies that ensure correct rejections and avoid making mistakes (Crowe & Higgins, 1997). As a result, promotion-focused people care about growth, advancement, and attaining better states, while prevention-focused people care about safety, security, and maintaining the status quo (Higgins, 1998).

Every person has a chronic disposition to a promotion focus, a prevention focus, or a combination of both. Indeed, the literature has studied chronic regulatory focus as a stable personality variable that varies in strength and composition (Scholer & Higgins, 2012). At the same time, the dominance of one motivational system over the other is receptive to situational cues (Higgins et al., 1994). For instance, a promotion focus can become more salient when goals are framed in terms of gains versus non-gains, whereas a prevention focus is activated when goals are framed in terms of non-losses versus losses. A person's regulatory state plays an important role in the performance feedback process, due to the different meaning of success in the promotion and prevention systems (Brockner & Higgins, 2001; Higgins, 1997). For a promotion-focused person, success is defined as the presence of a gain (Crowe & Higgins, 1997; Higgins et al., 1994; Molden & Higgins, 2005). Consequently, they are particularly sensitive to positive discrepancies between "0" (the status quo) and "+1" (their ideal), and less sensitive to the negative discrepancies between "0" and "–1" (Brendl & Higgins, 1996; Higgins, 1997). For a prevention-focused person, success is defined as the absence of a loss (Crowe & Higgins, 1997; Higgins et al., 1994; Molden & Higgins, 2005). They are particularly sensitive to negative discrepancies between "0" (the status quo) and "–1" (not meeting the status quo) and less sensitive to the positive discrepancies between "0" and "+1" (Brendl & Higgins, 1996; Higgins, 1997; Higgins & Tykocinski, 1992). The asymmetry between the two systems is important for the performance feedback process, because someone with a promotion focus is successful when they achieve a positive change (i.e., a gain), while someone with a prevention focus is successful when they maintain the status quo (i.e., a non-loss; Higgins, 1997).

Studies examining the effect of regulatory focus on strategic outcomes forge an important link with PFT in that they show that strategic organizational decisions—including responses to performance shortfalls—are made by decision-makers subject to different, situationally enacted regulatory foci. Indeed, recent studies examine the effect of CEOs' regulatory focus on various strategic outcomes, such as the number and value of acquisitions (Gamache et al., 2015), the level of engagement in stake-holder initiatives (Gamache et al., 2020), the willingness to experiment and engage in exploration (Ahmadi et al., 2017; Kammerlander et al., 2015), tolerance of opportunistic behavior of alliance partners (Das & Kumar, 2011), allocation of attention to competitive threats (McMullen et al., 2009), and strategic risk-taking (Mount & Baer, 2022).

In sum, RFT complements PFT in that it explains why and how a decision maker will react to performance feedback depending on the motivational systems governing the response. As is illustrated by Fig. 2, performance below historical and social aspiration levels are two distinct behavioral cues (Fig. 2A) and problemistic search and strategic change are two distinct outcomes (Fig. 2C). The activated motivational system (Fig. 2B) explains to what extent organizational decision-makers will engage in eager strategies geared toward change or cautious strategies geared toward stability. We begin by examining historical performance shortfalls and their tendency to activate a promotion-focused response.

2.5. A promotion-focused response to historical performance shortfalls

Now that we have established how RFT complements PFT, let us turn to the mechanisms explaining why historical and social performance shortfalls trigger different organizational responses. In this section, we argue that historical performance shortfalls are likely to activate decision-makers' promotion focus (represented by the arrows between elements A and B in Fig. 2). The reason is that success in terms of historical performance feedback is typically perceived as the presence of a positive outcome (performing better than before) and failure as the absence of a positive outcome (performing the same as or worse than before). Moreover, it is comparatively easy for decision-makers to attribute the historical performance shortfall to internal processes and activities. When the promotion motivational system is activated, decision-makers will try to resolve the performance discrepancy by increasing strategic change and decreasing R&D intensity (represented by the arrows between elements B and C in Fig. 2).

Success in terms of historical performance feedback is typically perceived as the presence of a gain: organizations are expected to perform better than the year before (Cyert & March, 1963). According to the behavioral theory of the firm, boundedly rational decision-makers maximize their utility when profits are greater than or equal to the level required to cover salaries, staff, investments, and slack (Cyert & March, 1963, p. 240). Because these expenses are expected to rise incrementally, the current aspiration level always exceeds the past achievement level "by a small amount" (Cyert & March, 1963, p. 33). Year-to-year performance improvements, therefore, signal that decision-makers can ensure the long-term viability of the organization. Moreover, executive compensation schemes often reward growth in firm size (van Essen, Heugens, Otten, & van Oosterhout, 2012). Decision-makers therefore receive strong motivational cues that growth, rather than stagnation, is valued by stakeholders. Success is the presence of a performance improvement ("+1"), while failure is a continuation of the status quo ("0"). The framing of success as the presence of a gain and failure as the absence of a gain activates the promotion motivational system (Crowe & Higgins, 1997; Higgins et al., 1994; Molden & Higgins, 2005).

Another mechanism by which historical performance shortfalls trigger a promotion focus is through causal attribution. Historical feedback has low information requirements and good forecasting properties, because it reflects the relatively stable characteristics of the focal organization (Greve, 2003b). Decision-makers have access to the type of internal knowledge necessary for feedback interpretation and can thus identify the possible causes of performance shortfalls (Menon & Pfeffer, 2003). As a result, the historical aspiration level tells decision-makers how well the organization *could* perform, given its capabilities and resources (Greve, 2003b). The capacity to locate causes within the firm reduces causal ambiguity and strengthens the salience of improvement opportunities. Such internally anchored attributions also heighten the illusion of control (Thompson, 1999), which allows promotion-focused decision-makers to buffer themselves against the affective consequences of failure (Langens, 2007). In boundedly rational organizations, the combination of internal attribution, low causal ambiguity, and available improvement opportunities increases the likelihood that historical feedback activates a promotion-focused motivational system.

When the promotion motivational system is activated, decision-makers are more likely to adopt eager strategies that emphasize advancement over caution (Higgins, 1997). For promotion-focused decision-makers, the only acceptable change is a movement from the status quo ("0") to a positive performance outcome ("+1"). We argue that an eager strategy is characterized by an increase in strategic change, because promotion-focused decision-makers are more willing to switch to new activities. When choosing between options, they tend to prefer riskier ones that harbor the promise of a larger payoff (Crowe & Higgins, 1997; Levine et al., 2000; Liberman et al., 1999). For example, a study by Gamache and colleagues (2015) shows that a CEO's promotion focus is associated with a higher number and a higher value of acquisitions, indicating that they engage in more acquisitions with a higher value than their prevention-focused counterparts. Responses to historical performance shortfalls are also likely to involve reduced resource

allocation to search, because promotion-focused decision-makers prefer speed over accuracy (Pham & Chang, 2010), tend to de-escalate commitment to current courses of action (Molden & Hui, 2010), and avoid making errors of omission that result from not taking a particular action (Higgins, 2015). We thus expect that promotion-focused decision-makers will choose to implement available solutions instead of broadening the range of possible solutions through a prolonged search process. See Hypotheses 1 and 2.

Hypothesis 1. When historical performance shortfalls are larger, organizational decision-makers are more engaged in strategic change.

Hypothesis 2. When historical performance shortfalls are larger, organizational decision-makers decrease R&D intensity.

2.6. A prevention-focused response to social performance shortfalls

Having established the promotion-focused response to historical performance, we now consider how social performance shortfalls activate prevention-focused responses. In this section, we will argue that it is likely that the prevention-focus of decision-makers will be activated when they are confronted with social performance shortfalls (represented by the arrows between elements A and B in Fig. 2). The reason is that success in terms of social performance feedback is typically perceived as the absence of a negative outcome (not performing worse than the competition) and failure as the presence of a negative outcome (performing worse than the competition). Moreover, it is comparatively difficult for decision-makers to attribute a social performance shortfall to internal processes and activities. When the prevention motivational system is activated, decision-makers will try to resolve the performance discrepancy by decreasing strategic change and increasing R&D intensity (represented by the arrows between elements B and C in Fig. 2).

Success in terms of social performance feedback is defined as the absence of a negative outcome: Organizations should not lag behind their competitors. The reason for this expectation is that social aspiration levels have a strong normative function (Kelley, 1952; Moliterno et al., 2014). Unlike historical aspirations, social benchmarks are tied to standards of group membership (Kelley, 1952). When social performance shortfalls increase, there is a point at which the focal organization can no longer be meaningfully compared to the reference group and loses its membership of it. Consequently, low relative rankings are interpreted by managers as negative feedback. Moliterno and colleagues (2014) draw an analogy between the normative function of social performance feedback and "competence-based" tournaments, in which players focus on "not losing" and perceive the "avoidance of punishment" as a reward. The study of Wang et al. (2017) illustrates this mechanism by showing that organizations in the thin-film transistor liquid-crystal display (TFT-LCD) industry are driven primarily by a desire not to fall behind peers rather than to move ahead of them. From the perspective of RFT, not performing worse than competitors is therefore perceived as an obligation or duty that managers must uphold.

The second mechanism by which social performance shortfalls trigger a prevention focus is through causal attribution. Social performance feedback requires extensive comparative information, which makes it difficult for managers to interpret. Unlike historical feedback, where internal benchmarks are readily accessible, evaluating relative performance involves information that is often incomplete or unavailable (Greve, 2003b). Kim et al. (2015) argue that there are two reasons why social aspiration levels are ambiguous performance benchmarks. First, knowledge about the capabilities of other firms is often only available to the managers of those firms (Menon & Pfeffer, 2003). Second, it is difficult to assess the heterogeneity among the members of the reference group, and a relevant reference group might not even be available (Beckman & Haunschild, 2002; McEvily & Zaheer, 1999). The relationship between actions and social performance shortfalls is, therefore, difficult to determine, and uncertainty about what constitutes the right course of action is high. Since prevention-focused people show more ambiguity aversion than promotion-focused people (Liu, 2011), such causal ambiguity reinforces their preference for safety and security (Higgins, 1997).

We therefore propose that when the prevention-focused motivational system is activated, decision-makers will respond to social performance shortfalls by reducing strategic change and increasing resources allocated to problemistic search. Prevention-focused decision-makers are satisfied when they manage to change an unacceptable negative performance outcome ("–1") to the acceptable status quo ("0"). They prefer cautious strategies geared toward stability (Higgins, 1997). This preference has two organizational consequences. First, implementing cautious strategies will lead to a decrease in strategic change, because prevention-focused decision-makers are more likely to remain committed to current courses of action (Scholer & Higgins, 2012). When confronted with a set of options, they tend to prefer conservative over risky ones (Crowe & Higgins, 1997; Liberman et al., 1999). Second, vigilance will lead to an increase in R&D intensity, because prevention-focused decision-makers prefer accuracy over speed (Pham & Chang, 2010) and like to take the time to contemplate different choices and explore different possibilities (Zhu & Meyers-Levy, 2007). For example, a study by Gamache and colleagues (2015) shows that a CEO's prevention focus is negatively associated with the number and value of acquisitions, indicating that they engage in fewer acquisitions with smaller values than their promotion-focused counterparts. These cautious responses involve increasing R&D search to expand the set of available solutions (Greve, 2003b; Levinthal & March, 1981) while simultaneously reducing exposure to risk (Bromiley et al., 2017). These arguments lead to the following hypotheses.

Hypothesis 3. When social performance shortfalls are larger, organizational decision-makers are less engaged in strategic change.

Hypothesis 4. When social performance shortfalls are larger, organizational decision-makers increase R&D intensity.

3. Methods

We tested our hypotheses with a theory-extending meta-analysis of 74 primary PFT studies encompassing 28,836,008 observations. We use meta-analysis not only as a tool to summarize the inconsistent empirical findings reported in the PFT literature but also as a theoretically necessary method for consolidatinge its findings, clarifying the relative importance of its explanatory mechanisms, and distinguishing important patterns from study-specific idiosyncrasies. Individual studies often examine isolated relationships, employ different research designs, or focus on distinct contexts, which has led to contradictory evidence on the effects of historical and social performance shortfalls on search intensity and strategic change (Posen et al., 2018). This variability makes it difficult to adjudicate among theoretical mechanisms or to draw robust conclusions about their effects. Our meta-analytic approach addresses this issue by statistically aggregating findings across studies, allowing us to quantify the distinct effects of social and historical performance feedback and determine their consistency and robustness across empirical settings (Borenstein et al., 2009; Eden, 2002; Hunter & Schmidt, 1990). Meta-analytic structural equation modeling (MASEM) allows us to move beyond bivariate associations to test an integrated theoretical model that accounts for interdependencies among variables and key controls (Bergh et al., 2016). A critical advantage of MASEM is that it can draw on the widest possible base of empirical evidence without requiring that all relationships be reported in every primary study (Combs et al., 2019), enabling us to provide a holistic test of PFT that differs fundamentally from prior narrative reviews (Posen et al., 2018) or bivariate syntheses (Kotiloglu et al., 2019).

While other research designs could in principle be used to study organizational responses to performance feedback, none can address the dispersion and fragmentation of findings in the PFT literature as effectively as a meta-analysis can. For example, longitudinal studies provide

detailed insights into process dynamics but remain confined to specific industries, time periods, or firms and cannot adjudicate across the contradictory findings reported in multiple separate studies. Experimental studies allow causal identification but often oversimplify the contextual contingencies that characterize organizational decision-making under performance feedback. Narrative reviews can synthesize prior arguments but lack the ability to quantify the relative strength of mechanisms or to test the interdependencies central to PFT. In contrast, a meta-analytic approach, and MASEM in particular, provides the unique ability to integrate diverse primary studies into a single, comprehensive model that captures the complex and interdependent nature of PFT and evaluates its coherence on the widest possible base of empirical evidence (Borenstein et al., 2009; Eden, 2002; Hunter & Schmidt, 1990). PFT has reached a stage of theoretical maturity where the central task is to consolidate accumulated evidence and clarify the relative importance of its mechanisms. In this context, meta-analysis provides the critical pathway for addressing our research question and advancing PFT to its next stage of theoretical development. Having outlined the rationale for our methodological choice, we now describe the process used to identify and code the relevant studies.

3.1. Literature search

Following best practices (e.g., Bergh et al., 2016; Burkhard et al., 2023; Combs et al., 2019; Geyskens et al., 2009; Heugens & Lander, 2009), we employed four search strategies to identify the largest possible set of primary studies. First, to ensure that the sampled studies are part of the behavioral theory of the firm research tradition, we surveyed all articles citing Cyert and March (1963) listed in the ISI Web of Science database. We used several search terms to identify relevant studies, including "Feedback," "Aspiration*," "Aspiration Levels," "Historical Comparison," and "Social Comparison." Second, we examined the reference lists of review articles covering empirical work on aspirations (Shinkle, 2012), the behavioral theory of the firm (Argote & Greve, 2007; Gavetti et al., 2012), and organizational learning (Miner & Mezias, 1996; Schulz, 2005). Third, we manually examined the articles published from 2010 onward in four top-tier management journals: *Academy of Management Journal*, *Administrative Science Quarterly*, *Organization Science*, and *Strategic Management Journal*. Finally, based on the studies identified in the first three steps, we contacted 65 authors directly. We asked them for published and unpublished work to mitigate the so-called "file-drawer problem": the concern that significant results tend to be overrepresented in meta-analyses due to publication bias (Borenstein et al., 2009). Our request yielded one unpublished study that we included in our meta-analysis.[2]

To determine which studies should be included in our dataset, we used five eligibility criteria, in line with meta-analytic best practices (Burkhard et al., 2023; Lipsey & Wilson, 2001). We summarized the identification and selection of studies in a PRISMA-style diagram (see Fig. 3). First, because PFT operates at the organizational level of analysis, the study should have the organization or business unit as the object of study. Second, it should contain a quantitative analysis and report effect size estimates of our hypothesized relationships and sample sizes (Hunter & Schmidt, 2004). Third, the study should cite Cyert and March (1963), to ensure its pedigree in the PFT literature. The application of these first three criteria resulted in an initial dataset of 436 eligible studies.

After we applied the first three eligibility criteria, we applied two additional criteria to the 436 studies to ensure that they could be used in our meta-analytic review. The fourth criterion is that the study should measure performance relative to aspiration levels. For example, some of the 436 studies measured a form of strategic change or problemistic search, without relating it to performance feedback. These studies fall outside the scope of our meta-analytic review, and we excluded them. The application of this criterion reduced our dataset from 436 to 173 studies. The fifth criterion is that the study should operationalize performance feedback as a *spline function* (Greve, 1998), with separate variables capturing performance above and below the aspiration level. Of the remaining 173 studies, 98 operationalized performance feedback as attainment discrepancy: a continuous variable capturing the absolute difference between aspiration level and actual performance. These studies cannot be used to test our hypotheses because they do not report the effect of performance shortfalls. Of the 436 studies, 75 met all five criteria. After submitting the first version of this paper, we noticed that one paper was retracted, and we removed it from our dataset. Our final dataset, therefore, consists of 74 studies reported in 73 academic articles, of which 72 have been published in peer-reviewed journals and one is an unpublished working paper (see Appendix A for a bibliographic overview).

3.2. Coding protocol

With our dataset established, we next detail the coding procedures applied to ensure consistency and reliability. We developed a coding protocol in accordance with the conventions for rigorous meta-analytic procedures (Lipsey & Wilson, 2001) and the Meta-Analysis Reporting Standards (MARS) of the American Psychological Association (APA) (Appelbaum et al., 2018). We recorded three sets of characteristics. First, we recorded study characteristics, such as the names of authors, publication year, and journal title. Second, we coded sample information, including number of observations, geographical and industry information, cross-sectional or longitudinal design, and sampling timeframe. Third, we used the Pearson correlation coefficient as the effect size we want to synthesize and coded the number of observations, the names of the variables, and the ways the variables have been operationalized and measured. To ensure the reliability of our coding procedure, we reviewed and discussed the coding protocol in our author team and engaged in regular discussions to ensure that our meta-analytic dataset was coded consistently and reliably.

3.3. Measures

3.3.1. Firm performance

We followed the authors' operationalizations when we coded for organizational performance. The resulting measurement strategy is in line with the view that performance is a latent multi-dimensional construct (e.g., Miller et al., 2012; Richard et al., 2009) and includes dimensions such as accounting (e.g., Desai, 2008; Greve, 2010; Iyer & Miller, 2008), market (e.g., Baum & Dahlin, 2007; Greve, 1998), and innovative performance (e.g., Gaba & Bhattacharya, 2012; Lungeanu et al., 2016).

3.3.2. Performance below the historical aspiration level

Performance below the historical aspiration level occurs when the organization's current performance is lower than its past performance. Performance below the historical aspiration level is typically operationalized as the absolute difference between a firm-level performance indicator and the firm's historical aspiration level, if the resulting value is negative and zero otherwise (Greve, 1998). The studies in our sample measured the historical aspiration level as the performance of the organization one time period earlier, as an average of the performance over prior time periods, or as an exponentially weighted moving average across prior time periods. It should be noted that out of the 74 studies in our dataset, 54 included the negative value of the performance shortfall in their analysis, while the remaining 21 transformed it to an absolute value. To draw correct conclusions, it is critical that we align the signs of the effects before conducting the meta-analysis. We chose to use the

[2] We conducted a robustness check without the unpublished paper. We recalculated the results and found that the conclusions of our study did not change.

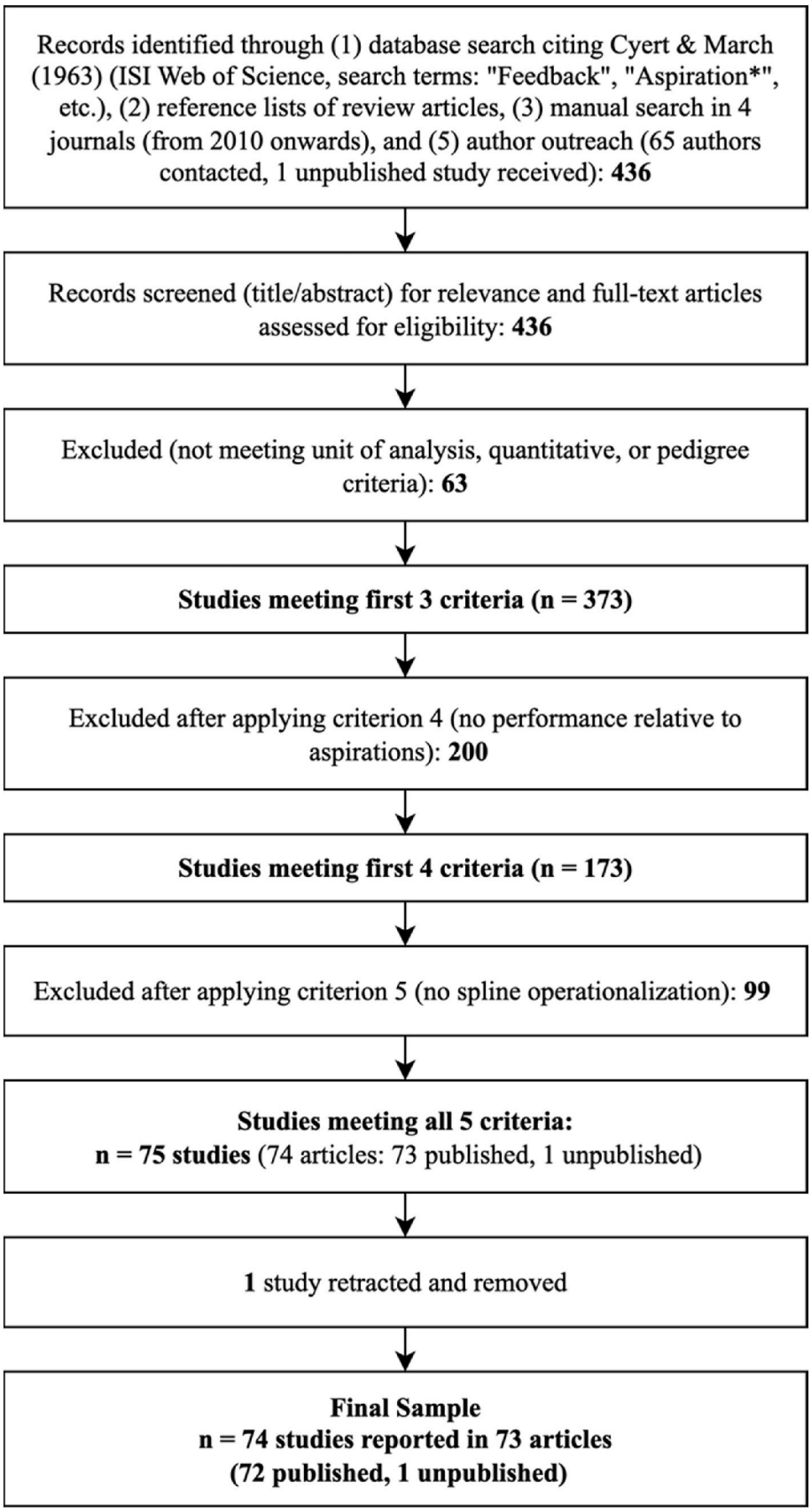

Fig. 3. PRISMA-style flow diagram of study identification, screening, eligibility assessment, and inclusion in the meta-analysis.

absolute value to aid interpretation of the results and reversed the sign of the historical performance shortfall correlations if they were based on a negative operationalization.

3.3.3. Performance below the social aspiration level

Performance below the social aspiration level occurs when the organization's current performance is lower than the performance of its peers (e.g., its competitors). Performance below the social aspiration level is typically operationalized as the absolute difference between a firm-level performance indicator and the firm's social aspiration level if the resulting value is negative and zero otherwise (Greve, 1998). The studies in our sample measure the social aspiration level as mean industry performance, median industry performance, or the exponentially weighted moving average of either. We reversed the sign of the social performance shortfall correlations if they were based on a negative operationalization to include the absolute value in our analysis.

3.3.4. Strategic change

In line with the PFT literature, we defined strategic change as any strategic action taken by the organization's decision-makers that permanently changed the organization or its activities. In line with this definition, we operationalized *strategic change* as discrete changes in an organization's strategy, following the recommendations of Rajagopalan and Spreitzer (1997). This operationalization captures the degree of change, its direction, and its likelihood (Rajagopalan & Spreitzer, 1997). The first set of measurements included in our dataset count the strategic actions that the firm undertook in a given time period, such as the number of new R&D alliances (Tyler & Caner, 2016), new market entries (Ref & Shapira, 2017), or the number of new product introductions (Parker et al., 2017). The second captures the direction of strategic change that happened over a certain time period, including strategic divergence of an organization relative to another organization (Park, 2007) or reference group (Schimmer & Brauer, 2012). The third captures the likelihood that the firm will change, such as the acquisition hazard rate (Iyer & Miller, 2008; Kim et al., 2015).

3.3.5. R&D intensity

Following common practice in the PFT literature, we conceptualized problemistic search as *search intensity*: the level of resources invested by the organization to conduct problemistic search (Posen et al., 2018). Following this convention, we use the relative or absolute allocation of resources to R&D as a measure of problemistic search (e.g., Chen, 2008; Chrisman & Patel, 2012; Greve, 2003a).

3.3.6. Control variables

To control for alternative explanations of our hypothesized relationships, we coded the correlations of the variables in our model with *performance above social and historical aspiration levels, organizational age*, *size*, *experience*, and *slack*. We control for age because older organizations tend to withdraw attention from social aspiration levels and focus instead on prior performance (Blettner et al., 2015). They are also more likely to hold on to routines that were successful in the past (Levinthal & March, 1993). We control for size because larger organizations are more rigid and their inertial processes make change less likely (Greve, 2003a, 2010). We control for organizational experience because it influences the interpretation of and response to feedback (Kim et al., 2015). We measured organizational experience as prior discrete changes in an organization's strategy, including the cumulative number of repetitions of a specific action or outcome. Finally, we control for slack resources because they weaken the relationship between performance feedback and strategic change (Kuusela et al., 2017) and form a cushion that buffers the firm from negative consequences in times of adversity (Cyert & March, 1963).

3.4. Meta-analytic procedures

Our meta-analytic approach consists of two steps, which we implemented with R version 4.0.0 (R Core Team, 2020). First, we used version 2.1-0 of the metafor package (Viechtbauer, 2010) to conduct a meta-analysis (MA) of the empirical evidence reported by the PFT studies in our sample. We combined the meta-analytic results into a meta-analytic correlation table. Second, we used version 0.6–4 of the lavaan package (Rosseel, 2012) to estimate a meta-analytic structural equation model based on the meta-analytic correlation table. MASEM is a statistical technique that combines meta-analysis and structural equation modeling (SEM) to test complex theoretical relationships using aggregated data from multiple independent studies (Bergh et al., 2016). MASEM allows researchers to estimate path coefficients and model fit, enhancing the generalizability and robustness of theoretical models because it accounts for the variability across empirical settings. MASEM is particularly appropriate for our study because it allows us to test a comprehensive theoretical model with multiple dependent, independent, and control variables (Bergh et al., 2016). This allows us to examine the simultaneous effects of performance feedback on strategic change and R&D intensity, while controlling for important factors such as firm size, firm age, and prior experience. A separate meta-analysis of the four hypothesized relationships would only inform us about the average effects of feedback on change, or feedback on search, without considering their interdependence. The same reasoning holds true for historical and social performance feedback, because we can use MASEM to establish the average effect of historical performance feedback while controlling for the effect of social performance feedback, and vice versa.

3.4.1. Meta-analysis

To synthesize the effect sizes, we used Hedges and Olkin-type meta-analysis (HOMA; Hedges & Olkin, 1985). HOMA is an appropriate choice because the vast majority of the studies in our sample used archival data, making Hunter and Schmidt-style corrections for psychometric measurement properties less appropriate (Geyskens et al., 2009). The HOMA procedure consists of four steps. First, we used Fisher's (1921) z transformation to correct for potential skewness in our effect size distribution (Lipsey & Wilson, 2001, p. 63). Second, we weighted each effect size by the inverse of its variance, to reduce the influence of sampling error and attribute greater informational weight to effect sizes based on larger sample sizes. Third, we used the random-effects model to compute a summary effect and modeled the variance of each correlation coefficient as a composite of the variation in true correlations (between-study variance) and sampling error (within-study variance; Borenstein et al., 2009; Lipsey & Wilson, 2001). It is likely that true effect sizes vary between studies, because a large part of the studies in our sample is functionally different (e.g., based on different sampling strategies or data structures) or draws from different empirical populations (e.g., different countries or industries). Finally, we transformed the Fisher's z score of the summary effect back to a correlation coefficient (Borenstein et al., 2009).

3.4.2. Meta-analytic structural equation modeling

We combined the average correlation coefficients resulting from the HOMA procedure into a meta-analytic correlation matrix, using it to fit a structural equation model consisting of all our hypothesized relationships. The estimation of a SEM model requires the specification of a sample size, for which we used the harmonic mean sample size of all studies included in the analysis. The harmonic mean provides a more conservative test than the arithmetic mean, since it reduces the effect of outlying sample sizes. We use maximum likelihood (ML) estimation to assess whether the meta-analytic correlation matrix matches the correlation matrix implied by our theoretical model (Bollen, 1989). The difference between both matrices is captured by the fitted residuals, with larger residuals indicating weaker fit and a theoretical misspecification of the model.

We use six parameters to judge model fit. Three of these—the root-mean-square error of approximation (RMSEA), non-normed fit index (NNFI), and comparative fit index (CFI)—are important because they do not depend strongly on sample size (Schermelleh-Engel et al., 2003). The NNFI and CFI parameters tell us whether our theoretical model is the best possible improvement over the independence model, in which the variables are assumed to be uncorrelated, based on their χ^2 values. An NNFI of 0.95 or higher and a CFI value of 0.9 or higher indicate a good fit. The RMSEA is an indication of overall model fit and compares the theorized correlation matrix with the correlation matrix of the sample population (MacCallum et al., 1996). An RMSEA of 0.05 or less indicates a good fit. Hu and Bentler (1998) recommend considering the standardized root mean square residual index (SRMR) as well, which measures the misfit of the standardized residuals. A model with an SRMR value of 0.8 or less has a good fit with the data. We also include the goodness of fit and adjusted goodness of fit (AGFI) indices, because they are commonly reported in meta-analytic studies and tell us whether our theoretical model provides a better description of the data than the null model, in which all parameters are fixed to zero (Jöreskog & Sörbom, 1993). A GFI of 0.95 or higher and an AGFI of 0.90 or higher indicate a good model fit.

4. Results

4.1. Descriptive statistics

Table 1 provides an overview of the estimated average correlation coefficients between the hypothesized variables. Values range from −0.051 to 0.060, with 95 % confidence intervals between −0.079 and 0.108, indicating modest associations (Cohen, 1988). The Q-statistics of the hypothesized relationships are significant at the 0.001 level, thus confirming our assumption that the true correlation coefficients vary across the studies in our dataset (Borenstein et al., 2009). The heterogeneity of true effect sizes, as captured by their variance measure (T^2), shows that the true correlation coefficients can be stronger or weaker depending on the population of organizations that have been studied. Finally, the I^2 statistic values all exceed 97 percent, indicating that most of the observed variance of the average correlation coefficients reflects real differences across effect sizes (Borenstein et al., 2009). The meta-analytic correlation table (Table 2) reports the average correlation coefficients (r) between all variables and the numbers of samples (k) on which they are based. Performance above the social aspiration level and performance above the historical aspiration level are moderately associated ($r = 0.370$, 95 %CI [0.258, 0.472]), while the correlation between social and historical performance shortfalls is weak and negative ($r = -0.099$ (95 %CI [–0.221, 0.026])). Having presented the descriptive statistics of our study, we next assess the fit of the meta-analytic structural equation model we use to test our hypotheses.

4.2. Model fit

The meta-analytic structural equation model (Fig. 4) fits our data well (χ^2 (4) = 13.567, $p = 0.009$). It consists of two structural equations: (1) strategic change regressed on social and historical performance feedback, and (2) R&D intensity regressed on social and historical performance feedback. We controlled for firm age and organizational experience in the first equation and for firm size and slack resources in the second equation. The harmonic mean on which the estimates are based is 8018. The reported standardized coefficients reflect the number of standard deviations of change in the outcome variable for every standard deviation of change in the predictor variable. We included only our hypothesized relationships in Fig. 4; a complete overview of all estimated structural coefficients can be found in Appendix B. The RMSEA and SRMR of our model are 0.017 and 0.004, respectively, indicating a good model fit (Browne & Cudeck, 1992; Hu & Bentler, 1995). The NFI and CFI are 0.981 and 0.996, which reflect a good fit (Schermelleh-Engel et al., 2003). Finally, the GFI of the model is 0.998 and the AGFI is 0.978, indicating that our model has a good fit compared with a model in which all parameters are fixed to zero (Jöreskog & Sörbom, 1989; Marsh & Grayson, 1995). We now turn to the hypothesis tests, beginning with the predicted promotion-focused response to historical performance shortfalls.

4.3. Hypothesis tests of a promotion-focused response to historical performance shortfalls

Hypothesis 1 predicted that when historical performance shortfalls are larger, organizational decision-makers are more engaged in strategic change because historical performance shortfalls activate the promotion-focused motivational system. Our model shows that organizations indeed tend to increase the magnitude, direction, or likelihood of strategic change when historical performance shortfalls grow larger ($\beta = 0.029$, 95 % CI [0.010, 0.049], $p = 0.003$). Hypothesis 1 is therefore supported. This effect is consistent with the PFT literature and with our expectation that historical performance shortfalls activate a promotion-focused response geared to change. Hypothesis 2 predicted that larger historical performance shortfalls would decrease R&D intensity. The results, presented in Fig. 4, show that when historical performance shortfalls grow larger, organizations also tend to increase the relative or absolute allocation of resources to R&D ($\beta = 0.099$, 95 % CI [0.077, 0.121], $p = 0.000$). Hypothesis 2 is therefore not supported. Considering both effects simultaneously, organizations respond to historical performance shortfalls by increasing the variety of possible solutions (R&D intensity) as well as the number or magnitude of implemented solutions (strategic change). Although both effects are relatively small, our findings show that organizations prefer change over stability when they perform below historical aspiration levels.

4.4. Hypothesis tests of a prevention-focused response to social performance shortfalls

Next, we examine the hypothesized prevention-focused response to social performance shortfalls. Hypothesis 3 predicted that when social performance shortfalls are larger, organizational decision-makers are less engaged in strategic change because social performance shortfalls activate the prevention-focused motivational system. Our results show that when social performance shortfalls grow larger, organizations tend to decrease the magnitude, direction, or likelihood of strategic change

Table 1
HOMA results of the hypothesized relationships.

Relationships	k		r	SE	95 % CI		Q	p	$_T2$	$_I2$
Performance < HAL	R&D intensity	23	0.060	0.024	0.014	0.107	1789.723	0	0.012	99
Performance < HAL	Strategic Change	25	0.008	0.019	−0.030	0.045	3270.998	0	0.008	99
Performance < SAL	R&D intensity	21	0.056	0.027	0.004	0.108	2277.730	0	0.014	99
Performance < SAL	Strategic Change	36	−0.051	0.014	−0.079	−0.022	2334.084	0	0.007	99

Notes: HAL = Historical Aspiration Level, SAL = Social Aspiration Level. k = number of correlation coefficients, r = estimated mean correlation coefficient, SE = standard error, 95 % CI = confidence interval, Q = Q-statistic test for non-homogeneity of true effects, p = p-value of the Q-statistic, T^2 = the estimated (between-study) variance of the true effect sizes, I^2 = proportion of the observed variance that is due to the variation in true effect sizes.

Table 2
Meta-analytic correlation table and frequency matrix.

Variable	1	2	3	4	5	6	7	8	9
1. Performance > HAL	1	75	52	51	21	55	41	15	19
2. Performance < HAL	−0.117	1	55	54	22	60	45	17	23
3. Performance > SAL	0.389	−0.054	1	81	21	50	41	19	20
4. Performance < SAL	−0.037	−0.099	−0.142	1	21	44	40	18	21
5. Experience	0.076	−0.071	0.147	0.086	1	26	18	2	6
6. Slack	0.018	0.005	0.060	−0.009	0.005	1	85	29	55
7. Firm Size	−0.024	−0.046	0.031	−0.065	0.425	−0.029	1	29	29
8. Firm Age	−0.040	−0.007	−0.05	0.028	0.254	−0.041	0.304	1	14
9. R&D intensity	0.035	0.06	0.014	0.056	0.014	0.112	−0.016	−0.026	1
10. Strategic Change	−0.019	0.008	0.023	−0.051	0.391	−0.014	0.202	0.154	−0.029

Notes: The lower triangle contains the estimated mean population correlation coefficients (r); the upper triangle contains the number of effect sizes (k) used to estimate the correlation coefficients; HAL = Historical Aspiration Level; SAL = Social Aspiration Level.

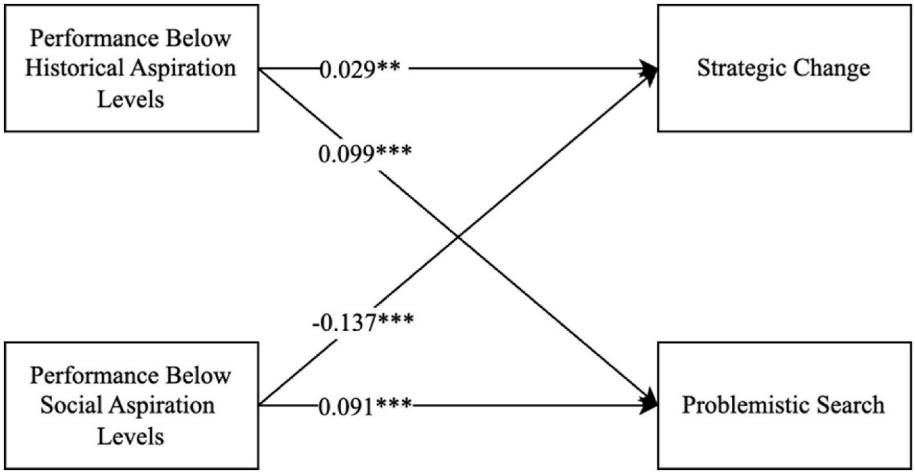

Fig. 4. Meta-analytic structural equation model results. *Notse*: Number of studies = 74; number of samples = 75. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; $n = 8058$ (harmonic mean). Only the hypothesized relationships are displayed (see Appendix B for a complete overview of all estimated relationships). We controlled for firm age and organizational experience in the first equation and for firm size and slack resources in the second equation. The model fits our data well (χ^2 (4) 27,261, $p = 0.000$; *RMSEA* = 0.027; *NNFI* = 0.965; *CFI* = 0.992; *SRMR* = 0.006; *GFI* = 0.997; *AGFI* = 0.957).

($\beta = -0.137$, 95 % CI [–0.157 – 0.118], $p = 0.000$). Hypothesis 3 is therefore supported. This finding contrasts with the positive effect predicted in the PFT literature and confirms our claim that social performance shortfalls activate a prevention-focused response geared to stability. The average negative effect of social performance shortfalls on strategic change is over five times stronger than the average positive

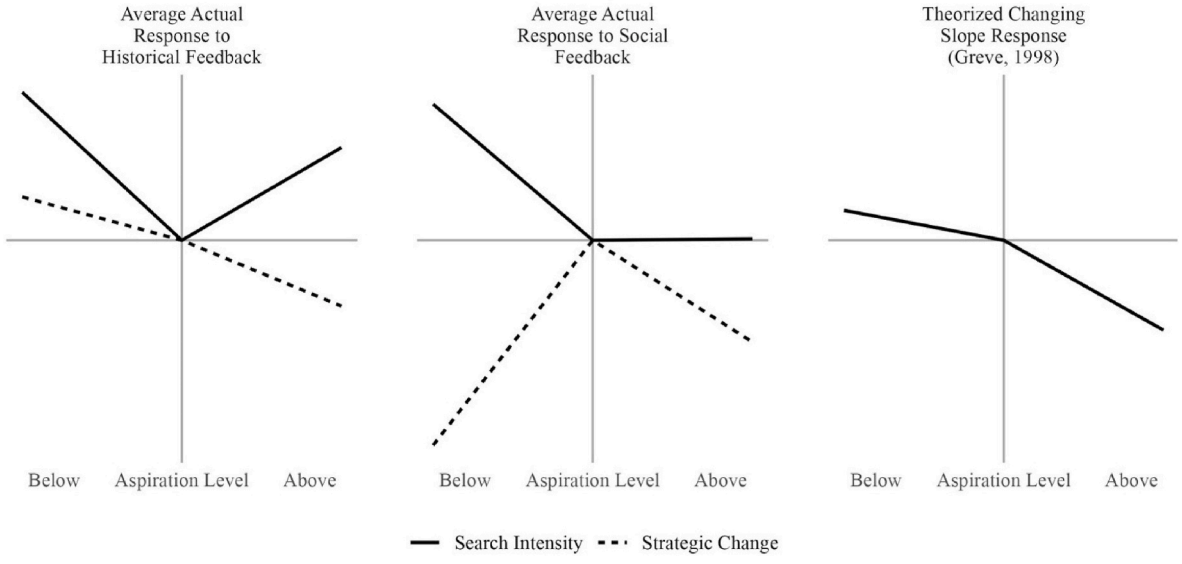

Fig. 5. Theorized versus average actual responses to historical and social performance feedback. *Notes*: The slopes of the lines represent the MASEM estimates of the relationships.

effect of historical performance shortfalls, thus showing clearly that social and historical performance shortfalls have different behavioral effects. Hypothesis 4 predicted that when social performance shortfalls are larger, organizational decision-makers increase R&D intensity. Our results indeed show that when social performance shortfalls grow larger, organizations increase R&D intensity (β = 0.091, 95 % CI [0.069, 0.113], p = 0.000). Hypothesis 4 is therefore supported.

4.5. Comparison of the meta-analytic results with the original changing-slope model

To better understand these findings, we compare them with the predictions of the original changing-slope model (Greve, 1998). This comparison shows that only historical performance feedback on strategic change aligns with the response pattern theorized in PFT (see Fig. 5). The difference is particularly evident in the effect of performance feedback on strategic change. According to the changing-slope model, change is more likely when organizations perform below the aspiration level, with the probability of change declining more quickly when the organization performs above the aspiration level. This is the case for the effect of historical performance feedback on strategic change because it is stronger above the aspiration level (β = −0.044) than below it (β = 0.029). The average effect of social performance feedback on strategic change, however, is incongruent with the changing-slope model in two different ways. First, change is less likely when organizations perform below the social aspiration level, not more likely. Second, the effect of performance above the social aspiration level is weaker (β = −0.068) than the effect of performance below the social aspiration level (β = −0.137).

4.6. Robustness tests of the meta-analytic results

To assess the robustness of our meta-analytic estimations, we used meta-analytic regression analysis (MARA; Lipsey & Wilson, 2001). For each hypothesized relationship, we regressed the observed effect sizes onto a vector of study characteristics that could conceivably influence our estimates. First, we created dummy variables to track multiple effect sizes reported in a single study, to detect and control for the effects of within-study stochastic interdependencies. Second, we included the median year of the sampling window, to account for time-varying market conditions. Third, we included a dummy variable to track whether our sampling window included the financial crisis years of 2008 and 2009. Fourth, since some of our studies are based on data collected in multiple countries or industries, we created two variables reflecting country and industry heterogeneity. Fifth, most of our studies are based on archival datasets, for which Compustat is the most commonly used database. We thus used a dummy variable to correct for primary studies' dependence on the Compustat database. Finally, we controlled for journals' impact factors as a proxy for study quality and for publication year to account for the fact that the management field is increasingly trading off effect size against sample size (Combs, 2010). The reported effect sizes remain robust and do not change significantly after these control variables are included. The MARA analyses are available upon request.

Second, we also compared the hypothesized MASEM model (Fig. 4) with a model in which the effect of social and historical performance shortfalls on strategic change is mediated by R&D intensity, thereby capitalizing on the advantage that MASEM can be used to evaluate the fit of competing theoretical models (Bergh et al., 2016). This model, however, has a fit that is worse (χ^2 (4) = 290.840, p = 0.000, *RMSEA* = 0.066, *SRMR* = 0.022, *NNFI* = 0.787, *CFI* = 0.900 *GFI* = 0.967, *AGFI* = 0.775) than the hypothesized model. The χ^2 difference test confirms that the hypothesized model fits the data significantly better ($\Delta\chi^2(4)$ = 263.58; p = 0.000). A model in which R&D intensity and strategic change are conceptualized as two different outcomes of the performance feedback process is, therefore, superior to a model in which they are sequentially separated.

Third, the studies in our sample do not measure decision-makers' regulatory focus. Even though we based our theoretical argumentation on a solid body of regulatory focus and organizational research, our meta-analysis cannot rule out the existence of other causal mechanisms explaining our results. To address this issue, we designed a randomized between-subjects experiment (see Appendix C) in which we confronted participants with social and historical performance feedback and measured their propensity to engage in strategic change and problemistic search. The results of the experiment provide support for our theoretical framework. We used version 4.5.0 of the mediation package (Tingley et al., 2014) to conduct causal mediation analysis in R. The analyses show that the promotion motivational system mediates the effect of historical performance shortfalls on strategic change (β = 0.091, 95 % CI = [0.032; 0.160], p = 0.003**, 10,000 bootstraps) and search intensity (β = 0.066, 95 %CI = [0.023; 0.120], p = 0.0018**, 10,000 bootstraps). Furthermore, our results also show that prevention focus mediates the effect of social performance shortfalls on strategic change (β = 0.046, 95 %CI = [0.013; 0.090], p = 0.004**,10,000 bootstraps) and search intensity (β = 0.048, 95 %CI = [–0.0139; 0.090], p = 0.003**, 10,000 bootstraps).

Finally, we removed the unpublished study from our dataset and recalculated the results. The effect of historical performance shortfalls on strategic change changes from 0.029 to 0.031. The effect of social performance shortfalls on strategic change changes from −0.137 to −0.139. The effects of historical and social performance shortfalls on problemistic search do not change. This analysis shows that the reported effect sizes are robust and do not meaningfully change upon removal of the unpublished study.

5. Discussion

Performance feedback is a fundamental determinant of strategic decision-making in organizations (Greve, 1998; Greve & Zhang, 2022; Surdu et al., 2021; Washburn & Bromiley, 2012). The performance feedback model—in which performance shortfalls trigger problemistic search followed by strategic change—continues to inspire a prolific line of management research (e.g., Gavetti et al., 2012; Greve, 1998; Greve, 2003; Greve & Zhang, 2022; Surdu et al., 2021). While recent research has suggested that the differences between historical and social performance feedback might lead to different responses (Blettner et al., 2015; Eggers & Suh, 2018; Greve & Gaba, 2017; Kacperczyk et al., 2015; Kim et al., 2015), it is still unclear whether and how these differences alter the original performance feedback model. The aim of this study was to answer the following question: "How do organizational responses—specifically problemistic search and strategic change—differ when addressing historical versus social performance shortfalls?" We enriched PFT (Cyert & March, 1963; Greve, 1998) and its performance feedback model with ideas drawn from RFT (Higgins, 1997, 1998) to explain how different types of feedback lead to different levels of problemistic search and strategic change. We conducted a meta-analysis of 74 primary performance feedback studies to test our explanation. Our findings support our theoretical model and confirm that organizations implement eager strategies geared to advancement when historical performance shortfalls trigger the promotion system of decision-makers. Organizations will enact vigilant strategies geared toward stability when social performance shortfalls activate decision-makers' prevention system.

5.1. Theoretical implications

Our study makes three important contributions to the performance feedback literature. First, whereas PFT expects organizations to implement strategic change in response to both social and historical performance feedback (e.g., Cyert & March, 1963; Greve, 1998; Greve, 2003; Gavetti et al., 2012; Greve & Zhang, 2022; Surdu et al., 2021), our

meta-analysis shows that—in reality—organizations only increase strategic change in response to historical performance shortfalls. When responding to social performance shortfalls, organizations drastically reduce the degree, direction, and likelihood of strategic change. In other words, our results indicate that only strategic change in response to historical performance feedback follows the pattern of the performance feedback model that has been central to the PFT literature (cf. Greve, 1998, p. 62; see Fig. 5). An important theoretical implication of this finding is that future research that uses PFT to explain strategic decision-making should treat social and historical performance feedback as inherently different sources of information that can lead to radically different behavioral outcomes.

There are two key differences between social and historical performance feedback that explain this result. First, decision-makers tend to perceive historical performance shortfalls as the absence of a positive outcome (Cyert & March, 1963) and social performance shortfalls as the presence of a negative outcome (Kelley, 1952; Moliterno et al., 2014). According to RFT, performance cues that are perceived by decision-makers as the presence or absence of a positive outcome trigger promotion-focused strategies geared toward change (Crowe & Higgins, 1997; Higgins et al., 1994; Molden & Higgins, 2005). Performance cues perceived by decision-makers as the presence or absence of a negative outcome trigger prevention-focused strategies toward stability (Brendl & Higgins, 1996; Higgins, 1997; Higgins & Tykocinski, 1992). Second, it is much easier for decision-makers to interpret historical performance feedback than it is to interpret social performance feedback (Greve, 2003b; Menon & Pfeffer, 2003). The low information requirements and good forecasting properties of historical performance feedback (Greve, 2003b) further strengthen the promotion-focused response (Langens, 2007; Thompson, 1999). The causal ambiguity of social performance feedback, in contrast, further reinforces the preference for safety and security (Higgins, 1997).

It is important to note that although we hypothesized that organizations respond to historical performance shortfalls by decreasing their resource allocation toward search, our results show that the opposite is true. When faced with historical performance shortfalls, decision-makers increase the degree, magnitude, or direction of strategic change, as well as the level of resources dedicated to search. Given the characteristics of promotion-focused decision-makers, we expected that they would prefer the implementation of solutions (strategic change) over the expansion of the solution range (R&D intensity), because they are more likely to switch to new activities (Crowe & Higgins, 1997) and prefer speed over accuracy (Pham & Chang, 2010). Our study shows, however, that the promotion-focused response to historical performance shortfalls does not only reflect an advancement strategy built on strategic change, but on search as well. A possible explanation for this finding is that promotion-focused decision-makers are able to consider multiple options at the same time and see the value of one option without derogating others (Liberman et al., 2001). An important takeaway, therefore, is that a promotion-focused response to historical performance shortfalls consists of a double-barreled advancement strategy: organizations increase search intensity and strategic change at the same time in an attempt to restore performance back to the desired level.

Second, while PFT explains why organizations respond differently to performance above and below their aspiration levels (e.g., Cyert & March, 1963; Greve, 1998; Greve, 2003; Gavetti et al., 2012), our study shows that RFT can explain why organizations respond differently to social and historical performance shortfalls. Over the past years, PF scholars have started suggesting that organizations respond differently to historical and social performance feedback (Blettner et al., 2015; Eggers & Suh, 2018; Greve & Gaba, 2017; Kacperczyk et al., 2015; Kim et al., 2015). Although RFT and PFT are both based on the notion that people—including senior organizational decision-makers—are motivated to reduce performance discrepancies, RFT extends our understanding of organizational-level feedback processes by providing explanations of the *strategies* organizations employ to achieve their aspiration levels. As such, it not only predicts that performance discrepancies trigger action, but also predicts the *type of actions* decision-makers take. Our meta-analytic results indicate that organizations respond to historical performance shortfalls with *eager* strategies geared toward change, and to social performance shortfalls with *cautious* strategies geared toward stability. Our study thus responds to the call for a deeper understanding of different types of aspirations and their effects on organizational action (Bromiley & Harris, 2014; Greve & Gaba, 2017), as well as how the motivations of decision-makers influence organizational search intensity (Salge, 2012).

By enriching PFT (Cyert & March, 1963; Greve, 1998) and its performance feedback model with ideas drawn from RFT (Higgins, 1997, 1998), this study advances a broader line of management research that studies the effects of decision maker's regulatory foci on important strategic outcomes (e.g., Ahmadi et al., 2017; Gamache et al., 2015; Gamache et al., 2020; Kammerlander et al., 2015; Mount & Baer, 2022). The primary focus of these studies is on *chronic* regulatory focus: a stable personality variable that varies in strength and composition (Scholer & Higgins, 2012). Our study indicates that *situational* regulatory focus—the dominance of one motivational system over the other in response to a situational cue (Higgins et al., 1994)—has important strategic consequences, too. For example, the study by Mount and Baer (2022) examines how the chronic regulatory focus of CEOs influences their risk propensity when their firms perform below or above their aspiration levels. A novel insight of our study is that different types of feedback influence the situational regulatory focus of decision-makers. An important implication of our study for future research, therefore, is that scholars should consider both chronic and situational regulatory focus when they develop theory about organizational responses to performance feedback.

Third, whereas PFT predicts the same response pattern for problemistic search and strategic change (Cyert & March, 1963; Greve, 1998; Greve, 2003a), our study shows that their response patterns are different. According to PFT, organizational responses to performance feedback mirror a *changing slope* (Greve, 1998, 2003a): the probability of change decreases as the performance of the organization increases, but the probability decreases faster above the aspiration level than below the aspiration level (Greve, 2003a, pp. 60–61; see Fig. 1). However, our results indicate that only strategic change in response to historical performance feedback matches the changing-slope response predicted by PFT. As displayed in Fig. 5, strategic change and R&D intensity vary depending on the type of feedback decision-makers receive, as well as on the extent to which the organization performs above or below the aspiration level. For example, our meta-analytic results show that—on average and *ceteris paribus*—the effect of social performance feedback on strategic change has a negative slope when performance is below and above the aspiration level. The effect of historical performance feedback on search intensity has a positive slope when performance is below and above the aspiration level.

An important implication of this finding for the PFT literature is that strategic change and search intensity are distinct strategic outcomes that vary based on the type and valence of the performance feedback considered by organizational decision-makers. The asymmetry we observe in these effects confirms that decision-makers use different cognitive processes to interpret and act upon performance feedback, as suggested in prior work (Blettner et al., 2015; Eggers & Suh, 2018; Greve & Gaba, 2017; Kacperczyk et al., 2015; Kim et al., 2015). It also has implications for the literature that specifically focuses on search and R&D intensity (e.g., Bromiley et al., 2017; Chen, 2008; Chrisman & Patel, 2012; Greve, 2003a; Han, 2023; Kotlar et al., 2014). When studying the effect of performance shortfalls on R&D intensity, for example, scholars should not expect to observe a difference between social and historical feedback, as both types of feedback trigger a similar increase in terms of R&D intensity. RFT explains why this is the case. When historical performance shortfalls trigger a promotion-focused

response, decision-makers are likely to invest in R&D because they want to consider multiple options at the same time to avoid not taking the right actions (Liberman et al., 2001). When social performance shortfalls trigger a prevention-focused response, decision-makers are likely to invest in R&D because they want to carefully explore different options to avoid taking the wrong actions (Pham & Chang, 2010; Zhu & Meyers-Levy, 2007).

5.2. Practical implications

Beyond advancing theory, our findings also carry important implications for managerial practice. First, recognizing that different types of feedback trigger different strategic responses helps decision-makers to better align the type of received feedback with a strategic response of their organizations. For instance, when the performance of an organization falls as compared with that of its peers, it will be clearer for decision-makers that the organization could engage in cautious strategy (such as a new R&D program). In practice we could expect that the managers will set the KPIs related to R&D objectives, such as R&D expenditure as a percentage of sales, innovation rate and time to market, or new product revenue as a percentage of total revenue. At the same time, when they observe drops in performance as compared with that of years before, they will be more likely to engage in a strategic change to remedy the situation. In such a case we could expect the KPIs to focus on promoting FDIs, setting up new strategic alliances, or searching for appropriate M&A targets. In addition, our findings help managers recognize that investing in R&D in response to historical performance shortfalls does not necessarily replace the need for strategic change but typically happens simultaneously. Conversely, when responding to social performance shortfalls, firms typically increase R&D intensity without making major strategic shifts to remain competitive.

Second, our findings have implications for managers navigating industry turbulence, where both social and historical performance indicators will be difficult to interpret. By integrating insights from two behavioral theories—PFT and RFT—this study equips decision-makers with a nuanced understanding of how they interpret and act upon performance discrepancies. Our meta-analytic results indicate that historical performance shortfalls activate a promotion-focused mindset, leading decision-makers to prioritize strategic change and speed over accuracy. In contrast, social performance shortfalls trigger a prevention-focused mindset, leading to caution and stability. As explained above, promotion-focused decision-makers can consider multiple options at the same time and see the value of one option without derogating others (Liberman et al., 2001), leading to double-barreled advancement strategy: increase search intensity and strategic change at the same time in an attempt to restore performance to the desired level. Such a promotion-focused team could be especially desirable for addressing industry turbulence, for instance. Understanding these mechanisms could help decision-makers to reconfigure their teams that have mindsets required for the situation at hand. While executives have a chronic regulatory focus that is stable over time (e.g., Mount & Baer, 2022), our study suggests that historical and social performance feedback are strong cues that trigger situational regulatory foci. Understanding these behavioral tendencies allows senior managers and boards to anticipate organizational responses more effectively and adapt the composition of the decision-making teams accordingly.

5.3. Limitations & future research

The strength of a meta-analysis lies in its ability to summarize empirical findings into a single effect size (Bergh et al., 2016; Hunter & Schmidt, 2004). Our meta-analysis indeed allowed us to determine how organizations respond differently to historical and social performance shortfalls, while controlling for firm characteristics such as firm age, size, experience, and slack resources. At the same time, the results of our meta-analysis do not come without their limitations, mainly in relation to primary studies in PFT literature.

One such limitation is that a meta-analysis does not allow us to distinguish between performance that is far below and just a little below the aspiration level. This is because our meta-analysis synthesizes the effects of large and small performance shortfalls. Hence, our study cannot address how performance shortfalls of varying sizes interact with regulatory focus. Such nuanced understanding of strategic decision-making under different conditions is important, given that some organizations do initiate change when social performance shortfalls are small. For instance, in a study of new market entry, Ref and Shapira (2017) argue that there is an inverted U-shaped relationship between performance below the aspiration level and the probability of firms entering new markets, which could be explained by the fact that managers shift their focus from achieving aspirations to survival when performance shortfalls grow very large (March & Shapira, 1987). Prior research in psychology also shows that prevention-focused people—rather than promotion-focused people—are motivated to take risky actions that have the possibility to return them to the status quo (Scholer & Higgins, 2012; Scholer et al., 2010). We encourage future empirical research that explores the relationship between regulatory focus and the size of the performance shortfalls.

Another limitation of our study is that we are unable to examine how the regulatory focus of decision-makers influences their response to simultaneous feedback from multiple aspirations, as well as decision fatigue and bounded rationality when decision-makers process multiple sources of feedback. Indeed, the most intriguing unanswered question in our study is what happens if an organization performs below both the historical and the social aspiration levels. We suspect that the collective regulatory focus of the dominant coalition will determine whether they will choose an eager or a cautious strategy to resolve the performance discrepancy, given that the PFT literature commonly assumes that decision-makers attend to different types of aspirations separately or switch their attention from one to the other. A study by Bromiley and Harris (2014) shows that an attention-switching model indeed best captures how decision-makers attend to different aspiration levels, as compared to additive or joint consideration models. More recently, however, Gaba and Greve (2019) have argued that performance feedback on one particular goal might influence the response to performance feedback on another goal. It would be worthwhile for future research to study these questions empirically.

A third limitation of our meta-analysis is that the studies we included did not directly measure the regulatory focus of the decision-makers. This leads to a question of how the collective regulatory focus of decision-makers determines how strongly the organization responds to performance shortfalls. Even though we addressed this issue with an online experiment, we feel that the relationship could be explored further in primary research. Further (primary) research measuring the regulatory foci of CEOs and other top management team members would further develop our understanding of behavioral traits such as narcissism (Chatterjee & Hambrick, 2016), extraversion (Malhotra et al., 2018), and political ideologies (Chin et al., 2013; Chin & Semadeni, 2017) that serve as important determinants of the magnitude and direction of strategic change. It would be also worthwhile to explore how the strength of the regulatory foci and the strength and the direction of the response depend on the firm size and industry type. We strongly encourage future research to delve into these questions empirically.

Another methodological limitation of our study is the absence of a formal measure of inter-coder reliability. Although our coding process involved multiple rounds of discussion and calibration among the authors to ensure consistency and validity, we did not calculate statistical measures such as Cohen's κ to quantify our agreement. We acknowledge that this limits the transparency and reproducibility of our coding decisions, particularly in the cases that involved our interpretation. Future meta-analyses in this domain could enhance methodological rigor by incorporating formal reliability assessments to enhance transparency, replicability, and the robustness of interpretive decisions. See, for

example, the Meta- Analysis Reporting Standards (MARS) of the American Psychological Association (Appelbaum et al., 2018), in particular the section on data collection.

Another potential limitation of our study is that our eligibility criteria excluded a subset of empirical work in the performance feedback literature. Specifically, we did not include studies that operationalized performance feedback as an attainment discrepancy (the absolute difference between an organization's performance and its aspiration level). To adequately capture the "changing-slope response" (Greve, 1998, p. 62), we only included studies that operationalize performance feedback as a spline function. While the exclusion of attainment-discrepancy studies was thus necessary to ensure conceptual alignment with our theoretical model and to allow for comparable effect size estimation across studies, it may introduce a degree of selection bias. For example, it could be that research contexts studied in the excluded studies are not represented in our meta-analytic dataset. Future research on the effects of attainment discrepancy—as opposed to the difference between performance above and below the aspiration level—could extend our work by including studies that use alternative operationalizations of performance feedback.

5.4. Conclusions

In conclusion, our study demonstrates that historical and social performance shortfalls trigger distinct organizational responses: historical performance shortfalls result in promotion-focused strategies that emphasize strategic change, while social performance shortfalls result in prevention-focused strategies that prioritize stability. By integrating PFT and RFT, we provide a more complete understanding of both when organizations act and how decision-makers interpret and prioritize responses to performance feedback. This integration advances the behavioral theory of the firm by showing that strategic change and search intensity are not uniform reactions but depend on the type of feedback and the motivational systems it activates. Future research should further refine this integration by examining the boundary conditions under which promotion- or prevention-focused responses emerge, and how contextual factors such as industry dynamics, firm size, or leadership characteristics moderate these effects. Since PFT and RFT offer complementary and commensurable views on how decision-makers seek to engage in restorative actions in response to negative performance feedback, their further integration represents an exciting opportunity to develop and expand the research program of the behavioral theory of the firm laid out by Cyert and March (1963) further.

CRediT authorship contribution statement

Stefan Breet: Writing – review & editing, Writing – original draft, Software, Project administration, Methodology, Formal analysis, Conceptualization. **Pursey Heugens:** Writing – review & editing, Methodology, Conceptualization. **Anna Nadolska:** Ouden, Writing – review & editing, Conceptualization.

Appendix A. : Overview of the 74 studies included in the meta-analysis

Study	Authors	Year	Journal*	Study	Authors	Year	Journal*
1	Audia & Greve	2006	MANSCI	38	Boon & Özcan	2016	ORGSCI
2	Baum et al.	2005	ASQ	39	Joseph, Klingebiel & Wilson	2016	ORGSCI
3	Greve	1998	ASQ	40	Krishnan & Krishnan Kozhikode	2015	AMJ
4	Harris & Bromiley	2007	ORGSCI	41	Sengul & Obloj	2017	JOM
5	Chen	2008	ORGSCI	42	Choi, Rhee, & Kim	2019	JBR
6	Shipilov, Li & Greve	2011	ORGSCI	43	Iglesias & Bogner	2019	IJBR
7	Chrisman & Patel	2012	AMJ	44	Li et al.	2018	IMR
8	Gaba & Bhattacharya	2012	SEJ	45	Arrfelt, Wiseman & Hult	2013	AMJ
9	Gaba & Bhattacharya	2012	SEJ	46	Wennberg, Delmar &	2016	JBV
10	Lungeanu, Stern &	2015	SMJ	47	McKelvie Kotlar et al.	2014	SBE
11	Zajac Ref & Shapira	2017	SMJ	48	Lv et al.	2019	JBR
12	Kuusela, Keil & Maula	2017	SMJ	49	Tyler & Caner	2016	SMJ
13	Chrissman & Patel	2014	SMJ	50	Mishina et al.	2010	AMJ
14	Vidal & Mitchell	2015	ORGSCI	51	Greve	2010	SMJ
15	Lim	2015	SMJ	52	Washburn & Bromiley	2012	JOMS
16	Lim	2017	LRP	53	Audia & Sorenson	NA	NA
17	Lim	2019	JOMS	54	Han, Mittal & Zhang	2017	JOMAR
18	Xie et al.	2019	JOWB	55	Kotlar et al.	2014	JPIM
19	Ok & Ahn	2019	SUS	56	Shipilov, Greve & Rowley	2019	SMJ
20	Iyer et al.	2019	LRP	57	Lyocsa, Vyrost & Baumohl	2019	AEL
21	Wiengarten et al.	2019	JOOM	58	Desai	2008	ORGSCI
22	Xu et al.	2019	AMJ	59	Henderson & Stern	2004	ASQ
23	Deng & Long	2019	SUS	60	Rowley, Shipilov & Greve	2017	SMJ
24	Jiang & Holburn	2018	JBR	61	Su & Su	2017	CMS
25	Gomez-Mejia, Patel &	2018	JOM	62	Yiu, Xu & Wan	2014	ORGSCI
26	Zellweger Lim	2018	JBR	63	Kim & Rhee	2017	JATM
27	Baum & Dahlin	2007	ORGSCI	64	Deb et al.	2019	JBR
28	Iyer & Miller	2008	AMJ	65	Syakhroza, Paolella & Munir	2019	AMJ
29	Lim & McCann	2014	ORGSCI	66	Park	2007	ORGSCI
30	Gaba & Joseph	2013	ORGSCI	67	Parker, Krause & Covin	2017	JOM
31	Ruth, Iyer & Sharp	2013	JBR	68	Rudy & Johson	2016	JOM
32	Madsen	2013	JOM	69	Barreto	2012	ORGSCI
33	Desai	2014	ICC	70	Greve	2003	AMJ
34	Kim, Finkelstein &	2015	AMJ	71	Greve	2007	ICC

(continued on next page)

(*continued*)

Study	Authors	Year	Journal*	Study	Authors	Year	Journal*
35	Haleblian Bromiley & Washburn	2011	JOSM	72	Schimmer & Brauer	2012	SO
36	Wang, Qian & Lehrer	2017	EMJ	73	O'Brien & David	2014	SMJ
37	Lin	2014	JOWB	74	Alexy, Bascavusolgu-Moreau & Salter	2016	ICC

Note: *Journal Abbreviations: AEL = Applied Economics Letters; AMJ = Academy of Management Journal; ASQ = Administrative Science Quarterly; CMS = Chinese Management Studies; EMJ = European Management Journal; ICC = Industrial and Corporate Change; IJBR = International Journal of Business Research; JATM = Journal of Air Transport Management; JBR = Journal of Business Research; JBV = Journal of Business Venturing; JOM = Journal of Management; JOMAR = Journal of Marketing; JOMS = Journal of Management Studies; JOSM = Journal of Strategy and Management; JOWB = Journal of World Business; JPIM = Journal of Product Innovation Management; LRP = Long Range Planning; MANSCI = Management Science; ORGSCI = Organization Science; SBE = Small Business Economics; SEJ = Strategic Entrepreneurship Journal; SMJ = Strategic Management Journal; SUS = Sustainability; SO = Strategic Organization; WP = Working Paper. †This paper reports two samples. Both have been included in the meta-analysis.

Appendix B: Results of the meta-analytic structural equation model

End. Variable	Exo. Variable	Estimate	SE	*Z*	*P*	95 % CI	
Strategic Change	Performance > HAL	−0.044	0.011	−3.949	0	−0.065	−0.022
Strategic Change	Performance < HAL	0.029	0.010	3.008	0.003	0.01	0.049
Strategic Change	Performance > SAL	−0.068	0.011	−6.011	0	−0.091	−0.046
Strategic Change	Performance < SAL	−0.137	0.010	−13.8	0	−0.157	−0.118
Strategic Change	Direct Experience	0.514	0.011	48.94	0	0.494	0.535
Strategic Change	Firm Age	0.030	0.010	2.979	0.003	0.01	0.05
R&D intensity	Performance > HAL	0.061	0.013	4.861	0	0.037	0.086
R&D intensity	Performance < HAL	0.099	0.011	8.841	0	0.077	0.121
R&D intensity	Performance > SAL	0.001	0.013	0.081	0.936	−0.024	0.026
R&D intensity	Performance < SAL	0.091	0.011	8.079	0	0.069	0.113
R&D intensity	Slack	0.145	0.011	13.243	0	0.124	0.167
R&D intensity	Firm Size	−0.001	0.011	−0.107	0.915	−0.023	0.020

Note: End. Variable = Endogenous Variable; Exo. Variable = Exogenous Variable; Estimate = Estimate; SE = Standard Error; Z = Z-value; p = p-value; 95 % = 95 % Confidence Interval.

Appendix C

C1 Study Design

We designed a randomized between-subjects experiment with four conditions. We wrote four vignettes about a company in the international telecommunication industry experiencing different types of performance feedback: (1) the historical and social performance of the organization is stable, (2) the organization experiences an historical performance shortfall while its social performance remains stable, (3) the organization experiences a social performance shortfall while its historical performance remains stable, and (4) the organization experiences both social and historical performance shortfalls. We anonymized the company's name as well as the names of its competitors. Participants were recruited via the Prolific platform. We received 1000 responses in total, 250 for each condition. All participants indicated informed consent and were informed that participation was voluntary and that all answers were processed anonymously.

We have asked the participants to imagine that they are the chief executive officer (CEO) of the company they are reading about and explained that their task as a CEO is to maximize the company's performance and, ultimately, its value. We have informed the participants that they have the authority and far-reaching responsibilities to make this happen, that they are responsible for the company's strategy, and that they must make important strategic decisions. These decisions include approval of research and development (R&D) budgets, development of new products, participation in strategic alliances with other companies, and acquiring suppliers. After they read the text describing the situation, we have asked how they—as the company's CEO—would respond to the situation the company is facing.

C2 Measures

C2.1 Strategic Change

We captured the respondents' propensity to engage in strategic change with a 12-item scale. This scale is consistent with the multidimensional definition of strategic change developed by Rajagopalan and Spreitzer (1997) and our operationalization of strategic change in the meta-analysis. The scale capture three dimensions of strategic change: (1) the degree of strategic change, (2) the direction of strategic change, and (3) the likelihood of strategic change (Rajagopalan & Spreitzer, 1997). The four items measuring the degree of strategic change include "Our new strategy should consist of very large initiatives," "I think we should go for a drastic turn-around," "Any future change will have to be enormous," and "Our strategic change initiatives should be big." The four items measuring the direction of strategic change are "We should diversify our product portfolio," "We must change our course of action to achieve future success," "We should pursue new opportunities outside our current area of expertise," and "We must enter new markets." Finally, the items measuring the likelihood of strategic change are "I will change the company's strategy," "In changing our strategy, we cannot wait much longer," "I will start several change initiatives," and "I think that our organization needs to drastically change." The scale is internally consistent (Cronbach's $\alpha = 0.94$).

C2.2 Search Intensity

We measured search intensity as a six-point scale. The items are "I will increase my company's Research and Development (R&D) budget,"

"Research and Development (R&D) is the key to solving our current problems," "We need to spend more on Research and Development (R&D) than we currently do," "We should develop more innovative products and service," "The development of new technology is the solution to the challenge we are facing," and "We must not overspend on our Research & Development (R&D)" (Reverse-Coded). The scale is internally consistent (Cronbach's α = 0.79).

C2.2.1 Promotion Focus

We measured promotion focus with a nine-item scale adapted from Lockwood, Jordan, & Kunda (2002). The nine items of the scale are "My focus is on the positive results the company can achieve in the future," "I focus on the ways in which I can make the company successful again," "It is more important to me to achieve success than to prevent failure," "I hate it when I did not do something that I should have done," "It is better to act decisively than to be right after the fact," "As soon as a reasonable strategic option is available, I will go for it," "My major goal is to restore our company to its former glory," "I see many opportunities to make the company better," and "I am motivated to achieve my aspirations for the company" (Cronbach's α = 0.76).

C2.2.2Prevention Focus

We measured prevention focus with a nine-item scale adapted from Lockwood, Jordan, & Kunda (2002). The items are "I am focused on preventing negative things from happening to the company," "Preventing failure in the future is my primary concern," "I worry that I would fall short of my responsibilities and obligations as CEO," "It is more important to prevent failure than to achieve success," "It is better to make the right decision than to make decisions fast," "I will carefully consider different strategic options before deciding," "I want to avoid making mistakes," "I fear that the position of the company could become worse in the future," and "I don't want to fall short of my obligations toward my employees and shareholders" (Cronbach's α = 0.77).

C2.3 Control Variables

We controlled for age and gender.

C3 Analytical Approach

To test whether the effects of performance shortfalls are mediated by regulatory focus, we conducted causal mediation analysis using the "mediation" package in the statistical software R (R Core Team, 2022; Tingley et al., 2014). We conducted two sets of mediation analyses. In the first set of analyses, we compared the group of respondents that received the vignette with historical performance feedback (the treatment group) with the group of respondents that received the vignette with no performance feedback (the control group). In the second set of analyses, we compared the group of respondents that received the vignette with social performance feedback (the treatment group) with the group of respondents that received the vignette with no performance feedback (the control group).

Table C1
– Descriptive statistics and correlations historical performance feedback

	Mean	S.D.	1	2	3	4	5	6
1 Strategic Change	3.845	0.906						
2 Search Intensity	4.759	0.872	0.363					
3 Group a	0.497	0.501	0.247	−0.026				
4 Age	39.361	13.709	−0.008	0.052	−0.027			
5 Gender	0.737	0.441	−0.011	−0.087	−0.041	−0.083		
6 Promotion Focus	5.421	0.663	0.388	0.254	0.129	0.037	0.136	
7 Prevention Focus	5.480	0.674	0.179	0.136	0.087	−0.038	0.182	0.480

Note: 0 = Control Group, 1 = Treatment Group Historical Performance Shortfalls.

Table C2
– Regression results Historical Performance Feedback

	Promotion Focus	Prevention Focus	Strategic Change	Search Intensity	
	(Model 1)	(Model 2)	(Model 3) (Model 4)	(Model 5)	(Model 6)
(Intercept)	5.290 *** (0.096)	5.530 *** (0.097)	0.944 ** (0.325) 2.400 *** (0.354)	2.693 *** (0.333)	3.468 *** (0.351)
Group†	0.181 ** (0.059)	0.127 * (0.060)	0.355 *** (0.075) 0.419 *** (0.079)	−0.115 (0.077)	−0.076 (0.078)
Age	0.003 (0.002)	−0.001 (0.002)	−0.001 (0.003) 0.000 (0.003)	0.002 (0.003)	0.003 (0.003)
Gender	−0.219 ** (0.067)	−0.282 *** (0.068)	0.114 (0.085) 0.066 (0.091)	0.247 ** (0.088)	0.226 * (0.091)
Promotion Focus			0.507 *** (0.057)	0.366 *** (0.058)	
Prevention Focus			0.222 *** (0.060)		0.210 *** (0.059)
N	487	487	487,487	487	487
R2	0.039	0.043	0.193 0.087	0.085	0.036
Adj. R2	0.033	0.037	0.187 0.080	0.077	0.027
F statistic	6.580	7.171	28.907 11.506	11.146	4.435
P value	0.000***	0.000***	0.000*** 0.000***	0.000***	0.002**

Note: ***p < 0.001; **p < 0.01; *p < 0.05. † 0 = Control Group, 1 = Treatment Group Historical Performance Shortfalls.

C4 Results historical performance shortfalls

Descriptive statistics and correlations are displayed in Table C1. The difference between the control group (no performance feedback) and the

treatment group (historical feedback) is represented by a dummy variable. The treatment group is more strongly associated with a promotion focus ($r = 0.129$, $p = 0.004$**) than with a prevention focus ($r = 0.087$, $p = 0.055$). Similar, the treatment group is positively associated with strategic change ($r = 0.247$, $p = 0.000$***) and not with search intensity ($r = -0.026$, $p = 0.566$). Both results are in line with our theoretical framework and provide initial support for the mechanisms we hypothesize in this paper.

The results of the regression analyses modeling the effects of historical shortfalls on regulatory focus, strategic change, and search intensity, are presented in Table C2. We theorized that historical performance shortfalls trigger eager organizational responses characterized by an increase in strategic change and a decrease in search intensity, because it makes the promotion system more salient. Models 1 and 2 show the effects of historical performance shortfalls on promotion and prevention focus, controlling for age and gender. The effect of historical performance shortfalls on promotion focus is positive and statistically significant ($\beta = 0.181$, S.E. $= 0.059$, $p = 0.002$**), which is in line with our theoretical framework. The effect of historical performance shortfalls on prevention focus is positive and statistically significant too ($\beta = 0.127$, S.E. $= 0.060$, $p = 0.035$*), albeit smaller than the effect on promotion focus. Models 3 and 4 show that promotion focus is a strong predictor of strategic change ($\beta = 0.507$, S.E. $= 0.057$, $p = 0.000$***). Prevention focus positively affects strategic change too, but the effect size is half as large as the effect of promotion focus ($\beta = 0.222$, S.E. $= 0.060$, $p = 0.000$***). Finally, models 5 and 6 show that the effects of promotion focus ($\beta = 0.366$, S.E. $= 0.058$, $p = 0.000$***) and prevention focus ($\beta = 0.210$, S.E. $= 0.058$, $p = 0.000$***) on search intensity are both positive and statistically significant.

We conducted several mediation analyses to test if the effects of historical performance shortfalls on strategic change and search intensity are mediated by regulatory focus. The first analysis shows that promotion focus partially mediates the relationships between historical performance shortfalls and strategic change ($\beta = 0.091$, 95 %CI = [0.032; 0.160], $p = 0.003$**, 10,000 bootstraps). The proportion mediated by promotion focus is 20 %. Prevention focus also mediates the relationship between historical performance shortfalls and strategic change, but this effect is significantly smaller ($\beta = 0.028$, 95 %CI = [0.002; 0.050], $p = 0.035$*, 10,000 bootstraps, proportion mediated = 6 %). Consequently, the effect of historical performance shortfalls on strategic change is mediated by promotion focus, thus supporting the theorized mechanism of hypothesis 1.

We theorized that historical performance shortfalls have a negative effect on search intensity. Our third mediation analysis shows that the effect of historical performance shortfalls on search intensity is partially mediated by promotion focus ($\beta = 0.066$, 95 %CI = [0.023; 0.120], $p = 0.003$**, 10,000 bootstraps). Interestingly, promotion focus mitigates the negative direct effect of historical performance shortfalls (i.e., makes the effect less negative and closer to zero). Similarly, the effect of historical performance shortfalls on search intensity is partially mediated by prevention focus ($\beta = 0.026$, 95 %CI = [–0.001; 0.060], $p = 0.033$*, 10,000 bootstraps). These findings do not directly support our theorized mechanism of hypothesis 2 but seem to indicate that regulatory focus can alleviate the negative effects of historical performance shortfalls on search intensity. This is in line with the findings of our meta-analysis (see Fig. 4), which show that historical performance shortfalls tend to increase search intensity.

C5 Results Social Performance Shortfalls

Descriptive statistics and correlations are displayed in Table C3. The difference between the control group (no performance feedback) and the treatment group (social feedback) is represented by a dummy variable. The treatment group is positively associated with both strategic change ($r = 0.451$, $p = 0.000$***) and search intensity ($r = 0.177$, $p = 0.000$***), and positively associated with a promotion focus ($r = 0.253$, p = 0.000***) and a prevention focus ($r = 0.168$, $p = 0.000$***). These results are partially in line with our theoretical framework. We expected the correlations between social performance shortfalls, strategic change, and promotion focus to be weaker than the correlations between social performance shortfalls, search intensity, and prevention focus. However, the correlations between social performance shortfalls, search intensity ($r = 0.177$, $p = 0.000$***), and prevention focus ($r = 0.168$, $p = 0.000$***) are significantly larger than the correlations between historical performance shortfalls, search intensity ($r = -0.026$, $p = 0.566$), and prevention focus ($r = 0.087$, $p = 0.055$). Social performance shortfalls are more strongly associated with search intensity and prevention focus than historical performance shortfalls, and these findings thus provide partial support for the mechanisms we hypothesize in this paper.

The results of the regression analyses modeling the effects of social shortfalls on regulatory focus, strategic change, and search intensity are presented in Table C4. We theorized that social performance shortfalls lead to vigilant organizational responses characterized by a decrease in strategic change and an increase in search intensity, because it makes the prevention system more salient. Models 1 and 2 show the effects of social performance shortfalls on promotion and prevention focus, controlling for age and gender. The effect of social performance shortfalls on promotion focus ($\beta = 0.352$, S.E. $= 0.060$, $p = 0.000$***) and prevention focus ($\beta = 0.240$, S.E. $= 0.060$, $p = 0.000$***) are positive and statistically significant. Models 3 and 4 show that both promotion focus ($\beta = 0.568$, S.E. $= 0.054$, $p = 0.000$***) and prevention focus (β = 0.192, S.E. = 0.059, $p = 0.001$**) have a positive direct effect on strategic change. Finally, models 5 and 6 show that the effects of promotion focus ($\beta = 0.427$, S.E. $= 0.056$, $p = 0.000$***) and prevention focus (β = 0.201, S.E. = 0.058, $p = 0.000$***) on search intensity are both positive and statistically significant. The results of models 3, 4, 5 and 6 are consistent with the results of the historical performance shortfalls situation.

Table C3
– Descriptive statistics and correlations for social performance feedback

	Mean	S.D.	1	2	3	4	5	6
[1] Strategic Change	4.062	0.975						
[2] Search Intensity	4.937	0.879	0.439					
[3] Groupa	0.500	0.501	0.451	0.177				
[4] Age	39.814	13.767	−0.04	0.01	0.006			
[5] Gender	0.745	0.436	−0.022	−0.08	−0.023	−0.01		
[6] Promotion Focus	5.511	0.691	0.477	0.342	0.253	0.087	0.118	
[7] Prevention Focus	5.538	0.693	0.196	0.159	0.168	0.062	0.216	0.501

Note: 0 = control group, 1 = treatment group historical performance shortfalls.

We conducted several mediation analyses to test if the effects of social performance shortfalls on strategic change and search intensity are mediated by regulatory focus. We theorized that social performance shortfalls affect strategic change negatively because they increase the salience of a person's prevention focus. The first mediation analysis shows that prevention focus does mediate the relationship between social performance shortfalls and strategic change ($\beta = 0.046$, 95 %CI = [0.013; 0.090], $p = 0.004$**, 10,000 bootstraps, proportion mMediated = 5 %). The experiment, therefore, does not provide support for this element of our theoretical framework.

We theorized that social performance shortfalls are positively associated with search intensity because it increases the salience of the prevention focus motivation system. A mediation analysis provides support for this claim. The effect of social performance shortfalls is partially mediated by the prevention focus motivational system ($\beta = 0.048$, 95 %CI = [–0.0139; 0.090], $p = 0.003$**, 10,000 bootstraps).

Table C4
Regression results social performance feedback

Promotion Focus Prevention Focus	Strategic Change		Search Intensity	
(Model 1) (Model 2)	(Model 3)	(Model 4)	(Model 5)	(Model 6)
(Intercept) 5.211 *** (0.098) 5.381 *** (0.098)	0.776 * (0.304)	2.703 *** (0.341)	2.501 *** (0.316)	3.641 *** (0.337)
Group† 0.352 *** (0.060) 0.240 *** (0.060)	0.678 *** (0.074)	0.832 *** (0.079)	0.157 * (0.077)	0.259 ** (0.079)
Age 0.004 * (0.002) 0.003 (0.002)	−0.006 * (0.003)	−0.004 (0.003)	−0.001 (0.003)	−0.000 (0.003)
Gender −0.198 ** (0.069) −0.351 *** (0.069)	0.139 (0.082)	0.094 (0.092)	0.238 ** (0.086)	0.224 * (0.091)
Promotion Focus	0.568 *** (0.054)		0.427 *** (0.056)	
Prevention Focus		0.192 ** (0.059)		0.201 *** (0.058)
N 490,490	490	490	490	490
R2 0.087 0.081	0.353	0.222	0.140	0.060
Adj. R2 0.081 0.075	0.348	0.216	0.133	0.053
F statistic 15.389 14.232	66.232	34.657	19.741	7.782
P value 0.000*** 0.000 ***	0.000 ***	0.000 ***	0.000****	0.000 ***

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$.

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