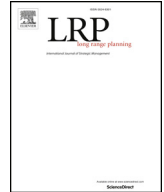




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## The triggers of local and distant search: Relative magnitude and persistence in explaining acquisition relatedness

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## ABSTRACT

Research on problemistic search has assumed negative attainment discrepancy to be the trigger of both local and distant search. Extending this research, we present and compare two additional triggers: (1) relative attainment discrepancy, which reflects *how much* a firm's attainment discrepancy deviates from its past negative attainment discrepancies; and (2) persistent attainment discrepancy, which reflects *how often* the firm experiences below-aspirations performance. Our triggers for distant search model a behavioral explanation for the timing and relatedness of acquisitions. We find support for baseline arguments of problemistic search whereby firms increase both industry- and skill-related acquisitions when they perform below aspirations. When they persistently perform below aspirations, however, this likelihood is reduced and firms engage in acquisitions that are more unrelated, thereby providing support for the notion of expanding search boundaries from local to distant search. Of the two triggers of distant search proposed, relative attainment discrepancy does not induce firms to expand search boundaries. Our results indicate that persistent attainment discrepancy is a key construct to consider when studying the expansion of search boundaries.

### Introduction

Three main theoretical explanations have been proposed to explain the relatedness of the target with respect to the acquiring firm: agency theory, resource-based view, and market power (see Halebian et al., 2009; Montgomery, 1994). These explanations for acquisition relatedness have ranged from firm to industry related factors, and from public policy to macro-economic conditions. Whereas some scholars have modeled the acquisition process to be idiosyncratic to the firm, whereby firms are in search of targets that are a good fit (Matsusaka, 2001), others have attributed merger and acquisition activity to overall movements in the economy and regulatory shifts (Andrade et al., 2001; Jovanovic and Rousseau, 2002). These shifts predict similar acquisition tendencies among firms that are similarly affected by these shocks. The industry-wide explanations for acquisition activity are rather specific with respect to the timing of when these acquisitions are likely and the type of acquisition that will be made.

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At the firm level, the type of acquisition could be driven by firm-specific capabilities (Chatterjee and Wernerfelt, 1991; King et al., 2008; Makri et al., 2010; Silverman, 1999), excess slack and firm-specific resources (Penrose, 1959), as well as by opportunities and survival threats that could drive the firm to either remain and consolidate or exit its current industries (Montgomery, 1994). However, firm-level explanations in contrast to industry-level explanations, range from random searches for acquisition targets to acquisitions related to specific capabilities within firms (Chatterjee and Wernerfelt, 1991; Kim et al., 2015) but are generally silent on when a firm is likely to expand from local (related) to distant (less related) search (acquisitions). We suggest that Behavioral Theory of the Firm (BTF) can provide insights on firm-level triggers for the type of acquisition that the firm is likely to make as the theory specifically concerns firm search and addresses expanding search boundaries.

BTF considers the motivation and direction of search behavior in firms (Cyert and March 1963; Greve, 2003a,b). In response to performance feedback, firms are likely to alter their intensity of efforts and search for solutions. Particularly when performance is below aspirations, firms engage in “problemistic search.” Although problemistic search has been used to theorize about the timing and likelihood of acquisitions (Iyer and Miller, 2008; Kim et al., 2015), the *type* of acquisition that it is likely to trigger remains less explored. The extant literature addresses *when* a firm is likely to engage in an acquisition (Iyer and Miller, 2008) but not the type of acquisition it is likely to make. Although macroeconomic and industry-wide conditions explain acquisition activity in general, these explanations do not fully account for intra-industry differences in acquisition activity such as why some firms within an industry or sector might choose to engage in related acquisitions while others engage in unrelated acquisitions. We propose a performance feedback triggered problemistic search as a complementary lens to explain the extent of relatedness of acquisitions.

A dimension of problemistic search that is often overlooked in the extant BTF literature is the notion of local and distant search—specifically, the literature is not explicit as to when and for how long a firm’s search is likely to remain local and when that search is likely to expand to distant search (see Posen et al., 2017). Researchers assume that unsatisficing solutions and severity of performance feedback is the primary determinant of increased risk taking and expanding search boundaries. This does not speak, however, to conditions that trigger a switch from local to distant search. Determining this requires us to explicitly consider the triggers of local and distant search within the framework of problemistic search. To this end, we offer a behavioral explanation and propose two triggers of switching from local to distant search: (1) relative attainment discrepancy; and (2) persistent attainment discrepancy. Relative magnitude or relative attainment discrepancy in the current study is the degree of negative attainment discrepancy compared to a firm’s past below-aspirations performance. Persistent attainment discrepancy reflects how long a firm has been experiencing below-aspiration performance.

Our study seeks to make the following contributions. First, we present a firm-level behavioral explanation for the *relatedness of acquisition* decision. Given that current understanding is limited to policy-oriented, economic, and industry-wide descriptions (cf. Iyer and Miller, 2008), we further extend the application of behavioral theory in the corporate strategy decision domain. Second, we theorize and hypothesize the triggers of distant search. In the behavioral view, the notion that search boundaries gradually expand from local to distant search is well accepted (Cyert and March 1963; Levinthal, 1997), but seldom theoretically or empirically explored. While it is well known that expansion of search boundaries results from unsatisficing solutions identified through local search, we introduce the concepts of *relative attainment discrepancy* and *persistent attainment discrepancy* as mechanisms that trigger this expanding search boundary. We propose that relative attainment discrepancy and persistent attainment discrepancy induce a firm to widen its search and to consider alternatives available through distant search.

Investigating these two triggers is important. The relative attainment discrepancy is distinct from usual considerations of negative attainment discrepancy. Extant literature implicitly assumes expanding search boundaries are driven by high negative attainment discrepancy and is largely silent on when a firm is likely to switch from local to distant search. Consider a situation where the magnitude of discrepancy could be similar for multiple firms while their search intensities, and hence riskiness of decisions, could differ based on how different firms perceive the same level of negative attainment discrepancy. Our second-order relative attainment discrepancy construct captures this by explicitly considering how much the current performance is below the firm’s past experiences with underperformance. Similarly, persistent attainment discrepancy is also a critical factor, as a firm could overlook small shortfalls and attribute them to external factors not under its control (Fang et al., 2014; Jordan and Audia, 2012). Firms might underperform their aspirations by very low margins and, hence, never trigger distant search. Thus, explicit consideration of repeated performance shortfalls will address whether firms that experience repeated shortfalls, albeit by small amounts, also expand search boundaries if underperformance is persistent.

The study is organized as follows. In the first section, we provide a brief overview of BTF and performance feedback theory with respect to problemistic search. This is followed by a review of the literature on the relatedness of acquisitions. Next, we specify the behavioral theory of firm arguments regarding firm-level motivations for search—local and distant—and develop testable hypotheses for the relatedness of acquisitions. In the second section, we present the model and variables used in the study to determine if relative attainment discrepancy and persistent attainment discrepancy trigger distant search in firms. In the third section, we review the results and discuss the findings and implications for research and practice.

## Theory and hypotheses

### *Behavioral theory and problemistic search*

According to BTF, organizations are goal-directed systems that use simple decision heuristics to adapt behavior in response to performance feedback. Performance feedback is the discrepancy experienced by the firm between its expected and realized performance. Expected performance is based on aspiration levels, an indication of organizational goals (Cyert and March, 1963; Gavetti

et al., 2012), and is described as the outcome that would be deemed satisfactory by the decision maker (Schneider, 1992). Boundedly rational decision makers use these aspirations to determine the boundary between success and failure on a continuum of performance (Fiegenbaum et al., 1996; Greve, 2003a; Lant et al., 1992; Lant and Mezas, 1990; Milliken and Lant, 1991). Theoretical and empirical studies support the position that aspiration levels in organizations are a function of both previous aspirations and feedback about actual performance (Lant et al., 1992; Lant and Mezas, 1992; Lant and Montgomery, 1987; Mezas et al., 2002). The difference between actual performance and aspiration levels is the “attainment discrepancy” (Lant, 1992), and when performance is below aspiration level—a negative attainment discrepancy—a firm is induced to engage in problemistic search for a solution to its performance shortfalls.

In an effort to resolve performance shortfalls, below-aspiration search seeks alternatives to current activities. The BTF involves the motivation and direction of search behavior (Cyert and March, 1963; Greve, 2003a) such that, in response to performance feedback, firms are likely to alter the intensity of their search efforts for solutions. Search begins by looking for local solutions and, if the initial efforts at search fail to uncover a satisficing alternative, then it broadens to include progressively more distant possibilities as solutions (Cyert and March, 1963; Levinthal, 1997). Problemistic search requires an increased intensity in the search for potential solutions to close the performance discrepancy, and as a response to increasingly negative performance feedback, this search progressively considers options of increasing risk by searching outside of local search domains. Solutions to close this performance shortfall may include operational, managerial, financial, and asset restructuring. While below-aspiration search encourages change, firms that perform above their aspirations may be less likely to seek performance improvements and, thus, less likely to engage in risky changes. In this regard, managers tend to take fewer risks when performance is above the aspiration level (March and Shapira, 1987; Singh, 1986).

Behavioral theory has predicted and tested the notion that below-aspirations performance induces problemistic search and leads to increased risk-taking (Bromiley, 1991), R&D intensity (Chen and Miller, 2007; Greve, 2003b), new product introductions (Greve, 2003b), growth (Audia and Greve, 2006; Greve, 2011), organizational learning (Levitt and March, 1988), and acquisitions (Iyer and Miller, 2008; Kim et al., 2015). Problemistic search boundary is gradually expanded if no satisficing solutions are found. Following this reasoning, our proposition is that firms would initiate local search, with respect to acquisitions, by examining targets that are in closely related industries and progressively move to consider less-related targets in distant industries.

#### *Explaining relatedness of acquisitions*

Understanding the rationale for acquisitions has been a central issue in finance and strategy literature, and the theoretical explanations have focused on market power, resource-based, and agency arguments (see Halebian et al., 2009; Montgomery, 1994). Through acquisitions, firms are able to leverage their operational and corporate competencies to other industries and create value through market power and economies of scope. These acquisitions could be related or unrelated to the firm's existing portfolio and could be driven by internal or external inducements. In general, explanations for relatedness of acquisitions range from firm-level characteristics to industry conditions and from public policy to macro-economic influences. For example, at the industry level, researchers have proposed that related diversifiers are in attractive industries, which explains pursuit of related acquisitions, while firms in less-attractive industries pursue unrelated acquisitions (Bettis, 1981; Christensen and Montgomery, 1981; Park, 2003). In the literature on acquisition timing and merger waves, however, a common explanation for the type of acquisition has centered on antitrust policy considerations that restrict related acquisitions (see Shleifer and Vishny, 1991) and, thus, lead firms to engage in unrelated acquisitions. Overall acquisition activity and resulting merger waves are seen as the result of economic and technological shifts that lead to a need for reallocation of resources (Andrade et al., 2001; Jovanovic and Rousseau, 2002). Industry-wide shocks initiate waves of acquisition activity (Mitchell and Mulherin, 1996) and drive the general relatedness of acquisitions by firms. Scholars have also suggested that overvaluation of stocks within the industry would lead firms to diversify outside the industry because other related firms are likely to be similarly overvalued (Shleifer and Vishny, 2003).

At the firm level, insights from transaction cost economics and the resource-based view of the firm have been used to explain acquisition decisions of firms and their motives such as market power, efficiency enhancement through scale and scope, new market entry, learning, and synergy-creating objectives. These acquisitions could be related or unrelated to the firm's existing portfolio and could be driven by internal or external inducements. Internal inducements to grow might arise from excess resources available within the firm (Penrose, 1959) that allow the firm to explore other opportunities and deploy slack resources. There is a strong association between intangible assets and related acquisitions (Chatterjee and Wernerfelt, 1991) as well as between a firm's technological resources and the direction of diversification (Silverman, 1999). Thus, a firm's choice of related or unrelated acquisitions is determined by its ability to exploit existing resources (Ruth et al., 2013). In fact, the presence of complementary resources between the acquirer and target is associated with better performance (King et al., 2008; Makri et al., 2010). External inducements, in contrast, may be in the form of opportunities or threats in the environment that lead to *offensive* or *defensive* actions (Montgomery, 1994) whereby the firm might decide to stay and consolidate, or exit, respectively, their position in the industry.

The resource-based perspective generally assumes a value-creating objective to acquisitions, whereas agency theory suggests that managers engage in acquisitions to enhance their power and prestige (Jensen, 1986), increase compensation (Jensen and Murphy, 1990), or entrench themselves (Shleifer and Vishny, 1989). In general, the extant literature suggests that, in the absence of agency problems (Amihud and Lev, 1981; Jensen and Meckling, 1976), a firm's acquisition decision is driven by its underlying resources, exogenous shocks, or misvaluation. Overall, evidence suggests that the relatedness of acquisition decisions are due to misvaluation (Shleifer and Vishny, 2003), economy- or industry-wide resource reallocation activities during waves (Jovanovic and Rousseau, 2002), and underlying resources of the firm (Chatterjee and Wernerfelt, 1991; Montgomery and Hariharan, 1991; Silverman, 1999).

Although the rationale for the relatedness of acquisitions is well explored, the timing of these transactions is ambiguous, at best, especially at the firm level. The extant literature does not specify when a firm is likely to engage in an acquisition (Iyer and Miller, 2008) or the type of acquisition it is likely to make. Thus, if two firms possess similar underlying resources, experience the same shock, or are similarly misvalued, current theories are not able to explain disparate acquisition choices including timing and type. The studies discussed above do not explicitly consider directed search as an explanation for the relatedness of the acquisition decision at the firm level and are inconclusive about the timing of the acquisition decision. BTF helps to fill this gap through its explicit consideration of when firms are likely to intensify their search and in what direction. We offer a behavioral explanation and propose that the type of acquisition is a function of the firm's scope of problemistic search, specifically local and distant search.

#### *Acquisition relatedness*

Related acquisitions enable firms to exploit and leverage their existing resources, capabilities, and synergies with the acquired firm. A firm might engage in search not only for opportunities to exploit its existing resources but also for new resources that may complement its existing resource base (Chatterjee, 1990; Makri et al., 2010; Villalonga and McGahan, 2005). Resources and capabilities developed in an industry are more transferable to similar or related acquisitions (Chatterjee and Wernerfelt, 1991; King et al., 2008; Makri et al., 2010; Montgomery and Hariharan, 1991; Silverman, 1999) for which potential for economies of scope and scale are high. Generally speaking, managers are more likely to engage in related acquisitions when the firm is performing well and the industry prospects are bright. To the extent that managers possess more knowledge about related compared to unrelated industries with respect to products, markets, and technologies, we postulate that related acquisitions are perceived as being less risky (Govindarajan, 1989; Gupta, 1984; Gupta and Govindarajan, 1984; Sitkin and Pablo, 1992). This conceptualization is also consistent with the notion that related industries fit the “dominant logic” (Prahalad and Bettis, 1986) of the firm's managers and also reduce the learning associated with a new industry (Hitt et al., 2001). This proposition also conforms to a resource-based explanation for related acquisitions, wherein firms prefer to move into industries with similar resource profiles.

The propositions of BTF present a novel opportunity to explore the question of the type of acquisition in which a firm is likely to engage. BTF suggests that negative attainment discrepancy, or performance below aspirations, triggers problemistic search and incites organizational change and risk-taking (Bromiley, 1991; Greve, 2003a, 1998), whereby search boundaries are initially locally bounded and expanded when no satisficing solutions are found (Levinthal & March, 1981; Rosenkopf & Nerkar, 2001; Stuart & Podolny, 1996). Problemistic search requires increased intensity in search for potential solutions to close the performance discrepancy including progressive consideration of increasingly risky options as a response to increasingly negative performance feedback. Search begins by looking for local solutions and then broadens to include progressively more distant solutions if initial efforts at local search fail to uncover a satisficing alternative (Cyert and March, 1963; Levinthal, 1997). In this way, search may gradually expand to consider options of increasing risk, such as cost-cutting efforts, divestments, operational and financial restructuring, and potential acquisitions (Iyer and Miller, 2008). Following this reasoning, when performance falls below aspirations, firms should initiate local search, with respect to acquisitions, by examining acquisition targets that are in closely related industries. When there are limitations on managerial time, such a constraint would result in the selection of a target with which the firm has a high degree of relatedness, as an initial interest in local search portends an interest in related acquisitions as a feasible solution to performance issues. In fact, acquiring related firms is associated with increased post-acquisition performance (see Palich et al., 2000). Accordingly, we propose the following:

**Hypothesis 1.** Among firms making an acquisition, performance below aspirations is positively associated with the extent of relatedness of acquisitions.

#### *Problemistic search and triggers of distant search*

Despite good effort, firms may fail to find a satisficing solution through local search, and if so, they are likely to expand their search horizons to pursue distant targets. The extant literature considers risk-taking to increase as a function of increasing “discrepancy”—the difference between performance and aspirations. Greater discrepancy increases the intensity of search and broadens search boundaries (Lehman et al., 2011). This increase in risk-taking behavior under negative attainment discrepancy calls for significant change (Greve, 1998), innovation (Bolton, 1993), and exploration (March, 1991) and, at times, may also result in financial misrepresentations from managers to address performance shortfalls (Harris and Bromiley, 2007). Firms that are unable to find satisficing solutions through local search are likely to expand search boundaries to consider distant options.

One possible trigger of this distant search, and implicit in behavioral research, is the extent of performance discrepancy experienced by the firm. Research suggests that greater risk taking is likely when the extent of performance discrepancy is significantly below aspirations (Cyert and March, 1963; Posen et al., 2017). Although past research has focused on the level of negative attainment discrepancy as a proxy for magnitude (Audia and Greve, 2006; Miller and Chen, 2004), we propose that the relative decline, i.e., the degree of decline compared to negative attainment discrepancies in the past, could be a second-order aspiration point that triggers distant search in firms.

Fang et al. (2014) proposed that firms do not immediately initiate search upon negative feedback but that there are second-order triggers that increase the intensity of search. Feedback from the environment could be ambiguous or noisy and, coupled with boundedly rational managers, firms may not be able to fully untangle systematic effects from firm-related idiosyncratic factors that

drive negative attainment discrepancy. When faced with negative attainment discrepancy, managers could simply attribute performance decline to industry and other macroeconomic factors, as opposed to declines remediable by the firm, and thus may not focus on closing the negative attainment gap (Jordan and Audia, 2012). As such, attributions to factors that drive the negative attainment discrepancy could affect initiation and expansion of search and its boundaries.

A simple, first-order attainment discrepancy may not capture the seriousness of performance feedback in triggering distant search, as such deviations could be considered “noisy.” In other words, similar levels of underperformance may be experienced by multiple firms whereas their propensity to engage in distant search may not be the same. Firms may interpret the same level of discrepancy differently. However, the firm might view its performance discrepancy differently when compared to its own underperformance in the past. We posit that a second-order aspiration point—relative attainment discrepancy—comparing current underperformance to the firm's mean negative attainment discrepancy in the past could drive the intensity and scope of problemistic search into distant search. Essentially, this measure is the degree to which a firm's below-aspiration performance deviates from its past negative attainment discrepancies. If this deviation is greater than what the firm is regularly used to, then the likelihood of the firm expanding its search boundary to fix the performance shortfall also increases. Such a second-order aspiration point may be an inducement for firms to engage in distant search and expand search boundaries. Thus, we propose:

**Hypothesis 2.** Among firms making an acquisition, the relative attainment discrepancy decreases the extent of relatedness of acquisitions.

Although managers might attribute performance shortfalls to industry and macroeconomic conditions beyond the control of the firm, the likelihood of such attribution should decrease when a firm repeatedly misses its aspirations. This conjecture is distinct from the idea of relative magnitude (Hypothesis 2), whereby the severity of performance relative to past negative attainment discrepancies triggers distant search. It is also possible that firms may consistently perform just below aspirations. If so, distant search is less likely to be triggered because performance is just below aspirations and, thus, does not warrant increased risk taking. Constant downward adjustment of aspirations also could allow a firm to not face significant shortfalls in performance feedback. A tendency to overlook and attribute performance shortfalls to factors not within the firm's control exacerbates this problem (Fang et al., 2014). To counteract this barrier to expanding search boundaries, we propose that distant search is also likely due to repeated shortfalls in performance over time.

Problemistic search resulting from *persistent* poor performance will increase the likelihood of strategic change and may prompt exploration of new strategies through distant search, especially because internal resistance to change is also likely to be weaker (Boeker, 1989). Thus, expansion of search boundaries is conjectured to be more likely the longer a firm has been consistently performing below aspirations. A persistent shortfall indicates decreasing value of the firm's current resource profile and lowers perceived gains from combining existing resources with acquisition targets of similar resource profiles. Consequently, persistent performance shortfalls should induce a firm to widen its search and engage in greater risk-taking, thus decreasing the extent of relatedness of acquisitions considered (Bowman, 1982; Bromiley, 1991; Greve, 1998; Lant and Montgomery, 1987; Wehrung, 1989).

**Hypothesis 3a.** Among firms making an acquisition, persistent attainment discrepancy decreases the extent of relatedness of acquisitions.

A direct extension of this proposition is that persistent shortfalls will also moderate the direct effect of firm search in response to performance feedback. Problemistic search efforts are directed toward local search when firms initially experience performance below their aspirations and we predicted that this is likely to lead firms to engage in acquisitions that are highly related. However, if the firm has been experiencing persistent shortfalls in performance with respect to aspirations, then this is likely to attenuate the search efforts due to performance feedback. The firm will likely abandon local search efforts faster and widen its search boundaries thus considering unrelated acquisitions. Essentially, a persistent performance shortfall will influence the scope of firms' problemistic search by inducing the firm to abandon its local search and expanding its search boundaries to consider acquisitions that are less related in nature. Thus, we posit that persistent attainment discrepancy will weaken the extent to which acquisitions are related.

**Hypothesis 3b.** Among firms making an acquisition, persistent attainment discrepancy will weaken the relationship between performance below aspirations and the extent of relatedness of acquisitions.

## Methods

### Sample

We constructed a longitudinal dataset by combining two Swedish databases: RAMS and LISA. The RAMS (*registerbaserad arbetsmarknadsstatistik*) database provides yearly financial performance data on all non-listed (i.e., privately held) firms that are registered in Sweden. All private firms in Sweden are required to make their financial statements public, and therefore, such performance data are considered highly reliable. The LISA (*longitudinell integrationsdatabas för sjukförsäkringsoch arbetsmarknadsstudier*) database is an employer-employee matched database that provides yearly data on all Swedish inhabitants. This unique and rich dataset allows us to evaluate the relatedness of acquisitions at a fine-grained level. Our sample and analyses are based on annual observations between 2001 and 2007. Based on prior work (e.g., Neffke and Henning, 2013) on Swedish firms, we collated our sample of all private Swedish limited liability companies (partnerships were excluded) with at least 10 employees (micro-firms with

fewer than 10 employees are generally less likely to acquire other firms and more likely to fail) and those that engaged in at least one acquisition during the observation period.<sup>1</sup> These filters led to a final sample of 1409 firms.

## Variables

### Dependent variables

The dependent variables concern the extent to which acquisitions are related to the focal firm and, as such, could pertain to activities along the value chain and could be either external or internal to the firm (Homburg and Bucerius, 2006). Relatedness has been defined in terms of resources, competencies, technologies, and markets, as well as in terms of the dominant logic at the corporate level (Grant, 1988; Prahalad and Bettis, 1986). We use the following measures for relatedness of acquisitions in an effort to capture both the industrial component and the skill and technologies components of firms: industry and skill-relatedness.

### Industry relatedness

Industry relatedness is based on similarity in the SNI (Swedish Standard of Industrial Classification) code. Following Wang and Zajac (2007), physical relatedness is operationalized as follows: If the first four digits of the primary SNI codes of the acquirer and the target match, we code as 1; if only the first three digits match, we code as 0.75; if only the first two digits match, we code as 0.5; if only the first digit matches, we code as 0.25; otherwise, we code as 0. Thus, increasing values indicate increasing industry relatedness. If a firm acquired multiple targets in a year, we take the mean of relatedness of transactions for each firm-year; else, we use the value of industry relatedness for the only acquisition during the year (Hoskisson et al., 1993).

### Skill-relatedness

We follow Neffke and Henning (2013) to measure skill-relatedness. Skill-relatedness considers cross-industry labor flows and the assumption that individuals are more likely to migrate to jobs in industries in which their skills are more rather than less related. The measure of skill-relatedness is, indirectly, a multidimensional measure of relatedness. The flow of employees across sectors represents relatedness of applicability of knowledge and skills from other industries and shared tangible and intangible resources across industries. Compared to the popular measure of industry relatedness, skill-relatedness provides a more fine-grained measure of relatedness.

According to Neffke and colleagues (2011), the baseline number of co-occurrences between two industries is given by the prediction of a regression analysis. In particular, let the observed labor flow from an industry of origin  $i$  to a destination industry  $j$  be denoted by  $F_{ij}$ . First, a value of  $F_{ij}$  is created for every possible combination of two industries. Then, using a zero-inflated negative binomial regression,  $F_{ij}$  is regressed on industry characteristics (i.e., total employment, the growth rates, and the average wage levels for a labor flow's industries of origin and of destination). The choice of the model is driven by the necessity of accounting for nonnegative and integer-valued labor flows. Further, because most industry pairs do not exhibit any labor flows, the dependent variable contains an excess of zeros. Thus, skill-relatedness is defined as relative excess labor flow. To maximize comparability of the two relatedness measures, we transformed skill-relatedness into a categorical variable by choosing thresholds such that each skill-relatedness category contains approximately the same number of industry combinations as the corresponding industry relatedness category (see Neffke and Henning, 2013, for the detailed procedure).

## Independent variables

### Attainment discrepancy

Various measures of financial performance, such as return on assets (ROA), return on sales (ROS), return on equity (ROE), and profit margin, may be relevant to managers as they assess performance relative to aspirations. ROE is affected by the relative mix of firms' equity and debt, and ROS does not capture non-sales (e.g., strategic activities) related activities; thus, we chose ROA as the performance proxy (Greve, 2003a; Iyer and Miller, 2008). This is an indicator of how well a firm has performed relative to its total asset base. We used profit margin as a robustness test of our main results.<sup>2</sup>

Firm performance could be above or below an aspiration level. Positive (negative) attainment discrepancy occurs when firm performance is above (below) an aspiration level. Behavioral research typically includes two different proxies for aspirations: historical and social. Historical aspirations are based on a firm's prior performance, while social aspirations are based on the performance of a typical observable firm within the same industry. Studies on risk-taking find support for the relevance of both types of performance comparisons: to past performance of the same firm (Lehner, 2000) and to other firms in the industry (Gooding et al., 1996). Performance is measured in period  $t-1$ , and the historic aspiration level is the performance in the prior period,  $t-2$  (Iyer and Miller, 2008). Our focus is on historical aspirations given that the use of social aspirations is less relevant in a sample of private firms, as these figures are not readily and directly available for owners and managers to gauge their status with respect to performance.

The difference between performance and the historical aspiration level is the firm's attainment discrepancy. Positive and negative attainment discrepancies are coded such that larger distances from aspiration levels represent larger values. If firm performance is below the aspiration level, then the absolute difference represents the negative attainment discrepancy. Similarly, when firm

<sup>1</sup> Our results were consistent with a sample of COMPUSTAT firms that looked at industry relatedness.

<sup>2</sup> The results are available from the authors upon request.

performance is greater than or equal to the aspiration level, then the difference represents the positive attainment discrepancy.

#### *Relative attainment discrepancy*

To assess the relative attainment discrepancy, we created a spline of the historical negative attainment discrepancy variable at the mean, based on the last three years' performance.<sup>3</sup> We coded the variables as Relative Magnitude-high and Relative Magnitude-low based on performance compared to the mean. The mean level of negative attainment discrepancy acts as an additional, or a second-order, reference point, instead of extreme reference points, such as bankruptcy. This measure allows us to capture the second-order aspiration point—the relative attainment discrepancy in relation to the mean negative attainment discrepancy in the past.

#### *Persistent attainment discrepancy*

This measure is based on a count variable that tracks the number of consecutive firm-years where the attainment discrepancy is negative until year  $t-1$ . This counter resets when attainment discrepancy is positive in any year.

#### *Control variables*

We include several controls to account for alternate explanations for acquisition decisions. First, to control for firm resources and financial health we include acquirer size, slack, free cash flow, distance from bankruptcy, negative net income and debt ratio. We controlled for size effects by including *acquirer size* as the log of total firm assets. Prior research shows that firm size may influence corporate diversification (Bettis, 1981; Montgomery, 1982) and level of risk taking (Baysinger and Hoskisson, 1989).

*Slack resources* can be a key determinant of firm diversification behavior (Jensen and Meckling, 1976). Harford (1999) finds that cash-rich firms are more likely to engage in acquisition activity and, specifically, diversifying acquisitions. In addition, slack resources may encourage managers to engage in risky strategic moves such as acquisitions (Lang et al., 1991; Ruth et al., 2013). Specifically, excess financial resources may induce the firm to engage in unrelated acquisitions. However, from a behavioral perspective, excess organizational and financial resources enable the firm to increase experimentation (Cyert and March, 1963), which may lead to exploration of previously unexplored domains. These resources allow firms to take higher risks with limited consequences for existing activities. Both agency and BTF suggest similar outcomes with respect to slack. Iyer and Miller (2008) find significance for behavioral variables of slack after controlling for the effects of free cash flow on the overall acquisition activity. Slack search occurs when firms possess excess resources that allow for experimentation, which can result in identifying and pursuing new opportunities (Levinthal and March, 1981). As such, we control for high- and low-discretion slack. The former is measured as the level of cash reserves, while the latter is measured as the debt-to-equity ratio (George, 2005). Because slack also differs across industries, we calculated slack as the deviation from the mean of each industry subsector (Bradley et al., 2011; George, 2005). We standardized these two measures and summed them to obtain a general slack index (see Chen, 2008).

We also controlled for the availability of *free cash flow* logged (Jensen, 1986), as this may induce firms to engage in unrelated acquisitions. We employed the measure used by Halebian and Finkelstein (1999) for free cash flow, which is assessed as the percentage of free cash flow and is operationalized as follows: (operating income minus taxes minus interest expense) divided by equity. Availability of free cash flow controls for inefficient investments driven by excess resources (Harford, 1999; Lang and Stulz, 1994). In addition, firms are likely to use internal reserves to fund unrelated acquisitions and to seek external resources to engage in related acquisitions (Myers and Majluf, 1984). *Distance from bankruptcy* measure controls for firms that have a survival focus as opposed to an aspiration focus. The threat-rigidity Hypothesis (Staw et al., 1981) suggests that a survival focus prevents the firm from taking risky actions and instead induces them to cut costs (Schendel et al., 1976; Starbuck, 1992) and limit new strategic initiatives (D'Aveni, 1989), such as acquisitions (Iyer and Miller, 2008). Other researchers find evidence for increased risk-taking in the face of poor performance (Chen and Miller, 2007; Ketchen and Palmer, 1999). Thus, firms threatened by bankruptcy may have a strong motivation to explore investments in alternative businesses and make defensive acquisitions, as such investments allow a firm to diversify away from a threatened line of business. We include the distance from bankruptcy variable as a control to account for these effects. We use the Altman Z score as a proxy for financial distress (Altman, 1983). The Altman Z score is computed using a firm's working capital, retained earnings, earnings before interest and taxes, the book value of equity, and sales. Altman's Z for private firms is defined as:  $(0.717 \times \text{working capital divided by total assets}) + (0.847 \times \text{retained earnings divided by total assets}) + (3.107 \times \text{income before interest expense and taxes divided by total assets}) + (0.420 \times \text{book value of equity divided by total liability}) + (0.998 \times \text{sales divided by total assets})$ . Low scores indicate proximity to bankruptcy. To round out the controls at the firm level we also included controls for *Negative net income and debt ratio*. Given potential effects on related acquisitions, we controlled for negative net income, indicating whether a firm has a negative net income or not (Feldman et al., 2016), and debt ratio, that is the proportion of a firm's assets that are financed by debt, measuring a firm's indebtedness (Kaplan and Weisback, 1992).

Second, we include controls for risk tendency, intangible resources, and CEO age, tenure, and education. Related and unrelated acquisitions are also affected by the firm level of risk-taking. Following previous studies (e.g., Gómez-Mejía et al., 2007), we calculated the coefficient of variation, as a measure of *risk*, by dividing the standard deviation in firm sales by the average firm sales. *Intangible resources* such as the firm's technological resources, may not be shared easily across markets and may require extensive internal integration in the post-acquisition phase. We included the measure provided by Statistics Sweden on intangible assets (log) as reported on the balance sheet of each firm. Because the CEO's age (Sanders, 2001), CEO's tenure (Gómez-Mejía et al., 2015) and CEO

<sup>3</sup> We tested whether using median, instead of mean, changed the results. We do not find significant difference in magnitude, direction, and significance.

education (having a business administration/Engineering degree or not) (Haunschild et al., 1999) may affect a firm's decision to acquire business units, we include these controls.

Third, we introduce controls for industry characteristics such as Herfindahl index of industries represented in a firm's diversification portfolio, industry sales growth, level of acquisition activity in each industry, environmental dynamism and munificence, and industry dummies. We controlled for diversification of the firm's portfolio using a *Herfindahl index*. We relied on the number of employees in each division to calculate this measure as the information on sales by division is not available. We also controlled for the *industry sales growth* given by the average sales growth rate of all single-segment companies operating in a firm's primary four-digit SIC code (Feldman et al., 2016). We controlled for the *level of acquisition* activity (number of acquisitions) in each industry (using 4 digits SNI code) given that institutional isomorphism may affect the acquisition propensity (Krishnan et al., 2004). We controlled for *environmental dynamism and munificence* that may influence acquisition decisions (Brauer, 2006). Dynamism, or the degree of instability in the external environment, is measured by the antilog of the standard error of each regression slope coefficient from the equations used to calculate the munificence in each industry (Keats and Hitt, 1988). Munificence is the abundance of resources in the environment. Following Keats and Hitt (1988), we regressed time against the natural log of sales in each industry (four-digit SNI code). Munificence was then measured by the antilog of the regression slope coefficient. Finally, given that *industries* may differentially encourage companies to acquire business units (Mulherin and Boone, 2000), we also controlled for industry dummies using the high digit-level SNA/ISIC aggregation, A\*10 "agriculture, forestry and fishing" sector as reference category; dummy variables: (a) Manufacturing, mining and quarrying, and other industry; (b) Construction; (c) Wholesale and retail trade, transportation and storage, accommodation, and food service activities; (d) Information and communication; (e) Financial and insurance activities; (f) Real estate activities; (g) Professional, scientific, technical, administration, and support service activities; (h) Education, human health, and social work activities; and (i) Other services (Eurostat, 2008).

Finally, we also included additional controls for phenomenon-specific characteristics such as prior acquisitions, social aspiration, and time-trend effects. From an organizational learning perspective, firms with *prior acquisition experience* are more likely to have developed capabilities for successful integration of the acquired firm (Anand and Khanna, 2000; Dyer and Singh, 1998; Haleblan and Finkelstein, 1999; Hayward, 2002). We included acquisition experience as a count of the total prior acquisitions of the firm in the past 10 years (see Haleblan and Finkelstein, 1999; Iyer and Miller, 2008). We also controlled for the *social aspiration* gap between a firm's performance in year  $t-1$  and its social/competitors' performance in year  $t-2$ , calculated by the ROA of firms in the relevant four-digit SNI industry, which has been found to affect acquisitions (Iyer and Miller, 2008). To control for time-trend effects, the *lo of time* was also incorporated into the analyses as this has been found to be the most appropriate functional form (e.g., in comparison with year dummies) (Box-Steffensmeier and Jones, 2004; Kennedy, 2003)<sup>4</sup>.

### Analysis

Due to the nature of our research question that explores the extent acquisition relatedness, we have to account for the fact that this is only observed amongst firms that engaged in acquisition(s). Our empirical approach must, therefore, control for this self-selection bias. We used the Heckman (1979) two-step procedure, which allows us to calculate a control variable, commonly referred to as the inverse Mill's ratio. The first-stage probit model predicts whether a firm engages in an acquisition. Entering the resulting inverse Mill's ratio from the first-stage into the second-stage regression model reduces bias in regression coefficients by accounting for sample selection. Proper identification of the inverse Mills ratio requires that a variable is correlated with the first-stage probit model's outcome but not with the second-stage model's outcome (Kennedy, 2003; Wooldridge, 2002). We identified asset turnover as an instrumental variable that meets these criteria and was included in the first-stage probit model but not in the second-stage model (Kennedy, 2003; Morrow et al., 2007). We controlled for the predicted inverse Mills ratio in all the analyses and using this specification, we are able to predict the extent of acquisition relatedness.

### Controlling for endogeneity

It is also possible that engaging in related acquisitions is endogenous to our independent variables. In other words, factors that might influence related acquisitions might also influence performance below historical aspiration, relative attainment discrepancy, and persistent negative attainment discrepancy. The key to testing for endogeneity is choosing instruments that are correlated with independent variables in an analysis but not with the dependent variable. Thus, we selected three instruments that meet these criteria: a) Debt interest, and b) Personnel costs, and c) firm count in the municipality of the company. All instruments may affect performance measures while are less likely to influence acquisition relatedness.

We employed a two-stage residual inclusion (2SRI) model (see Terza et al., 2008) to control for endogeneity. The 2SRI estimator is similar to the linear two-stage least squares estimator, except that in the second-stage regression, endogenous variables are not replaced by the first-stage predictors. Instead, first-stage residuals are included as additional regressors. As such, we controlled for the endogeneity score in the final analyses.

### Results

To test the proposed hypotheses, we draw on panel data analysis (*xtreg* command in Stata 13.1 with the option "vce(robust)"). The Hausman specification test revealed that there was no difference between random- and fixed-effects estimations. Therefore, the random-effects specification was used and its results are presented in all the analyses. Correlations are listed in Table 1.

<sup>4</sup> The use of year dummies provided similar results.



**Table 1**  
Descriptive statistics and correlations.

	Mean	S.D.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Industry relatedness	0.79	0.36											
2. Skill relatedness	0.81	0.31	0.78										
3.  Negative Attainment Discrepancy	0.02	0.04	0.08	0.07									
4. Positive Attainment Discrepancy	0.02	0.04	0.02	0.02	-0.34								
5. Relative Magnitude-Low	0.00	0.01	0.02	0.04	-0.08	0.14							
6. Relative Magnitude-High	0.00	0.01	0.05	0.01	-0.07	-0.07	0.07						
7. Persistent attainment discrepancy	0.81	1.19	-0.00	0.01	-0.08	-0.40	-0.08	0.00					
8. CEO age (log)	49.65	7.87	-0.04	-0.03	-0.13	-0.13	-0.04	0.00	-0.01				
9. CEO tenure (log)	2.28	1.57	-0.00	-0.01	-0.05	0.01	-0.03	0.01	-0.07	0.22			
10. CEO education	0.68	0.47	-0.07	-0.08	-0.00	-0.07	-0.02	-0.00	-0.02	0.01	0.05		
11. Total assets (log)	12.47	2.02	-0.16	-0.10	-0.11	-0.07	-0.10	-0.08	0.01	0.20	-0.06	0.17	
12. Altman Z score	3.73	1.66	0.11	0.03	-0.05	0.12	0.01	-0.02	-0.08	-0.01	0.09	-0.10	-0.25
13. Free cash flow (log)	7.17	0.12	-0.01	-0.01	0.00	-0.00	0.00	0.00	0.01	0.03	0.00	-0.01	0.03
14. Negative net income	0.25	0.43	-0.07	-0.08	0.15	-0.03	-0.00	0.04	0.09	-0.18	-0.16	0.08	0.05
15. Debt ratio	73.10	797.63	0.03	0.02	0.10	-0.03	-0.01	-0.01	0.08	-0.04	-0.06	-0.03	-0.02
16. Intangible assets (log)	6.62	7.03	0.08	0.05	0.00	-0.05	-0.04	-0.05	0.09	-0.04	0.06	0.08	0.28
17. Prior acquisition	0.71	0.45	0.01	-0.02	0.01	-0.07	-0.07	-0.08	0.10	0.11	-0.03	0.06	0.46
18. Social aspiration	0.01	0.14	0.04	0.03	-0.30	0.28	-0.02	-0.04	-0.21	0.01	0.18	-0.00	-0.03
19. Risk	0.13	0.23	0.05	0.09	0.07	0.13	0.07	0.03	-0.03	-0.06	-0.08	-0.12	-0.33
20. Industry growth	-0.07	0.30	0.13	0.04	0.06	-0.05	0.03	0.01	0.06	-0.07	0.01	0.07	-0.11
21. Herfindahl Index	11.10	3.38	-0.02	-0.03	-0.04	-0.05	-0.08	-0.08	0.02	0.09	-0.14	0.09	0.60
22. Level of acq. activity (industry)	106.59	136.95	0.11	0.08	0.04	0.06	0.01	-0.02	0.02	-0.04	-0.07	-0.07	0.01
23. Environmental Munificence	1.03	0.04	-0.23	-0.18	-0.03	-0.01	-0.00	-0.01	-0.04	0.11	0.03	0.03	0.19
24. Environmental Dynamism	1.00	0.06	0.08	0.03	0.02	-0.10	-0.03	-0.01	0.07	0.09	-0.03	0.04	-0.03
25. Log of time	1.27	0.59	-0.07	-0.08	-0.02	-0.02	0.01	0.03	-0.04	-0.01	0.47	0.04	-0.07

(continued on next page)

Table 1 (continued)

	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.
1. Industry relatedness													
2. Skill relatedness													
3.  Negative Attainment Discrepancy													
4. Positive Attainment Discrepancy													
5. Relative Magnitude-Low													
6. Relative Magnitude-High													
7. Persistent attainment discrepancy													
8. CEO age (log)													
9. CEO tenure (log)													
10. CEO education													
11. Total assets (log)													
12. Altman Z score													
13. Free cash flow (log)	-0.00												
14. Negative net income	-0.32	-0.01											
15. Debt ratio	-0.05	0.00	0.13										
16. Intangible assets (log)	-0.27	-0.01	0.12	-0.00									
17. Prior acquisition	-0.03	0.03	0.05	-0.00	0.26								
18. Social aspiration	0.38	0.01	-0.36	-0.12	-0.07	-0.06							
19. Risk	-0.05	-0.00	0.05	-0.02	-0.07	-0.11	-0.02						
20. Industry growth	0.02	0.00	-0.01	-0.00	0.05	-0.05	-0.03	-0.19					
21. Herfindahl Index	0.02	0.00	0.02	-0.03	0.19	0.41	-0.05	-0.18	-0.14				
22. Level of acq. activity (industry)	0.02	-0.01	0.02	0.04	0.04	0.16	0.01	0.12	-0.07	0.17			
23. Environmental Munificence	-0.13	0.01	0.05	0.01	-0.01	-0.03	-0.01	-0.00	-0.34	0.07	-0.20		
24. Environmental Dynamism	-0.01	-0.00	-0.05	0.03	-0.01	0.01	-0.08	-0.06	-0.00	0.03	0.07	-0.03	
25. Log of time	0.05	-0.01	-0.03	-0.13	0.07	0.03	0.04	-0.08	0.01	-0.10	-0.04	-0.02	-0.17

Notes. Correlations with values of |.03| or greater are significant at  $p < .05$ ; Industries are not reported due to space limitations.

Our dependent variable is a continuous measure of relatedness. A positive effect implies an increase in relatedness of acquisitions, and a negative effect implies a decrease in relatedness of acquisitions (or increase in the unrelatedness of acquisitions). Empirical results for industry relatedness and skill-relatedness are shown in Tables 2 and 3, respectively. All models include controls. Model 1 shows the results of controls only. Model 2 focuses on positive and negative attainment discrepancy (H1). Model 3 introduces the test for low and high relative attainment discrepancy (H2). Models 4 and 5 depict the results for the persistence in below-aspirations search and its interaction (H3a and H3b, respectively).

**Hypothesis 1** proposed that as performance falls below aspirations, the extent of relatedness of acquisitions increases. We found support for this hypothesis. Specifically, below-aspiration performance increases the extent to which acquisitions are related as reflected by *industry relatedness* (see Table 2, Model 2:  $\beta = 0.766, p < 0.001$ ). Likewise, firms engaged in below-aspiration search also increase the extent that acquisitions are high in *skill-relatedness* (see Table 3, Model 2:  $\beta = 0.714, p < 0.001$ ). Thus, H1 is supported when measured by industry and skill-relatedness of acquisitions.

**Hypothesis 2** proposed that relative attainment discrepancy decreases the extent of relatedness of acquisitions. The coefficients of high relative magnitude are positive and significant for *industry relatedness* (see Table 2, Model 3:  $\beta = 1.892, p < 0.001$ ) and *skill-relatedness* (see Table 3, Model 3:  $\beta = 1.342, p < 0.001$ ). Thus, **Hypothesis 2** is not confirmed; rather, the results reflect an increase in acquisition relatedness even when firms perform below their mean negative attainment discrepancy. Interestingly, the low-relative magnitude variable does not show an effect with respect to acquisition relatedness, as was observed with **Hypothesis 1**, and this effect seems to be driven primarily by a high relative magnitude of attainment discrepancy. Firms seem to not increase the scope of search under an increasing magnitude of negative attainment and continue to pursue local search.

**Hypothesis 3a** predicted that persistent attainment discrepancy decreases the extent of acquisition relatedness. The coefficients for persistent attainment discrepancy are negative and significant for industry relatedness indicating a reduction in the extent to which the focal acquisition(s) are related (see Table 2, Model 4:  $\beta = -0.015, p < 0.001$ ). This relationship also holds true with respect to Skill relatedness (see Table 3, Model 4:  $\beta = -0.010, p < 0.05$ ). This hypothesis was supported.

**Hypothesis 3b** proposed that persistent negative attainment discrepancy weakens the positive effect of below-aspirations performance on the extent of relatedness. This hypothesis is supported with respect to industry relatedness (see Table 2, Model 5:  $\beta = -0.203, p < 0.01$ ) and *skill-relatedness* (see Table 3, Model 5:  $\beta = -0.244, p < 0.01$ ). Figs. 1 and 2 present the relationship between below-aspirations performance and acquisition relatedness as moderated by persistent attainment discrepancy. High persistence weakens the relationship and, hence, reduces acquisition relatedness for both industry and skill-relatedness. Moreover, we also ran the analyses with *xtegar*, which addresses both autocorrelation and heteroscedasticity issues and results were generally robust.<sup>5</sup>

In continuation of prior work (Greve, 2003a; Iyer and Miller, 2008), we used past ROA as a reference point to compare current year ROA. However, ROA measure could be biased by accounting practices (Baucus et al., 1993) and differences in cost of capital or capital structures (Sirower, 1997). Furthermore, endogenous variation in changes driven by prior acquisitions could confound with ROA as a reference point, since paying a premium for acquisitions artificially increases the asset base. In addition, short-term post-acquisition integration challenges could also lower profitability. As such, ROA could be a downward biased measure (Sirower, 1997).<sup>6</sup> To assess whether the findings are an artifact of the ROA measure as a reference point, we used profit margin as a robustness test. Profit margin is less influenced by the changes in asset base resulting from acquisitions and divestitures. Our predictors (|Negative Attainment Discrepancy|; Positive Attainment Discrepancy; Relative Magnitude-Low; Relative Magnitude-High; Persistent attainment discrepancy) were thus calculated based on profit margin instead of ROA. The results were consistent with those reported using the ROA measure.

## Discussion

In this study, we delineate problemistic search into local and distant search and propose that acquisition relatedness can be explained by the type of search a firm is engaged in—where local search is likely to trigger related acquisitions and distant search is likely to trigger unrelated acquisitions. This investigation is important because the extant literature is not explicit regarding when and how long a firm's acquisition search is likely to remain local and when that search is likely to expand into distant search. To address this issue, we explicitly consider the triggers of local and distant search and, specifically, triggers of distant search under negative attainment discrepancy in the domain of BTF research. The extant literature typically considers the level of negative attainment discrepancy to explain triggers on expanding from local search to distant search to close aspiration gaps. We proposed a BTF-based explanation that addressed when firms are likely to intensify search efforts and explain acquisition type as a function of the firm's scope of problemistic search, specifically, local and distant search. In our research, we compare two drivers for search expansion: relative attainment discrepancy (a measure of how much) and persistent attainment discrepancy (a measure of how often). The relative magnitude construct is a second-order measure of performance discrepancy, while the persistency construct is a measure of how often a firm experiences below-aspirations performance.

Fang et al. (2014) observed that managers have a tendency to “sugarcoat” lower performance and negative performance feedback implying a reduced likelihood of response to performance below aspirations. To overcome this tendency, we proposed a construct comparing current underperformance to past underperformances of the firm, whereby such sugarcoating or the use of self-serving

<sup>5</sup> Results are not reported due to space limitations but available from authors upon request.

<sup>6</sup> We thank an anonymous reviewer for this suggestion.

**Table 2**  
Random effects estimates for industry relatedness.

Industry Relatedness	Model 1 Base	Model 2 H1	Model 3 H2	Model 4 H3a	Model 5 H3b
CEO age (log)	0.007 (0.027)	0.015 (0.027)	0.009 (0.027)	0.012 (0.027)	0.014 (0.027)
CEO tenure (log)	0.003 (0.010)	0.001 (0.010)	0.003 (0.010)	0.001 (0.010)	-0.001 (0.010)
CEO education	-0.011 (0.010)	-0.013 (0.010)	-0.011 (0.010)	-0.014 (0.010)	-0.014 (0.010)
Total assets (log)	-0.043*** (0.004)	-0.042*** (0.004)	-0.042*** (0.004)	-0.042*** (0.004)	-0.042*** (0.004)
Altman Z score	0.001 (0.003)	-0.001 (0.003)	0.001 (0.003)	-0.001 (0.003)	-0.001 (0.003)
Free cash flow (log)	0.006 (0.005)	0.005 (0.005)	0.005 (0.005)	0.006 (0.005)	0.005 (0.005)
Negative net income	-0.040** (0.012)	-0.046*** (0.012)	-0.042*** (0.012)	-0.045*** (0.012)	-0.046*** (0.012)
Debt ratio	-0.003 (0.004)	-0.003 (0.004)	-0.002 (0.004)	-0.003 (0.004)	-0.003 (0.004)
Intangible assets (log)	0.007*** (0.001)	0.007*** (0.001)	0.007*** (0.001)	0.007*** (0.001)	0.007*** (0.001)
Prior acquisition	0.004 (0.013)	0.003 (0.013)	0.007 (0.014)	0.006 (0.013)	0.005 (0.013)
Social aspiration	0.034 (0.036)	0.067+ (0.039)	0.029 (0.038)	0.067+ (0.039)	0.061 (0.039)
Risk	0.006 (0.019)	-0.004 (0.019)	0.002 (0.019)	-0.004 (0.019)	-0.006 (0.019)
Industry growth	0.050* (0.021)	0.048* (0.021)	0.050* (0.021)	0.050* (0.021)	0.048* (0.021)
Herfindahl Index	0.010*** (0.002)	0.011*** (0.002)	0.011*** (0.002)	0.011*** (0.002)	0.011*** (0.002)
Level of acq. activity (industry)	0.005 (0.004)	0.004 (0.004)	0.005 (0.005)	0.004 (0.005)	0.004 (0.005)
Environmental munificence	-0.044*** (0.009)	-0.045*** (0.009)	-0.044*** (0.009)	-0.045*** (0.009)	-0.045*** (0.009)
Environmental dynamism	0.016* (0.006)	0.018** (0.006)	0.017** (0.006)	0.018** (0.006)	0.018** (0.006)
Log of time	-0.066*** (0.009)	-0.063*** (0.009)	-0.066*** (0.009)	-0.064*** (0.009)	-0.064*** (0.009)
Negative Attainment Discrepancy		0.766*** (0.130)		0.922*** (0.136)	1.197*** (0.166)
Positive Attainment Discrepancy		0.390** (0.130)	0.163 (0.124)	0.257+ (0.137)	0.328* (0.138)
Relative Magnitude-Low			0.368 (0.285)		
Relative Magnitude-High			1.892*** (0.314)		
Persistent attainment discrepancy				-0.015*** (0.004)	-0.008 (0.005)
Negative Attainment Discrepancy  X Persistent attainment discrepancy					-0.203** (0.069)
Inverse Mills Ratio	0.047*** (0.009)	0.046*** (0.009)	0.047*** (0.009)	0.047*** (0.009)	0.048*** (0.009)
Endogeneity score	0.304+ (0.177)	0.306+ (0.179)	0.316+ (0.178)	0.324+ (0.182)	0.352+ (0.183)
Wald chi2	797.83	829.31	826.17	839.50	846.27
Prob > chi2	0.000	0.000	0.000	0.000	0.000

+  $p < 0.1$ ; \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

biases is less likely. We theorized that if the decline in performance is greater than the past average of negative attainment discrepancy, justifications may take a back seat, and firms must “roll up their sleeves” to close the performance gap. Similarly, managers may not immediately respond to a one-time negative attainment discrepancy, due to self-serving bias, and may delay corrective actions (Jordan and Audia, 2012). This highlights the importance of our construct, persistent attainment discrepancy. Persistent attainment discrepancy is important, as a firm could underperform by low margins and, hence, never indulge in distant search; yet, when negative attainment discrepancy occurs in consecutive periods, distant search could be triggered. Thus, both relative attainment discrepancy and persistent attainment discrepancy could be important anchors or reference points, between performance below aspirations and survival point that trigger a firm to expand search scope.

**Table 3**  
Random effects estimates for skill relatedness.

Skill Relatedness	Model 1 Base	Model 2 H1	Model 3 H2	Model 4 H3a	Model 5 H3b
CEO age (log)	-0.024 (0.025)	-0.017 (0.025)	-0.023 (0.025)	-0.019 (0.025)	-0.017 (0.025)
CEO tenure (log)	0.007 (0.008)	0.006 (0.008)	0.007 (0.008)	0.005 (0.008)	0.004 (0.008)
CEO education	-0.043*** (0.009)	-0.045*** (0.009)	-0.043*** (0.009)	-0.045*** (0.009)	-0.045*** (0.009)
Total assets (log)	-0.020*** (0.004)	-0.020*** (0.003)	-0.020*** (0.004)	-0.020*** (0.003)	-0.019*** (0.003)
Altman Z score	-0.007* (0.003)	-0.009** (0.003)	-0.007* (0.003)	-0.009** (0.003)	-0.009** (0.003)
Free cash flow (log)	-0.008+ (0.004)	-0.009* (0.005)	-0.009* (0.004)	-0.008+ (0.005)	-0.010* (0.004)
Negative net income	-0.054*** (0.011)	-0.060*** (0.011)	-0.056*** (0.011)	-0.059*** (0.011)	-0.060*** (0.011)
Debt ratio	-0.002 (0.004)	-0.003 (0.004)	-0.002 (0.004)	-0.003 (0.004)	-0.003 (0.004)
Intangible assets (log)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)
Prior acquisition	-0.009 (0.011)	-0.010 (0.011)	-0.007 (0.011)	-0.009 (0.011)	-0.009 (0.011)
Social aspiration	-0.001 (0.031)	0.034 (0.033)	-0.002 (0.032)	0.034 (0.033)	0.027 (0.033)
Risk	0.070*** (0.017)	0.061*** (0.018)	0.067*** (0.018)	0.061*** (0.018)	0.059*** (0.018)
Industry growth	-0.032* (0.014)	-0.035* (0.014)	-0.033* (0.014)	-0.034* (0.014)	-0.036* (0.014)
Herfindahl Index	0.006*** (0.002)	0.007*** (0.002)	0.007*** (0.002)	0.007*** (0.002)	0.007*** (0.002)
Level of acq. activity (industry)	0.018*** (0.004)	0.017*** (0.004)	0.018*** (0.004)	0.017*** (0.004)	0.017*** (0.004)
Environmental munificence	-0.055*** (0.007)	-0.055*** (0.007)	-0.054*** (0.007)	-0.055*** (0.007)	-0.055*** (0.007)
Environmental dynamism	0.002 (0.005)	0.003 (0.005)	0.002 (0.005)	0.003 (0.005)	0.002 (0.005)
Log of time	-0.047*** (0.008)	-0.045*** (0.008)	-0.048*** (0.008)	-0.045*** (0.008)	-0.045*** (0.008)
Negative Attainment Discrepancy		0.714*** (0.118)		0.817*** (0.122)	1.140*** (0.153)
Positive Attainment Discrepancy		0.296** (0.115)	0.079 (0.111)	0.205+ (0.121)	0.293* (0.124)
Relative Magnitude-Low			0.382 (0.255)		
Relative Magnitude-High			1.342*** (0.286)		
Persistent attainment discrepancy				-0.010* (0.004)	-0.001 (0.005)
Negative Attainment Discrepancy  X Persistent attainment discrepancy					-0.244** (0.075)
Inverse Mills Ratio	0.027*** (0.005)	0.027*** (0.005)	0.027*** (0.005)	0.027*** (0.006)	0.028*** (0.006)
Endogeneity score	-3.315+ (1.794)	-3.425+ (1.781)	-3.250+ (1.794)	-3.468+ (1.787)	-3.058+ (1.781)
Wald chi2	623.28	649.11	642.97	651.26	661.87
Prob > chi2	0.000	0.000	0.000	0.000	0.000

+  $p < 0.1$ ; \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

We find support for the arguments of problemistic search and that firms increase both industry- and skill-related acquisitions when they perform below aspirations. As they consistently perform below aspirations, however, this likelihood is reduced. Persistent below-aspirations performance induces firms to engage in unrelated acquisitions, thereby providing support for the notion of expanding search boundaries. Key to this finding is that the typically used construct of magnitude alone is not sufficient for teasing out this expansion of search boundaries. Indeed, persistence is a clearer indicator of this search boundary expansion under negative attainment discrepancy.

Notably, the context of the study, acquisition relatedness, contributes to the mergers and acquisitions literature. The acquisitions context allowed us to test the expansion of search boundaries and risk-taking from the firm's perspective. We presented a firm-level

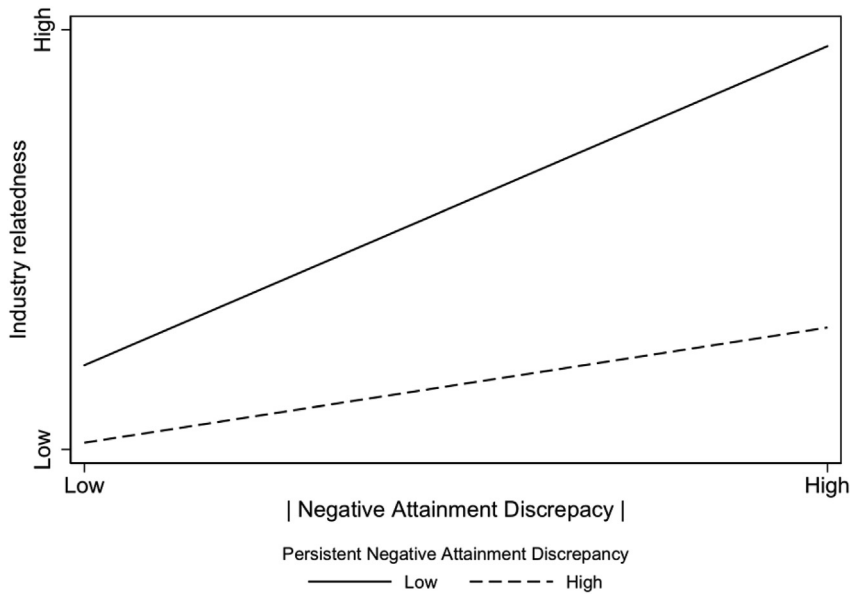


Fig. 1. Moderation effect of Persistent Attainment Discrepancy on the |Negative Attainment Discrepancy|.

behavioral explanation for relatedness of acquisitions. The extant literature has offered various explanations for the acquisition type including industry characteristics (Bettis, 1981; Christensen and Montgomery, 1981), overvaluation of stocks (Shleifer and Vishny, 2003), antitrust policy (Shleifer and Vishny, 1991), underlying resources of the firm (Chatterjee and Wernerfelt, 1991; Montgomery and Hariharan, 1991; Silverman, 1999), and agency problems (Amihud and Lev, 1981; Jensen and Meckling, 1976), among others. Although macroeconomic and industry-wide conditions explain acquisition activity and its timing in general, these explanations do not fully account for intra-industry differences in acquisition activity. For instance, they do not explain why some firms within an industry or sector choose to engage in related acquisitions while others choose to engage in unrelated acquisitions. As such, if two firms possess similar underlying resources or experience the same shock, current theories do not help to predict the type of

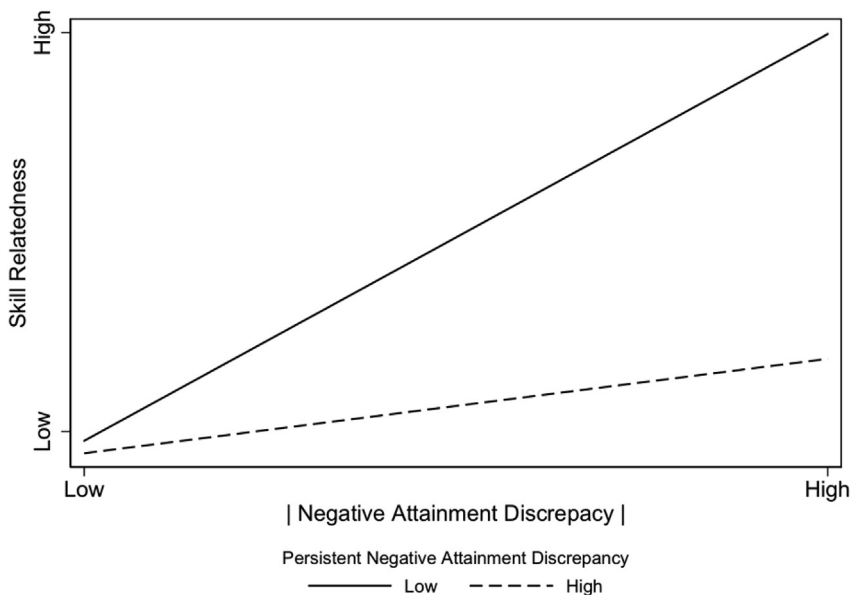


Fig. 2. Moderation effect of Persistent Attainment Discrepancy on the |Negative Attainment Discrepancy|.

Figs. 1 and 2 depict predicted extent of acquisition industry relatedness and skill relatedness, respectively, for firms with low and high levels of persistent attainment discrepancy (Model 5, Tables 2 and 3). Low and high variable levels refer to the mean minus two standard deviation and the mean plus one standard deviation, respectively. For both figures, the X-axis plots |Performance-Aspiration| when (P-A) < 0. All other variables were held constant at their mean. Both graphs suggest that Persistent Attainment Discrepancy reduces the extent to which acquisitions are related (or increases the unrelatedness of acquisitions).

acquisition a firm is likely to engage in and when. Furthermore, some findings suggest that acquisition relatedness has a positive impact on post-acquisition performance (Palich et al., 2000), while a meta-analysis shows that there is no significant effect of relatedness on acquisition performance (King et al., 2004). One explanation for the difference in findings might be due to not considering the acquiring firm's performance in diversification decisions. Our study offers a complementary reason to consider acquiring firm performance when considering relatedness of acquisition decisions.

#### *Future research and study limitations*

Future research could consider alternative measures of relatedness (see e.g. the entropy measure from Hoskisson et al., 1993), other triggers of distant search, and alternative solutions to performance shortfalls as possible considerations for extension of this research stream. While our study considered two forms of relatedness, we urge researchers to consider the applicability of BTF in combination with other measures of relatedness in acquisitions, such as geographically proximate and distant acquisitions. This study also focused mainly on a single general measure of financial performance. Because managers attend to various performance indicators and firms engage in problemistic search based on forecasted future performance (e.g., Chen, 2008), a study that contrasts historical and forward-looking performance relative to aspirations could inform us whether managers tend to be retrospective or prospective when they initiate search and changes in strategy. Firms could also explore operational, asset, managerial, and financial restructuring as solutions to performance decline (Sudarsanam and Lai, 2001), and consideration of these alternatives could provide a fruitful research agenda. Recent work also suggests that historical and social aspirations could have varying impacts on firm responses (Kim et al., 2015) and studying whether one form of attainment discrepancy is more or less likely to induce a firm to consolidate its position or exit industry positions where it is struggling would be informative.

Unrelated diversification can also be the result of moral hazard, entrenchment, and other agency theoretic explanations. Specifically, differences in governance may induce different corporate behaviors in response to performance feedback. Firms with weak governance structures may differ from those with strong governance, both in regard to their propensity to engage in acquisitions and the types of acquisitions that they undertake. We recommend that future research explicitly consider governance mechanisms along with problemistic search triggers to measure firm responses.

The current research has several limitations that could be interesting avenues for future research. Firstly, our analysis focuses on the acquisition activity only from the “buyers” perspective. That is, we do not explicitly consider the firms that become targets in related acquisitions. The two-sided sorting process for matching buyers with target firms is not accounted for in our analysis. The acquisition of firms by the buyer must also be complemented by the firms who “leave” the industry. Similarly, divestments would also be prone to sorting from sellers willing to divest and potential buyers considering purchase of firms available for divestment. Overall, endogeneity in the choice of acquisition/divestment, the choice between related and unrelated acquisitions or divestments, and the unobservables from the two-sided sorting in acquisitions and divestment activities, are important considerations for future research. What induces some firms to acquire while others choose to divest, exit, or become targets in an industry?

It is also important to not infer causation from our findings. Endogeneity is a concern when factors that are supposed to affect an outcome may themselves depend on that outcome. We used several instrumental variables such as debt interest, personnel costs, and firm count in the municipality in our analysis to control for endogeneity issues. The firm count in the municipality could explain the availability of potential targets in a region making monitoring easier as the extant literature has highlighted the role of geographic distance in acquisition activity. However, while this instrument may explain the choice of related acquisitions better, it does not fully explain divestment of related firms and/or acquisition of unrelated firms. While the empirical analysis showed limited association between personnel cost and debt, these factors could most certainly drive the acquisition decisions of a firm. For example, if an industry is consolidating, then personnel costs may drive the decision to acquire related firms. Debt levels would influence the ability to raise funds for acquisitions and strategic risk would drive the risk-related framing in making acquisition decisions. Our analysis also cannot explain the homogeneity in the choice of related and unrelated acquisitions. We call for future research to further address the issue of endogeneity in acquisitions or divestiture decisions in general and the choice between related and unrelated acquisitions or divestitures in particular.<sup>7</sup>

#### **Conclusion**

BTF research generally proposes performance below aspirations as a trigger of all problemistic search. We introduce two constructs, namely relative attainment discrepancy and persistent attainment discrepancy, as potential factors that could influence when search boundaries of firms expand, i.e., from local to distant search. This is an important aspect of search since current understanding and research is limited to implicitly considering magnitude and unsatisficing solutions as the only triggers for expanding boundaries. Our analysis was focused on the relatedness of acquisitions that firms make and we found support for persistent attainment discrepancy as a trigger for expanding search boundaries. Recognition of this impetus toward search direction due to the influence of performance feedback is critical for managers looking to improve firm performance.

<sup>7</sup> We acknowledge the comments from an anonymous reviewer in helping us address these limitations.

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