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Antecedents, Consequences and Dynamics of Organizational Reference Group Selection

DISSERTATION

submitted in partial satisfaction of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

in Management

by

Cheon Mok Kim

Dissertation Committee:
Professor John Joseph, Chair
Professor Philip Bromiley
Assistant Professor Luke Rhee

2023

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ABSTRACT OF THE DISSERTATION

Antecedents, Consequences and Dynamics of Organizational Reference Group Selection

by

Cheon Mok Kim

Doctor of Philosophy in Management

University of California, Irvine, 2023

Professor John Joseph, Chair

This dissertation aims to further our understanding of organizational reference groups and examines the antecedents, consequences, and dynamic processes of organizational reference groups. Specifically, it consists of two empirical essays that focus on the 1) role of firm status as an antecedent to reference group, and 2) consequences of reference group characteristics on strategic change, and a conclusion that outlines future research directions.

The first chapter of this dissertation aims to address the neglected area of research on specification of reference groups by focusing on the role of organizational status. Drawing on features of status, I theorize and find that high firm status increases the level of status of firms in reference groups, decreases reference group size, increases the use of non-conforming reference groups and the number of mentions as referents by other firms. I investigate the causal effect of status on the process of organization's selection of reference groups empirically by utilizing Fortune 500 rankings and applying a sharp regression discontinuity design (RDD) approach. Overall, this study offers a better understanding for how organizations form reference groups,

contributing to the literatures on behavioral theory of the firm, organizational learning, and status.

The second essay focuses on the consequences of reference group characteristics for firm decision making and examines how responses to performance feedback from social aspirations may vary for same level of performance, contingent on the variance of performance of peers and reference group size. This essay theorizes that variance in performance of firms within a reference group and reference group size reduces firm's responsiveness to underperformance as it creates opportunity for decision makers to self-enhance by enabling them to focus on underperforming firms within the reference group. Furthermore, I also argue that firms can change their reference group composition when experiencing underperformance relative to peers, as an alternative to increasing levels of strategic change. Results suggest that variance in peer performance decreases firm responsiveness to performance below social aspirations, and that the effect of reference group size is conditional on the level of variance in peer performance such that larger reference group size weakens the effect of negative social performance feedback on strategic change only when variance in performance of peers is high. I also find that firms with low levels of strategic change are more likely to change their reference group composition when experiencing low performance relative to peers.

In the final chapter, potential research ideas and directions for future research on the area of organizational reference groups are discussed.

This dissertation contributes to the behavioral theory of the firm and organizational learning literatures by highlighting whom organizations learn from, complementing the existing focus on what is learned from other organizations.

CHAPTER 1: The Effect of Status on Reference Group Selection: Evidence from Regression Discontinuity Approach

1.1 Introduction

Reference groups, "sets of organizations… against which a focal organization is compared" (Smith & Chae, 2017: 1135) are a central source of feedback and vicarious learning (Beckman & Lee, 2020; Cyert & March, 1963; Kacperczyk, Beckman, & Moliterno, 2015) and play a critical role for several organizational decision making processes, including evaluation of performance to determine whether to make organizational changes (Greve, 1998), corporate philanthropy (Marquis & Tilcsik, 2016), make sense of the competitive environment (Porac, Thomas, Wilson, Paton, & Kanfer, 1995) and justify the compensation of a CEO (De Vaan, Elbers, & DiPrete, 2019)

While we know from previous research that organizations attend to and learn from their reference group, which serves as a basis of social aspiration level (Cyert & March, 1963), we know much less about whom organizations compare themselves to and existing studies have inferred an aspiration level using industry mean or median performance (e.g. Audia & Greve, 2006; Baum & Dahlin, 2007; Bromiley, 1991). Although this approach has provided important insights, scholars have questioned whether the average is a valid referent group and called for further research on referent group for social comparison (Baum, Rowley, Shipilov, & Chuang, 2005; Moliterno, Beck, Beckman, & Meyer, 2014; Shinkle, 2012; Washburn & Bromiley, 2012). The lack of precision in specification of reference groups has been suggested to be the reason behind the mixed results examining the effect of performance relative to social aspiration level on search (Boyle & Shapira, 2012).

The use of industry average implicitly assumes that organizations attend to all firms in the industry and that there is no variation and asymmetry in how organizations select their reference groups. However, organizations use other "comparable" organizations as sources of aspiration level (Cyert & March, 1963; Festinger, 1954) and attend to limited number of organizations as their referents (Fiegenbaum & Thomas, 1995; Porac, Thomas, & Baden-Fuller, 1989). Although some studies have identified alternative ways of determining reference groups (e.g. Boyle & Shapira, 2012; Hu, Blettner, & Bettis, 2011; Massini, Lewin, & Greve, 2005; Moliterno et al., 2014), they rely on arbitrary construction of reference groups and lack a direct test of the process of reference group selection. Moreover, existing research does not incorporate the dynamic process of reference group selection which accounts for the change in the composition of reference groups over time.

This paper aims to address the neglected areas of research on specification of reference groups by organizations, an important source of firm heterogeneity (Massini et al., 2005). This research extends the literature's focus on *what* is learnt from other organizations and asks "*whom* do organizations learn from?" (Beckman & Lee, 2020: 2), focusing on how organizations determine from whom to refer and compare to. Greater knowledge of whom organizations learn from is critical because what organizations learn from others is also determined by the basis of social referent selection.

More specifically, this paper addresses the research question of "how do organizations identify, select, and change their reference groups?" To address this question, I investigate the role of organizational status on selection of organizations reference groups. While status has been identified as an important driver of several organizational decision-making processes (e.g. Askin & Bothner, 2016; Benjamin & Podolny, 1999; Stern, Dukerich, & Zajac, 2014), and its

importance in markets have been well established (Jensen, Kim, & Kim, 2011; Podolny, 1994), its potential impact on how organizations select their referents have been overlooked. However, status concerns are important drivers of competitive behavior and rivalry (Kilduff, Galinsky, Gallo, & Reade, 2016) and given the effect of status on organization's association with other organizations such as tie formation and alliances (Baum et al., 2005; Stern et al., 2014), organizational status can be an important driver in determining whom the organization compares itself to. Drawing on theories and features of status: homophily, exclusivity, security, and visibility, I propose that high status firms will be more likely to select other high status firms as reference groups while excluding non-high status firms from their reference group, be more restrictive in their reference group size, and increase the likelihood of using non-conforming, custom peer groups. Moreover, I predict that increased visibility associated with high organizational status will increase the likelihood that the focal firm is selected by another firm as a reference group.

I investigate the causal effect of status on the process of organization's selection of reference groups, and the dynamic process of changes in reference group over time. Establishing a causal impact of organizational status poses several challenges due to the endogenous nature of status being associated with several other features such as quality and size which could account for both differences in organizational status and reference group selection. Another concern is of reverse causality, as patterns of reference group selection may lead to increases or decreases in the level of organizational status. To overcome the challenge of identifying the causal effect of status, I explore these ideas empirically by utilizing the Fortune 500 rankings and leveraging a discontinuity in status at the 500th rank by applying a sharp regression discontinuity design (RDD) approach. In support of my hypotheses, I find evidence that high-status firms are more

likely to select other high-status firms as reference groups, be more restrictive in their reference group size, and increase the likelihood of using non-conforming, custom peer groups. Finally, I find that high-status firms are more likely to selected as referents by other firms.

This paper offers one of the first direct empirical evidence of inter-firm heterogeneity in reference group specification and temporal variation in reference groups. In so doing, this paper contributes to the literature on behavioral theory of the firm to provide a better understanding of the antecedents of reference group selection by drawing on the role of organizational status. Additionally, this study contributes to the literature on organizational learning by providing insight on *whom* organizations learn from, complementing the existing focus on *what* organizations vicariously learn from other organizations. Finally, this study advances research on organizational status by providing causal evidence of status and linking status to the process of organizational reference group selection.

1.2 Theoretical Background

1.2.1 Processes of Organizational Reference Group Selection

Although choice of reference groups by firms is a critical decision, as mentioned previously, much of the prior research on performance feedback and reference groups have primarily focused on the influences of reference groups on organizations such as the outcome of vicarious learning from reference groups (Aranda, Arellano, & Davila, 2017; Baum, Li, & Usher, 2000; Srinivasan, Haunschild, & Grewal, 2007) or different types of reference group's experience that organizations learn from, such as whether organizations learn from other organization's failure or success experiences (e.g. Baum & Dahlin, 2007; Clough & Piezunka, 2020; Kim & Miner, 2007; Madsen & Desai, 2010). Other work has examined different factors and characteristics that

facilitate or hinder vicarious learning from reference groups (e.g. Beckman & Haunschild, 2002; Darr, Argote, & Epple, 1995).

While it has been established that reference group is a critical source of learning and influence several decision-making processes, research on how organizations actually compose and select their reference groups lacks both theoretical development and empirical evidence (Beckman & Lee, 2020; Hu, He, Blettner, & Bettis, 2017; Shinkle, 2012). Most studies have assumed that firms use the entire population of the industry or industry average performance as a referent point (e.g., Audia & Greve, 2006; Baum & Dahlin, 2007; Bromiley 1991, Greve 1998), but this is inconsistent with theory and empirical finding that organizations attend to only a limited number of organizations as their referents (Fiegenbaum & Thomas, 1995; Porac et al., 1989) and the validity of this assumption has been questioned by several scholars (e.g. Lehner, 2000; Moliterno et al., 2014; Shinkle, 2012; Washburn & Bromiley, 2012). Assumption that a firm's reference group consists of the entire population of the industry is problematic not only because it lacks precision and realism (Baum et al., 2005), but also because it imposes a static view of reference groups, as it fails to account for the dynamic nature of reference groups. Moreover, this assumption suggests that every firm within an industry considers each other as a referent, failing to account for asymmetry and heterogeneity in reference groups among firms. Second, this assumption is problematic given that industry boundaries are increasingly blurring and that many firms are becoming increasingly diversified operating in multiple industries.

Number of studies have extended on the assumption that organizations attend to the entire industry as their reference group. For example, Boyle and Shapira (2012) argue that in a competitive context, the leader is selected as a reference point. Relatedly, Moliterno et al. (2014) theorize that organization's selection of reference group is a function of its prior historical

performance, suggesting that organization's only attend to other organizations of similar performance. Kacperczyk et al. (2015) and Hu et al. (2017) demonstrate that there exists both internal reference groups within the organization, and external reference groups in the mutual fund and the German magazine industry respectively. While these studies offer important insights, they only offer indirect evidence of the process of reference group selection as actual reference groups were unable to be directly observed and still *assumes* that organizations attend to different reference points that they have identified.

Recent studies have attempted to directly measure reference groups used by organizations. For example, Audia, Brion, and Greve (2015) examine how self-assessment and self-enhancement motives influence organization's choice of reference groups, and Smith and Chae (2017) show that organizational atypicality increases the likelihood of choosing non-conforming reference groups for self-enhancement purposes. However, empirical generalizability of the findings is limited as these studies are based on experiments and empirical research at the firm level remains scant. Porac, Wade, and Pollock (1999) examine how peer companies are selected in the context of CEO compensation but investigates reference groups selected by board members rather than the top management team and is limited to cross-sectional data. One exception is a study by Audia, Rousseau, and Brion (2022), which offers a direct test of the effect of CEO power on selection of non-conforming reference groups in the chemical industry.

Together, existing studies have revealed that organizations vary in their composition of reference groups, but our understanding on antecedents of reference group selection is limited and empirical evidence is scant. While there has been some research investigating the antecedents of reference group selection, the role of organizational status has been overlooked

despite its importance in shaping market structure and influence on affiliation decisions by firms (Podolny, 1993, 1994, 2010). Because firm status is an important factor shaping the competitive environment and who firms compete with in the market (Kilduff et al., 2016), and has been shown to establish how firms choose other firms to affiliate with (Baum et al., 2005; Stern et al., 2014), firm status can also be expected to be a significant driver of reference group selection processes as selection of firms as a referent can also be viewed as an association (Buunk & Gibbons, 2007). The current study focuses on organizational status as an important determinant of reference group selection process, addressing the issues identified above.

1.2.2 Status and Homophily in Reference Group Selection

Similarity between the focal firm and the potential referent has been considered as a key determinant in selecting referents for social comparison (Audia et al., 2015; Festinger, 1954; Kulik & Ambrose, 1992). Firms allocate greater attention to firms that are similar in salient characteristics such as size, geographic location and strategic orientation (Fiegenbaum & Thomas. 1995; Massini et al. 2005). Building on the importance of similarity in specification of reference groups, and given that the market is divided into niche by status (Podolny, 1993, 2010), I argue that status is a salient characteristic and signal used by firms to select reference groups, and that high status firms will consider other high-status firms as its reference group.

The prevalence of the phenomenon status homophily in tie formation and affiliations has been widely established (Gulati & Gargiulo, 1999; Podolny, 1994) where actors avoid engaging in relationship with lower-status firms to avoid leakage of status. Since comparison between two firms can be viewed as an affiliation (Buunk & Gibbons, 2007), a similar logic can be applied to explain firm's selection of reference group. If a high-status firm was to acknowledge a lower status firm as its competitor and thus its reference group, the two firms would be considered to

be in the same league (Boen, Vanbeselaere, Pandelaere, Dewitte, Duriez, Snauwaert et al., 2002; Snyder, Higgins, & Stucky, 1983). This prompts the high-status firm to be perceptually associated with the low status firm (Podolny, 2010) and a high status firm will want to avoid being competitively affiliated with lower status firms, as it increases the risk of status leakage (Snyder, Lassegard, & Ford, 1986). Relatedly, Washington and Zajac (2005) find that competing with lower status organizations deteriorates the focal organization's status and accrues smaller rewards even if the focal organization is successful over its competitors. Kim and Tsai (2012) also show that firms actively avoid being compared to less reputable firms, and that firms can protect its image by avoiding comparison with less successful firms. Research in sociology also support our prediction, which find that actors engage in "symbolic exclusion" to contrast oneself with the low-status group (Bryson, 1996).

Furthermore, the degree of competition is likely to be greater between status-similar firms, and high status-firms are more likely to consider other high status-firms as its rivals and referents as the intensity of competition is also greater among them. Related attributes hypothesis (Goethals, 1986; Goethals & Darley, 1977) also posits that the degree of competition is greatest when the comparison firm is commensurate. Piezunka and colleagues (2018) find that competitive behavior are more frequent between status-similar competitors, and high status firm's will allocate greater attention to other high status firms (Bothner, Kang, & Stuart, 2007), and base their social comparisons on other high status firms (Moliterno et al., 2014).

In summary, I argue that high status firms engage in status homophilous behavior when engaging in competitive affiliations, to avoid being perceptually associated with low status firms, which leads to the following hypothesis:

> *Hypothesis 1: High firm status increases the level of status of firms selected as a reference group.*

1.2.3 Status and Reference Group Size

Firms attend to a limited number of firms as its reference groups due to its limited attentional capability (Porac et al., 1989). I expect that there is heterogeneity among firms in their reference group size and theorize that firms with high levels of status will limit the number of firms in their reference group for two reasons.

First, an important feature of status is exclusivity (Podolny, 1994). Exclusivity refers to the desire to be differentiated and unique (Amaldoss & Jain, 2005; Belk, 1988; Bourdieu, 1984; Bryson, 1996; Veblen, 1899). This is evident by firms limiting its supply despite high levels of demand and offering limited edition versions of their products (Amaldoss & Jain, 2010), and consumption patterns of individuals (Bourdieu, 1984; Veblen, 1899). Because comparison with other firms leads to an affiliation between the focal firm and the referent, high-status firms will be less willing to include other firms in their reference group in order to remain distinguished from other firms. By excluding other firms from its reference group, the firm is able to dissociate itself from other firms.

Second, high-status firms may be less likely to consider many firms as their reference group due to its high levels of egocentric focus. High-status and power has been shown to increase validation of existing views and reduce the level of attention paid to external information (Brinol, Petty, Valle, Rucker, & Becerra, 2007; Petty & Cacioppo, 1986). The literature on perspective taking also suggests that individuals with high status and hierarchical rank are less likely to adopt another's viewpoint and perceptions (Fiske, 1993; Galinsky, Magee,

Inesi, & Gruenfeld, 2006; Kraus, Côté, & Keltner, 2010). High-status firms are inattentive to social comparison information (Johnson & Lammers, 2012), and hence their self-focus will lead to a lack of use of other referent firms overall.

Taken together, high-status firms are likely to only consider a limited number of firms as its reference group, as they seek to be differentiated from other firms, and are less likely to attend to external information due to its egocentric focus. Thus, I hypothesize:

Hypothesis 2: High firm status decreases the number of firms in a reference group.

1.2.4 Status and Non-Conforming Reference Group Selection

While reference groups are used for evaluation of performance and to compare the focal firm with its peers, such information is also publicly disclosed and are assessed by the stakeholders (Falschlunger, Eisl, Losbichler, & Greil, 2015). Firms are expected and required to compare their performance to established indexes and benchmarks, like the S&P 500. However, firms often deviate from the norm of using established indexes and compare their performance to non-conforming reference groups by using custom peer groups. Because use of non-conforming reference groups increases the difficulty of evaluation and reduces trust in information offered by the firm, analysts and activist investors penalize firms that use non-conforming reference groups (Audia et al., 2022).

Existing studies on reference group have identified the drivers of selecting non-conforming reference groups for evaluation of performance despite its negative consequences. Smith and Chae (2017) have identified that evaluators of atypical organizations are more likely to use non-conforming referents due to the ambiguity inherent in organizational atypicality, and Audia, Rosseau and Brion (2021) find that CEO power is associated with greater use of non-conforming reference groups. Drawing on the literature on middle-status conformity, I theorize

that high-status firms are more likely to deviate from the norm of using established reference groups.

Abundance of research suggests that high-status organizations face less pressure to conform (Durand & Kremp, 2016; Phillips & Zuckerman, 2001), and that these organizations can deviate from the norm as status provides a sense of security in their position as status positions tend to rigidify (Merton, 1968; Phillips & Zuckerman, 2001; Podolny, 1993) and are stable (Jensen & Roy, 2008; Podolny, 2010). High-status thus provides a source of agency (Guler, 2007; Jensen et al., 2011). For example, existing high-status restaurants were less likely to modify their presentation to fit with the expectations of Michelin guide (Favaron, Di Stefano, & Durand, 2022). Stakeholders are more likely to react less negatively to the use of non-conforming reference group by high-status firms as they are evaluated more positively in ambiguous situations (Kim & King, 2014), and are given increased benefit of the doubt when their behavior are open to interpretation (McDonnell & Werner, 2016; Sharkey, 2014). On the other hand, firms with low levels of status who do not enjoy the security and buffer will be more likely to adhere to the norm and avoid using non-conforming reference groups. In accordance with this work, I hypothesize that high-status firms are more likely to select non-conforming reference groups because of the security and agency provided by high levels of status.

> *Hypothesis 3: High firm status increases the likelihood of using non-conforming reference groups.*

1.2.5 Status and Selection by Rival Firms as Reference Groups

Not only do firms select other firms as reference groups, but a focal firm can also be selected as reference group by rival firms. I believe there are two reasons why high-status firms are more likely to be selected as referents by rival firms.

First, high-status firms have greater visibility and exposure compared to lower status firms (Podolny, 1993). Information about high-status firms is generally more readily available, and due to their visibility and media coverage (Goode, 1978; Van de Rijt, Shor, Ward, & Skiena, 2013), high-status firms receive greater attention (Bowers & Prato, 2018; Larivière & Gingras, 2010; Merton, 1968). For instance, articles by high-status authors receive significantly higher levels of attention relative to articles in the same-issue without any high-status affiliation (Reschke, Azoulay, & Stuart, 2018). Moreover, high-status firms often possess greater level of resources, and are thus more likely to be perceived as a threat to other firms, which will lead more competitors to consider a high-status firm as its reference group (Clark & Montgomery, 1999; Tucker, Zivan, & Camp, 1987). Ease of observation and salience associated with high status has been identified as important factors affecting firm's selection of reference groups (Greve, 2003; Lant & Baum, 1995) and thus high-status firms should be more likely to be identified as a referent by other firms.

Second, selecting high-status firm as a referent can accrue positive returns to the firm. A firm can be perceived to be associated with the high-status firm, and "bask in the reflected glory" of high status firms by engaging in competitive affiliation with high-status firms (Fujimoto, Snijders, & Valente, 2017; Podolny, 2010). Universities tend to compare themselves with other high-status schools to signal prominence (Elsbach & Kramer, 1996; Labianca, Fairbank, Thomas, Gioia, & Umphress, 2001) and studies of aggression at the interpersonal level have demonstrated that actors tend to strategically engage in aggression to high-status actors with the motivation of status attainment (Faris, 2012; Faris & Felmlee, 2011). In support to our argument, Kim and Tsai (2012) show that firm's self-asserted comparison with more reputable firms resulted in sales growth of the focal firm. Relatedly, Kim and Kim (2022) find that mere spatial

proximity to high-status neighbors can create perceived associations between the high-status firm and the neighboring low-status firm, which creates an opportunity for lower status firms to improve their status.

In summary, high-status firms are more visible and gain greater attention from competitors and because there are positive returns to selecting high-status firm as a referent, high-status firms will be more frequently be selected as reference groups by rival firms compared to firms with lower status.

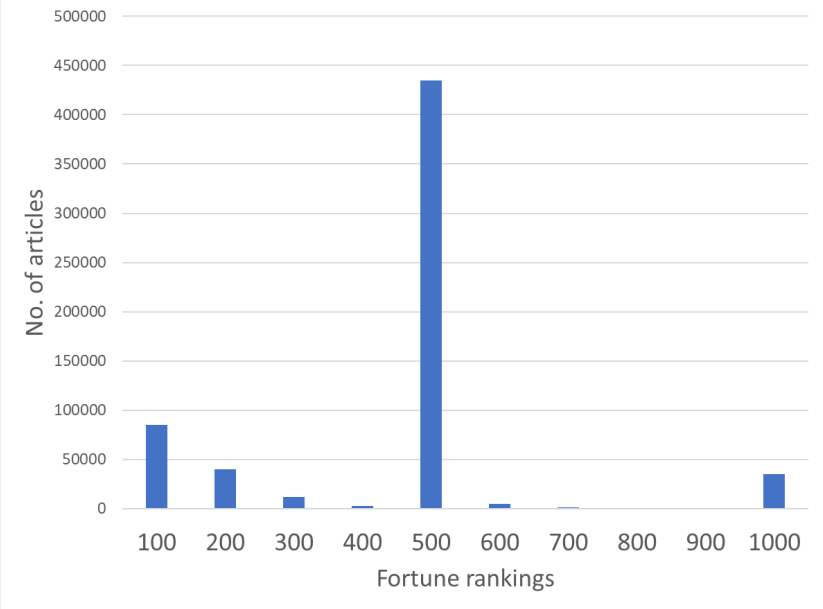
> *Hypothesis 4: High firm status increases the number of mentions of the focal firm as a reference group by other firms*.

1.3 Data and Methods

1.3.1 Empirical Setting

The empirical setting consists of Fortune 1000 firms between 2007 to 2020. The Fortune rankings provide a desirable context to investigate the causal effect of status on selection of reference groups and overcome the challenge of endogenous nature of status. In 1955, the Fortune magazine began ranking all US public firms by their annual revenue and published the top 500 firms. It later began offering the list of top 1000 Firms in 1996 although it is now presented as the "Fortune 500" ranking. I argue that inclusion in the Fortune 500 ranking confers a high-status distinction as it is equivalent to occupying a limited position within a status hierarchy. As illustrated in Figure 1.1, media references to Fortune 500 are significantly higher than any other Fortune rankings, providing further evidence that Fortune 500 rankings is an established category while other rank position matters.

Figure 1.1 Media publicity of Fortune rankings

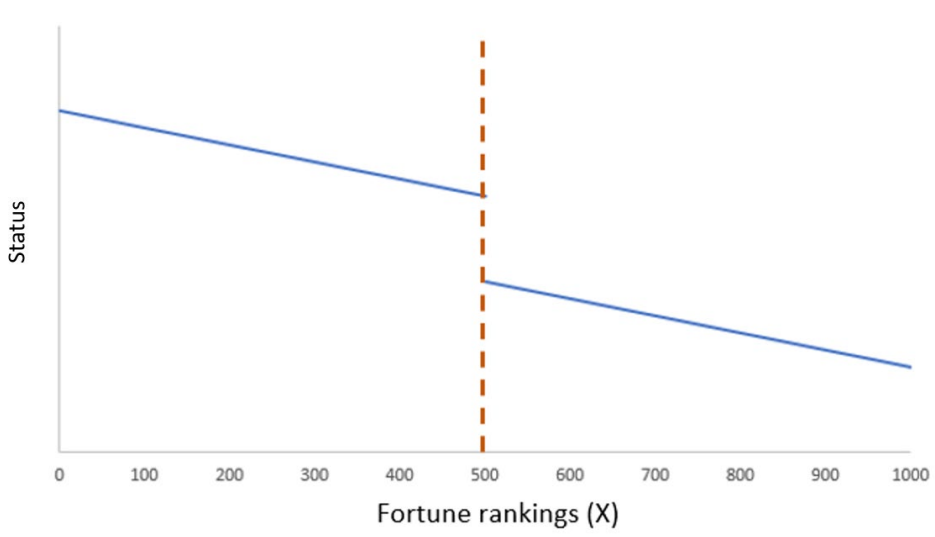


Source: ProQuest Newspaper (as of Oct. 2021)

In an ideal world, the causal effect of status would be estimated by randomly assigning firms to be included or excluded from the Fortune 500 rankings. To approximate this ideal experiment, I utilize the discontinuity in status at the 500th position to apply a sharp regression discontinuity design (RDD). RDD is "often seen as the sharpest tool of causal inference since it approximates very closely the ideal setting of a randomized control experiment" (Flammer & Bansal, 2017: 1828). I leverage the cut-off at the 500th rank position where there exists a

discontinuity in status among firms just above and below the 500th ranking while revenue follows a continuous distribution (See Figure 1.2). In our setting, a firm that is marginally excluded from the Fortune 500 rankings is comparable to a firm that is just included in the Fortune 500 rankings, but their level of status would be significantly different due to the firm's affiliation in the Fortune 500 category. This sharp discontinuity in status at the Fortune 500th rank position provides a useful quasi-natural experimental setting to draw causal inferences about the effect of status on reference group selection, ruling out alternative explanations of self-selection or omitted variables bias (Imbens & Lemieux, 2008). My conceptualization of status is analogous to the Merton's example of the 41st chair in the example of the French Academy and the limited recognition of only the top 40 scientists in the field (1968:2). This approach is consistent with previous studies using rankings as a measure of status (e.g. Askin & Bothner 2016; McDonnell & King, 2018; Rider & Tan, 2015) but overcomes the problem of endogeneity where higher rank is also associated with higher levels of quality and size.

Figure 1.2 Distribution of status by Fortune rankings



Another obstacle in conducting empirical research on organizational reference groups was the limited availability of data on firm reference groups. Due to the lack of data, the literature has relied on an indirect test of firm's reference group selection (see Audia et al., 2022 for an exception). To overcome this challenge, I leverage annual 10-K filings as a source to identify firm's selection of reference groups. 10-K statements are useful sources of firm reference group for several reasons. First, firms are legally mandated to select and report other firms that they compare themselves to and compete with. For example, in Costco's 10-K filing in 2019, it reports that "*Walmart, Target Kroger, and Amazon.com are among our significant general merchandise retail competitors. We also compete with other warehouse clubs (primarily Walmart's Sam's Club and BJ's Wholesale Club)".* Second, comprehensive records are available at the annual level due to the mandatory requirement by the Securities and Exchange Commission. I manually coded the list of firm's reference group to construct measures of status of the reference group, reference group size, use of non-conforming reference groups and whether the focal firm is selected as a reference group by other firms. This enables us to perform a direct test of the causal effect of status on how firms construct reference groups.

1.3.2 Variables

1.3.2.1 Dependent variables

As noted, data on firm's reference group are obtained from the 10-K filings. I use four dependent variables to test our set of hypotheses on the effect of status on reference group selection: *reference group status, reference group size, non-conforming reference group, selection by rivals.*

Reference group status. This variable is measured by using the proportion of Fortune 500 firms in the focal firm's reference group. This measure captures the degree to which the firm's reference group is comprised of high-status firms relative to lower status firms.

Reference group size. I measure the size of the firm's reference group annually by counting the number of firms reported by the focal firm as its competitor.

Non-conforming reference group. Following Audia et al. (2022), I measure the use of non-conforming reference groups by coding whether the focal firm uses a custom peer group in Item 5 of the 10-K to evaluate the company's performance by comparing it to a published industry index (e.g., S&P 500) and/or a peer group of competitors. This variable equals one when the firm includes custom peer group in its performance comparisons, and zero otherwise. Use of custom peer groups are considered to be non-conforming and are discounted by investors and analysts (Audia et al., 2022).

Selection by rivals. To measure the extent to which the focal firm is selected by other firms, I count the number of times a focal firm is selected as a reference group by other Fortune 1000 firms in a given year.

1.3.2.2 Control Variables

I control for several other factors that could influence the selection of reference groups. *Firm size* is measured as the log of number of employees. *ROA* is the return on assets calculated as the ratio of operating income to book value of total assets. *Market value* is the total market capitalization value of total number of outstanding shares. *Number of segments* is a count variable measuring the number of different business segments reported by the firm in the 10-K, as firms with greater number of business areas may report more diverse set of referents or non-conforming reference groups. Industry and year fixed effects are also included.

1.3.3 Model Specification

I first estimate a non-parametric local linear regression that analyzes the difference in means between firms just above and below the Fortune 500 ranking cutoff in small bandwidths. To determine the optimal bandwidth, I used the STATA command *rdrobust* and *rdbwselect* using mean square error (MSE)-optimal bandwidth allowing for different bandwidths below and above the Fortune 500 ranking cut-off (Calonico, Cattaneo, Farrell, & Titiunik, 2017). The optimal bandwidth is a window of 200 to 231 ranks below the 500th rank and 146 to 231 ranks above the Fortune 500 threshold contingent on the dependent variable. I compute the estimates with triangular kernel type to assign greater weights on firms ranked closer to the 500th position in the Fortune rankings (Calonico, Cattaneo, & Titiunik, 2014). I then employ a parametric estimation to evaluate the casual effect of status on reference groups with the following model specification[1]:

$$y_i = \beta_1 F500_i + \beta_2 \overline{rank}_i + \beta_3 \overline{rank}_i^2 + \beta_4 \overline{rank}_i \times F500_i + \beta_5 \overline{rank}_i^2 \times F500_i + \mathbf{X}_i\delta + \varepsilon_i, \quad (1)$$

where y_i is outcome variable of firm i, $F500_i$ is an indicator variable for whether firm i is included in the Fortune 500 ranking, $\overline{rank}_i$ measures the difference between firm i's rank position and the 500th rank, and $\mathbf{X}_i$ is a vector of control variables. I use robust stand errors clustered at the firm level to account for within-firm correlation of errors over time.

[1] Consistent with Gelman & Imbens (2019), up to second-order polynomials of the assignment variable are included in the analyses.

1.4 Results

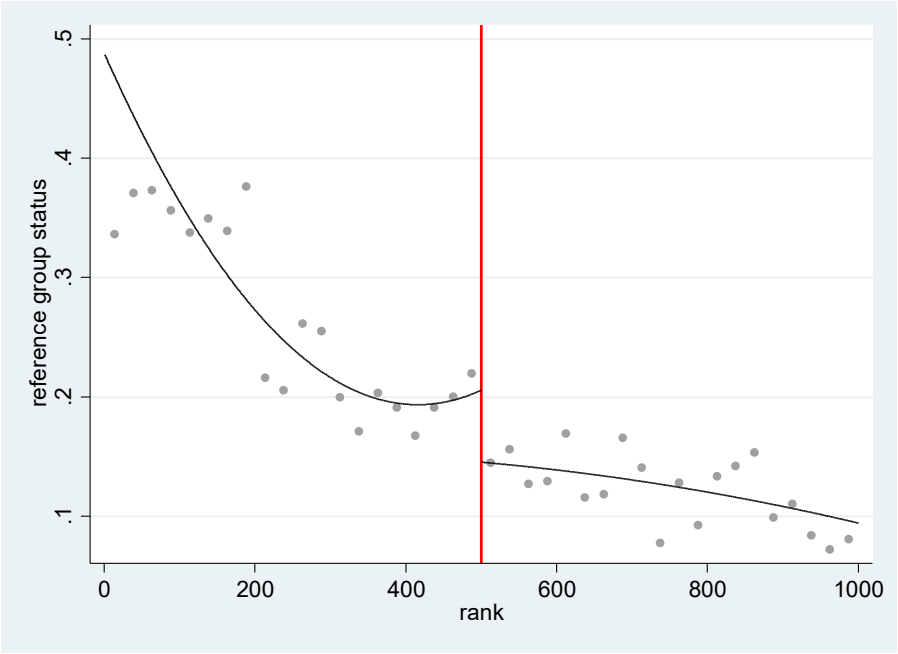
1.4.1 Graphical Analyses

To estimate the effect of firm status on specification of reference group (H1-3) and selection by rivals (H4), I first provide a visual impression of the regression discontinuity analysis in Figure 1.3. Figure 1.3 plots *reference group status, reference group size, non-conforming reference group,* and *selection by rivals* against Fortune rankings. Each dot in the figures represents the average values of each dependent variable of interest in bins of 25 rank. The solid link represents the predicted values of the dependent variable from second-order polynomials in Fortune rank estimated separately for below and above the Fortune 500 threshold.

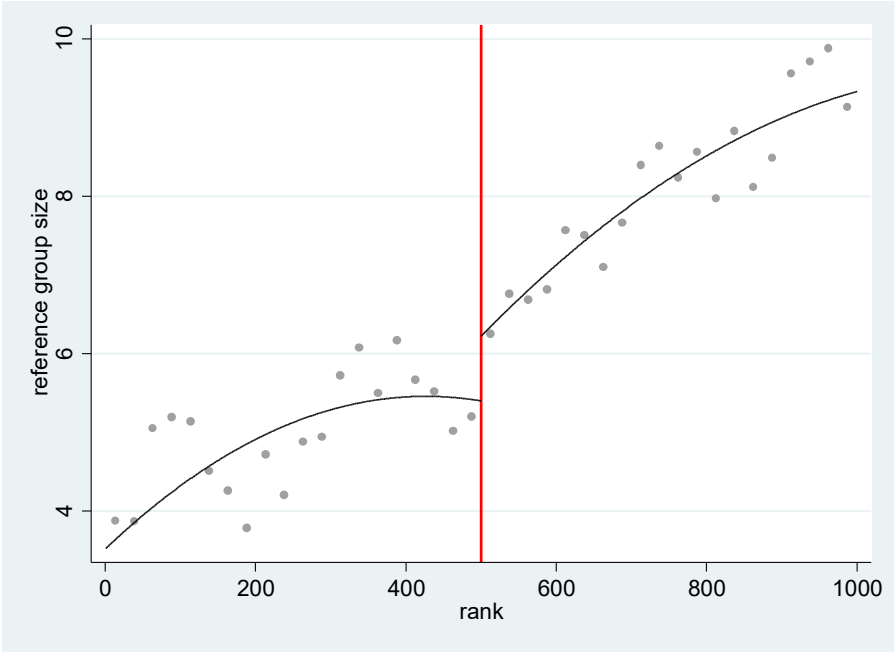
In Figure 1.3a, I observe a discontinuity in *reference group status* at the Fortune 500 threshold, where average status of firms in reference group is discontinuously higher for firms just included in the Fortune 500 ranking. Figure 1.3b plots the relation between *reference group size* and Fortune rank, and I see a discontinuous fall in the number of firms in the reference group at the Fortune 500 threshold. Figure 1.3c shows that the likelihood of using custom peer groups is discontinuously higher as firms are included in the Fortune 500 list. Similarly, In Figure 1.3d, I observe a discontinuous jump in mentions by other firms at the Fortune 500 threshold. In all four plots, the dependent variables seem to be continuous and a smooth function of rank except at the except at the Fortune 500 threshold where there is exists a discontinuity, lending support for all my hypotheses.

Figure 1.3 Regression discontinuity plots of effect of firm status on reference group selection

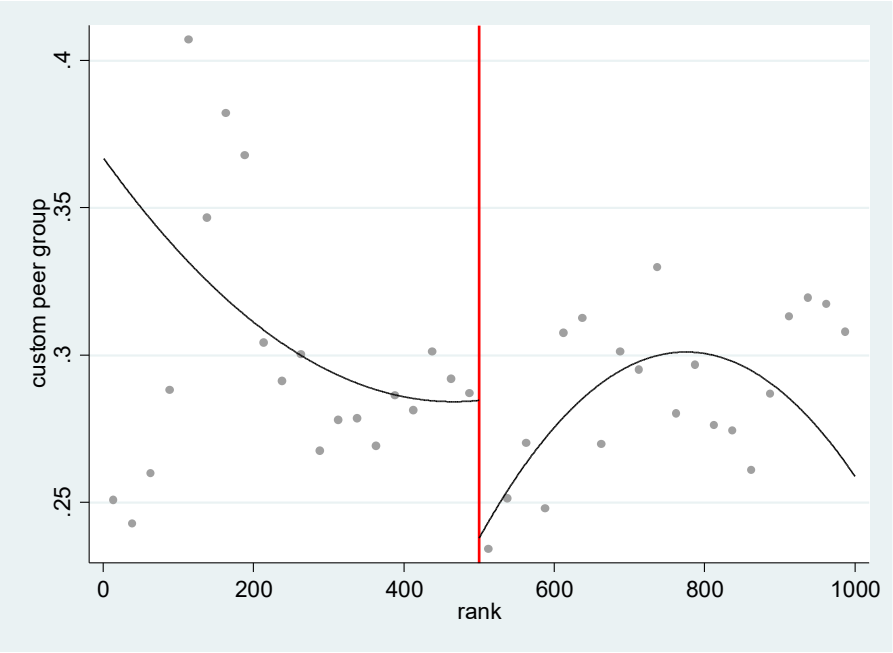
a) Reference group status on rank



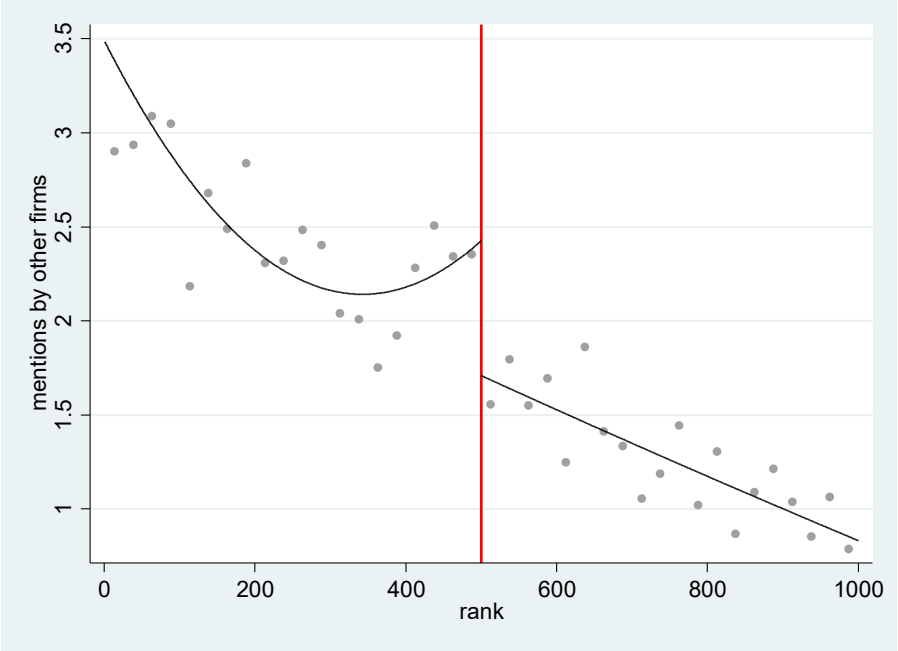
b) Reference group size on rank



c) Non-conforming reference group on rank



d) Selection by rivals on rank



1.4.2 Regression Analyses

The graphical analysis in Figure 1.3 suggests that inclusion in the Fortune 500 list leads to a increase in reference group status, decrease in reference group size, increase in likelihood of using non-conforming reference groups, and increase selection by other rival firms. I formally test these hypotheses using both non-parametric and parametric estimation.

The non-parametric estimation reports estimates of the differences in reference group characteristics restricting the sample to firms that are just included and excluded from the Fortune 500 in small bandwidths. I used the STATA command *rdrobust* and *rdbwselect* using mean square error (MSE)-optimal bandwidth allowing for different bandwidths below and above the Fortune 500 ranking cut-off (Calonico et al., 2017) to compute the non-parametric estimates. Table 1.1 reports the results from the nonparametric estimates of the differences in the dependent variables between firms that are included and excluded from the Fortune 500 threshold. For firms within the inclusion threshold, I find that the difference in *reference group status* is 0.085 ($p < 0.05$). The difference in *reference group size* between firms above and below the Fortune 500 threshold is -1.552 ($p < 0.01$). Model 3 tests Hypothesis 3, and I observe that the likelihood of using non-conforming custom peer groups is 6.8 p.p ($p < 0.01$) higher for firms just above the Fortune 500 rank compared to firms that just fall below the threshold, providing support for the hypothesis. For firms within the inclusion threshold, the difference in *selection by rivals* is 0.768 ($p < 0.05$). Overall, these findings provide support for Hypothesis 1-4, suggesting that increase in firm status by inclusion in the Fortune 500 list affects firm reference group selection behavior and the propensity for them to be selected by other firms.

Table 1.1 Regression discontinuity analysis using non-parametric local polynomial estimation

Variables	H1 Model 1	H2 Model 2	H3 Model 3	H4 Model 4
F500	0.085*	-1.552**	0.068**	0.768**
	(0.350)	(0.504)	(0.250)	(0.284)
Observations	6,296	4,908	5,042	4,658
Bandwidth	[231.4, 131.5]	[215.9, 146.3]	[200.2, 164.4]	[200.2, 164.4]

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 1.2 reports the results of the parametric estimation using model specification given by Equation (1), controlling for the distance in rank from the Fortune 500 threshold using second-order polynomials incorporating the full sample with sets of control variables. Consistent with the non-parametric estimates, we find statistically significant differences in *reference group status* (b = 0.054, $p < 0.05$)*, reference group size* (b = -0.974, $p < 0.001$)*, non-conforming reference groups* (b = 0.036, $p < 0.01$) and *selection by rivals* (b = 0.549, $p < 0.001$) between firms included and excluded from the Fortune 500 list. Overall, these results provide strong support for my hypotheses that firm status is an important antecedent of reference group selection.

Table 1.2 Regression discontinuity analysis using parametric estimation

Variables	H1 Model 1	H2 Model 2	H3 Model 3	H4 Model 4
F500	0.054*	-0.974***	0.036**	0.549***
	(0.022)	(0.283)	(0.014)	(0.151)
Firm size	-0.001	-0.045	0.014***	-0.019
	(0.005)	(0.066)	(0.004)	(0.037)
ROA	-0.040	-2.790***	-0.022	0.429
	(0.040)	(0.608)	(0.028)	(0.300)
Market value	0.002	0.133*	-0.007**	-0.032
	(0.004)	(0.055)	(0.002)	(0.027)
Revenue	-0.034	-0.394*	-0.062***	-0.038
	(0.018)	(0.185)	(0.010)	(0.123)
Constant	0.453**	6.998***	1.013***	2.280*
	(0.151)	(1.564)	(0.124)	(1.028)
Observations	12,609	12,609	12,609	12,609
R-squared	0.053	0.146	0.098	0.058
Degrees of freedom	87	87	87	87

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

1.4.3 Supplementary Analyses and Robustness Checks

I conduct several supplementary analyses and robustness checks to further verify the main empirical results, and whether the assumptions of regression discontinuity design analysis are valid in our empirical setting and data. Moreover, the results are robust to alternative methodologies such as different parametric functions and bandwidth choice.

1.4.3.1 Moderating Effects of Underperformance on Use of Custom Peer Group

Our initial results suggests that inclusion in Fortune 500 rankings increases the likelihood of using non-conforming reference groups. In my theory for how organizational status influences the likelihood of using non-conforming reference groups, I argued that firms often use custom peer groups with the motivation of presenting the focal firm's performance more favorable to the public. If this is true, the effect of status on likelihood of using non-conforming reference groups should be more salient when firms are underperforming, as they will have greater motivation to use custom peer groups to sugarcoat the firm's poor performance. On the other hand, we should not find any differences in use of custom peer groups between low and high status firms when firms are performing above its expectations, as these firms do not have the motivation to use custom peer groups given its potential negative consequences.

To check for this, I evaluate the moderating impact of underperformance. First, I operationalize social performance feedback (SPF) as performance relative to the average performance of firms in the same two-digit SIC industry code within the Fortune 1000 firm excluding the focal firm using return on assets (ROA) as the performance metric. I then split the full sample into two based on whether the focal firm is underperforming (SPF < 0) or outperforming (SPF > 0) the industry at a given year.

Table 1.3 presents both the non-parametric and parametric regression discontinuity analyses examining the moderating effect of underperformance. As displayed in Table 1.3, I find a significant discontinuity in the likelihood of using custom peer groups at the Fortune 500 threshold only when the firm is underperforming relative to the industry, providing further support for my arguments on the effect of organizational status on use of non-conforming reference groups.

Table 1.3 Moderating effect of underperformance on custom peer group

	Non-parametric		**Parametric**	
	SPF < 0	**SPF > 0**	**SPF < 0**	**SPF > 0**
Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**
F500	0.071*	0.044	0.049**	0.018
	(0.326)	(0.038)	(0.017)	(0.024)
Control variables			Included	Included
Observations	2,902	2,241	6,160	6,450
Bandwidth	[226.2, 206.6]	[210.1, 116.9]		

1.4.3.2 Panel regressions with firm fixed effects

Since regression discontinuity design pools all observations, I am unable to test for any within-firm variation in reference group composition as a result of changes in levels of firm status. To investigate whether a firm changes its specification of reference groups over time, I examine the effect of changes in firm status on the dependent variables using a panel regression with firm fixed effects.

I operationalize change in levels of firm status using firm's entry into the Fortune 500 ranking, and firm's exit from the Fortune 500 ranking s a measure of status gain and status loss

respectively. *Enter Fortune 500* is a binary variable that equals one when firm rank was greater than 500 in year t-1 but is within 500 at year t and zero otherwise. Conversely, *exit Fortune 500* equals one when firm rank was higher than 500 (within 500) at year t-1, but is ranked lower than 500 at year t.

Table 1.4 reports the panel regression analyses with firm fixed effects to examine within-firm temporal changes in reference groups. I find that firm's entry into the Fortune 500 ranking increases the level of *reference group status* ($p < 0.10$), and decreases *reference group size* ($p < 0.05$), and increases the likelihood using custom peer groups ($p < 0.05$), consistent with our main findings. However, firms are unaffected by their exit from the Fortune 500 ranking. Moreover, neither entry or exit in the Fortune 500 ranking changes the number of mentions of the focal firm by other Fortune 1000 firms. Overall, while firms are responsive to one's status gains reflected by their new entry to the Fortune 500 ranking, they are not adaptive to status losses suggesting that firm's perception of their own status does not shift as quickly as actual losses in status. These firms may still feel that they are high-status firms, given that they were previously member of the Fortune 500. Also, the insignificant relationship between entry to and exit from Fortune 500 ranking and *selection by rivals* suggest that other firms do not immediately respond to the focal firm's inclusion or exclusion in the Fortune 500 ranking, providing support for the notion that status is stable.

Table 1.4 Within-firm regression analyses of Fortune 500 entry and exit

	H1	H2	H3	H4
Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Enter F500	-0.051†	-0.406*	-0.010*	0.198
	(0.030)	(0.176)	(0.005)	(0.187)
Exit F500	0.037	0.012	-0.005	0.056
	(0.032)	(0.226)	(0.011)	(0.224)
Rank	-0.000*	0.002*	-0.000	-0.000
	(0.000)	(0.001)	(0.000)	(0.000)
Firm size	-0.034	0.718*	-0.017	-0.073
	(0.025)	(0.355)	(0.014)	(0.198)
ROA	-0.022	-0.694	0.003	-0.193
	(0.057)	(0.557)	(0.018)	(0.388)
Market value	-0.003	0.080	-0.004	0.016
	(0.009)	(0.124)	(0.005)	(0.061)
Revenue	0.043	-1.000**	0.003	0.678***
	(0.031)	(0.345)	(0.015)	(0.198)
Constant	0.033	11.077***	0.391***	-3.929*
	(0.253)	(2.937)	(0.112)	(1.618)
Observations	11,203	11,203	11,203	11,203
R-squared	0.003	0.016	0.004	0.005
Degrees of freedom	19	19	19	19

Robust standard errors in parentheses

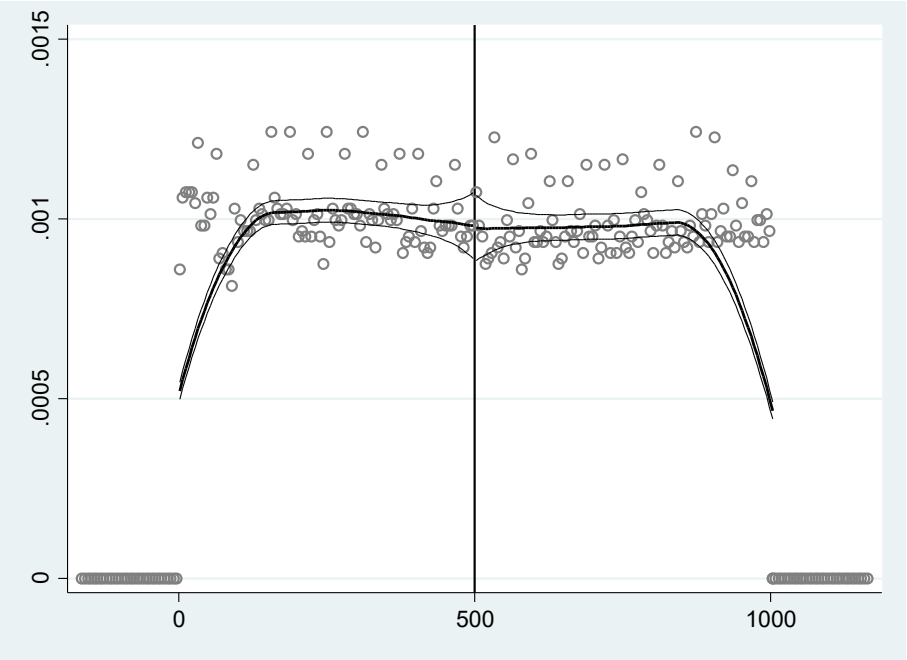
*** p<0.001, ** p<0.01, * p<0.05, †p<0.1

1.4.3.3 Continuity in distribution of Fortune rankings

Given that Fortune rankings are determined solely based on annual revenue, strategic manipulation of rankings is highly unlikely for two reasons: first, a firm would need to have information on financial performance of all other firms before they are publicly released. Second, there is little room for manipulation of the rankings by both the firm and the third-party as it is based on objective performance indicator of annual revenue (Rindova, Martins, Srinivas, & Chandler, 2018).

Because the distribution of Fortune rankings is continuous, with one firm corresponding to one rank at each given year, we should not observe any discontinuity in the distribution of Fortune rankings around the Fortune 500 threshold. However, because our sample does not include the entire population of Fortune 1000 firms for each year due to missing data in Compustat and 10-K filings, I further investigate for discontinuity in the density of Fortune rankings around the Fortune 500 threshold which could invalidate the identifying assumption of RDD. As shown in Figure 1.4, the distribution of Fortune rankings is smooth and continuous around the threshold. McCrary (2008) test of continuity in the density function around the Fortune 500 threshold provides no evidence for a discontinuity failing to reject the null hypothesis of continuity of the density function at the threshold ($p = 0.926$)

Figure 1.4 McCrary density test



1.4.3.4 Preexisting differences

I also examine for whether firms that are just included in the Fortune 500 ranking and firms that just fall below the threshold are similar on the basis of ex-ante characteristics. No significant preexisting differences should be observed among firms near the Fortune 500 threshold if our treatment of firm status is as good as random.

In Table 1.5 I examine for significant differences among marginal firms around the threshold using all of the variables. In Column 1, I compare all firms included in the Fortune 500 (rank 1 to 500) to all firms that are excluded (rank 501 to 1000) and find significant differences between them as expected. Column 2 reports the differences-in-means between marginal firms that have been just included or excluded in the Fortune 500 threshold. I find that most of the differences between firms above and below the Fortune 500 ranking become insignificant except for revenue when we only narrow the comparison set to only marginal firms with a distance of

100 ranks. These results provide further support for the assumption that inclusion in Fortune 500 is approximately random and for my identification strategy.

Table 1.5 Preexisting differences as a function of Fortune 500 rank

Variables	Full sample Model 1	Marginal firms Model 2
Firm size	1.188***	0.696
	(0.177)	(0.500)
ROA	0.008***	0.008
	(0.002)	(0.005)
Market value	1.432***	0.042
	(0.025)	(0.072)
Revenue	1.594***	0.118***
	(0.122)	(0.013)

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

1.4.3.5 Placebo test

To further test the assumption is that firm status is discontinuous at the Fortune 500 threshold, I test for whether there exists any significant discontinuity at other alternative thresholds. If Fortune 500 is an established category granting high status for firms, we should not observe significant effects at other potential cut-offs. I test for presence of such placebo effects using alternative cut-offs for every 100th rank and find no statistical evidence of discontinuity at alternative specification of thresholds.

Table 1.6 Placebo test

	H1		H2		H3		H4	
Cut-off	**b**	**p-value**	**b**	**p-value**	**b**	**p-value**	**b**	**p-value**
F100	0.364	(0.369)	-1.619	(0.157)	-0.148	(0.164)	0.364	(0.369)
F200	0.058	(0.249)	-0.701	(0.194)	-0.090	(0.307)	0.269	(0.455)
F300	0.009	(0.843)	-0.196	(0.924)	-0.024	(0.428)	0.448	(0.159)
F400	0.047	(0.276)	-0.132	(0.842)	0.022	(0.498)	-0.263	(0.395)
F600	-0.052	(0.187)	-0.303	(0.622)	-0.026	(0.340)	0.142	(0.607)
F700	-0.007	(0.865)	-0.186	(0.913)	-0.007	(0.833)	0.380	(0.216)
F800	-0.070	(0.202)	1.355	(0.592)	0.032	(0.363)	-0.168	(0.640)
F900	0.017	(0.788)	-1.811	(0.102)	-0.018	(0.643)	0.198	(0.667)

1.5 Discussion and Conclusion

This study examines the impact of firm status on firm's specification of reference groups. Drawing on research on status, I theorized that that firms with high levels of status are more likely to comprise their reference group with other high status firms, attend to a smaller number of firms as referents, are more likely to use non-conforming reference groups, and are also more likely to be selected as a referent by other firms. Analyses of Fortune 1000 firms and their reference group identification using sharp regression discontinuity design provide results consistent with my hypotheses. I also show that firms are more responsive to status gains by changing their reference group composition but are not responsive to status losses. I argued that this is because firms are adaptive to signals suggesting gains in levels of status, but their perception of one's status not being as reactive to losses in status. My findings provide evidence that there is heterogeneity in how firms select their reference group, and that the process of firm reference group selection is conditioned by the level of firm status.

1.5.1 Contributions

This research has implications for the behavioral theory of the firm (Cyert & March, 1963; Greve, 2003) and advances our understanding of reference groups in several ways. First, this study identifies status as an important factor contributing to the process of reference group selection, which has been overlooked in studies of referent choice and social comparison in both micro and firm level research. This study highlights that status not only influences how organizations select their reference groups, but also influence the likelihood of a firm being selected as referents by other firms. Second, our results inform us to rethink several implicit assumptions in reference groups. I demonstrate that organizations do indeed attend to a limited number of organizations as their referents, and that there is both inter-firm variation and asymmetry in reference groups. My findings also indicate that there is temporal variation in organization's composition of reference groups, departing from the static view of reference groups in existing research. Moreover, this paper examines how organizations select and form reference groups and provide a *direct* empirical test of reference group selection processes, advancing prior studies on reference groups that have relied on an *indirect* test of reference groups or experimental evidence (see Audia et al., 2022 for an exception).

This study also contributes to the organizational learning literature by providing insight on *whom* organizations learn from, complementing the existing focus on *what* organizations vicariously learn from others (e.g. Kim & Miner, 2007). Better knowledge of *whom* organizations learn from is critical, because *what* organizations learn from is contingent on *whom* they learn from. Greater understanding of organization's reference groups enhances our accuracy of measuring social aspiration levels, which can contribute to reconciling the inconclusive

findings in organizations response to performance feedback from social aspiration level in prior research (Boyle & Shapira, 2012).

In addition, this study contributes to the literature on organizational status. Leveraging a status discontinuity in rankings, I provide empirical evidence of the causal effect of status, complementing prior studies' efforts in identifying the causal effect of status (e.g. Azoulay, Stuart, & Wang, 2014; Malter, 2014; Simcoe & Waguespack, 2011). Utilizing the cut-off in rankings addresses endogeneity concerns in using actual rankings as a measure of status (e.g. McDonnell & King, 2018; Rider & Tan, 2015). Second, I provide a new consequence of status by linking organizational status to processes of reference group selection. Also, while I am not able to measure the actual mechanisms, building on Bourdieu (1984) and Veblen (1899), I highlight the desire for exclusivity as an important characteristic of status which affects organization's selection of reference groups, whereas past research on status have focused on security and agency as mechanisms affecting organizational outcomes of status. Finally, I demonstrate that status homophily exists in competitive network and tie formation as well, complementing existing research that have examined status homophily in positive ties such as alliances (e.g. Stern et al., 2014).

1.5.2 Limitations and Future Research

I recognize that this study has a number of limitations. First, while the annual 10-K filings are a useful source for identifying firm reference groups, given that they are publicly disclosed, there may be differences in reference groups identified from the 10-K filings to the internal reference groups that are not disclosed to the public. However, differences between firms in internal reference groups and those identified in the 10-K should be minimal as previous research confirms that 10-K statements provide an accurate description of how managers

perceive its competitors (Hoberg & Phillips, 2016; Li, Lundholm, & Minnis, 2013; Thatchenkery & Katila, 2021), and regulation mandates firms to not include irrelevant firms. Nevertheless, specification of reference groups may vary within organizations among different groups and organizations may hold multiple reference groups for different purposes or even for same purposes (e.g. Hu et al., 2017; Kacperczyk et al., 2015). Future research could explore how firms construct multiple reference groups, or how firms manage differences in reference groups across different coalitions within the firm. Moreover, while the focus of this study is to explore how firms self-identify reference groups, reference groups are also often imposed by third parties. The dynamics between self-identified reference groups and third party-imposed reference groups would be an interesting avenue for future research. Second, while I am able to establish a causal effect of firm status on how firms specify their reference groups, I am unable to directly measure the actual mechanisms on how status creates variation in firm reference group selection. Future research could focus more on the process of how managers select and change reference groups and investigate how characteristics or heterogeneity in reference groups affect vicarious learning or other decision making processes in organizations. Lastly, although the RDD approach is desirable for establishing causal inference, my findings are limited in generalizability given that the effect is identified by a subset of marginal firms just below and above the Fortune 500 rank threshold. Hence, the analysis is only able to identify the local average effect as in any RDD. While I focus on firm status as an antecedent to specification of firm reference group, this study is only a starting point to deepening our understanding of firm reference groups and future studies can explore additional antecedents to how firms select and change their reference groups to enhance our understanding of firm reference group selection.

CHAPTER 2: Reference Group as Source of Self-Enhancement: The Role of Variance and Reference Group Size in Social Performance Feedback

2.1 Introduction

In this chapter, I focus on the process of how organizations evaluate their performance relative to their reference groups and examine the impact of firm reference groups on organizational change. More specifically, I theorize and investigate how reference group characteristics can influence firm's strategic change decisions in response to performance feedback from social aspirations.

The question of how organizations respond to performance shortfalls is a central one in behavioral theory of the firm (Dahlin, Chuang, & Roulet, 2018; Gavetti, Greve, Levinthal, & Ocasio, 2012; Posen, Keil, Kim, & Meissner, 2018). The behavioral theory of the firm suggests that performance below the aspiration level triggers organizations to engage in problemistic search and adapt their behavior to recover from the failure (Cyert & March, 1963; Greve, 2003). While large body of work considering the effects of firm responses to historical aspiration level on search and change has yielded consistent results, studies on the effect of performance feedback from social aspiration level report mixed findings. Some extant studies report that performance below social aspiration level led to increased level of search, whereas other studies identify the opposite result. For example, Joseph and Gaba (2015) find that performance below social aspiration level leads to decreased level of search and subsequent new product introductions in the mobile device industry, yet other studies report that strategic change is more likely as performance falls below social aspiration level (e.g. Clough & Piezunka, 2020; Lim & Audia, 2020). On the contrary, Lucas, Knoben, and Meeus (2018) do not find any significant

relationship between performance relative to social aspiration level and search. This contrast suggests the need to more closely examine how firms respond and interpret its performance relative to its peers.

The inconclusive results in how organizations respond to social performance feedback have been attributed to the difficulty in ascertaining the appropriate social referent (Washburn & Bromiley, 2012) and subsequent inaccurate specification of social aspiration level, with an unrealistic assumption of considering all firms in the industry as a reference group (Boyle & Shapira, 2012). This raises an important concern that the existing literature have neglected the importance of reference groups, despite it being the core concept in behavioral theory of the firm and source of the social aspiration level. Consideration of reference group characteristics is crucial for understanding the process of how organizations interpret and respond to performance relative to their peers, as evaluating one's performance using social aspiration level is a more complex process than evaluating performance relative to one's own prior performance (Baum & Ingram, 2002; Kim, Finkelstein, & Haleblian, 2015) since it involves a social comparison process of interpreting performance of peer firms in a firm's reference group which may not always be straightforward.

In addition to these factors, this inconclusive finding may stem from our implicit assumption that organizations only attend to the overall average performance of its reference groups, ignoring the possibility of an organization attending to individual organizations within the reference group. However, research suggests that organizations also pay attention to particular actors within the reference group. For example, Boyle and Shapira (2012) find that actors pay greater attention to the leader within its peer group. Attending to particular actors within the reference group creates room for self-enhancement when processing the social

performance feedback such that firms can interpret their performance in a more favorable way, especially when performance is the level of performance of its peers, namely the social aspiration level.

This paper aims to address the neglected areas of research by focusing on the characteristics of reference groups and how they impact firm responses to performance feedback. In particular, I examine how responses to performance feedback from social aspirations may vary for same levels of performance, contingent on the variance of performance within a focal firm's reference group and size of the reference group. Previous studies have implicitly treated reference groups as an aggregate for social comparison. However, organizations may also attend to individual constituents of the reference group and same level of social performance feedback from the reference group may be interpreted differently depending on characteristics of the reference group. This paper focuses on the importance of considering individual firms within the reference group, even though the reference group may be the overall source of information for learning.

In theorizing the effects of variance in performance of reference groups and reference group size on firm responsiveness to underperformance relative to its peers, I draw on research on performance feedback and self-enhancement (Audia et al., 2015; Audia & Greve, 2021; Jordan & Audia, 2012) to argue that variations in firm responses to underperformance relative to its peers are due, in part, to differences in the levels of variance in performance of firms within a reference group and reference group size. My primary logic is that high levels of variance in performance of social referents and large reference group size creates opportunities for self-enhancement when experiencing underperformance relative to its peers.by enabling the focal firm to focus on specific underperforming firms within the reference group and allows the firm

to externally attribute the poor performance. Also, firms can self-enhance by changing its reference group, rather than by increasing its levels of search in response to negative social performance feedback.

To test my theory, I examine the effect of firm performance feedback, reference group characteristics, strategic change and changes in reference group over time in a sample of Fortune 1000 firms over the period of 2007-2020. I construct firm's reference group using annual 10-K filings to identify firm's self-identified selection of reference groups. In support of my hypotheses, I find evidence that high levels of variance in performance of peers and larger reference group size are likely to decrease firm responsiveness to underperformance relative to its peers, and that firms are more likely to change their reference group composition when they are experiencing poor performance relative to its social peers.

This paper contributes to the literature on behavioral theory of the firm by providing focusing on reference group characteristics as a source to explain the variation in how firms respond to performance relative to social aspiration levels. This study not only highlights the importance of reference groups but emphasizes the importance individual firms within the reference group by showing that firms do not just attend to the reference group as an aggregate. Additionally, this study extends our understanding of when opportunities for self-enhancement can arise in organizations and highlighting that self-enhancement can occur when using only single performance indicators. Furthermore, this study provides more accurate empirical evidence of how firms respond to social performance feedback by using firm's self-identified reference groups and demonstrate that reference groups can change over time. Finally, this study highlights the dynamic nature of reference groups, by demonstrating that firms can change their

reference group composition in response to performance feedback, extending prior research that have implicitly assumed reference groups to be fixed and stable.

2.2 Theoretical Background and Hypotheses

2.2.1 Performance Feedback and Strategic Change

A central assumption in behavioral theory of the firm is that firms are goal-oriented, and evaluate their performance by comparing their performance with the firms' aspiration level, and interpret the outcome as success or failure depending on whether performance is above or below the aspiration level (Cyert & March, 1963; Greve, 1998, 2003). Firms then adapt their behavior in accordance with the difference between performance and aspiration level. Aspiration level is derived from firm's own prior performance (historical), and performance of peer firms in reference group (social). Because we are interested in how reference group characteristics influence firm responses to performance feedback, we focus on how firms engage in strategic change in response to performance relative to social aspiration level (i.e. social performance feedback)[2].

When firms underperform relative to their peers, i.e. performance is below their social aspiration level, they engage in greater organizational change through problemistic search (Posen et al., 2018). Firms exert greater motivation to recover their performance and meet is aspiration level and make changes in organizational factors as viability of current resources and routines are questioned (Levitt & March, 1988; Starbuck & Milliken, 1988). This will manifest in decision makers searching for solutions and greater degree of changes in strategic decision making processes, such as resource allocation and investment decisions (Arrfelt, Wiseman, McNamara,

[2] We control for historical performance feedback i.e. performance relative to historical aspiration level in our empirical analyses (see Control Variables in 3. Data and Methods section for more detail).

& Hult, 2015; Lim & Audia, 2020). Current resource allocation and investment decisions are insufficient to maintain satisfactory performance and firm must make necessary changes to improve performance.

Consistent with prior studies on performance feedback theory (e.g., Clough & Piezunka, 2020; Kacperczyk et al., 2015; Lim & Audia, 2020; Moliterno et al., 2014), my baseline hypotheses posits that as firm performance decreases below its social aspiration level, the greater the levels of strategic change.

> *Baseline hypothesis: Lower levels of performance below the social aspiration level is associated with higher levels of strategic change.*

2.2.2 Self-enhancement and Firm Responses to Performance Feedback

While behavioral theory of the theory predicts that firms will increase the level of search and change when performance fails to meet its aspiration level, studies incorporating psychological factors suggest and find that self-enhancement can limit the extent to which search is triggered in response to performance below aspiration (Audia & Brion, 2007; Audia et al., 2015; Audia & Greve, 2021; Jordan & Audia, 2012).

The self-enhancing motive reflects people's fundamental motive to "elevate the positivity of their self-conceptions and to protect their self-concepts from negative information" (Sedikides & Strube, 1997: 212). These findings suggest that decision makers place greater importance on performance indicators that enable them to avoid perceptions of failure or select referents of lower performance to interpret the performance feedback in a favorable way. Self-enhancement in performance evaluation is likely to be activated over problem-solving motive when the perceived threat of low performance is high, such that the motivation to engage in self-enhancement is high and when decision makers have high latitude to portray performance in a

positive way (Jordan & Audia, 2012; Kunda, 1990). Decision makers in self-enhancement motive will often ignore or sugarcoat poor performance by using alternative performance indicators that enable them to portray performance in a more favorable way, or attribute the performance to external factors outside one's control (KC, Staats, & Gino, 2013; Pfeffer & Fong, 2005). For example, Audia and Brion (2007) find that individuals and organizations engage in less change when they are underperforming in the primary performance measure if second performance measure was high by placing greater importance to the satisfactory second performance measure. Blagoeva, Mom, Jansen, and George (2020) provide evidence that CEO power enables self-enhancement where CEOs engage in less search behavior in response to inconsistent performance feedback, by focusing on more positive performance indicator. Similarly, Kostopoulos, Syrigos, and Kuusela (2023) show that decision makers self-enhance by focusing on performance above aspirations on a secondary goal, and decreasing responsiveness to poor performance on a primary goal. Relatedly, Joseph and Gaba (2015) reveal ambiguity in performance feedback create opportunities for self-enhancement by allowing managers to form favorable interpretations of performance by giving greater weight to information that is positive. Lim and Audia (2020) also find that diversification enables self-enhancement by providing flexibility in assessment of performance due to increased task complexity.

One insight from these findings is that self-enhancement mode is activated when there exists ambiguity or multiplicity of interpretation of performance feedback (Audia & Greve, 2021; Levinthal & Rerup, 2021) as it provides the decision maker latitude to portray performance in favorable ways. However, multiple interpretations of performance are assumed to be possible only when there exists multiple performance indicators or goals. However, multiple performance indicators may not be a necessary condition for the possibility of

multiplicity of interpretation in performance feedback. In this study, I theorize that decision makers in firms can also self-enhance even when assessing performance based on a single performance indicator of peers' performance, by attending to individual firms within a firm's reference group. In what follows, I elaborate on how 1) variance in performance of firms within a reference group and 2) larger reference group size creates opportunities for self-enhancement when experiencing underperformance relative to its peers. Also, I explicate how firms can change their composition of reference group following negative performance relative to peers, instead of engaging in search to address the low performance.

2.2.3 Variance in Performance of Reference Group Firms and Self-Enhancement

Research on self-enhancement suggests that when individuals are faced with complexity, they display considerable cognitive agility in search of positive information amidst a noisy environment (Pfeffer & Fong, 2005). Decision makers not only embrace ambiguity in performance outcomes, but often engage in interpretive activities and seek for ambiguity and multiplicity in interpretation of performance to self-enhance and justify the outcome (Levinthal & Rerup, 2021; March, 2010). While previous research has focused on multiple aspiration levels or performance indicators as sources of ambiguity, high levels of variance in performance of peer groups, that form the basis of social aspiration level can also create opportunities for decision makers to form favorable interpretations of performance when firm is underperforming relative to its reference group. Performance variance within the reference group reduces firm's responsiveness to underperformance as it creates room for self-enhancement via three ways. First, variance creates an opportunity for the focal firm to focus on underperforming firms within the reference group. Because variance creates dispersion in distribution of performance of peers, and some peer firm's performance will be lower than the focal firm's performance despite the

focal firm's performance being lower than the average performance of all peers in a reference group. Because interpretation of performance feedback is less straightforward when variance is high (Denrell, 2005), decision makers will allocate greater levels of attention to the performance of peer firms. This allows decision makers to attend to specific firms within a reference group with lower performance and justify the focal firm's low performance (relative to social aspiration level). Consider two situations where the aggregate level of performance of focal firm's reference group is identical, but the performance of individual firms within the reference group varies as represented in Figure 2.1. Assume that the focal firm's performance is below the performance of its reference group (assume 4 for this example). While previous research has assumed that firm response to the negative social performance feedback would be identical in both Scenario A and B as the aggregate level of social aspiration level is equal, I posit that the interpretation of the performance feedback will differ when performance levels of individual firms within the reference group are considered.

Figure 2.1 Example of social performance feedback varying in performance variance



In situations where the focal firm's performance is below its peers, when there is little or no variance in performance of its peers (Scenario A), the firm is unable to interpret its performance relative to social aspiration favorably, as all individual firms are outperforming the

focal firm. However, when there exists performance variance among firms within the reference group (Scenario B), an opportunity for self-enhancement arises. By examining performance of individual firms in the reference group, the firm will identify referents that are underperforming relative to the focal firm (firms with performance levels of 1 and 3 in Scenario B) and interpret its performance favorably by assessing it relative to the underperforming firms within the reference group. Consistent with my argument, Audia et al. (2015) show that organizations focus on lower performing referents even when they were less similar and comparable to the focal organization to self-enhance and positively interpret its performance.

Second, high levels of variance in performance decreases the reliability in the informational value provided by the social performance feedback, increasing the level of ambiguity and noise in performance evaluation (Keil, Posen, & Workiewicz, 2022). Research on decision making has shown that variance in observations impede decision maker's ability to make accurate interpretations of the observation (Hogarth, 1987; March, 1994). With high levels of variance, a decision maker is less likely to accept the information provided by social performance feedback at face value, as high levels of variance increases doubts about the credibility of the information. (Kim et al., 2015). This is also consistent with research on adoption and isomorphism which show that heterogeneity inhibits adoption of practices as variance decreases legitimacy (Deephouse, 1996; Rhee, Kim, & Han, 2006). Past findings also provide empirical support to my theory. For example, Kim and colleagues (2015) show that high variability in prior acquisition performance decreases firm's responsiveness to negative performance feedback. Relatedly, Arrfelt, Wiseman, and Hult (2013) find that variance in performance across business units decreases the level of investment in response to performance shortfalls. On the other hand, with low levels of variance, and homogeneity in performance of

peer firms, there is less latitude for self-enhancement as it provides a clear signal that the focal firm is underperforming relative to its peers overall.

Third, when variance in performance across peer firms within a reference group is high, the focal firm can attribute the underperformance externally, as variance signals a turbulent environment. High levels of performance variance within reference group firms enables external attribution of the low performance. High levels of variance in performance of peers signal that the environment is unstable, and allows firms to attribute the underperformance externally to external factors, which will lead to ignorance of the existing failure, and subsequent low levels of strategic change (Kim et al., 2015).

Taken together, high levels of variance in peer firm's performance will decrease firm responsiveness to negative social performance feedback by allowing the decision maker to focus on individual firms within a reference group, decreasing reliability in performance feedback, and enabling external attribution of the poor performance.

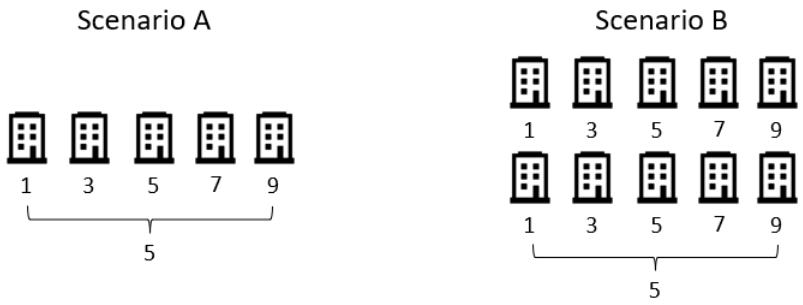
> *Hypothesis 1: The relationship between performance below the social aspiration level and strategic change is weaker for high levels of variance in performance of reference group.*

2.2.3 Reference Group Size and Self-Enhancement

Firms with reference groups with large number of firms are also likely to engagement self-enhancement when experiencing underperformance and result in lower strategic change following negative social performance feedback. In discussion of Hypothesis 1, I argued that high variance creates opportunity for self-enhancement by allowing the decision maker to focus on relatively low performing peer firms within a reference group. Similarly, greater number of firms in the focal firm's reference group increases availability of individual firms that are underperforming relative to the focal firm, even when the overall social aspiration level obtained

is above the focal firm's performance. This suggests that the larger the number of peer firms with relatively low levels of performance, the greater the latitude for decision makers in the focal firm to positively portray performance, as the larger number would provide them greater evidence or opportunity to justify its performance.

Figure 2.2 Example of social performance feedback varying in reference group size



For example, in Figure 2.2, although the level of variance in performance in Scenario B is lower than the variance in Scenario A, a focal firm has greater number of firms with performance lower than the focal firm to attend to and engage in self-enhancement. Presence of firms with lower performance than the focal firm should create room for self-enhancement and increase the level of attention paid to these underperforming firms within the reference group.

Hypothesis 2: The relationship between performance below social aspiration level and strategic change is weaker for firms with larger reference group size.

2.2.4 Change in Reference Group Composition and Self-Enhancement

My theorizing above suggests that reference group characteristics including performance variance, and size impact the opportunity for decision makers to engage in self-enhancement, and thereby decreases firm responsiveness to negative social performance feedback (lower levels of

strategic change). One question that arises what actions are firms taking if these firms that are underperforming are not making changes in strategic decision making? Building on my logic above, I further argue that firms that exhibit low levels of strategic change in response to poor performance relative to peers, can self-enhance by changing its reference group as an alternative to making changes in corporate investment decisions and routines.

Firms use other "comparable" peer firms as sources of social aspiration (Cyert & March, 1963; Festinger, 1954; Greve, 2003) and construct reference groups consisting of limited number of peer firms (Fiegenbaum, Hart, & Schendel, 1996; Porac et al., 1989). Prior research has suggested that firms can shift attention among multiple performance indicators when performance is below the firm's social aspiration level (Lucas et al., 2018). Research on social comparison have also highlighted that decision makers with negative outcomes are likely to compare themselves with those worse off to maintain their positive image (Jordan & Audia, 2012; Wills, 1981). For example, Audia and colleagues (2015) show in an experimental study that decision makers in organizations are likely to compare themselves to idiosyncratic and lower performing firms than higher performing similar firms when experiencing failure. Similarly, Gong, Li, and Shin (2011) find that underperforming firms are more likely to compare themselves with firms of poor expected performance. Consistent with this logic, decision makers in firms when faced with performance shortfalls relative to its peers, can opt to change its reference group composition, and self-enhance instead of engaging in problemistic search. Decision maker may consider the current set of reference group as inaccurate for social comparison purposes or can simply adjust its reference groups to favorably present its performance.

I suggest that underperformance relative to peers will motivate firms to change their reference groups, only for firms that do not respond to performance shortfall by increasing strategic change. For firms that respond to negative performance feedback by with high levels of subsequent strategic change, self-enhancement motivation is less likely to be activated, as strategic change will be made only after problemistic search has been triggered (Posen et al., 2018). Thus, I posit that:

> *Hypothesis 3: For firms with low levels of strategic change, lower levels of performance below the social aspiration level is associated with greater likelihood of change in reference group composition.*

2.3 Data and Methods

2.3.1 Empirical Setting

I examined my hypotheses in the context of Fortune 1000 firms over the period of 2007 to 2020. I collected accounting data and financial information of Fortune 1000 companies at the annual level from Compustat Fundamentals Annual and data on reference groups were obtained from the annual 10-K filings. 10-K statements are useful sources of firm reference group because firms are legally mandated to select and report other firms that they compare themselves to and compete with and comprehensive records are available at the annual level due to the mandatory requirement by the Securities and Exchange Commission. I manually coded the list of firm's reference group to compute the variance in performance of reference groups and size of the reference group.

2.3.2 Variables

2.3.2.1 Dependent Variable

Strategic change. Given that the sample represents multiple industries, I use multiple proxies to capture the degree of strategic change by a firm as firms in different industries can engage in

varying types of search and strategic change (Blagoeva et al., 2020). More specifically, I operationalize strategic change by capturing change in four dimensions of resource allocation indicators: 1) R&D intensity (R&D/sales); 2) advertising intensity (advertising/sales); 3) selling, general and administrative expenses (SGA/sales) and 4) financial leverage (debt/equity). For each firm-year, I calculate the absolute level of change between the year *t* and *t-1* for each dimension and standardize each dimension over all observations by converting them to z-scores (mean = 0; standard deviation = 1). I then summed the four standardized indicators to create a composite measure of strategic change. This is consistent with previous research examining search and change across multiple industries and takes into account that firms may engage in varying types of strategic change (Chatterjee & Hambrick, 2007; Lim & Audia, 2020).

Reference group change. This variable is the dependent variable to test Hypothesis 3, and is measured by coding whether the focal firm's reference group composition in the 10-K filings includes any changes compared to the previous year. Changes can include both addition of a new firm to the reference group, or removal of an existing firm from the reference group. Because reference group composition is fairly stable over time, I use a binary variable which equals one if there are any changes in the reference group composition from the previous year, and zero otherwise.

2.3.2.2. Explanatory Variables

Performance relative to social aspiration. I derive a *social aspiration level* as the average return on assets (ROA) of firms in the firm's peer reference group, identified from the firm's annual 10-K filing. For firms that do not report specific reference groups in its 10-K filing, I use the average ROA of firms in the same 2-digit SIC industry code within the Fortune 1000 excluding

the focal firm[3]. I then construct measures of *performance relative to social aspiration* by subtracting the *social aspiration level* from the focal firm's ROA. I implement a spline function to separately examine the effect of *performance below social aspiration (P < SA)* and *performance above social aspiration (P > SA)*.

Variance in social aspiration. To investigate the effect of variance in social performance feedback on firm's responsiveness to underperformance, I operationalize *variance in social aspiration* as $\sum_{i=1}^{N_t} \frac{(ROA_{it}-\mu_t)^2}{N-1}$, where N_t is the number of firms in the focal firm's reference group at year *t*, ROA_{it} is return on assets of firm *i* in the reference group at year *t*, and μ_t is the average return on asset among firms in the reference group for year *t.* I also ran additional analyses using standard deviation of performance as an alternative measure for robustness.

Reference group size. We measure the size of the firm's reference group annually by counting the number of firms reported by the focal firm as its competitor.

2.3.2.3 Control Variables

I control for several other factors that could influence the degree of strategic change, and changes in reference groups. Because performance relative to historical aspiration level has shown to induce change (Greve, 1998; Lim & Audia, 2020), I also control for historical performance feedback. Historical aspiration level is computed as the exponential weighted moving average of the firm's past performance (Greve, 2003) as follows:

$$HA_{it} = \alpha ROA_{it-1} + (1-\alpha)HA_{it-1}$$

[3] I limit the reference group to firms in the same industry within the Fortune 1000 rather than all firms in the industry for constructing the social aspiration level since these firms are more similar to the focal firm (e.g. in terms of size and prestige) and firms are likely to compare themselves to similar others (Audia, Brion & Greve, 2015).

where HA_{it} is the historical aspiration level for firm i at time t. α denotes the weight to the previous level of performance. α was estimated by searching the parameter values in increments of 0.1 and using the value that yielded the best model fit. The procedure yielded the value of α = 0.6. I then subtract the historical aspiration from the focal firm's performance using ROA to construct measures of *performance relative to historical aspiration.* Because the effect of performance above and below aspiration levels can differ, I also implemented a spline function for historical performance feedback identical to construct *performance below historical aspiration (P < HA)* and *performance above historical aspiration (P > HA)*. *Firm size* is measured as the log of number of employees. *Market value* is the total market capitalization value of total number of outstanding shares. Because possession of slack can facilitate changes (Chen & Miller, 2007; Iyer & Miller, 2008), I include controls for *slack* represented by firm's current ratio (current assets/current liabilities). I also control for *rank,* measured as the focal firm's current ranking in the Fortune to capture status effects. At the industry level, I also control for the average level of strategic change at the industry level (*industry strategic change)* for testing Hypothesis 1 and 2, and *industry reference group change* measured as the percentage of firms in the focal firm's industry that also made changes in its reference group for testing Hypothesis 3. Firm and year fixed effects are also included.

2.3.3 Analytical Strategy

I estimate my models using a linear panel regression estimator with firm fixed effects. Firm fixed effects accounts for any time-invariant omitted variables associated with the firm and I am able to analyze the within-firm effect of variance in performance of reference group and underperformance on strategic change. I also control for unobserved heterogeneity across time periods by including year fixed effects. All explanatory variables are lagged by one year.

2.4 Results

2.4.1 Main Analyses

Table 2.1 presents the descriptive statistics and correlation coefficients. Majority of the correlations between our variables are low, indicating that multicollinearity is not a concern. The min VIF was 2.02, with the highest VIF being 3.14, well below the threshold of 10 for VIF (O'brien, 2007).

Table 2.2 reports the regression analyses predicting strategic change to test our baseline hypothesis, Hypothesis 1 and 2. Model 1 is the base model including the control variables. The coefficient of *performance below historical aspiration* is negative, indicating that negative historical performance feedback is associated with higher levels of strategic change ($p < .01$), consistent with prior empirical findings (Bromiley, 1991; Greve, 1998; Lim & Audia, 2020). Strategic change of peers is also positively associated with higher levels of strategic change ($p < .001$), indicating that firms also vicariously learn and imitate its peers in terms of strategic decision making. Model 2 includes the main effects of performance below and above social aspiration level testing the baseline hypothesis. The coefficient for *performance below social aspirations* is negative, in line with the baseline hypotheses: the further a focal firm underperforms relative to its social aspiration level, the greater the level of strategic change ($p < 0.05$), suggesting that firms engage in problemistic search after experiencing negative social performance feedback. This is significant, as performance decreases by one standard deviation below the social aspiration from the mean is associated with 21.6% increase in levels of strategic change.

Model 3 tests Hypothesis 1 by including *variance in social aspiration* and the interaction between *performance below social aspiration* and *variance in social aspiration.* The model

provides evidence that variance in performance of peers weaken the relationship between negative performance feedback and strategic change shown by the positive coefficient of the interaction term ($p < 0.01$), which supports Hypothesis 1.

Table 2.1 Descriptive statistics and correlations

	Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Strategic change	-0.096	0.276													
2	Reference group change	0.073	0.26	0.01												
3	Performance below social aspiration	-0.023	0.058	-0.15	-0.07											
4	Performance above social aspiration	0.04	0.054	0.01	-0.08	0.29										
5	Variance in social aspiration	0.022	0.015	0.04	0.01	-0.14	0.21									
6	Number of peers	12.097	20.6	0.11	0.03	0.03	0.11	0.09								
7	Performance below historical aspiration	-0.021	0.055	-0.10	-0.03	0.77	0.17	-0.22	-0.02							
8	Performance above historical aspiration	0.02	0.048	0.06	-0.01	0.05	0.36	0.00	0.10	0.16						
9	Firm size	3.153	1.248	-0.13	0.01	0.12	0.02	-0.03	-0.18	0.06	-0.14					
10	Market value	9.067	1.742	0.01	0.04	0.1	0.15	0.01	0.23	0.05	-0.02	0.36				
11	Slack	1.853	1.11	0.02	0.01	0.06	0.14	0.02	0.19	0.02	0.04	-0.29	0.09			
12	Rank	444.347	291.006	0.05	0.02	-0.1	-0.06	0.03	-0.01	-0.04	0.07	-0.73	-0.40	0.19		
13	Industry strategic change	-0.037	0.083	0.20	0.01	-0.03	0.06	0.10	0.30	-0.06	0.05	-0.13	0.18	0.06	0.05	
14	Industry reference group change	0.06	0.107	0.00	0.00	-0.05	0.03	-0.04	-0.48	-0.03	-0.03	0.02	-0.03	-0.08	-0.05	-0.12

Correlation coefficients whose magnitudes exceed 0.045 are significant at the 5% level

Table 2.2 Regression estimates predicting strategic change

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	High variance Model 6	Low variance Model 7
P < SA		-0.310*	-0.419**	-0.329*	-0.495**	-0.639*	-0.461*
		(0.131)	(0.138)	(0.161)	(0.173)	(0.319)	(0.227)
P > SA		0.019	0.035	0.009	0.026	-0.063	-0.087
		(0.110)	(0.114)	(0.110)	(0.114)	(0.185)	(0.170)
Variance in social aspiration			0.079		0.092		
			(0.306)		(0.306)		
P < SA * Variance in social aspiration			2.915**		3.013**		
			(1.119)		(1.142)		
Number of peers				0.002+	0.002+	0.003	0.004+
				(0.001)	(0.001)	(0.002)	(0.002)
P < SA * Number of peers				0.000	0.002	0.004*	-0.003*
				(0.002)	(0.003)	(0.002)	(0.001)
P < HA	-0.190**	0.040	-0.032	0.045	-0.027	-0.164	0.112
	(0.072)	(0.121)	(0.124)	(0.121)	(0.125)	(0.222)	(0.177)
P > HA	0.076	0.070	0.087	0.076	0.089	0.263	-0.115
	(0.084)	(0.105)	(0.106)	(0.105)	(0.106)	(0.184)	(0.154)
Firm size	0.010	0.011	0.009	0.011	0.009	0.017	0.011
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.035)	(0.024)
Market value	-0.000+	-0.000+	-0.000	-0.000+	-0.000	-0.000+	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Slack	-0.002	-0.001	-0.001	-0.001	-0.001	0.006	-0.012
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.010)	(0.011)
Rank	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Industry strategic change	0.214***	0.224***	0.221***	0.214***	0.210**	0.150	0.152
	(0.063)	(0.064)	(0.064)	(0.064)	(0.064)	(0.093)	(0.120)
Constant	-0.098	-0.103	-0.104	-0.212*	-0.211*	-0.238	-0.264+
	(0.081)	(0.083)	(0.083)	(0.102)	(0.103)	(0.202)	(0.136)
Observations	2,812	2,812	2,812	2,812	2,812	1,401	1,411
R-squared	0.037	0.039	0.042	0.040	0.043	0.079	0.033

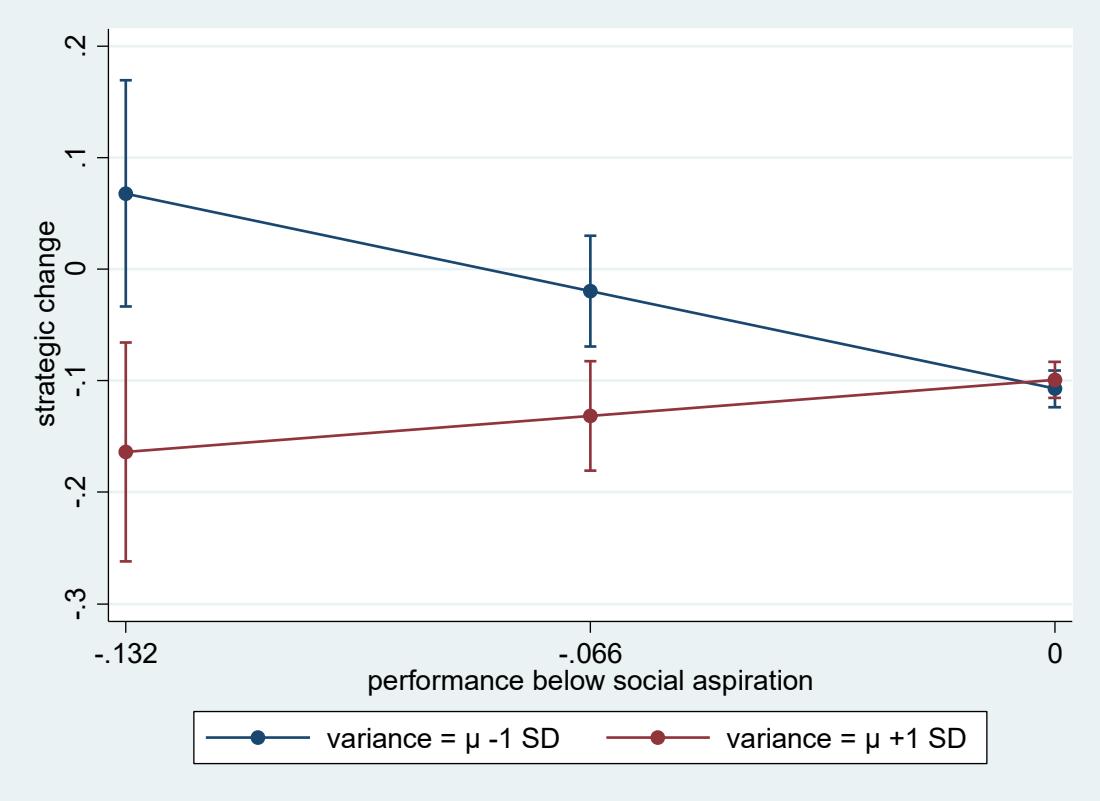
Robust standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Firm and year fixed effects included

This relationship is visually represented in Figure 2.2, which illustrates the relationship between performance below social aspiration when variance in social aspiration is high (1 standard deviation above the mean) and low (1 standard deviation below the mean). The figure shows that when variance is low, decreases in performance below the social aspiration level is associated with increased levels of strategic change, but on the contrary, when variance in performance of peers is high, levels of strategic change decreases, the lower the performance below the social aspiration, supporting my logic that variance creates opportunities for decision makers to self-enhance.

Figure 2.3 Interaction effect between negative social performance feedback and variance in social aspiration



Hypothesis 2 predicts that larger reference group size will weaken the effect of negative social performance feedback on strategic change. Model 4 tests this using an interaction term between *performance below social aspiration* and *number of peers.* The interaction term is insignificant ($p > 0.05$), indicating that the relationship between performance below social aspiration level and strategic change is independent of reference group size. However, in additional analyses, I test for the moderating effect of reference group size at varying levels of variance in performance of peers. I split the sample into high and low levels of *variance in social aspiration* using its median value and re-ran the regression in Model 5. Model 6 represents the results with high levels of variance in performance of peers, and I find a positive interaction of performance below social aspiration and number of peers ($p > 0.05$), confirming that reference group size negatively moderates the relationship between negative social performance feedback and strategic change when variance in performance of peers is high. In contrast, the relationship is negative ($p < 0.05$) in Model 7 (i.e., when levels of variance in social aspiration is low), suggesting that the effect of performance below social aspiration level is strengthened when reference group size is large, and variance is social aspiration is low. The moderating effect of reference group size may vary conditional on the levels of variance in performance feedback, as it provides managers with different signals. When levels of variance in performance is high, large number of peer firms indicate greater availability of peer firms with relatively low performance (consistent with the logic for Hypothesis 2), providing opportunities for the decision maker to engage in self-enhancement and decrease levels of change. However, when levels of variance in performance is low, large number of peer firms provides a clear signal that the focal firm is underperforming relative to its peers, leaving little room for self-enhancement,

and strengthening the problemistic search motive, increasing responsiveness and subsequent change.

I test Hypothesis 3 using a split-sample analyses. Table 2.3 presents the result of our split-sample regression analysis to test Hypothesis 3, which argued that performance below aspiration levels is associated with greater likelihood of change in reference group composition, for firms that do not respond to the negative performance feedback with increased levels of strategic change. I split the full sample into two subsamples using the median value of *strategic change* (at year *t)* and examine the effect of performance below social aspiration on strategic change at low and high values of strategic change. Model 8 reports the result with low levels of strategic change, whereas Model 9 shows the results with high levels of strategic change. I find that *performance below aspiration level* is associated with greater likelihood of change in reference groups when levels of strategic change is low, but I do not find any statistical evidence of the relationship between *performance below social aspiration* and *reference group change* when levels of strategic change is high. Overall, I find strong support for Hypothesis 3.

Table 2.3 Regression estimates predicting reference group change

Variables	Low strategic change Model 8	High strategic change Model 9
P < SA	-1.826***	0.352
	(0.403)	(0.268)
P > SA	-0.576+	-0.475*
	(0.316)	(0.219)
P < HA	0.189	-0.234
	(0.367)	(0.244)
P > HA	0.367	0.171
	(0.339)	(0.204)
Firm size	-0.055	0.022
	(0.053)	(0.034)
Market value	0.000	0.000
	(0.000)	(0.000)
Slack	-0.018	-0.005
	(0.019)	(0.012)
Rank	0.000	-0.000
	(0.000)	(0.000)
Industry reference group change	0.286	0.365**
	(0.190)	(0.141)
Constant	0.166	0.029
	(0.229)	(0.156)
Observations	1,221	1,255
R-squared	0.065	0.027

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1
Firm and year fixed effects included

2.4.2 Supplementary Analyses and Robustness Checks

2.4.2.1 Alternative explanation

In my previous theoretical framework, I proposed that variance in the performance of peers creates opportunities for self-enhancement, resulting in reduced firm responsiveness to negative social performance feedback. This, in turn, weakens the moderating effect on the relationship between performance below social aspiration and strategic change. However, an alternative mechanism could be at play, wherein high levels of variance serve as a signal of environmental turbulence. In such cases, firms may shift their focus towards a survival reference point, diminishing their responsiveness to negative social performance feedback (March & Shapira, 1987, 1992). To investigate this possibility, I examine whether firms with lower levels of resources, which are more vulnerable to survival threats, demonstrate stronger moderating effects of variance in social aspiration. To test this hypothesis, I introduce a third-order interaction term involving *slack*, *performance below social aspiration*, and *variance in social aspiration.* If the alternative mechanism holds true, we would expect to observe a positive and significant coefficient for the three-way interaction term (*P < SA * variance in social aspiration * slack*), indicating a weakening effect. In Model 10 of Table 2.4, I present the results of the three-way interaction analysis to explore the conditional effect of slack. However, the statistical analysis does not yield any significant evidence of the moderating effect of slack, suggesting that the alternative explanation is unlikely.

Table 2.4 Effect of slack and standard deviation in social aspiration on strategic change

Variables	Model 10	Model 11
P < SA	-0.575**	-0.580***
	(0.216)	(0.157)
P > SA	0.013	0.049
	(0.115)	(0.116)
Variance in social aspiration	-1.342+	0.017
	(0.698)	(0.109)
P < SA * Variance in social aspiration	2.475	1.734**
	(3.127)	(0.554)
Slack	-0.008	-0.001
	(0.008)	(0.007)
P < SA * Slack	0.100	
	(0.104)	
Variance in social aspiration * slack	0.755*	
	(0.330)	
P < SA * Variance in social aspiration * Slack	0.264	
	(1.604)	
Standard deviation in social aspiration		0.017
		(0.109)
P < SA * Std dev. in social aspiration		1.734**
		(0.554)
Controls	included	included
Observations	2,810	2,810
R-squared	0.044	0.043

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1
Firm and year fixed effects included

2.4.2.2 Alternative specifications of performance variance

I also re-ran the regression analysis using *standard deviation in social aspiration* instead of variance to capture the variability in distribution of performance of peer firms within a reference group. The results in Model 11 of Table 2.4 presents the results of the analysis using the alternative measure of standard deviation. The interaction between *performance below social*

aspiration level and *standard deviation in social aspiration* is positive and significant ($p < 0.01$), providing additional robustness and support for Hypothesis 2.

2.4.2.3 Endogeneity concerns

Although I include firm and year fixed effects to alleviate concerns about endogeneity, we can still not rule concerns of omitted variable bias where a variable not included in the analysis is correlated with both the dependent variable and the explanatory variable. I further performed an impact threshold of a confounding variable (ITCV) analysis using robustness of inference to replacement (RIR) test (Busenbark, Yoon, Gamache, & Withers, 2022; Frank, 2000). This test predicts the proportion of the data that must be biased for the estimate to be invalid (Frank, Maroulis, Duong, & Kelcey, 2013) and has been increasingly used in management research (e.g., Harrison, Boivie, & Withers, 2022; Thatchenkery & Katila, 2023). I used the STATA command *konfound* to assess the effects of our explanatory variables (Xu, Frank, Maroulis, & Rosenberg, 2019). In the sample, 35.62% of the cases for *performance below social aspiration* and 86.78% of the cases for *variance in social aspiration* would have to be biased for the results to be invalid. Thus although I cannot fully rule out the possibility of endogeneity, it is highly unlikely that endogeneity is an issue in this study.

2.5 Discussion

Our study provides a more complete process of how firms respond to negative performance relative to social aspirations by incorporating the role of reference groups; Specifically, this study examines the impact of variance in performance of reference group firms, and reference group size on firm responsiveness to negative social performance feedback. I theorized that firms are more likely to engage in self-enhancement when level of variance in

performance of peers is higher and reference group size is large, compared to low levels of variance and small reference group size, decreasing the level of strategic change in response to negative social performance feedback. Moreover, I hypothesized that firms can also self-enhance and respond to negative social performance feedback by changing its reference group composition, rather than increasing levels of strategic change. Analyses of Fortune 1000 firms and their reference group characteristics from self-identified reference groups provide results consistent with my hypotheses. These findings provide important insights into how firms process and interpret performance feedback, and what conditions allow decision makers in organizations to engage in self-enhancement.

2.5.1 Contributions

I believe that this study has several important implications to the behavioral theory of the firm. First, I extend the theory on firm responses to performance feedback from social aspiration level by proposing that differences in reference group characteristics can account for systematic differences in firm responses to underperformance. That is, differences in levels of variance in performance of individual firms in reference groups and reference group size affect opportunities for self-enhancement and when organizations are likely to engage in strategic change or neglect the information of failure. My findings provide one explanation to reconcile the mixed findings regarding the effect of social performance feedback on search and change and deepen our understanding of the conditions under which performance below social aspiration level is likely to increase level of search. Moreover, this study highlights the importance of individual firms within the reference group. I demonstrate that organizations do not just mechanistically attend to the social aspiration level of the overall performance level of its reference group as an aggregate but also pay attention to particular firms within the reference group.

Second, this study also contributes to the research stream on self-enhancement in organizations (Audia & Brion, 2007; Audia et al., 2015; Jordan & Audia, 2012) by connecting reference group characteristics as a condition where self-enhancement motive can arise in organizations. Prior research has focused on presence of multiple performance indicators as a condition for decision makers in organizations to engage in self-enhancement e.g., inconsistent performance feedback from multiple performance metrics (Audia & Brion, 2007; Audia et al., 2015; Lucas et al., 2018; Xie, Huang, Stevens, & Lebedev, 2019) or have focused on individual characteristics of decision makers (Audia et al., 2022; Blagoeva et al., 2020; Jordan & Audia, 2012; Joseph & Gaba, 2015). However, I demonstrate that self-enhancement can arise when firms are responding to a single performance indicator of performance feedback. Specifically, I demonstrate that large variance in performance of peers, and greater number of peers can increase the latitude for firms to portray performance in a more favorable way, by focusing on individual firms within a firm's reference group with lower performance. This is in line with Levinthal and Rerup (2021), who also suggested that even a single dimension of performance can be interpreted in various ways.

Third, I also show that reference groups can change over time as a result of firm's underperformance relative to its peers, providing evidence that reference groups are dynamic in nature, and extending the implicit assumption that reference groups are fixed and stable. Linking reference group change as an outcome or response to performance feedback has implications for behavioral theory of the firm, by highlighting that firms can not only respond to performance feedback in actions, but can also respond by making changes in one's cognition.

Finally, this research increases realism and precision of empirical research on behavioral theory of the firm, by demonstrating how a firm's social aspiration level can be more accurately constructed, contrast to existing studies that have used industry average for convenience.

CHAPTER 3: Directions for Future Research

In this final chapter, I outline some avenues for future research on organizational references groups to extend our understanding of organizational reference groups beyond this dissertation.

While this dissertation relies on reference groups identified from the 10-K filings as a source of firm's reference groups, it is unrealistic to assume that a firm has only one set of reference groups. In reality, firms construct multiple reference groups which is a promising opportunity for future research to explore. There could be multiple reference groups for different purposes (e.g. Hu et al., 2017; Kacperczyk et al., 2015), for example, the set of organizations used as referents for evaluating a focal organization's performance could be very different to the set of organizations that is used as a basis for determining compensation levels of CEOs or executives (e.g., Gong et al., 2011; Porac et al., 1999). Multiple reference groups may exist across different units within an organization, and also may vary at different levels of the organization. For example, even for the same purpose, a reference group that is identified by one unit or department of the organization could be very different from a reference group that is specified by a different unit. This can also occur within unit but at varying levels of the organizational hierarchy, where the overlap between the set of referent organizations identified by the CEO and that identified by the lower-level managers may be very little. Future research could examine both the antecedents and consequences of these inconsistency in multiple groups, and whether they converge over time or how they influence one another. Future research should also explore how firms construct multiple reference groups, and how firms manage differences in reference groups across different coalitions within the firm.

Although this dissertation focuses on firm's self-identified reference groups, which the existing literature have overlooked, reference groups are frequently imposed by third party actors. For example, the media often co-mentions similar firms together and categorizes set of firms into peers by comparing them and perceptually associating set of organizations together. Analysts and investors also have their own perceptions of reference groups, which may not necessarily overlap with the firm's internal set of reference groups. Awards and rankings also impose reference groups by categorizing sets of organizations together. For example, Lewis and Carlos (2023) show that inclusion in rankings will lead a firm to be compared with the rest of the firms that are also included in that ranking. It is interesting to note that while an organization's self-identified reference groups is reflective of one's identity, reference groups imposed by the audience or third party is indicative of one's image (Elsbach & Kramer, 1996). Future research is needed to increase our understanding of what leads to a mismatch between an organization's self-identified reference group and third party imposed reference groups, and whether this has any implications for organizational decision-making processes. The dynamics between self-identified reference groups and third party-imposed reference groups would be an interesting avenue for future research, to further understand how one set of reference groups influence another.

Finally, while this dissertation is interested in and focuses on status and strategic change as antecedents and consequences of organizational reference groups, this is only a starting point and further work is needed to increase our understanding of the process of reference group selection. Recent work has started to identify some antecedents of reference group selection at the organizational level, including performance (Luger, 2023), and top decision maker characteristics (Audia et al., 2022). Future research could examine factors such as organizational

structure, or environmental features as potential antecedents of reference group selection processes at the organizational level to enhance our understanding of firm reference group selection. Future research is also needed to deepen our understanding of the possible consequences of an organization's reference group selection processes and how it impacts the decision-making process. Recent studies have suggested that organization's reference group impacts important organizational outcomes like innovation (Thatchenkery & Katila, 2021) and re-opening decisions in the context of universities (Acton, Cook, & Luedtke, 2022). Examining the mechanisms of how reference groups impact decision-making processes would also be a promising area of research.

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