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The Psychology of Rivalry

by

Gavin James Kilduff

A dissertation submitted in partial satisfaction of the

requirements for the degree of

Doctor of Philosophy

in

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in the

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of the

University of California, Berkeley

Committee in charge:

Professor Barry Staw, Co-chair
Professor Cameron Anderson, Co-chair
Professor Philip Tetlock
Professor Serena Chen

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The Psychology of Rivalry

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Gavin James Kilduff

Abstract

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Gavin James Kilduff

Doctor of Philosophy in Business Administration

University of California, Berkeley

Professors Barry M. Staw and Cameron Anderson, Co-chairs

In this dissertation, I explore the psychological phenomenon of rivalry, defined as a competitive relationship that increases the psychological stakes of competition independent of the objective stakes. In particular, I investigate the consequences of rivalry for motivation, performance, and unethical behavior. I examine these questions with a variety of research designs and methodologies, including laboratory experiments, surveys, a field experiment, and an archival data analysis. Overall, this work represents the first systematic exploration of rivalry as a psychological phenomenon, and my findings suggest that it can be a double-edged sword, with both positive and negative consequences. Further, this research suggests a view of competition as relationally-dependent – that is, the behavior of actors within competitive settings depends upon whom they are competing against, and the relationships they have with these competitors. Beyond these two broad contributions, this research speaks to the literatures on motivation and ethical decision-making, and also suggests some important practical implications. In addition, a wide range of important and interesting directions exist for future research on rivalry.

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PREFACE¹

Competition is a fact of life – employees compete for promotions, groups of researchers vie for grants, and companies fight for market share. Typically associated with competition is the desire to outperform and defeat one’s opponents. However, not all opponents are alike. Certain opponents, or rivals, can create a motivation to perform that goes above and beyond ordinary competitive spirit or the objective stakes of the contest. Competition against these rivals is characterized by heightened psychological stakes, such that victory is sweeter, and defeat more painful. For example, a University of Missouri student once described the rivalry between his school and the University of Kansas as follows: “Missouri and Kansas are rivals in so many things that each would rather defeat the other than gain victories over all the rest of the world.” (<http://www.nytimes.com/2007/11/23/sports/ncaafootball/23border.html>).

Anecdotal evidence suggests that this kind of psychological preoccupation with certain other opponents can exist in many domains, and that it may have a powerful influence on attitudes and behavior. Within science, there have been a number of famous rivalries, such as Newton vs. Leibniz, Edison vs. Tesla, and Lavoisier vs. Priestley. More generally, it is not hard to imagine certain scholars paying particular attention to each other’s publication records or trying to outdo one another in terms of citation counts. In the business world, given the ubiquitous nature of competition, rivalry may be especially common. Within firms, pairs of employees who find themselves repeatedly competing for bonuses or promotions may come to see one another as rivals in the battle for career advancement. Between firms, longstanding industry competitors, such as Coke and Pepsi, or Microsoft and Apple, may come to define success by their performance vis-à-vis one another, and pursue victory with a zeal that seems to go far beyond objective gains and losses. For example, Oracle CEO Larry Ellison once commemorated his company outselling its primary rival from the early 1980s, Ingres, by telling his fellow executives: “It isn’t enough that we beat Ingres on a sale, Ingres has to go out of business. I want them on their knees. Begging for mercy. Pleading for their lives. Confessing every sin.” Then he began to chant: “Kill, kill, kill!” (Wallace & Erickson, 224). In turn, rivalry can lead to abnormal, suboptimal, or downright shocking competitive behavior. For instance, in 1993, Virgin Atlantic won a libel suit against British Airways after the latter admitted to having launched a “dirty tricks” campaign against its rival, which included calling Virgin’s customers to tell them their flights had been cancelled in addition to circulating rumors that Virgin CEO Richard Branson was infected with HIV (Branson, 1998). In a slightly less scandalous example, Boston Scientific recently overpaid for its acquisition of Guidant – later referred to as “arguably the second-worst” acquisition ever – in large part because it was bidding against rival Johnson & Johnson (Malhotra, Ku, & Murnighan, 2008; Tully, 2006).

Despite all of this anecdotal evidence that speaks to the power of rivalry as a psychological phenomenon, a relative dearth of research exists on the topic, which is symptomatic of a broader lack of study on how the relationships that exist between competitors may alter the nature of competition. In my dissertation, I attempt to fill this gap by investigating the psychology of rivalry, with a particular emphasis on its consequences for behavior and decision-making.

Overview

My dissertation is organized as follows. In Chapter 1, I introduce the topic of rivalry, and position it within the fields of organizational behavior and psychology. This includes a review of the literatures on competition at the individual, group, and organizational levels, as well as a discussion of how rivalry relates to a number of other relevant theories and literatures. In Chapter 2, I investigate the consequences of inter-individual rivalry for motivation and performance. This includes analysis of data from a laboratory experiment, as well as survey and archival performance data collected from competitive runners. In Chapter 3, I explore the influence of rivalry on unethical behavior, and test my ideas across a series of three laboratory experiments. In Chapter 4, I present a field experiment conducted at a calling center organization in which I look at how inter-organizational rivalry can affect employee performance and job attitudes. Finally, in Chapter 5, I conclude with a summary of the theoretical and practical implications of my theory and findings, and discuss some important next steps for future research.

CHAPTER 1 THEORETICAL BACKGROUND AND LITERATURE REVIEW

In this chapter, I attempt to position rivalry within a number of existing and related research literatures. I begin by reviewing the literatures on competition at the individual, group, and organizational levels of analysis, with an emphasis on the ways in which this research relates to rivalry. Then I discuss the definition of rivalry that I will be working with, drawn from a recent paper which represented my first exploration of the topic (Kilduff, Elfenbein, & Staw, 2010). This section includes a discussion of how rivalry is different from competition more broadly. Next, I discuss how the topic of rivalry relates to a number of other relevant theories and literatures, such as social comparison theory and goal-setting. Finally, the chapter ends with a brief summary of this first paper on rivalry (Kilduff et al., 2010).

Prior research on rivalry

Surprisingly little research exists on the psychology of rivalry. Although a number of literatures are related, I have uncovered only two isolated studies that directly examine rivalry from a psychological point of view and as distinct from competition more broadly. First, researchers examined the influence of rivalry on testosterone levels among professional soccer players (Neave & Wolfson, 2003). Players were asked to identify the opposing team towards which they felt the highest level of rivalry, and the researchers found that players had heightened levels of testosterone prior to a match against this rival as compared to a match against another team. Second, a study of college students found that perceptions of intergroup differences are higher during the week prior to a football game against a rival school as compared to weeks with no football games (Smith & Schwartz, 2003). Although these studies are suggestive of the power of rivalry as a psychological phenomenon, they clearly leave much to be learned.

Rivalry, however, is closely related to the broader topic of competition, which has been studied at length by researchers hailing from a number of scholarly backgrounds, including psychology, organizational behavior, sociology and economics. My review of this work is organized by level of analysis. A common theme across these literatures is a lack of study of the relationships existing between competitors, which in effect rules out the study of rivalry.

Competition between individuals

Much of the existing research on the psychology of competition has roots in a paper by Morton Deutsch (1949), in which he defined competition as a setting in which the goal attainment of actors is negatively linked – i.e., the success of one participant inherently comes at the failure of the other. In the extreme case, known as *zero-sum competition*, actors' goals are perfectly negatively correlated. Although this definition certainly identifies the central feature of competition, it offers no consideration of the relationship between competitors, thus failing to capture what seems to be the essence of rivalry.

Following from Deutsch's definition, studies on inter-individual competition have typically taken place within a laboratory setting, pitting participants against one another or against confederates of the experimenter (e.g., Beersma, Hollenbeck, Humphrey, Moon, & Conlon, 2003; Deci, Betley, Kahle, Abrams, & Porac, 1981; Reeve and Deci, 1996; Scott & Cherrington, 1974; Stanne, Johnson, & Johnson, 1999; Tauer & Harackiewicz, 1999). For

example, participants are paired with a confederate and told to try to complete more puzzles than this person (Deci et al., 1981). Although this approach has been successful in isolating the effects of competition as defined by Deutsch, it may fail to fully capture the essence of competition in the real world, where competitors often know one another and may have histories of prior interaction. Indeed, the vast majority of studies on inter-individual competition match unacquainted individuals in the laboratory, and even field studies of competition do not typically distinguish participants based on their prior relationships (e.g., Tauer & Harackiewicz, 2004; Brown, Cron, & Slocum, 1998).

The nature of competition, however, may vary substantially as a result of the relationship between competitors. For instance, competing against a familiar foe may be quite a different experience than competing against a stranger. Although little research has directly examined relationships between competitors, related literatures suggest their importance. For instance, game theorists have shown that the decisions made by participants in a prisoner's dilemma game are affected by the prior interactions they have had with their partners (Bettenhausen & Murnighan, 1991). This has led researchers to focus on repeated game scenarios as opposed to isolated interactions (e.g., Boles, Croson, & Murnighan, 2000; Chen & Bachrach, 2003; Sivanathan, Pillutla, & Murnighan, 2008). Similarly, researchers in the area of negotiations have shown that relationships and prior interactions can affect both negotiators' behaviors and outcomes (Curhan, Elfenbein, & Eisenkraft, 2010; Drolet & Morris, 2000; Thompson, Valley, & Kramer, 1995; Valley, Neale, & Mannix, 1995).

Competition between groups

Existing studies of competition between groups resemble those on competition between individuals. In the typical laboratory experiment, participants are placed into groups, these groups are pitted against one another, and measures of motivation, cohesion, and performance are then collected (e.g., Mulvey & Ribbons, 1999). Sometimes, an individual-level competition condition is included as well, with the goal of comparing inter-individual to intergroup competition (Erev, Bornstein, & Galili, 1993; Hammond & Goldman, 1961; Julian & Perry, 1967; Tauer & Harackiewicz, 2004; Young, Fisher, & Lindquist, 1993); however, the relationships between competing groups are rarely measured or manipulated.

Certain studies on the related topic of intergroup bias, however, support the idea that intergroup attitudes and behavior can be relationally-dependent. Intergroup bias refers to tendency for people to perceive their own groups more positively than other groups (Brewer, 1979; Sherif, Harvey, White, Hood, & Sherif, 1961; for a recent review, see Hewstone, Rubin, & Willis, 2002). Although much of this work is steeped in the "minimal group paradigm," where arbitrary characteristics are used to divide participants into groups (e.g., Brewer, 1979; Tajfel, Billig, Bundy, & Flament, 1971), a number of studies have considered the moderating effects of the relationship between groups. These studies indicate that the strength of intergroup bias can depend on the amount of interaction between groups (e.g., Janssens & Nuttin, 1976; Rabbie & Wilkens, 1971), the nature and outcomes of these interactions (e.g., Pettigrew, 1998; Rabbie, Beoist, Oosterbaan, & Visser, 1974; Wilson & Miller, 1961), perceived similarity between the groups (e.g., Jetten, Spears, & Manstead, 1998), and the relative status of the groups (Branthwaite & Jones, 1975; for a recent meta-analysis, see Bettencourt, Dorr, Charlton, & Hume, 2001). So again, while there is little research that directly examines this question, there is

reason to believe that the nature of inter-group competition may depend on the relationships existing between the competing groups.

Competition between organizations

Historically, much of the research on interfirm competition has also ignored the role of relationships. Organizational ecologists have typically conceived of competition as occurring between organizational forms, or populations of similarly structured organizations (Carroll & Hannan, 1989; Hannan & Freeman, 1989). This leaves little role for relationships between individual organizations. Network researchers have typically examined competition between firms as defined by their structural equivalence, that is, the degree to which they conduct transactions with the same suppliers and consumers (e.g., Burt, 1988). So while this involves a consideration of relationships with third parties, there is little study of the direct relationship between competitors. Lastly, in classical economic theory, competition is generally treated as a property of the aggregate market structure (e.g., a free market vs. an oligopoly; Scherer & Ross, 1990), with competing firms depicted as anonymous actors (see Porac, Thomas, Wilson, Paton, & Kanfer, 1995), again leaving little role for inter-firm relationships.

However, over the past two decades, there has been increasing focus within the strategy literature on the role of relationships in interfirm competition (e.g., Baum & Korn, 1999; Chen, 1996; Chen, Su, & Tsai, 2007). Following Porter (1980), researchers have studied the exchange of competitive moves between firms – referred to as “interfirm rivalry” – such as market entry or new product launches (Chen, 1996; Chen & Hambrick, 1995; Chen, Smith, & Grimm, 1992). A number of studies suggest that the competitive strategies that competing firms pursue are influenced by aspects of their relationship, such as relative size (Chen et al., 2007), market overlap (Baum & Korn, 1996), multimarket contact (Baum & Korn, 1996; Baum & Korn, 1999), and resource similarity (Chen, 1996). This work underscores the importance of considering relational factors in inter-firm competition; however, it still leaves much to be learned. First, this work tends to focus on the relative attributes of competing firms (e.g., relative size, resource similarity), leaving the role of prior interactions between firms largely unstudied (although Chen et al., 2007 do consider how recent competitive exchanges may influence ensuing strategic endeavors). Second, the conception of interfirm rivalry could be expanded to encompass more than just the exchange of competitive moves. These moves are but one possible consequence of rivalry, and may also be influenced by factors orthogonal to rivalry, such as market conditions.

Defining rivalry

I believe that our understanding of competition can be increased via consideration of the relational context. In particular, I propose that competitors’ attitudes and behaviors can be significantly influenced by the extent to which they see their opponents as rivals. Thus, in addition to increasing our understanding of a widespread and largely unstudied psychological phenomenon, this research on rivalry is intended to address the dearth of research on the relational nature of competition. In my first paper on this topic, my co-authors and I defined rivalry as follows (Kilduff et al., 2010; pg. 8):

“We define rivalry as a subjective competitive relationship that a focal actor has with another actor which increases the focal actor’s psychological involvement and stakes of

competition independent of the objective characteristics of the situation. In other words, rivalry exists when an actor places greater significance on competition against – or is more “competitive” towards – certain other opponents as a direct result of his or her competitive relationships with these opponents, controlling for any objective stakes (financial, reputational, or otherwise). Thus, this conception of rivalry captures the extent to which competition is relational, as opposed to models of competition in which competitiveness is driven purely by objective threat or the extent to which actors’ goals are in opposition.”

We went on to discuss several important aspects of this definition (8 – 10):

“First, in addition to being relationally-driven, rivalry is subjective; that is, it exists within the minds of competitors. This means that, in contrast to objective conceptions of competition, rivals cannot be identified solely by their positions within markets, hierarchies, or other competitive arenas (e.g., Bothner, Kang, & Stuart, 2007; Garcia, Tor, & Gonzalez, 2006), nor can rivalry be inferred simply from the characteristics of the competitive setting (e.g., Deutsch, 1949). Second, prior interaction is central to rivalry, as relationships are generally formed over time and via repeated interaction. Although the role of relative attributes (e.g., ability level) in determining competitive behavior has been explored within certain literatures, the role of prior interaction has gone largely unstudied. We believe that competitive experiences can leave a lasting psychological residue that may influence competitors’ behaviors even long after the contests have been resolved.

Third, rivalry magnifies competitors’ psychological stakes independent of objective stakes, and as a result, it may lead to departures from economically rational behavior. Similarly, as contests between rivals are relationally embedded, their competitive behavior towards one another may be influenced by aspects of their relationship – such as prior contests long since decided – that may be irrelevant from a rational standpoint. Furthermore, outcomes of competition against rivals are apt to provoke stronger reactions – in terms of emotions and ensuing attitudes and behaviors – than outcomes of competition in the absence of rivalry. Fourth, rivalry may vary in strength, much like friendship or other relational constructs. Lastly, although it may often be two-sided, the subjective nature of rivalry means that reciprocity is not a requirement – one side could feel rivalry while the other does not.”

Related literatures and theoretical concepts

Beyond the existing work on competition, a number of theories and literatures are relevant to the topic of rivalry. In this section, I briefly review these and discuss how they relate to my conception of rivalry.

Social comparison theory

Social comparison theory (Festinger, 1954) states that people have a desire to evaluate their opinions and abilities, and that in the absence of objective criteria, they will make these evaluations by comparing themselves to others. In addition, people have a drive to diminish discrepancies in attitudes and abilities between themselves and the people they compare

themselves to, and this drive is positively related to the importance of the target others as bases of comparison. In the realm of performance and abilities, there exists a unidirectional *drive upward* such that people are motivated to improve their performance relative to comparison others.

Though he does not explicitly state it, it follows from Festinger's ideas that social comparison is a basis for competition between actors – in effect, competition is a direct comparison of actors' levels of performance. With respect to rivalry more specifically, Festinger's idea of the upward drive in the realm of ability and performance is consistent with the idea that people can be motivated to outperform their comparison others independent of any tangible stakes of competition. Furthermore, he links this motivation to the importance of the target other as a base of comparison, consistent with the idea that competitive behavior – and the psychological stakes of competition – may vary depending upon whom one is competing against. Indeed, some later empirical research has found that the consequences of social comparisons can vary substantially depending upon the relationship between the focal actor and target (e.g., Tesser, 1988). Lastly, by positing that pressures towards comparison are strongest amongst similar actors, Festinger's theory points to similarity as to a potential antecedent to rivalry – which was supported in our first empirical study of rivalry among basketball teams (Kilduff et al., 2010).

Social Value Orientation

Messick and McClintock (1968) proposed that, rather than always acting to maximize individual outcomes as proposed by classical economics, people's utility functions may also take into account the outcomes attained by their interaction partners. Research in this area outlined six different categories of social value orientation – self-sacrifice, altruistic, cooperative, individualistic, competitive, and aggressive – that vary by whether, and in what manner, focal and target outcomes drive utility and motivation (MacCrimmon & Messic, 1976). Of particular relevance to rivalry is the competitive social value orientation, which describes the desire to maximize the relative difference between one's own outcomes and the outcomes of one's counterpart. People operating under this orientation derive utility from the extent to which they outperform their interaction partners, regardless of the absolute value of their own outcomes. This is similar to the idea that actors may derive utility from outperforming their rivals independent of the objective outcomes of competition. Furthermore, empirical work stemming from this literature suggests that people involved in a prisoner's dilemma type game may become more competitive – i.e., place greater importance on relative maximization – over time (McClintock & McNeel, 1967; McClintock & Nuttin, 1969). This suggests that some level of rivalry may develop as a result of repeated competition, which is indeed what my co-authors and I found in our exploration of rivalry between university basketball teams (Kilduff et al., 2010). Furthermore, existing relationships between interaction partners in these games were found to influence their social value orientation and game decisions – strangers were more likely to adopt a competitive orientation than friends (McClintock, Nuttin, & McNeel, 1970).

Competitive arousal theory

Some recent work examining the factors contributing to auction fever also has relevance to my theory of rivalry. A group of researchers have examined “competitive arousal” as a process that leads people to exceed their limits in auctions (Ku, Malhotra, & Murnighan, 2005; Ku, Galinsky, & Murnighan, 2006). Of particular relevance to rivalry, these researchers found

that people are more likely to exceed their bidding limits when facing a few, rather than many, competing bidders – suggesting that rivalry may be developing between bidders and pushing them to try to achieve “victory” (Ku et al., 2005).

Goal setting theory

Locke’s theory of goal-setting (1968) also has potential relevance to rivalry. Locke posits that clear and challenging goals can serve to motivate people and enhance their performance. Given that individuals achieve a psychological payoff from exceeding the performance of their rivals, these rivals may, in a sense, provide salient and persistent performance goals. That is, people may see the performance of a rival as a goal to be pursued. However, in contrast to the kind of static and impersonal goals that Locke discusses, the performance of rivals may be continually updating, thus serving to address one of the drawbacks of traditional goals – that they must be replaced once they have been achieved.

First empirical investigation of rivalry

My first investigation into the topic of rivalry took place within the empirical setting of NCAA Men’s Division I basketball (Kilduff et al., 2010). In this research, my co-authors and I investigated the nature of rivalry and the factors that lead to rivalry between basketball teams. We drew upon three sources of data in this research. First, we surveyed sportswriters at universities across the United States and asked them to indicate the strength of rivalry that their teams felt towards their opponents. Then, using a statistical technique known as the Social Relations Model (Kenny, 1994), we assessed the extent to which feelings of rivalry varied at the level of the individual team versus the dyad. We found that variance in rivalry between teams existed largely at the dyadic level – the attributes of individual teams only accounted for a small portion of this variance – supporting our notion of rivalry as a relational phenomenon.

Second, we collected a host of archival data on the attributes of teams and their histories of competing against one another, in order to assess the factors that lead to rivalry. We found that we could reliably predict the strength of rivalry between teams based upon attributes of the relationship that existed between them; that is, their relative characteristics and histories of interaction. Specifically, rivalry was higher between teams that were similar (in terms of geographic location, basketball success, and university characteristics), had a history of being evenly-matched, and had repeatedly competed against each other. These results provided further support for a view of rivalry – and competition in general – as relational and path-dependent (i.e., dependent upon prior interactions between competitors).

Lastly, we collected a season’s worth of game statistics in order to investigate how rivalry influenced teams’ performance on the basketball court. We found some preliminary evidence for the motivating role of rivalry: defensive effort and performance was positively predicted by rivalry. I build upon these findings in this dissertation, with a particular focus on the consequences of rivalry.

CHAPTER 2

THE EFFECTS OF RIVALRY ON MOTIVATION AND PERFORMANCE

Introduction

As discussed in Chapter 1, rivalry is defined as a relationship that magnifies the psychological stakes of competition (Kilduff et al., 2010), and so it may have a range of consequences for the behavior of actors within competitive settings. In this chapter, I investigate how rivalry affects motivation and performance. I begin with a review of the existing literature on competition, motivation, and performance, and then propose my main hypothesis. I predict that people will be more motivated – and will in turn tend to perform better on tasks in which effort is important – when they harbor feelings of rivalry towards their opponents. I investigate this hypothesis with a lab experiment and an archival study of real-world competitors, and conclude by discussing the theoretical and practical implications of my findings.

Competition, motivation, and performance

Research on the link between competition and performance can be traced back to the late 19th century work by Norman Triplett (1898). In what is considered the first ever experiment in social psychology, Triplett observed that bicycle racers turned in faster times when racing with another cyclist than when racing alone. Further, the fastest times were produced by cyclists racing in direct competition with each other. Triplett attributed these performance gains to the “power and lasting effect of the competitive stimulus” (4-5).

Since Triplett, however, research on this topic has yielded mixed findings (cf. Epstein & Harackiewicz, 1992). On one hand, a number of studies have similarly linked competition to improved motivation and performance (e.g., Brown, Cron, & Slocum, 1998; Erev, Bornstein, & Galili, 1993; Gneezy, Niederle, & Rustichini, 2003; Scott & Cherrington, 1974; Tauer & Harackiewicz, 1999; Tauer & Harackiewicz, 2004; Weinberg & Ragan, 1979). For example, orange pickers were found to pick greater numbers of oranges when working under a competitive reward structure – i.e., under which payoffs were contingent upon outperforming others – as opposed to a team-based reward structure (Erev et al., 1993). On the other hand, a number of researchers have argued the opposite: that competition is generally detrimental to motivation and performance because it can promote anxiety and be seen as controlling (Deci et al., 1981; Deutsch, 1949; Kohn, 1992; Reeve & Deci, 1996; Vallerand, Gauvin, & Halliwell, 1986). For instance, lab participants who were told to try to defeat an opponent displayed less interest in the task than those told to simply try their best (Deci et al., 1981). Further, a meta-analysis of the relationship between competition and motor skills performance found that people tend to perform worse within competitive as opposed to cooperative settings (Stanne, Johnson, & Johnson, 1999).

In an effort to explain these mixed findings, a number of potential moderators of the effects of competition have been investigated. First, researchers have examined the role of certain individual differences. In terms of personality traits, there is evidence suggesting that achievement orientation, or the extent to which individuals strive to attain competence and seek out challenges (Murray, 1938), moderates the relationship between competition and motivation (Tauer & Harackiewicz, 1999; Epstein & Harackiewicz, 1992). Specifically, individuals high in achievement orientation were found to report greater motivation and task enjoyment under

conditions of competition than those low in achievement orientation. Additionally, recent work suggests that gender may also moderate the effects of competition, such that men tend to respond more positively, in terms of motivation and performance, to competition than women (Gneezy, Niederle, & Rustichini, 2003; Gneezy & Rustichini, 2004).

Second, researchers have begun to examine how certain characteristics of the situation may moderate the effects of competition. Johnson and Johnson (1974, 1989) describe competition as “appropriate” when: 1) winning is relatively unimportant, 2) all participants have a reasonable chance to win, 3) there are clear and specific rules, procedures, and criteria for winning, and 4) participants are able to monitor each other’s progress and engage in social comparison. A meta-analysis suggests that appropriate competition results in higher task performance than zero-sum competition (Stanne, Johnson, & Johnson, 1999). Further, it appears that the level of interdependence of the task – or the extent to which it requires that actors work together – may moderate the effects of competition; competition tends to be detrimental for performance on more interdependent tasks (Miller & Hamblin, 1963; Stanne, Johnson, & Johnson, 1999).

Lastly, some recent work suggests that competition may have greater motivational benefits when it takes place between groups instead of individuals (Tauer & Harackiewicz, 2004). A study conducted at a children’s basketball camp found that performance in a shooting task was highest among children competing in pairs, as compared to children who competed as individuals or children who cooperated on the task.

Relationships between competitors

Although the work described above has certainly increased our understanding of competition and the conditions under which it may or may not benefit motivation and performance, a potentially critical factor has gone largely unstudied. What about the identity of the person one is competing with? In line with my arguments from Chapter 1, it seems likely that people’s responses to competitive situations may vary greatly depending upon who they are competing with, and the relationship they have with this person. In the majority of studies reviewed above, participants are placed in competition with other participants or confederates to the experimenter. In other words, they are induced to compete with people they have probably never met before and may see little reason to compete against. This may help to explain why many of these studies identified competition as a demotivating force; indeed, self-determination theory predicts that competition is demotivating to the extent that it is seen as controlling or coercive (Reeve & Deci, 1996).

In contrast to much of this existing work, competition in the real-world often takes place between people who know one another and may have a long history of competing with each other. Indeed, as discussed in Chapter 1, competition is often embedded within long-term rivalries. Thus, to truly understand the nature of real-world competition – and how it influences motivation and performance – it is necessary to consider this social context in which it takes place. To that end, in this chapter I examine how rivalry affects motivation and performance among actors in competitive settings.

The consequences of rivalry for motivation and performance

As discussed in Chapter 1, rivalry is defined as a competitive relationship that entails increased psychological stakes (Kilduff et al., 2010). That is, competitors place greater importance on the outcomes of contests against their rivals versus contests against other, non-rival opponents; or, in the language of traditional theories of motivation, rivalry causes an increase in the *valence* of competitive outcomes (Van Eerde & Thierry, 1996; Vroom, 1964). Given this, it follows from both psychological and economic theories of motivation that people will be more motivated when competing against their rivals – in a sense, there are greater subjective incentives for success. In turn, this increased motivation should benefit task performance to the extent that it is contingent upon effort.

These ideas received some preliminary support from my first empirical study of rivalry in college basketball. Specifically, my co-authors and I found that rivalry between teams was positively related to their defensive performance, which is generally thought to be positively influenced by effort (Kilduff et al., 2010). However, given the correlational and indirect nature of our findings, the conflation of offensive and defensive performance in basketball, and the interdependent nature of success in this setting (i.e., the success of one team is perfectly confounded with the failure of the other), these findings were inconclusive. Further, we were unable to rule out objective-stakes as a more rational driver of these behaviors, given the complex nature of success for these university organizations. Finally, these findings existed at the group (or organizational) level, so it remains an open question as to whether rivalry between individuals is as common and whether it has similar effects. It might be the case that there is something specific to intergroup processes that promotes such relational competitiveness and motivation. It is also worth noting that researchers studying auction behavior have implicated feelings of rivalry to explain their finding that people are more likely to exceed their bidding limits when facing a few, rather than many, competing bidders (Ku, Malhotra, & Murnighan, 2005). However, this work did not include direct measurement of motivation, or any manipulation or measurement of rivalry.

In this chapter, then, I conduct the first systematic investigation of the consequences of rivalry for motivation and performance. Further, I seek to directly compare competition within the context of rivalry to competition more broadly, with the goal of showing that they can have distinct consequences even when controlling for the tangible stakes of the contest. Lastly, beyond informing us about the nature of rivalry, this research represents some of the first work to examine the role of relationships in determining how competition affects motivation and performance. In doing so, I hope to extend existing models of competition, and help inform a longstanding question within this literature; namely, whether competition helps or hurts motivation and performance.

Overview of Studies

Two studies investigate how rivalry influences motivation and task performance. Study 1 involves a between-subjects laboratory experiment in which participants recalled a past competitive experience and indicated how motivated they were. Study 2 is a field study of competitive runners and examines both qualitative self-report data from runners in addition to their actual performance in races.

Study 1

Study 1 took place in the experimental laboratory, and provided a preliminary test of the idea that rivalry fosters increased motivation.

Method

Participants

78 undergraduate students from an organizational behavior course participated in the study. 43.6% of participants were male, and the average age was 22.5 years ($SD = 3.88$).

Procedure

Participants arrived at the lab, and were informed that they would be participating in an experiment looking at “interpersonal experiences and personality.” After providing their consent to participate in the experiment, participants were given a paper survey to complete. Participants were randomly assigned to one of two conditions – rivalry and competition – as determined by which version of the survey they received. The survey took approximately ten minutes to complete, after which participants completed some decision-making tasks and additional surveys for a different study.

Experimental conditions

The first part of the survey consisted of the Ten Item Personality Inventory (TIPI; Gosling, Rentfrow, & Swann, 2003), which was included as a brief filler task. Participants then received the experimental manipulation. In the rivalry condition, they were asked to recall a time in which they had competed against a personal rival. Although I allowed participants leeway to define exactly what that meant to them, I provided them with example characteristics of rivals based upon the findings of Kilduff et al. (2010).

“Please think back to a time in which you competed against a personal rival (e.g., someone you repeatedly competed against and/or were evenly-matched with). Please spend a few minutes describing this person and the thing(s) you competed on (1 – 2 paragraphs). How did you feel towards this person, and while you competed against him or her?”

By contrast, participants assigned to the competition condition were asked to recall their most recent competitive experience:

“Please think back to the most recent time in which you competed against someone (on anything). Please spend a few minutes describing this person and the thing(s) you competed on (1 – 2 paragraphs). How did you feel towards this person, and while you competed against him or her?”

Thus, this allowed for the comparison of competition against a personal rival to everyday competition.

Measures

Apart from the first sentence of the recall task, the two versions of the survey were identical. Following the recall task, participants rated aspects of the competition they had just

described. Two questions assessed aspects of the competition that might covary with rivalry and were thus important to control for. First, it was possible that contests against personal rivals involved higher objective stakes in addition increased psychological stakes. Thus, I asked participants “How high were the tangible stakes (e.g., money, career success, grades, athletic success, broader reputational benefits, etc.) associated with this competition?” on a scale from 1 (“Nothing tangible at stake”) to 7 (“Very high”) ($M = 4.04$; $SD = 1.96$). Second, although rivalry generally tends to be highest between evenly-matched competitors, there is also a tendency for more successful actors to attract stronger feelings of rivalry from their opponents as compared to less successful actors (Kilduff et al., 2010). Thus, it is possible that recalled contests against personal rivals involved a greater frequency of failure or defeat than recalled recent contests. In order to control for this, participants answered “To what extent did you succeed or win in this competition?” on a scale from 1 (“Not at all”) to 7 (“Very much”) ($M = 5.01$; $SD = 1.57$).

Following these control variables, two items measured the primary dependent variable of motivation. Participants answered “How motivated were you to perform well in this competition?” on a scale from 1 (“Not at all”) to 7 (“Very much”) and “How important was it to you to out-perform this person?” on a scale from 1 (“Not at all”) to 7 (“Very important”). These items exhibited high reliability, $\alpha = .84$, and were thus combined into an aggregate measure of motivation ($M = 4.99$; $SD = 1.48$).

Results

Prior to running analyses, participants’ responses were checked – by an independent research assistant who was blind to hypotheses – to ensure that they were successful at recalling a personal rival or recent competition. Indeed, every participant successfully completed the recall task, although two of the participants in the competition condition wrote about an anonymous competitor (e.g., an unknown applicant for the same job opening). Removing these responses did not change results. It was also observed that one person recalled competing against her significant other, and three others recalled competing against a family member. Due to the potentially unique nature of these competitions, these participants’ responses were removed from analyses, although doing so had no effect on results.

As depicted in Figure 1, participants who recalled a competition against a personal rival reported significantly higher levels of motivation than participants who recalled the most recent time they had competed against someone (5.51 vs. 4.40, $t(72) = 3.69$, $p < .001$), in line with my prediction. Furthermore, the positive relationship between rivalry and motivation was robust to controls for success and tangible stakes. In a linear regression analysis of motivation, a dummy variable corresponding to condition (0 = competition; 1 = rivalry) was positive and significant ($\beta = .35$, $t(70) = 3.49$, $p < .001$); tangible stakes ($\beta = .25$, $t(70) = 2.33$, $p < .05$) and success ($\beta = .25$, $t(70) = 1.79$, $p < .05$) also predicted motivation.

Discussion

Study 1 supported the idea that rivalry can lead to increased motivation. Participants who recalled competing against a rival reported higher levels of motivation than those who recalled a recent competitive experience, and this effect existed even when controlling for the tangible stakes of the competition. This is consistent with the idea that rivalry fosters greater motivation and a desire to win independent of the objective stakes of the competition, and also underscores

the notion that the identity of one's competition is a crucial determinant of the consequences of competition.

Study 2 Overview

Study 1 provided preliminary support for the idea that rivalry can foster greater motivation. Given the simplicity of the design, however, some limitations existed. First and foremost, motivation was self reported; no behavioral measures of motivation or performance were collected. This leaves open a number of potential threats to the validity of these findings. For instance, participants' responses may have been influenced by their lay theories of motivation – that is, if participants believe that rivalry leads to greater motivation, then they may have responded that way simply because this is in line with their expectations. Additionally, by asking participants to rate their motivation shortly after asking them to recall a competition against a rival, I may have introduced demand effects, whereby participants were indicating higher motivation because they anticipated that this was what I was looking for. Second, although participants were recalling real-world competitions, no actual performance-based task or competition was taking place.

In Study 2, therefore, I studied real-world competitors engaging in a task with measurable performance. Specifically, I examined middle- and long-distance runners engaging in competitive footraces. Running is an excellent empirical setting for studying the effects of rivalry on motivation and performance for a number of reasons. First, this is a setting in which head-to-head competition occurs with regularity, thus providing a critical antecedent for the existence of rivalry. Second, there exists a fairly clear link between motivation and performance in running; although ability drives a lion's share of performance variation, trying harder tends to result in faster times. Therefore, performance on this task can be seen almost as a behavioral measure of motivation, thus providing an excellent test of the idea that competition against rivals is motivating. Third, and related, performance on this task is largely independent, thus eliminating a host of potential confounding variables inherent in studies of performance on interdependent tasks (e.g., Kilduff et al., 2010). Fourth, results from many races are available online, providing for a wealth of data on performance and the histories of competition between pairs of runners. Finally, the majority of amateur races – including those studied in Study 2B – entail either insignificant or non-existent rewards for performance, thus reducing the plausibility of tangible stakes as an explanation for any performance findings.

Study 2 is divided into two parts. In Study 2A, I analyze surveys collected from runners, and investigate the frequency of rivalry in this setting as well as runners' beliefs about its effects on their motivation and race performance. In Study 2B, I analyze several years worth of publicly-available race results data, and examine how the presence vs. absence of rivals – as empirically identified using a formula based upon the antecedents of rivalry as described by Kilduff et al. (2010) – is related to the performance of runners.

Study 2A

Method

Procedure and participants

The president of a running club located in the northeast United States was contacted via email and asked to distribute an online survey to club members. As the survey was extremely

short, no compensation was provided beyond a promise to share the results. A total of 72 runners completed the survey, 34 of which were female (47.2%).

Measures

After indicating their gender, participants were asked two questions concerning their level of experience with competitive running. Specifically, they were asked to indicate the number of years that they had been running competitively, as defined as participating in at least two races per year, ($M = 12.5$ years; $SD = 11.15$), and the number of races they ran in the previous year ($M = 5.6$ races; $SD = 5.3$).

Next, participants answered two questions related to the dependent measures of interest. First, they were asked to indicate whether or not they had rivalries with other runners. Specifically, they answered yes or no to the question: “Would you say that you feel rivalry towards any of the other runners in your region?” and were given a set of blanks in which to write down the names of these people. Second, participants were asked an open-ended question related to the consequences of rivalry: “Do you have any thoughts about how rivalry affects you? Do you approach races that your rivals are also running in any differently?”

Results

Frequency of rivalry

41 of 72 runners (56.9%) indicated that they felt rivalry towards at least one other runner in their region, and the average number of rivals listed was 2.92 ($SD = 1.29$). This proportion increased if the analyses was limited to more regular runners – 38 of 62 runners (61.3%) who had run at least two races in the previous year indicated having at least one rival, and 26 of 34 runners (76.5%) who had run in at least five races in the previous year had rivals. There were no significant gender differences in frequency of rivalry (53% for men vs. 62% for women) or number of rivals listed (2.95 for men vs. 2.90 for women).

Perceptions of the effects of rivalry

Of the 41 runners who indicated feeling rivalry towards at least one other runner in the region, 37 (90.2%) completed the open-ended question regarding their beliefs about how these rivalries affected them. In order to quantitatively analyze these responses, two research assistants, who were blind to hypotheses, independently coded runners’ responses for whether or not they made reference to being more motivated and/or running faster in races as a result of their rivalries. These included statements such as: “Rivalry gives me additional motivation to do my best.”, “I always try to pay more attention to being prepared for a race I know a rival will be in, and look for them during the race. If I see them within striking distance, then that causes me to go full out to try to catch or keep up with them.” and “I like having rivals. I definitely feel challenged and will try harder when I know one of my rivals is competing.” The coders agreed on 30 of 37 cases (81.1%); all differences of opinion were resolved through discussion. Based on these codings, 25 of 37 runners (67.6%) reported some form of motivational and/or performance increase within races as a result of rivalry. This increased to 71.4% for runners who had run at least two races during the prior year, and to 73.9% for runners who had run at least five races during the prior year. These results provide strong support for the idea that rivalry increases motivation and performance, particularly given that respondents were not prompted with the topics of motivation and performance – they were merely asked to report “how rivalry

affects” them – suggesting that the motivational boost associated with rivalry is very salient to these competitors.

Study 2B

Study 2A confirmed that rivalry between runners is relatively widespread and revealed that runners believe that they are more motivated, and run faster, in races against their rivals. Much like Study 1, however, these results were based upon self-report measures. Therefore, in Study 2B, I conducted an archival analysis of actual race performance, using race results collected from the World Wide Web.

Method

The basic procedure of Study 2B was as follows. After identifying an appropriate region for study, I downloaded and formatted six years of race results data. From these data, I identified a sample of runners who raced regularly during this time period. Then I split the race data in two. The first three years of data were used to identify rival runners, based upon the antecedents of rivalry – similarity, repeated competition, and past competitiveness – identified by Kilduff et al. (2010). The second three years of data were used to test the hypothesis that rivalry fosters increased performance. Specifically, runners were expected to run faster races when their rivals were present as compared to races when they were absent.

Setting

Race results were collected from the website of a running club located in a moderately-sized college town in the northeast United States. This region was well suited to an analysis of rivalry and race performance for two main reasons. First, there were regularly scheduled races – approximately one race every two weeks. Second, there was a large enough sample of regular runners so as to provide sufficient statistical power for analyses, but this sample was small enough that runners could feasibly see and form rivalry relationships with one another.

Race data

Data were collected from 184 races between January 1, 2004 and December 31, 2009. The results file for each race indicated its length, and the race time, gender, and age of all runners who participated in the race. Races ranged between 3.0 and 21.1 kilometers (half-marathon) in length, with a mean of 7.65 km ($SD = 4.51$); a majority (54.9%) of the races were 5 kilometers long. Across these 184 races, there were 34,905 runner races, for an average number of runners per race of 189.7 ($SD = 249.9$). This value was skewed by a few large outliers, however – the median number of runners per race was 91.

Sample of regular runners

To begin, I sought to identify a subsample of regular runners within these data. Because these races are open to the public, there are a number of ‘casual’ runners who participate in the occasional race associated with a holiday or other event (e.g., 4th of July). Oftentimes these participants do not even run the race; rather, they pay their entry fee as a donation to charity and enjoy a leisurely stroll. Therefore, these participants are unlikely to be forming rivalries with one another, and indeed may not view these races as competitions at all.

Regular runners were identified as those who participated in at least two races per year during each of the two time periods studied (2004 – 2006; 2007 – 2009). I also eliminated child runners (ages 17 and below), as they were quite uncommon and may be less likely to attract rivalry from other runners. These criteria yielded a final sample of 82 runners. 29 of these regular runners were female (35.4%), and they were 44.2 years old on average ($SD = 8.94$) as of the midpoint of the sample (December 2006). These runners ran an average of 27.1 races ($SD = 14.4$) during the entire six years studied, for an average of 4.52 races per year (total number of races run: 2,224).²

Elimination of outliers

Before beginning an analysis of race times, it was important to check for outliers. A number of factors, such as injuries or running together with a family member or friend, might cause runners to race at a much slower pace than normal. To identify outliers, runners' average kilometer paces (race time divided by distance) were calculated for each of the races they ran. Then, races were grouped into three categories: short (between 3 and 6 km), medium (between 8 and 12 km) and long (between 16 and 21 km). Extreme outliers were identified as races in which the runner's kilometer pace was at least five standard deviations above or below the mean pace of the runner's other races within that distance category. I employed such a conservative definition of outliers due to the fact that runners' performance levels might change substantially during this six year period, due to varying levels of training, among other factors. 33 runner races, spread across 26 separate runners, were identified as extreme outliers. All 33 of these outliers involved kilometer paces that were higher than the mean (i.e., slower), and they were often quite extreme (average standard deviation above the mean: 10.95; $SD = 9.86$), consistent with the idea that they involved external or extenuating circumstances. These races were removed from further analysis.

Empirical identification of rivals

Races run from 2004 to 2006 ($N = 72$) were used to empirically identify rivals. Specifically, I created a formula to estimate the degree of rivalry a focal runner should feel towards a target runner based upon the presence of the three factors identified by Kilduff et al. (2010) as contributing to rivalry: similarity, repeated competition, and past competitiveness (the extent to which actors have been evenly-matched in their past races against each other). For a given focal runner, each target runner could score from 0 to 10 points on each of these factors. For similarity, 5 points were awarded if the runners were of same gender (0 if they were not), and up to 5 points were awarded for similarity in age; from 0 points for age differences above 10, to 5 points for identical ages. Thus a score of 0 for similarity would indicate different genders and an age difference of 11 years or above, and a score of 10 would indicate same gender and identical age. For repeated competition, points were awarded based upon the proportion of the focal runner's races that the target runner had also participated in, multiplied by ten. Thus a score of 0 would indicate that the runners had never participated in the same race, and a score of 10 would indicate that the target runner had participated in every race that the focal runner ran. Lastly, points for past competitiveness were awarded based upon the average margin of victory, in seconds per kilometer, between the runners in their head-to-head contests against one another. This ranged from 0 points for pairs of runners for which the average margin of victory between them was greater than 30 seconds/kilometer, up to 10 points for pairs of runners who ran equal times in their races together. These formulas are displayed mathematically in Table 1 under

Rivalry Formula 1, along with two additional sets of formulas that were used as robustness checks, as described below.

Using these formulas, I iterated through all 82 regular runners, and for each focal runner, created rivalry scores for the other 81 runners, equal to the average of their scores on similarity, repeated competition, and competitiveness. Thus, 6,642 pairs of runners were given a rivalry score between 0 and 10 ($M = 2.65$; $SD = 1.53$).

From these data, I created a subset of rival runners. For each of the 82 focal runners, I labeled a target runner as a rival if their rivalry score was equal to or above a value of 6.0, which seemed appropriate because it resulted in an average of 2.57 rivals per runner (minimum of 0 to a maximum of 8), which was approximately the average number of rivals reported by runners who were surveyed for Study 2A.³ To this I added one stipulation: the two runners had to have run in at least two races together. This additional criterion was imposed because it seemed unlikely that runners who had never raced against one another, or had only raced one time, would feel rivalry towards one another. In the robustness checks presented below, however, this criterion is relaxed. Additionally, runners for whom more than five target runners qualified as rivals were assigned the top five scoring targets as rivals, given that five rivals was the maximum number listed by any of the runners surveyed in Study 2A. This resulted in a final sample of 163 rivalries across 58 focal runners (mean # of rivals = 2.79; $SD = 1.56$). 24 (29.3%) of the regular runners were not included because they did not have any rivals who scored a value of 6.0 or higher. Across this sample of 163 rivalries, the average rivalry score was 6.70 ($SD = 0.54$).

Results

Sample

To investigate whether rivalries between runners predicted faster race times, I analyzed results from races run between 2007 and 2009 ($N = 112$). Across the 58 regular runners with rivals, a total of 866 races were run during this period ($M = 14.93$; $SD = 10.0$), which served as the sample for analyses.

Independent variables

The primary independent variable was a dummy variable, set equal to 1 if at least one of the focal runner's rivals was present at the race. In addition, I created measures equal to the number and proportion of rivals present. Table 2 displays descriptive statistics and bivariate correlations.

Dependent variable

The dependent variable was simply the pace, in seconds per kilometer, run by the focal runner. This was calculated by dividing the runner's race time by the race distance in kilometers.

Control variables

In order to control for individual runners' ability levels, fixed effects for runners were included in all models. Further, given that running pace is highly dependent upon race distance, fixed effects were also included for the 15 different race distances. Fixed effects for distance were considered preferable to a continuous variable of race distance, as the latter would assume a linear relationship between race distance and running pace, which is unlikely to be the case. Beyond these two sets of fixed effects, I also controlled for the number of runners in the race,

log-transformed. This was important to control for because race attendance might influence both the independent and dependent variables. The more runners at a race, the more likely a focal runner's rivals are to be in attendance; further, runners might run faster in races with more runners, perhaps due to social facilitation processes (e.g., Zajonc, 1965).

Rivalry and race performance

In a linear regression analysis of race pace with fixed effects for runners and distances, the presence of at least one rival was significantly predictive of faster race times, $t(792) = -3.08$, $p < .01$, as seen in Model 1 of Table 2. The coefficient for this variable indicated that the presence of a rival was associated with a 4.44 second/km increase in pace. Thus, in 5 kilometer race, a runner would be expected to run approximately 22 seconds faster if at least one of their rivals was also participating in the race. Rivalry was also a significant predictor of better race performance when measured by the number of rivals present (Model 2; $t(792) = -2.58$, $p = .01$), or by the proportion of rivals present (Model 3; $t(792) = -2.34$, $p < .05$). To test whether the presence of multiple rivals predicted an additional boost in performance above and beyond the presence of a single rival, in Model 4 I entered two dummy variables: one indicating whether one or more rivals were present, and a second indicating whether two or more rivals were present. The coefficient for the presence of at least one rival remained significant ($t(791) = -2.65$, $p < .01$), but the presence of multiple rivals beyond that did not significantly predict performance ($t(791) = -1.12$, *ns*).

Checks of robustness

Given the somewhat subjective nature of both the formula used to determine rivalry as well as the cutoff point for whether target runners were considered to be rivals or not, it was important to investigate whether these results were robust. Three additional sets of analyses were conducted with this goal in mind. First, I eliminated the cutoff point of 6.0 for target runners to be considered rivals, and instead allowed all 82 of the regular runners to have a rival – identified simply as the target runner with the highest rivalry score. This also allowed the sample of runner-races to be expanded to include all 1262 races run by regular runners. A regression analysis of running pace, again with fixed effects for runners and distances, indicated that the presence of a focal runner's top rival was significantly associated with faster pace ($t(1165) = -2.26$, $p < .03$).

Second, I adjusted the repeated competition component of the formula used to assign rivalry scores, and re-identified runners' rivals. In Rivalry Formula 1, the proportion of the focal runner's races also run by the target runner was used to assess repeated competition; thus, the absolute number of races run between the two runners was not taken into account. However, as displayed in Table 1, in Rivalry Formula 2 target runners were awarded points for repeated competition based upon the log-transformed ratio of the # of races between them divided by the maximum number of races run between any pair of rivals in the sample, which was 23. Thus, while a target runner who participated in all six of a focal runner's races would have been awarded a maximum of 10 points for repeated competition under Rivalry Formula 1, he or she would only receive 5.71 points under Rivalry Formula 2. Further, I removed the requirement that runners had to run at least two races against each other. Regression analyses of rivalry and race performance using rivals identified with Rivalry Formula 2 confirmed the significant relationship between them: the presence of a rival ($t(819) = -2.04$, $p < .05$), number of rivals

present ($t(819) = -2.00, p < .05$), and proportion of rivals present ($t(819) = -1.83, p < .07$) all predicted faster running pace.

Third, I again adjusted the formula used to assign rivalry scores, as seen under Rivalry Formula 3 in Table 1. In this formula, repeated competition was operationalized simply as the number of races between the two runners, up to a maximum value of 10, and the cutoff for receiving points for competitiveness was reduced from 30 sec/km to 20 sec/km. Once again, the positive relationship between rivalry and race performance was robust to this adjustment: faster running pace was predicted by the presence of a rival ($t(799) = -2.13, p < .05$), the number of rivals present ($t(799) = -2.11, p < .05$), and the proportion of rivals present ($t(799) = -1.76, p < .08$) in regression analyses. Overall, the positive relationship between rivalry and race performance appears to be fairly robust to measurement decisions. It is also worth noting that the significant findings for rivalry are robust to the inclusion vs. exclusion of control variables, including fixed effects.

Discussion

Consistent with my prediction, and the qualitative survey responses collected in Study 2A, analyses of competitive runners' actual race performances indicated that they ran faster when competing against their rivals than in races in which their rivals were absent. Further, this relationship was found to be robust to several different operational definitions of rivalry, as well as to the number of runners participating in the race.

General Discussion

Across two studies, one involving university undergraduates and the other real-world competitive runners, I found evidence for a positive relationship between rivalry and motivation. Both students and runners reported being more motivated in competitive settings when facing their rivals. Further, analyses of actual race results suggested that rivalry can promote increased performance on an effort-based task. These findings carry a number of important implications. First, this research increases our understanding of rivalry, a psychological phenomenon that has gone largely unstudied despite anecdotal evidence speaking to its power to influence attitudes and behavior. The results presented here suggest that rivalry is relatively commonplace within competitive settings – even in the absence of intergroup processes – and that it can positively influence how hard competitors push themselves, and in turn how they perform. Further, rivalry appears to have these consequences independent of the objective stakes of competition. Second, this work extends existing theories of competition by demonstrating that the consequences of competitive settings depend upon the relationships that exist between the competitors. Purely situational definitions, such as Deutsch's (1949), may thus be incomplete; instead, the social context in which competition occurs should be taken into account. Third, these findings help to resolve a long-standing discrepancy in the literature on competition and motivation by identifying rivalry as an important moderator of this relationship. Finally, this research points to rivalry as a predictor of motivation and performance, topics that receive a great deal of attention from researchers and practitioners alike. From a practical standpoint, these findings suggest that managers might be able to motivate their subordinates by fostering feelings of rivalry among them or between them and those from another organization. However, in addition to its apparent motivational boost, there might also be some potential downsides to rivalry. For instance, people

might be more willing to “bend the rules” in order to defeat their rivals, a possibility that I investigate the next chapter.

CHAPTER 3

THE EFFECTS OF RIVALRY ON UNETHICAL BEHAVIOR

Introduction

In this chapter, I explore the consequences of rivalry for unethical behavior. I propose that, due to its magnification of the psychological stakes of competition as well to its focusing attention specifically on outperforming the other side, rivalry can lead to an increased willingness to engage in unethical behavior in order to achieve success. I test this hypothesis with a series of three laboratory studies, and then discuss the theoretical and practical implications of my findings.

Research on unethical behavior

The question of when and why people engage in unethical behavior – such as lying, cheating, and stealing – has attracted substantial attention over the years. Given the potentially costly and destructive nature of such behavior, this is a topic that appeals to researchers, policy-makers, and practitioners alike. Existing research has identified a range of factors that may contribute to unethical behavior (for a review, see Kish-Gephart, Harrison, & Treviño, 2010). For instance, unethical tendencies are related to demographic characteristics such as age and gender, as well as to dispositional traits such as locus of control and cognitive moral development (Kish-Gephart et al., 2010; Whitley, 1998). Further, situational and environmental characteristics, such as norms, the presence of honor codes, and exposure to abundant wealth also appear to influence unethical behaviors (Gino & Pierce, 2009; Kish-Gephart et al., 2010; Whitley, 1998).

The majority of work to date has focused on how characteristics of the individual, the ethical decision being faced, and the setting in which the individual is acting influence decisions to behave unethically (Kish-Gephart et al., 2010). More recently, however, researchers have also to recognize that relational factors can also be important determinants of unethical behavior. For instance, the extent to which people follow another individual's decision to cheat depends upon whether they categorize that person as an in-group vs. an out-group member (Gino, Ayal, & Ariely, 2009). Also, the decision to engage in illegal helping behavior has been found to be related to the level of similarity between individuals, and to the empathy vs. envy that they feel towards each other (Gino & Pierce, 2010).

Rivalry and unethical behavior

In this chapter I investigate how rivalry influences individuals' decisions to act unethically. Specifically, I predict that people will be more willing, and likely, to engage in unethical behavior when they harbor feelings of rivalry towards their counterparts in competitive settings. In other words, as evidenced by the "Dirty Tricks" campaign launch by British Airways against Virgin Atlantic, rivalry will make people more willing to do "whatever it takes" to succeed. To date, no research has examined the role of rivalry in driving unethical behavior; however, some researchers have argued that competition more generally may foster unethical tendencies (e.g., Kohn, 1992). For example, educational research has found a positive relationship between students' perceptions of the competitiveness of the classroom and academic

dishonesty (Perry, Kane, Bemesser, & Spicker, 1990; Smith, Ryan, & Diggins, 1972). However, such research is relatively scarce, and furthermore, no attempts have been made to investigate how the relationship that exists between competitors may moderate this relationship. In this research then, I hope to contribute to the literatures on both ethical decision-making and competition, as well as to increase our understanding of rivalry.

I predict that rivalry will foster greater unethical behavior for two related reasons. First, rivalry, by definition, entails increased psychological stakes. That is, the psychological payoff for success is higher when individuals face off against their rivals, and conversely, the costs of failure are higher. Therefore, rivalry should lead people to be more willing to engage in behaviors that can increase their chances of success, including unethical behaviors such as cheating and deceiving others. Indeed, researchers have argued that the degree to which individuals' feelings of self-worth are contingent on task performance – a form of psychological stakes – is positively related to their willingness to engage in unethical behavior to ensure success (Crocker & Park, 2004; Crocker & Wolfe, 2001). Furthermore, prominent models of ethical decision-making within the literatures on academic dishonesty, crime, and deception in negotiations propose that people undergo cost-benefit analyses when deciding whether or not to engage in unethical behavior (e.g., Becker, 1968; Eccles, 1983; Lewicki, 1983; Wigfield & Eccles, 1992). In other words, unethical behavior is expected to increase as perceived benefits outweigh perceived costs. Again, given that rivalry increases the psychological benefits of success, it may tip such cost-benefit analyses in favor of engaging in unethical behaviors that can help increase performance and success.

Second, rivalry may promote unethical behavior by increasing individuals' focus on the specific goal of outperforming their opponents. Within a given task setting, even a competitive one, individuals may vary in their goals, or what they hope to achieve. In particular, researchers have identified a distinction between mastery or learning goals versus performance or achievement goals (Ames, 1992; Dweck & Leggett, 1988). Mastery goals reflect the desire to develop competency at the task, to improve relative to one's own past performance, and to learn and gain understanding. In contrast, performance goals involve the desire to outperform others and demonstrate superior ability. Given the psychological payoffs associated with outperforming one's rivals, it is likely that rivalry will cause individuals to focus more on outperforming others, and less on trying to achieve task mastery or learning. In turn, this is apt to foster greater unethical behavior, as research in educational and social psychology has shown that individuals adopting performance goals are more likely to cheat than those with mastery goals (Anderman, Griesinger, & Westerfield, 1998; Anderman & Midgley, 2004; Murdock, Hale, & Weber, 2001). Similarly, a recent study within the area of negotiations found that "win-framed" negotiators – who are focused more on outperforming their negotiation counterpart than on achieving mutual benefits – were more likely to try to deceive their counterparts (Schweitzer, DeChurch, & Gibson, 2005).

Overview of Studies

Three studies investigated how rivalry influences individuals' propensity to engage in unethical behavior. Studies 1 and 2 examined how rivalry affects people's willingness to engage in Machiavellian behaviors, with Study 1 employing a priming methodology, and Study 2 manipulating rivalry via simulated competition. In Study 3, rivalry mindsets were again primed

and I measured an instance of actual unethical behavior – whether participants misreported their performance on a cognitive task.

Study 1

Given that rivalry is a competitive relationship that is typically built up over time and repeated interaction, it was necessary to devise a way of manipulating it within a laboratory setting. To accomplish this, I adapted a priming methodology developed by Galinsky, Gruenfeld, and Magee (2003). These researchers primed feelings of power among participants by asking them to recall and write about a time in which they had power over others, and found that doing so led participants to be more likely to take action, much like having actual power over resources did. More recently, this technique has been used by a number of researchers, and has been shown to lead participants to act as if they had power across a variety of situations (e.g., Fast & Chen, 2009; Galinsky, Magee, Inesi, & Gruenfeld, 2006; Lammers, Stapel, & Galinsky, 2010), suggesting that such recall tasks can be effective in recreating real-world mindsets. In this study, I primed rivalry amongst participants by asking them to recall and write about a time in which they competed against a personal rival. Then, as an initial test of the hypothesis that rivalry fosters increased unethical behavior, participants indicated their willingness to endorse a number of Machiavellian attitudes and behaviors.

Method

Participants

170 undergraduate students from an organizational behavior course participated in the study for course credit. 50% of participants were male, and the average age was 20.9 years ($SD = 2.10$).

Procedure

Participants arrived at the lab, and were informed that they would be participating in an experiment looking at “interpersonal experiences and personality.” After providing their consent to participate in the experiment, participants were given a paper survey to complete. Participants were randomly assigned to one of three conditions – rivalry, competition, and control – as determined by which version of the survey they received. The survey took approximately fifteen minutes to complete, and participants received course credit for their participation.

Experimental conditions

The first part of the survey consisted of the Ten Item Personality Inventory (TIPI; Gosling, Rentfrow, & Swann, 2003), which was included as a brief filler task. Participants then received the experimental manipulation. In the rivalry condition, they were asked to recall and write about a time in which they had competed against a personal rival. Although participants were left to define exactly what that meant to them, they were provided with example characteristics of rivals based upon the findings of Kilduff et al. (2010). The instructions they received were as follows:

“Please think back to a time in which you competed against a personal rival (e.g., someone you repeatedly competed against and/or were evenly-matched with). Please

spend a few minutes describing this person and the thing(s) you competed on (1 – 2 paragraphs). How did you feel towards this person, and while you competed against him or her?”

Thus, this task placed participants in a rivalry mindset by having them, in effect, relive a past experience in which they competed against a rival. By contrast, participants assigned to the competition condition were asked to recall their most recent competitive experience, thus allowing for the comparison of rivalry to competition more broadly.

“Please think back to the most recent time in which you competed against someone (on anything). Please spend a few minutes describing this person and the thing(s) you competed on (1 – 2 paragraphs). How did you feel towards this person, and while you competed against him or her?”

Finally, participants in the control condition were asked to describe their morning commute:

“Please think back to this morning and how you arrived on campus. Please spend a few minutes describing your commute (1 – 2 paragraphs). How did you feel during your commute?”

Measures

Following the recall task, participants in the rivalry and competition conditions rated aspects of the competition they had just described. Two questions were designed to measure aspects of the competition that might covary with rivalry and were thus important to control for. First, it is possible that contests against personal rivals involve higher objective stakes in addition to increased psychological stakes. Thus, I asked participants “How high were the tangible stakes (e.g., money, career success, grades, athletic success, broader reputational benefits, etc.) associated with this competition?” on a scale from 1 (“Nothing tangible at stake”) to 7 (“Very high”) ($M = 4.04$; $SD = 1.96$). Second, given that Kilduff et al. (2010) found that more successful actors tend to attract stronger feelings of rivalry from their opponents, it seemed possible that contests against rivals might involve a greater frequency of failure or defeat than everyday competitive experiences. To control for this, participants answered “To what extent did you succeed or win in this competition?” on a scale from 1 (“Not at all”) to 7 (“Very much”) ($M = 5.01$; $SD = 1.57$).

Following these control variables, participants completed the Mach IV Machiavellianism personality scale (Christie & Geis, 1970), which assesses individuals’ endorsements of a series of attitudes and behavioral tendencies drawn from the writings of Niccolo Machiavelli (Gilbert, 1971). This was chosen as the dependent variable because agreement with these statements is “synonymous with amoral action, sharp dealing, hidden agendas, and unethical excess” (Nelson & Gilbertson, 1991, p. 633) and scores on this scale have been shown to predict a wide range of unethical behaviors, such as cheating, lying and exploiting others (Hegarty & Sims, 1978; Kis-Gephart, Harrison, & Treviño, 2010; Wilson, Near, & Miller, 1996). Furthermore, many of the items on this scale describe unethical behaviors directly related to getting ahead and achieving success, which is the focus here. The scale consists of 20 items such as “Never tell someone the real reason you did something unless it is useful to do so,” “It is hard to get ahead without cutting corners here and there,” and “One should take action only when sure it is morally right” (reverse-

coded). Participants rated their agreement with each item from 1 (“Strongly disagree”) to 5 (“Strongly agree”). Reliability was sufficiently high ($\alpha = .74$), so participants’ responses to these items were summed to create an overall aggregate score ($M = 48.6$; $SD = 8.39$).

Results

Prior to running analyses, participants’ responses were checked – by an independent research assistant who was blind to hypotheses – to ensure that they successfully completed the recall task. 7 participants (4.1%; 5 rivalry, 1 competition, 1 control) wrote very little – fewer than 15 words – and were thus eliminated from analyses as they were not likely to be engaged in the task. The rest of the participants successfully completed the recall task, although it was also observed that two people recalled competing against their significant other, and three others recalled competing against a family member. Due to the potentially unique nature of competition against such close others, these participants’ responses were also removed from analyses, leaving a final sample of 158 participants.

Participants mean scores on the Mach IV scale are displayed in Figure 2. An Analysis of Variance indicated that there were significant differences between mean scores across condition, $F(2, 155) = 4.72, p = .01$. As predicted, participants in the rivalry condition scored the highest ($M = 51.1$), and planned contrasts indicated that they scored significantly higher than participants in the competition condition ($M = 46.2$; $t(155) = 2.94, p < .01$) and the control condition ($M = 47.8$; $t(155) = 2.12, p < .05$). These latter two conditions did not differ significantly from one another, $t(155) = -1.00, ns$. Furthermore, the difference between the rivalry and competition conditions remained significant when controlling for success and tangible stakes. In a linear regression analysis, a dummy variable corresponding to condition (0 = competition; 1 = rivalry) was positive and significant ($\beta = .27, t(93) = 2.76, p < .01$); tangible stakes ($\beta = .12, t(93) = 1.17, ns$) and success ($\beta = -.11, t(93) = -1.12, ns$) did not significantly predict Mach IV score.

Discussion

Study 1 found that participants primed with a rivalry mindset reported greater agreement with Machiavellian attitudes and behaviors as compared to both participants primed with simple competition and participants in a control condition. This is consistent with Hypothesis 1, and suggests that competition against a rival can foster a willingness to do whatever it takes to get ahead, above and beyond competition more generally, and even when controlling for the tangible stakes of the contest. This finding is particularly striking given that Machiavellianism is generally thought to be a stable personality trait, and that no competition was actually taking place – just the mere experience of recalling a personal rival was enough to drive this increase in Machiavellianism.

Study 2

Study 2 sought to replicate the main finding from Study 1, but with an alternative manipulation of rivalry that involved actual competition. Specifically, I conducted a laboratory experiment in which participants ostensibly competed against one another across a series of performance trials. In addition to providing an alternative manipulation of rivalry for robustness purposes, this methodology allowed for a truly direct comparison of rivalry to competition. That

is, although I controlled for self-reported tangible stakes and success in Study 1, it was still possible that the experiences that participants recalled in the two conditions differed in some important way independent of rivalry. In turn, this might have been driving the relationship with Machiavellian attitudes, as opposed to rivalry.

Method

Participants

170 undergraduate students from an organizational behavior course participated for course credit. 44.1% of participants were male, and they were 21.0 years old on average ($SD = 2.41$).

Procedure

The experiment was run across eleven sessions of 14 to 18 participants each. Upon arriving at the lab, participants were informed that they would be completing a series of typing tests in competition with one another, as part of a study examining “personality, competition and typing performance.” The rest of the instructions for the experiment were provided via the computer workstations. Participants were given an ID number and randomly assigned to one of two conditions, competition and rivalry. The experiment began with a practice typing test, of length one minute, after which participants completed a series of four competitive typing tests, of length two minutes each. Before each of the competitive tests, participants were assigned an opponent in the form of an ID number of another participant, and were told that net speed (raw speed multiplied by accuracy) would be used to determine the winner. After each test, participants received feedback on their performance and their opponent’s performance, and were given approximately 30 seconds to rest. There were no objective stakes for winning or losing the competitions.

The competition and rivalry conditions were identical except for two factors. Based on Kilduff et al.’s (2010) findings that repeated competition and narrow margins foster rivalry, I manipulated these in order to create greater feelings of rivalry among participants in the rivalry condition. Participants in the rivalry condition faced the same opponent on all four competitive typing tests, whereas participants in the competition condition faced a different opponent on each test. Furthermore, instead of providing participants with the actual performance of their opponents, this information was instead manipulated to create narrow margins in the rivalry condition, and relatively wider margins in the competition condition. In the rivalry condition, the opponent’s net speed on each test was manipulated so that it was within 2 to 6 words-per-minute (randomly determined) from the participant’s net speed. In the competition condition, these margins were instead set to a random value between 12 and 20 words-per-minute. Thus, participants in the rivalry condition experienced repeated and evenly-matched competition against a single opponent, whereas participants in the competition condition experienced relatively lopsided competition against a series of different opponents. In both conditions, the opponent’s performance was manipulated so that participants won the first and third tests, but lost the second and fourth tests.

After completing all five typing tests (one practice test and four competition tests), participants filled out an online survey that included manipulation checks, the Mach IV Machiavellianism scale (Christie & Geis, 1970), and a probe for suspicion. They were then debriefed and sent on their way.

Measures

The online survey that followed the typing tests contained all of the measures used in this study. First, to assess whether participants were paying close enough attention for the manipulations to have any effect, they were asked: “Did you win the last (most recent) typing test?” and “Did you face the same opponent, or a different opponent, on each typing test?” Next, as a manipulation check, participants were asked to indicate their level of agreement with the statement “I feel a degree of rivalry towards the person I just typed against (on the last typing test)” on a scale from 1 (“Strongly disagree”) to 7 (“Strongly agree”) ($M = 4.69$; $SD = 1.79$). Next, participants completed the 20-item Mach IV scale, as in Study 1 ($\alpha = .73$; $M = 49.0$; $SD = 7.8$). Finally, given that the opponent scores were being manipulated rather than accurately reported, it was important to check for suspicions. Participants were asked: “Was there anything that took place in today’s experiment that you found strange, suspicious, or out of place?” and given a blank text box in which to respond.

Results

Before testing the main hypothesis, it was important to check participants’ responses for several factors that could threaten their validity. First, five participants (2.9%) mistakenly reported winning the last typing test, and two participants (1.2%) mistakenly reported facing the same opponent despite being in the competition condition. Second, 11 participants (6.5%) performed so poorly (less than 30 WPM net speed) on one or more of the competitive tests so as to threaten the plausibility of their opponent’s performance (e.g., if a participant achieved 27 WPM and they were supposed to win by a wide margin, the opponent’s score would be less than 15 WPM). This was generally due to participants accidentally skipping over a word as they typed and not realizing that they had done so, which resulted in the rest of the passage being typed incorrectly. Finally, 19 participants (11.2%) indicated some level of suspicion related to their opponents’ performance (e.g., “I noticed that everyone won and lost the same number of typing tests”; “The fact that I won, then lost, then won, then lost. It seemed patterned.”). All told, 36 participants (21.2%; 18 each from the two conditions) were removed from further analysis for one or more of these reasons. Additional analyses revealed, however, that the results of the hypothesis tests presented below did not differ based on the inclusion or exclusion of these 36 participants.

Using the remaining sample of 134 participants, I first conducted a manipulation check. As intended, participants in the rivalry condition reported greater feelings of rivalry towards their most recent opponent than did participants in the competition condition (5.12 vs. 4.35; $t(132) = 2.53$, $p < .05$). Thus, by manipulating repeated competition and narrow margins of victory, I was successful in priming a rivalry mindset amongst participants. Having established that the manipulation was successful, I moved to a test of my primary hypothesis. As displayed in Figure 3, participants in the rivalry condition scored higher on the Mach IV Machiavellianism scale than participants in the competition condition (50.6 vs. 47.4; $t(106) = 2.29$, $p < .05$). Thus, consistent with Study 1, participants who competed against a simulated rival reported higher levels of agreement with Machiavellian attitudes and behaviors as compared to participants who experienced competition absent rivalry. Lastly, I examined whether reported feelings of rivalry mediated the relationship between experimental condition and scores on the Mach IV scale. A regression analysis indicated that self-reported feelings of rivalry were positively related to Mach

IV score ($\beta = .24$, $t(132) = 2.87$, $p < .01$); further, when this variable was entered simultaneously with a dummy variable for condition (Rivalry = 1, Competition = 0), it remained significant ($\beta = .21$, $t(132) = 2.45$, $p < .05$), whereas the condition dummy dropped to marginal significance ($\beta = .15$, $t(106) = 1.75$, $p < .10$). A Sobel test indicated that the indirect effect of condition via feelings of rivalry was significant ($z = 1.76$, $p < .05$, one-tailed test). Thus, feelings of rivalry mediated the effect of condition on Mach IV score.

Discussion

Consistent with Study 1, Study 2 found that participants primed with rivalry were more likely to endorse Machiavellian attitudes and behaviors than participants primed with more generic competition, again providing support for the idea that rivalry fosters greater unethical behavior. Study 2 also extended Study 1 in some important ways. First, I found the same effect using an entirely different manipulation of rivalry, thus allaying any concerns about the unique nature of the recall task. Second, Study 2 demonstrated that feelings of rivalry can be experimentally manipulated via repeated competition and narrow margins of victory. This directly supports the idea that competition is relational and that its consequences vary according to prior interactions between competitors, as the two conditions were identical apart from these factors. Further, this suggests that some level of rivalry can develop even over a relatively short period of time and absent any face-to-face interaction. Lastly, these results corroborate the observational findings reported by Kilduff et al. (2010) with respect to the factors that contribute to rivalry, although the relative influence of repeated competition and narrow margins could not be estimated as they were manipulated in tandem.

Study 3

Study 3 sought to build upon the results from Studies 1 and 2 by examining actual unethical behavior. Although Machiavellianism has been identified by a number of studies as a predictor of unethical behavior, it was nonetheless important to see whether the effect of rivalry would extend to actual behavior. Thus, in Study 3 I examined the influence of rivalry on people's tendency to misreport their performance on a cognitive task, which has been used by a number of researchers as a measure of unethical behavior (e.g., Gino & Pierce, 2009; Schweitzer, Ordonez, & Douma, 2004). Further, because cooperation has long been used as the comparison condition to competition (e.g., Deutsch, 1949; Stanne, Johnson, & Johnson, 1999; Tauer & Harackiewicz, 2004), I examined how cooperative mindsets may influence unethical behavior in addition to comparing rivalry to competition. Study 3 employed a recall-based priming manipulation as in Study 1.

Method

Participants

143 undergraduate and master's students from a variety of majors participated in the study, which was conducted online. 39.9% of participants were male, and they were 22.9 years old on average ($SD = 3.76$). Participants were entered into random drawings for \$20 as compensation.

Procedure

Participants completed a brief online survey, entitled “Personality and decision-making,” in which they were randomly assigned to one of three conditions: rivalry, competition, and cooperation. The rivalry and competition conditions were identical to those used in Study 1. Participants in the rivalry condition were asked to recall and write about a time in which they competed against a personal rival; participants in the competition condition were asked to recall their most recent competitive experience. Participants in the cooperation condition were asked to “Please think back to the most recent time in which you cooperated or collaborated with someone.” I also added the instructions “This person should not be your significant other or a family member” to all three conditions.

Following the recall task, participants completed measures of tangible stakes and success to be used as control variables, just like in Study 1. For participants in the cooperation condition, these were reworded as “How high were the tangible stakes (e.g., money, career success, grades, athletic success, broader reputational benefits, etc.) associated with this cooperative effort?” and “To what extent did you succeed in this cooperative effort?” Participants were then presented with an anagrams task, adapted from researchers studying cheating behavior (DePalma, Madey, & Bornschein, 1995; Eisenberger & Shank, 1985). Specifically, they were given three minutes to try to solve a series of four anagrams (CRKO, LABEVE, DSLIE, & FTOEER) on a piece of scratch paper. The first and third anagrams (ROCK & SLIDE) were quite easily solved; however, unbeknownst to participants, the second and fourth anagrams had no solution. After this task, participants were asked to report how many anagrams they had solved, which completed the survey.

Dependent measure

Consistent with prior research that has employed unsolvable anagrams as a way of measuring cheating behavior (DePalma et al., 1995; Eisenberger & Leonard, 1985), a dichotomous dependent measure of unethical behavior was derived from the number of anagrams participants reported solving. Given that two of the anagrams were unsolvable, participants who reported solving three or four anagrams were classified as misreporting their performance (unethical behavior = 1); those who reported solving two or fewer anagrams were not (unethical behavior = 0).

Results

Due to the online and unmonitored nature of the study, it was important to ensure that participants were engaged in the task. To assess this, I looked at how long participants spent working on the anagrams. 42 participants (29.4%) spent less than 1 minute working on the task, despite being given up to 3 minutes to work. This did not differ by condition, $F(2, 140) = 1.12$, *ns*. Given that these participants were almost certainly not engaged in this activity, they were removed from analyses. Further, participants’ responses to the recall task were again checked by an independent research assistant. Four participants (4.0% of the remaining sample) wrote less than 15 words and were thus also eliminated from analyses. This left a final sample of 97 participants (42.3% male; 23.3 years old on average).

Mean levels of misreporting performance across conditions are displayed in Figure 4. As predicted, participants primed with a rivalry mindset ($M = 22.6\%$) were much more likely to falsely report solving 3 or 4 anagrams than participants in either the competition ($M = 7.9\%$) or

cooperation ($M = 0.0\%$) conditions. An analysis of variance confirmed significant differences across condition, $F(2, 94) = 4.52, p < .05$, and planned contrasts indicated that the misreporting of performance was significantly higher in the rivalry condition as compared to the competition condition ($t(94) = 2.06, p < .05$) and the cooperation condition ($t(94) = 2.94, p < .01$). Further, rivalry remained a significant predictor of misreporting performance when controlling for success and tangible stakes. In a logistic regression analysis, a dummy variable for participants in the rivalry condition was positive and significant (Wald statistic = 5.88, $p < .02$); tangible stakes (Wald statistic = .44, *ns*) and success (Wald statistic = .22, *ns*) were not significant. The odds ratio for the rivalry dummy was $\text{Exp}(B) = 6.03$, indicating that the odds of misreporting performance were approximately six times as high for participants in the rivalry condition versus participants in the other two conditions.

Discussion

Building upon the results from Studies 1 and 2, Study 3 found that priming participants with a rivalry mindset caused them to be significantly more likely to engage in unethical behavior. Specifically, these participants were more likely to misreport their performance on a cognitive task, as compared to participants primed with competition more broadly or participants primed with cooperation. Further, the magnitude of this effect was striking, suggesting that rivalry may be a powerful driver of unethical behavior.

General Discussion

Across three studies, I found evidence for a positive relationship between rivalry and unethical behavior. Participants operating under a rivalry mindset were more endorsing of Machiavellian attitudes and were more likely to misreport their performance on a cognitive task, suggesting that rivalry may be an important determinant of unethical behavior.

This research makes several theoretical contributions. With respect to the ethical decision-making literature, it identifies a previously unexplored determinant of unethical behavior, thus contributing to our understanding of when and why people behave unethically. More broadly, these findings add to a growing body of work speaking to the importance of relational factors in determining unethical behavior. Thus, the decision to behave unethically seems to be more than just a product of individual and situational factors – the relationships that exist between individuals also help determine whether they act unethically.

This insight on the importance of relationships applies equally to the literature on competition. As reviewed by Kilduff et al. (2010), research on the psychology of competition has largely neglected to consider the influence of relational factors. However, the findings presented here suggest that the consequences of competition can vary substantially depending upon the relationship that exists between competitors – competition against a rival may be a very different experience than competition in the absence of rivalry.

Further, this research contributes to our understanding of rivalry as a psychological phenomenon. The studies presented in Chapter 2 found rivalry to be a motivational force that can promote increased task performance; however, this chapter identifies at least one important downside to rivalry. Indeed it seems that rivalry may be a double-edged sword, which makes it a particularly important and fascinating topic for study.

Lastly, the findings presented here add to extant research that points to the validity of priming techniques as a way of manipulating psychological states. Simply having participants recall experiences in which they competed against a personal rival had profound effects upon their attitudes and behavior. This suggests that such priming techniques are a valid means of simulating real-world situations and the mindsets that accompany them.

There are also some important practical implications to these findings. Unethical behavior can be costly and destructive. Armed with the knowledge that feelings of rivalry may promote such behavior, managers may want to be careful about fostering such feelings among employees. For instance, they may want to avoid the antecedents to rivalry – such as repeatedly pitting employees against one another (Kilduff et al., 2010) – when designing incentive and promotion systems. Further, rivalry may be particularly dangerous at the executive level, given the power that top managers wield. Therefore, top management teams, and their boards of directors, should be alert to the potentially powerful influence of rivalry. Indeed, it is possible that rivalry may have been one of the factors contributing to the recent spate of corporate accounting scandals.

It would also be interesting to investigate whether organizational-level rivalries may promote greater unethical behavior among individual members. In general, the work I've presented so far in this dissertation has examined individual-level rivalries, so it remains an open question whether, and how, individuals are influenced by organizational-level rivalry. This is a question that I begin to investigate in the next chapter.

CHAPTER 4

THE EFFECTS OF INTERORGANIZATIONAL RIVALRY ON WORK PERFORMANCE AND ATTITUDES

Introduction

In Chapter 2, I presented evidence suggesting that individuals are more motivated, and perform better, when competing against their personal rivals. In this chapter, I explore whether inter-organizational rivalry can have similar effects. Specifically, I conducted a field experiment within a participant organization and examined how competition against rival and non-rival organizations affected the performance and job attitudes of employees. This research seeks to extend Chapter 2 in several ways. First, I examined whether the rivalries an organization is involved in can influence the attitudes and behavior of its individual members. Second, I investigated rivalry within a real-world work organization. Third, I measured the consequences of rivalry for a range of job-related attitudes, including job satisfaction, job burnout, and organizational commitment.

Theoretical background

With respect to why inter-organizational rivalry might motivate organizational members, many of the same theoretical arguments from Chapter 2 apply. Given that rivalry increases the psychological stakes of competition, it follows that it should foster greater motivation. Furthermore, as mentioned in that chapter, some recent research suggests that inter-group competition in general may be more motivating than inter-individual competition (Tauer & Harackiewicz, 2004), because group members reinforce the competitive spirit within one another; thus we might expect inter-organizational rivalry to be a particularly powerful motivational force. On the other hand, however, it remains an open question as to whether individual members will internalize the rivalries in which the organization is engaged. Organizational-level rivalries may be less proximal and personally relevant to individuals than their personal rivalries. Furthermore, to the extent that individual members feel controlled or coerced to compete with their organization's rivals, they may actually become demotivated (Reeve & Deci, 1996).

With respect to the job attitudes of organizational employees, similar competing hypotheses can be made. On one hand, having a salient organizational rival may give members a meaningful goal to shoot for, and may engender greater feelings of cohesion and common identity amongst members. Indeed, prior research indicates that intergroup competition can bolster intragroup commitment and cohesion (Julian, Bishop, & Fiedler, 1966; Sherif et al., 1961; Tajfel & Turner, 1979). So to the extent that intergroup rivalry represents an extreme form of intergroup competition, it might be expected to yield even greater benefits. Further, recent research indicates that group members may define themselves in terms of who they are *not* (Elsbach & Bhattacharya, 2001) – the implication being that the presence of rival groups can strengthen in-group identification among focal group members. A great example is the fight song sung of Texas A&M university, the *Aggie War Hymn*, which focuses almost solely upon the school's rivalry with the University of Texas, including lyrics such as “Good-bye to Texas University,” and “Saw varsity's horns off!” (http://en.wikipedia.org/wiki/Aggie_War_Hymn). In

turn, these feelings of increased cohesion and commitment might spread to other job attitudes such as satisfaction and enjoyment.

On the other hand, there is again the risk of organizational rivalry seeming imposed and controlling. If organizational members feel overly pressured to compete with their organization's rivals, they may react negatively by decreasing their commitment to the organization. Further, such pressure may cause performance anxiety among members, leading to reduced job satisfaction and enjoyment, and increased job burnout. In this chapter, then, I conducted an exploratory analysis of how organizational-level rivalry influences the motivation, performance, and job attitudes of individual members.

Methods

Setting and participants

The study took place at a university calling center associated with UC Berkeley. Study participants were 61 employees, or callers, whose primary duty was to telephone university alumni and attempt to solicit donations to the university. 63.9% of callers were female, 93.5% were undergraduate students (the others were graduate students or recent graduates), and the average age was 21.1 years old ($SD = 5.52$). Callers had been working at the calling center for an average of 8.9 months ($SD = 7.4$) at the time of the study.

Procedure

Two weeks prior to any experimental manipulations, participants completed a paper survey approximately 5 minutes in length, from which I drew measures of job attitudes (T1). I introduced this survey to participants in person, describing my research as “investigating personality and job attitudes.” Participants were assured that I would be the only one with access to these data, and that all analyses would be conducted at the aggregate level.

A few days prior to the experimental manipulation, the head manager of the calling center informed the callers about an upcoming “promotion” (the field experiment) in which individual callers would be randomly assigned to compete with callers from two other universities, UCLA, and UNC-Chapel Hill. Given that this head manager often organized performance-related promotions, this was not seen as out of the ordinary by callers. I was not present for this announcement, and made sure to avoid any visible association with this promotion more generally. This was done so that callers would not make a connection between the promotion and the surveys, thus reducing concerns over demand effects.

The following week, as callers arrived for work, they drew a piece of paper from a box, which indicated their ‘opponent’ assignment. In this manner, callers were randomly assigned to one of three conditions – rivalry, competition, and control. Callers in the rivalry condition received the first name of a caller at UCLA, a traditional rival to UC-Berkeley. Participants in the competition condition received the first name of a caller at UNC-Chapel Hill, and participants in the control condition received the word “Yourself.”

UNC-Chapel Hill was chosen as the non-rival control because it has a similar academic profile to UCLA – UCLA is ranked as the 24th best national university in the US News and World Report 2010 rankings, and UNC-Chapel Hill is ranked 28th (<http://colleges.usnews.rankingsandreviews.com/best-colleges/national-universities-rankings>) – but it does not have a traditional rivalry with UC-Berkeley. To confirm that UCLA is a stronger institutional rival to UC-Berkeley than UNC-Chapel Hill, I collected pilot data from a sample of

91 Berkeley undergraduates. I asked them to rate the extent to which they “feel rivalry towards each of the following universities,” on a scale from “1 – Not at all” to “7 – Very much,” and listed several universities, including UCLA and UNC-Chapel Hill. As expected, participants indicated feeling significantly stronger rivalry towards UCLA than UNC-Chapel Hill ($M = 4.16$ vs. 1.67 ; paired-samples $t(90) = 11.99, p < .001$).

After receiving their opponent assignments, callers were informed that they would be competing against their opponents – in terms of donation-raising performance – over the next two weeks, after which they would receive feedback about how they performed, i.e., whether they won or lost. Participants in the control condition were told that they should simply seek to improve upon their own performance during the prior two weeks. During the second week of the promotion, callers filled out a second paper survey, containing the same attitudinal measures as in the first survey (T2).

Performance measures

The calling center maintains an electronic database of the outcomes of all calls made to alumni, from which I drew my measures of caller performance. I analyzed four measures of performance. The first, known as pledge rate or success rate, was the proportion of calls made by callers that result in a donation being made. The second was the number of successful pledges the caller solicited per hour worked. The third was the average dollar amount donated across all donations that a caller successfully solicited. The fourth was the average number of dollars raised per hour worked. In addition to these measures, I also looked at number of hours worked, and number of calls made per hour worked, as possible behavioral measures of motivation.

Job attitude measures

On both surveys, I collected measures related to five dimensions of job attitudes. All items were rated on a scale from “1 – Strongly disagree” to “7 – Strongly agree.” First, callers completed three items related to job satisfaction (e.g., “In general, my job measures up to the sort of job I wanted when I took it”) taken from Quinn and Shepard (1974). Reliability on these items was fairly low (T1 $\alpha = .52$; T2 $\alpha = .55$), so I decided to restrict analyses to the single item with the greatest face validity (“All in all, I feel very satisfied with my job”). Second, callers indicated their level of organizational commitment across five items (e.g., “I feel like “part of the family” at this organization) drawn from Meyer, Allen, and Smith (1993). Reliability was high at both time periods (T1 $\alpha = .84$; T2 $\alpha = .84$), so aggregate average measures of commitment were created. Third, callers completed three items related to the meaningfulness of their jobs (e.g., “The work I do is meaningful to me”; T1 $\alpha = .87$; T2 $\alpha = .88$) drawn from Spreitzer (1995). Fourth, callers reported their level of burnout at work, via three items (e.g., “I feel used up at the end of the day”; T1 $\alpha = .81$; T2 $\alpha = .81$) drawn from Maslach and Jackson (1981). Finally, I measured callers’ job enjoyment by asking them to think back to their most recent day at work and complete three items related to their enjoyment and interest in their work (e.g., “I enjoyed my work”; T1 $\alpha = .59$; T2 $\alpha = .76$). In addition to these attitudinal measures, I collected callers self-reported motivation at work, via three items (e.g., “I put a high level of effort into succeeding at my job”; $\alpha = .72$; T2 $\alpha = .74$). On the first survey, I also collected the Ten Item Personality Inventory (Gosling, Rentfrow, & Swann, 2003), which measures the Big-Five personality traits, to support the idea that the research was examining the relationships between personality and job attitudes.

Results

Job performance

To analyze the influence of rivalry on job performance, I ran a series of ANCOVA analyses of the performance of callers during the two week study time period, controlling for their performance during the two weeks leading up to the study. Four callers who were unsuccessful in soliciting more than two pledges during the entire two week period were removed from analyses. Table 3 contains the results from these analyses: estimated marginal means for each of the three conditions (with standard errors), the ANCOVA F-statistic, and the results from three custom contrasts (all p-values are two-tailed). The first contrast compares the rivalry and control conditions, the second the rivalry vs. competition conditions, and the third assesses the effects of having a competitor (rival or non-rival) by comparing the average of the rivalry and competition conditions to the control condition.

Participants in the rivalry condition outperformed participants in the other two conditions in terms of pledge rate, number of pledges raised per hour, and dollars raised per hour. However, significant differences across conditions existed only for pledge rate, or the proportion of calls resulting in a successful pledge ($F(2, 53) = 3.33, p < .05$). Contrast tests indicated that participants in the rivalry condition achieved a significantly higher pledge rate than those in the control condition ($F(1, 53) = 6.62, p < .01$); however, the comparison with the competition condition did not quite achieve significance ($F(1, 53) = 2.70, p = .11$). Additionally, there were no significant differences across condition with respect to number of hours worked or calls made per hour.⁴ Overall, there is some suggestive but inconsistent evidence for rivalry causing increased performance.

Job attitudes

Participants' job attitudes were analyzed in the same manner as job performance; Table 4 displays the results of these analyses. Unfortunately, 19 callers did not complete one or both attitudinal surveys, leaving a sample size of only 38.

With respect to job satisfaction, organizational commitment, and job meaningfulness, the means across condition were very similar, and none of the contrasts approached significance. The results for job burnout, job enjoyment, and self-reported motivation were somewhat more interesting, however. Callers in the rivalry condition reported greater job burnout ($F(1, 32) = 3.05, p = .09$), lower job enjoyment ($F(1, 32) = 9.71, p < .01$), and lower motivation ($F(1, 32) = 2.62, p = .12$) than callers in the non-rival competition condition, although the last of these tests did not achieve significance. This suggests, then, that callers in the rivalry condition may have reacted negatively to the pressure of having to compete against an organizational rival. It is important to note, however, that for job burnout and job enjoyment, the comparisons between the rivalry and control conditions did not achieve significance.

Discussion

In this field experiment, I conducted a first investigation into the consequences of inter-organizational rivalry for job attitudes and job performance. The results were inconclusive. Participants assigned to compete against an organizational rival performed better on three of four performance measures; however, this effect only approached significance for pledge rate, or the proportion of calls that ended in a donation. With respect to job attitudes, rivalry appeared to have no effect on job satisfaction, organizational commitment or job meaningfulness. However,

I did find evidence suggesting that rivalry may cause reduced job enjoyment and increased job burnout, consistent with the idea that organizational members may feel pressured or threatened when induced to compete against organizational rivals. Although very preliminary, these findings suggest that organizations may want to be wary of placing too much pressure on employees to try to outperform rival firms.

A number of limitations and potential mitigating factors may help to explain these inconclusive results, which in turn could help inform the design of future studies on this topic. First, the sample sizes involved in this study were quite small, particularly with respect to the attitudinal measures, thus limiting my power to detect significant differences across conditions. If possible, future studies should look to increase sample size, perhaps by expanding to multiple calling centers. Second, by assigning callers to compete against specific other individuals at the rival and non-rival organizations, I may have blurred the distinction between inter-organizational and inter-personal competition, and also confounded rivalry with non-rival competition. Callers in this experiment were in a sense competing as individuals – they were assigned a specific individual as an opponent, and were anticipating feedback about whether or not they outperformed this individual. Therefore, this may not have represented true organizational-level rivalry; indeed, much as in the lab experiments of competition described in Chapter 2, callers may have seen little reason why they should compete against individuals they had never met, even if these individuals were members of a rival organization. In other words, while callers may have felt rivalry towards UCLA, they may have felt little rivalry towards their specific opponents at UCLA. Furthermore, this individual-level competition might have been particularly threatening to callers, as they are solely responsible for the outcome of the contests against their opponents. So it's possible that callers' performance was hurt by anxiety stemming from the fact that they had to represent their organization vis-à-vis its rival. Finally, by conducting the competitions at the individual level, I may have failed to engage the group-level processes (e.g., social identity) that may underlie the previously documented beneficial effects of intergroup competition. In future studies, therefore, it would probably make sense to conduct the competition purely at the organizational-level – i.e., by having all participants in a given condition compete as one against the competing institution, using average performance to decide the winner.

Third, individual differences might moderate the influence of inter-organizational rivalry on member behavior and attitudes. For instance, perhaps callers high in self-efficacy were invigorated by competing against an organizational rival, whereas the performance of those less confident in their abilities was damaged. Or, perhaps personality traits such as need for achievement moderate the consequences of organizational rivalry much as they do inter-individual competition (e.g., Tauer & Harackiewicz, 1999). Indeed, it is worth noting that standard deviations across all four performance metrics were substantially higher in the rivalry condition as compared to the other two conditions – consistent with the idea that rivalry may have benefited some callers and hurt others. Thus, future studies could benefit from collecting these individual difference measures. Overall, the question of how inter-organizational rivalry influences individual members is one worthy of further study.

CHAPTER 5 CONCLUSIONS AND FUTURE DIRECTIONS

In this dissertation, I conducted an investigation into the psychology of rivalry, a largely unstudied topic to date. Building upon an existing research project of mine (Kilduff et al., 2010), I took a detailed look at some of the consequences of rivalry, and also sought to distinguish it from competition more generally. In doing so, I employed a variety of methodologies, including lab experiments, surveys, a field experiment, and an analysis of archival data. Briefly, my findings suggest that rivalry differs meaningfully from more general competition, and that it can significantly affect competitive behavior, both in positive and negative ways. On one hand, it appears that rivalry can motivate people and cause them to exert greater effort in the pursuit of victory; in turn, this may result in increased performance on effort-based tasks. On the other hand, rivalry may also promote greater willingness to engage in unethical behavior.

Theoretically, this work makes two broad contributions. First, it suggests that competition is relationally-dependent – that the relationships that exist between competitors are instrumental in determining their behavior. Consequently, conceptions of competition that only take into account the characteristics of the situation and the individual actors are likely to be incomplete. Second, this research represents the first systematic exploration of rivalry as a psychological phenomenon. Consistent with anecdotal evidence, the results suggest that it can be a powerful driver of behavior and is a topic worthy of further study. Beyond these two broad contributions, the results presented here also extend the literature on competition and motivation, as well as the literature on ethical decision-making, as reviewed in the chapters above.

This work also has practical significance. Motivation and unethical behavior are topics critical to organizational success; furthermore, rivalry is apt to be widespread in the business world, given that competition is ubiquitous. Feelings of rivalry could exist within employees ranging from front line workers up through the top management team. A better understanding of the nature of rivalry and how it influences behavior, therefore, should be of great interest to practitioners.

Future Directions

There are many potential future research directions for the topic of rivalry. First, rivalry may have additional consequences beyond the two studied here, motivation and unethical behavior. For instance, we might predict that rivalry can lead to greater risk-taking. Much as people may be willing to do “whatever it takes” to beat their rivals, they may also be willing to take extreme risks. Indeed, recent research on risk-taking in NASCAR auto-racing found that drivers with competitors just below them in the standings were more likely to suffer accidents, and that this relationship was strongest during periods of relative stability in the standings, consistent with the notion that rivalries were forming between long-standing competitors (Bothner, Kang, and Stuart, 2007). Further, given that rivalry is defined as increasing psychological stakes separate from objective stakes, it should follow that actors will be willing to sacrifice their own gains in order to defeat or hurt their rivals. In other words, in the language of social value orientation work, rivalry should lead to more *competitive* orientations – in which relative gains are favored over absolute gains (Messick & McClintock, 1968). Such a finding would carry substantial real-world implications; for instance, it would suggest that organizational leaders involved in rivalries might steer their organizations in directions contrary to their

economic best interests. Similarly, because rivals are driven to outperform each other, they may be less willing to cooperate or engage in joint ventures, even when it is instrumentally beneficial to do so.

Second, our understanding of rivalry could be increased by greater investigation of the psychological processes that underlie its consequences for behavior. For instance, does rivalry lead to unethical behavior simply via increased psychological stakes? Or, does it do so by altering actors' goal orientations, or perhaps by threatening their sense of self-worth? In addition to furthering our understanding of rivalry, future work that focuses on these kinds of mediating mechanisms might also provide some insights about how to prevent or avoid the unwanted consequences of rivalry. One could also go even further by exploring the physiology of rivalry. There is a burgeoning literature on the roles of testosterone and cortisol in competitive situations (e.g., Josephs, Sellers, Newman, & Mehta, 2006; Mehta & Josephs, 2006), and it would be interesting to see how rivalry influences and interacts with these hormonal factors.

Third, future work should explore potential moderators of the effects of rivalry. For instance, the extent to which rivalry fosters unethical behavior might depend upon whether actors are currently leading vs. trailing their rivals (or whether they anticipate winning vs. losing). An actor who is losing to a rival may be particularly willing to do "whatever it takes" to catch up. In support of this idea, recent research finds that unethical behavior is higher under loss as opposed to gain framing (Kern & Chugh, 2009). Additionally, certain individual differences might moderate the consequences of rivalry. That is, certain types of people, such as those high in need for achievement, might be more influenced by rivalry than others.

Fourth, it would be interesting to explore how stable rivalry is, and whether it can be extinguished. Perhaps as its contributing factors diminish, rivalry also tends to disappear; for instance, two former rivals who no longer compete against one another might no longer feel rivalry. Alternatively, it might be the case that "once a rival, always a rival." From a more practical standpoint, it would be worthwhile exploring whether certain interventions can be taken to reduce feelings of rivalry. For example, Sherif et al. (1961) found that feelings of competitiveness can be reduced by the introduction of a superordinate goal.

Fifth, more work should be done on rivalry at the group and organizational levels. I see particular opportunity in applying some of the ideas contained here to organizational-level outcomes. For instance, the idea that rivalry – driven in part by past competitive interactions – can foster greater motivation and competitiveness has substantial firm-level implications. Previous studies have linked managerial complacency to reduced competitive action (Ferrier, 2001), reduced strategic complexity (Miller & Chen, 1996) and greater competitive inertia (Miller & Chen, 1994), all of which generally lead to reduced firm performance (Ferrier, 2001; Ferrier, Smith, & Grimm, 1999). Managers who are motivated to outperform rival firms, however, may not fall prey to the pitfalls of complacency, and may instead strive for increased performance even in times of prosperity. On the other hand, executives might become so focused on outperforming rival firms that they overlook newly emerging competitive threats, as seems to have been the case with American automakers and their Japanese competitors during the 1970s and 1980s (Glemet & Mira, 1993). One way to test this idea could come within the framework of competitive moves (e.g., market entry) exchanged between firms (e.g., Chen, 1996). Specifically, one could seek to predict the competitive moves exchanged between pairs of firms by measures of past competition and competitiveness, while controlling for current market conditions. A rivalry-based hypothesis would be that firms focus their 'attacks' more on

the firms that they've competed with and been evenly-matched with in the past, above and beyond what would be predicted by objective measures of competitive tension.

Another realm in which rivalry might inform organizational-level outcomes is performance aspirations and strategic change. Prior work on organizational aspirations generally depicts firms as aspiring to be above industry averages on key performance metrics, and shows that firms failing to meet these thresholds tend to undertake significant strategic changes, including changes in leadership (e.g., Greve, 1998). Consistent with the idea that competition is relational, however, I would argue that organizations may also be concerned with their relative performance vis-à-vis certain key rivals. One could test this by collecting data on CEO turnover within firms and looking to see whether firms that underperform their rivals are more likely to change CEOs.

Sixth, future work should investigate how rivalry may spread across levels of analysis. For instance, an inter-individual rivalry between two members of separate groups or organizations might lead to broader rivalry between these two collectives, particularly if the individuals are high in influence and status within their groups. Similarly, intergroup or inter-organizational rivalry might foster inter-individual rivalries, particularly between members in comparable positions – e.g., CFOs at rival firms, or analysts at rival investment banks. In other cases, rivalry may fail to spread across levels – rivalries between less influential members may not be adopted by their respective groups, and less committed or strongly identified organizational members may fail to internalize macro-level rivalries.

Seventh, the subject of asymmetric rivalry presents an interesting avenue for research. Rivalry as I have defined it leaves open the possibility that an actor may feel rivalry towards another actor but that these feelings are not reciprocated. It would be interesting to explore whether such asymmetric rivalry has different consequences than rivalry that is reciprocal. Eighth, rivals may vary in the extent to which they feel animosity vs. respect towards one another. For example, famous basketball rivals Larry Bird and Magic Johnson appeared to respect one another, whereas executives at Virgin Atlantic and British Airways likely did not. The extent to which these brands of rivalry have different antecedents and consequences presents another avenue for research.

Ninth, it might be interesting to consider the evolutionary basis for rivalry. From a functional standpoint, how is a psychological preoccupation with certain other opponents beneficial? One possible answer could be that because much of human evolution took place in group settings, individuals may have typically only faced a handful of other individuals of similar fitness or status. Thus it may have been beneficial to focus all of one's efforts on outperforming these specific individuals, rather than also competing with others of much higher or lower hierarchical rank. Another possibility is that perhaps displaying a willingness to do whatever it takes to win, even at personal cost, may be functional because it leads others to back down. In other words, although some of the actual behaviors engendered by rivalry might be suboptimal for the individual – such as being willing to sacrifice personal gains to limit those of a rival – perhaps projecting a willingness to engage in these behaviors is actually beneficial. Actors who perceive such willingness in their prospective opponents may be less likely to engage them in competition – thus benefiting these opponents and obviating the need for them to actually engage in these costly behaviors. This idea is similar to notion that apparently irrational emotional reactions may be beneficial due to their ability to signal behavioral tendencies to others (Frank, 1988) – for instance, if my emotions drive me to pursue justice no matter the cost, then others may be less likely to try to take advantage of me.

Finally, it might be interesting to examine certain questions related to the sociology of rivalry. For instance, how are feelings of rivalry are transmitted among or shared between organizational members? Can rivalry be contagious, much as emotions and attitudes about work can be? Further, to what extent is rivalry felt and expressed by observers of competition in addition to the competitors themselves? Anecdotal evidence from sports certainly suggests that observers may experience the rivalries their teams are engaged in. To the extent that individuals identify with or are connected to an actor – be it another individual or organization – we might expect them to internalize the rivalries that actor is involved in.

Conclusion

This dissertation represents the first systematic exploration of the psychology of rivalry. The results of my research indicate that rivalry can be a powerful determinant of behavior, and thus deserves greater research attention. A wide range of exciting possibilities exist for future research.

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Footnotes

¹ Parts of the Preface and Chapter 1 are drawn from Kilduff, Elfenbein, & Staw (2010).

² Custom-built software was created to aid with the analyses of race data.

³ An alternative approach to classifying target runners as rivals or non-rivals might be to try to assess the level of rivalry that the entire field of competitors imposes on a focal runner (although this would be a significant methodological challenge). However, this seemed less appropriate given that the surveys collected in Study 2A suggested that runners tend to focus on just a few key rivals.

⁴ I also ran analyses using log-transformed measures for average pledge size and dollars raised per hour, due to concerns about possible outliers. Results from these analyses were not meaningfully different.

Table 1: Chapter 2, Study 2B formulas used to estimate rivalry between runners.

Rivalry Formula 1	Similarity	$5 * (\text{same gender}) + (\text{MAX}(11 - (\text{ABS}(\text{focal age} - \text{target age}) * (5/11)), 0)$
	Repeated Competition	$10 * (\# \text{ races run by both runners together} / \# \text{ races run by the focal runner})$
	Past Competitiveness	$\text{MAX}((30 - (\text{average margin of victory b/w runners})) / 3, 0)$
Rivalry Formula 2	Similarity	$5 * (\text{same gender}) + (\text{MAX}(11 - (\text{ABS}(\text{focal age} - \text{target age}) * (5/11)), 0)$
	Repeated Competition	$(\ln(\# \text{ races run by both runners together}) / \ln(23)) * 10$
	Past Competitiveness	$\text{MAX}((30 - (\text{average margin of victory b/w runners})) / 3, 0)$
Rivalry Formula 3	Similarity	$5 * (\text{same gender}) + (\text{MAX}(11 - (\text{ABS}(\text{focal age} - \text{target age}) * (5/11)), 0)$
	Repeated Competition	$\text{MIN}(\# \text{ races run by both runners together}, 10)$
	Past Competitiveness	$\text{MAX}((20 - (\text{average margin of victory b/w runners})) / 2, 0)$

Table 2: Chapter 2, Study 2B regressions of race pace (sec/km).

Variables	Model 1	Model 2	Model 3	Model 4
Number of runners (log-transformed)	1.45† (0.84)	1.53† (0.86)	1.39† (0.85)	1.60† (0.85)
Rival present	-4.44** (1.44)			-3.98** (1.50)
Number of rivals present		-2.12** (0.82)		
Proportion of rivals present			-4.43* (1.89)	
Two or more rivals present				-2.20 (1.97)

^a $n = 866$ runner-races

^b All models include fixed effects for runners and distances

† $p \leq .10$, all tests two-tailed

* $p \leq .05$

** $p \leq .01$

Table 3: Chapter 4 calling performance by condition (N = 57).

Performance Metric	Estimated Mean (Control)	Estimated Mean (Competition)	Estimated Mean (Rivalry)	Condition F-test	Rivalry vs. Control (Contrast)	Rivalry vs. Competition (Contrast)	Rivalry/Competition vs. Control (Contrast)
Pledge Rate	26.93% (2.49)	30.22% (3.01)	37.46% (3.22)	F = 3.33, p < .05	F = 6.62, p < .02	F = 2.70, p = .11	F = 4.27, p < .05
Pledges per Hour	0.61 (.11)	0.74 (.13)	0.89 (.14)	F = 1.35, p = .27	F = 2.67, p = .11	F = .63, p = .43	0.21, p = .15
Average Pledge Amount	\$146.29 (27.59)	\$218.22 (33.47)	\$189.12 (35.50)	F = 1.42, p = .25	F = .91, p = .35	F = .36, p = .55	F = 2.41, p = .13
\$\$ Raised per Hour	\$115.52 (67.44)	\$208.17 (81.86)	\$261.01 (87.06)	F = 0.95, p = .39	F = 1.75, p = .19	F = .20, p = .66	F = 1.75, p = .19
Hours Worked	16.62 (.87)	16.61 (1.06)	17.34 (1.12)	F = .15, p = .86	F = .26, p = .62	F = .22, p = .64	F = .09, p = .76
Attempts per Hour	72.98 (1.61)	68.93 (1.95)	70.17 (2.07)	F = 1.39, p = .26	F = 1.15, p = .29	F = .19, p = .66	F = 2.53, p = .12

Table 4: Chapter 4 job attitudes by condition (N = 38).

Attitudinal Measure	Estimated Mean (Control)	Estimated Mean (Competition)	Estimated Mean (Rivalry)	Condition F-test	Rivalry vs. Control (Contrast)	Rivalry vs. Competition (Contrast)	Rivalry/Competition vs. Control (Contrast)
Job Satisfaction	4.44 (.24)	4.59 (.28)	4.50 (.30)	F = .92, p = .92	F = .02, p = .88	F = .05, p = .82	F = 0.11, p = .74
Organizational Commitment	4.42 (.17)	4.67 (.23)	4.68 (.21)	F = .65, p = .53	F = .88, p = .36	F = .00, p = .99	F = 1.30, p = .26
Job Meaningfulness	4.57 (.22)	4.76 (.29)	4.85 (.28)	F = .36, p = .70	F = .62, p = .44	F = .04, p = .84	F = .69, p = .41
Burnout	3.97 (.21)	3.20 (.25)	3.82 (.25)	F = 3.03, p = .06	F = .19, p = .67	F = 3.05, p = .09	F = 2.82, p = .10
Job Enjoyment	4.13 (.18)	4.88 (.24)	3.83 (.23)	F = 5.27, p = .01	F = 1.04, p = .32	F = 9.71, p < .01	F = .80, p = .38
Motivation	5.39 (.16)	5.41 (.21)	4.94 (.19)	F = 1.89, p = .17	F = 3.12, p = .09	F = 2.62, p = .12	F = .97, p = .33

Figure 1: Chapter 2, Study 1 self-reported motivation by condition (N = 74).

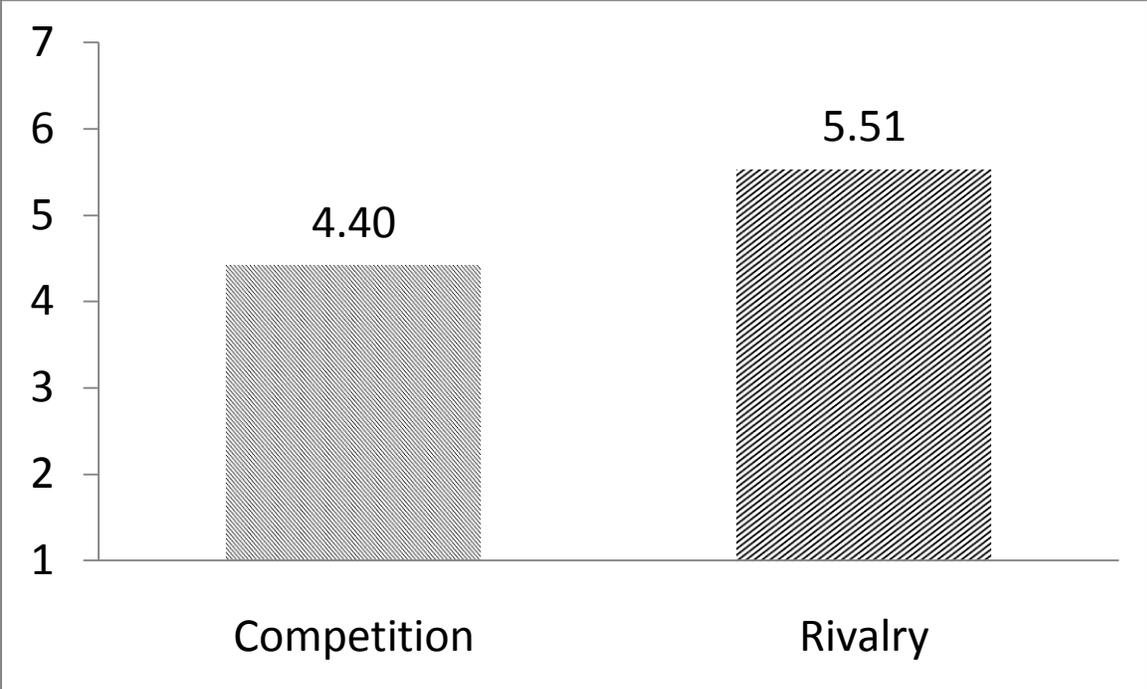


Figure 2: Chapter 3, Study 1 Machiavellianism by condition (N = 158).

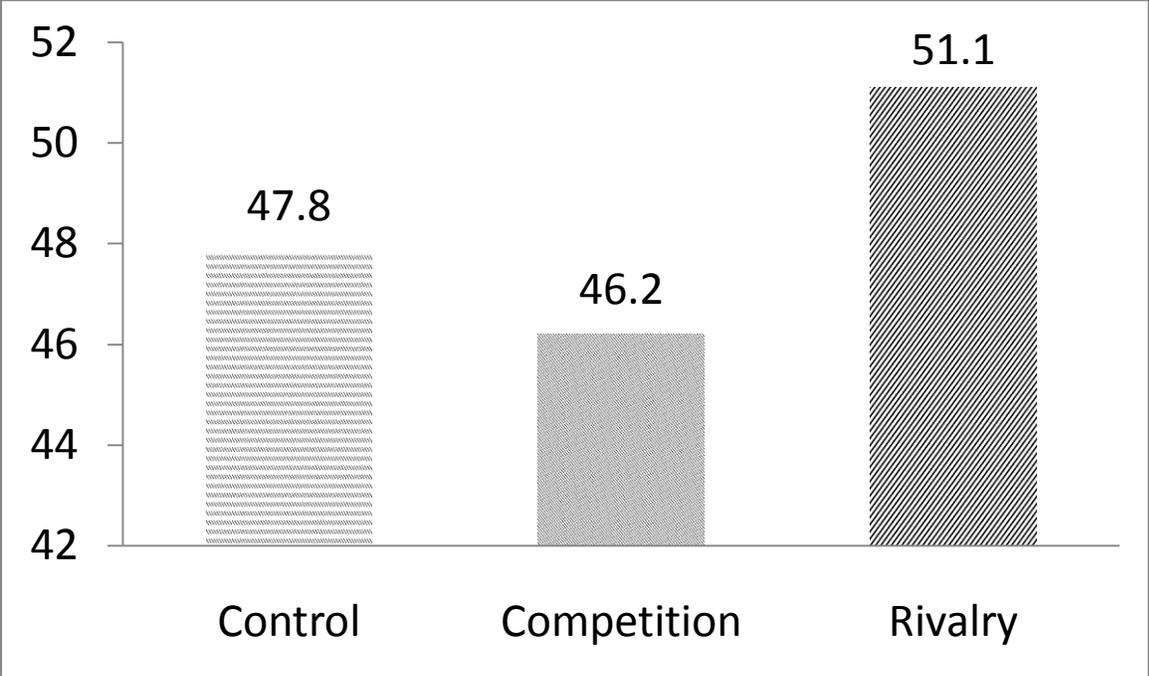


Figure 3: Chapter 3, Study 2 Machiavellianism by condition (N = 134).

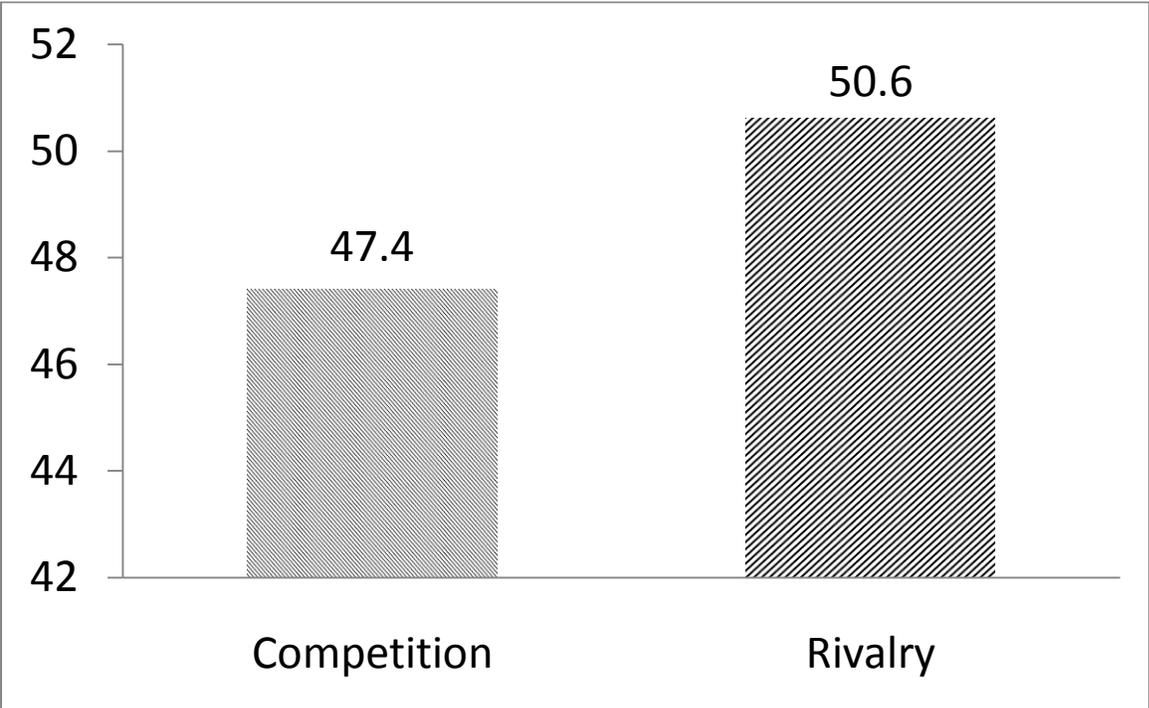
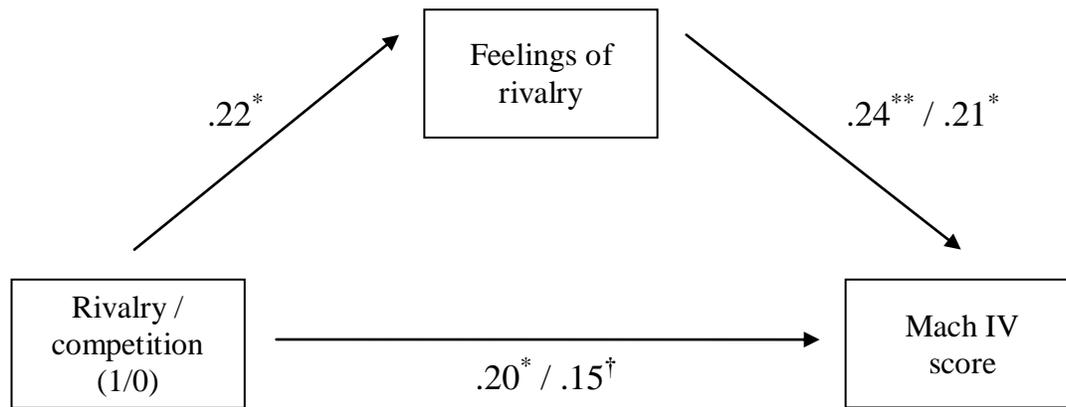


Figure 4: Chapter 3, Study 2 mediation by feelings of rivalry (N = 134).



$^\dagger p \leq .10$, $^* p \leq .05$, $^{**} p \leq .01$.

Figure 5: Chapter 3, Study 3 proportion of participants misreporting their performance (N = 97).

