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Ranks and Rivals: A Theory of Competition

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Social comparison theories typically imply a comparable degree of competition between commensurate rivals who are competing on a mutually important dimension. However, the present analysis reveals that the degree of competition between such rivals depends on their proximity to a meaningful standard. Studies 1 to 3 test the prediction that individuals become more competitive and less willing to maximize profitable joint gains when they and their commensurate rivals are highly ranked (e.g., #2 vs. #3) than when they are not (e.g., #202 vs. #203). Studies 4 to 6 then generalize these findings, showing that the degree of competition also increases in the proximity of other meaningful standards, such as the bottom of a ranking scale or a qualitative threshold in the middle of a scale. Studies 7 and 8 further examine the psychological processes underlying this phenomenon and reveal that proximity to a standard exerts a direct impact on the basic unidirectional drive upward, beyond the established effects of commensurability and dimension relevance.

Keywords: *competition; social comparison; decision making; social capital; behavioral economics; choice behavior*

"First one to the tree is the *COOLEST-PERSON-IN-THE-WORLD*!" A herd of children then stampede toward the tree. Another stampede transpires when one of them shouts, "Last one there is a *ROTTEN EGG*!" The structure of these childhood games tell us something interesting about the dynamics of competition: Competition is not equally distributed among the racing children. In the former race, the children closest to the tree will be more likely than their farther-behind counterparts to tug and pull at each other's clothing to preempt their competitors from getting to the tree first. Similarly, in the latter race, the children lagging behind, the would-be rotten eggs, will be likely to act more competitively than those farther ahead. Competition—a manifestation of the social comparison process (Festinger, 1942, 1954; Hoffman, Festinger, & Lawrence, 1954; Tesser, 1988; Whittemore, 1924, 1925)—has generally been assumed to be greatest among rivals with commensurate attributes on a relevant dimension (Goethals, 1986; Goethals & Darley, 1977; Stanne, Johnson, & Johnson, 1999). However, we propose that competitive behavior intensifies when rivals have high rankings (e.g., #2 vs. #3) compared to intermediate ones (e.g., #202 vs. #203). Moreover, this increased competition among highly ranked rivals signifies a more general phenomenon—a tendency for competition among commensurate rivals on a relevant dimension to intensify in the proximity of a meaningful standard. Such standards are not limited to high rankings (e.g., "the top" standard) but also may include rankings that coincide with a bottom or qualitative threshold in the middle of such a scale (e.g., #500 on the *Fortune* 500 vs. #501—just off it).

From *The Financial Times* to *Billboard*, *Forbes*, *The Wall Street Journal*, and *U.S. News & World Report*, rankings permeate our popular culture, and the present analysis uses the ranking context to advance our understanding

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of the social comparison process. In doing so, the current studies also build on the choice literature that found individuals willingly trade off social comparison concerns (e.g., disadvantageous inequality) for profit (Bazerman, Loewenstein, & White, 1992; Bazerman, White, & Loewenstein, 1995; Blount & Bazerman, 1996). We qualify this finding, however, by revealing that such trade-offs become more difficult and less likely for rankings in the proximity of a meaningful standard than for rankings farther away from a standard.

Social Comparison and Competition

An upward comparison of the self to someone else who is better on a valued dimension can be especially painful and foster competitive behavior (Brickman & Bulman, 1977; Tesser, 1988; Tesser, Felson, & Suls, 2000). In Festinger's (1954) words, "competitive behavior, action to protect one's superiority, and even some kinds of behavior that might be called cooperative, are manifestations in the social process of these pressures" (p. 126) to reduce such discrepancies. For example, in a classic experiment (Hoffman et al., 1954), after one participant in a group of three began scoring considerably well on a performance task, the other two began to act in ways aimed at preventing the higher scorer from gaining additional points. Such competitive behavior served to reduce the relative differences in performance between the higher scorer and the lower ones.

For competition to occur, however, the social comparison must be important to the self, and one significant factor that makes social comparisons important to the self is the relevance of the dimension at hand. The Self-Evaluation Maintenance Model (Beach & Tesser, 2000; Tesser, 1988), for instance, reminds us that not all upward comparisons are painful. Only when the dimension is relevant to the self will the upward comparison be painful and increase competitive behavior. For example, Tesser and Smith (1980) paired acquainted or unacquainted individuals in an interactive word identification task and told them task performance was either relevant or irrelevant to a valued dimension—verbal skill. Results showed that participants who thought performance was relevant to their own verbal skill gave more difficult clues to their partners than did participants who thought that performance was irrelevant. As Tesser (1988) explains, "when the task is relevant and another's performance threatens to surpass our own, we may take action to prevent that from happening" (p. 444). Competition therefore increases when the dimension is relevant to the self.

Another significant factor that makes social comparison important to the self is the commensurability of the reference person. According to the related attributes hypothesis (Goethals & Darley, 1977; see Suls & Wheeler, 2000), we have a tendency to choose a reference person who is "close to one's own performance or opinion, given his standing on characteristics related to and predictive of performance or opinion" (Goethals & Darley, 1977, p. 265). The reference person is someone with similar characteristics as the self, and this reference person keeps the self motivated to perform just as well, if not better, than this commensurate other.

Thus, according to both the Self-Evaluation Maintenance Model (Tesser, 1988) and the related attributes hypothesis (Goethals & Darley, 1977), social comparison on a mutually relevant dimension (e.g., profit) with a commensurate counterpart (e.g., rival) generates competition. We propose, however, that rankings provide important contextual information about an additional significant factor that can moderate competition even when the dimension is highly relevant and the reference person, or rival, is commensurate. Moreover, we suggest that this effect impacts competition directly via a basic drive underlying social comparison of performance—the unidirectional drive upward (Festinger, 1954).

Proximity to a Standard and the Unidirectional Drive

Festinger (1954) posits that "there is a unidirectional drive upward in the case of abilities which is largely absent in opinions" (p. 124). This drive is premised on the existence of an obvious, basic, and ubiquitous standard, namely, the top. For clarity, we take our definition of *standard* from the dictionary: "An acknowledged measure of comparison for quantitative or qualitative value; a criterion" (*The American Heritage Dictionary of the English Language*, 2000). In the typical case, higher is better because high rankings convey one's proximity to the standard of reaching the top (e.g., self and rival ranked #2 and #3).

However, if the presence of a standard drives social comparison, we might expect the unidirectional drive upward to become even stronger in the proximity of the standard, that is, near the top. In this case, rivals with high rankings would behave more competitively, whereas rivals with intermediate rankings (e.g., #202 vs. #203), far from the standard, will behave less competitively. Furthermore, if high rankings signify one's proximity to the top and thereby amplify competition, then other rankings that signify a standard also should increase competition. For instance, competition also should increase where there is a cost to being ranked last, or to the extent that one's rank may not meet a given standard in the middle of the ranking scale. Contrary to the view implied by previous research (e.g., Goethals & Darley, 1977; Tesser, 1988), competition between commensurate rivals on a mutually important dimension is not static but rather dynamic, fluctuating as a function of self-other ranking information.

Whereas previous research on the rank-order paradigm primarily used rankings to measure comparison selection (Suls & Wheeler, 2000; Wheeler, 1966), we use rankings to ensure rivals' commensurability and vary the rivals' distance from the standard, ergo the unidirectional drive. By manipulating the very unidirectional drive on which social comparison is based, the present analysis makes two important contributions: showing (a) that high rankings can increase competition between rivals to a greater extent than intermediate rankings because high rankings signify proximity to the top and (b) that this high-ranking effect represents a more general phenomenon, occurring wherever rankings coincide with other standards.

Overview

Using multiple measures of competition, we predicted that people would become averse to trading disadvantageous inequality for extra profit (e.g., an unequal allocation that puts the decision maker at a disadvantage compared to another recipient), rate the pain of social comparison as being greater, and report more intense feelings of competition when they and their rivals' rankings were proximate to a valued standard (e.g., high rankings) than when they were not (e.g., intermediate rankings). To ensure rivals' commensurability (Goethals & Darley, 1977), paired rivals always occupied two contiguous ranks (e.g., #n vs. #n+1). We also focus only on dimensions that are mutually relevant to the rivals in the context at hand, without manipulating relevance. Using a decision-making methodology, Studies 1 to 3 demonstrate that competition intensifies with high rankings, Studies 4 to 6 generalize this effect to other rankings that signify a standard, and Studies 7 and 8 measured the unidirectional drive upward.

STUDY 1

One common measure of competition in the pay-offs and profit maximization literature (e.g., Axelrod & Dion, 1988; Brickman, 1975; Kelly & Thibaut, 1978; Messick & Sentis, 1979; Messick & Thorngate, 1967; Turner, Brown, & Tajfel, 1979) is the trade-off between profit and disadvantageous inequality (Bazerman et al., 1992, 1995; Bazerman, Schroth, Shah, Diekmann, & Tenbrunsel, 1994; Blount & Bazerman, 1996; Garcia, Tor, Bazerman, & Miller, 2005), where participants choose between an equal amount as another individual (e.g., self: $500, other: $500) or a more lucrative but disadvantageously unequal amount (e.g., self: $600, other: $800). The implication of choosing this latter pay-off is that individuals willingly forgo social comparison concerns for extra profit (Bazerman et al., 1992), whereas the more competitive strategy is to choose the former suboptimal equal pay-off.

We predicted that more individuals in the high-rankings condition than in the intermediate rankings condition would choose a less lucrative but equal pay-off (e.g., 5% self, 5% other) over a more lucrative but disadvantageously unequal one (7% self, 25% other). We also included a control condition (Wheeler, 2000) where no ranking information was provided. If the control condition were to produce results akin to the intermediate rankings condition, we could infer that the high rankings amplify competition, as predicted. If it were to resemble the high rankings condition, on the other hand, we could infer that intermediate rankings somehow deflate competition.

Participants

A total of 162 undergraduates (85 women, 77 men) from two midwestern universities received $8 for completing a 45-min survey packet or volunteered at the library.

Procedure

In a between-subjects design, the high rankings and intermediate rankings conditions were titled "Top 500 Nonprofits" and read as follows:

> Imagine that you are the CEO of a nonprofit organization that is ranked #1 [#101] in donation earnings. You are thinking about a fundraising joint venture with another nonprofit organization that is ranked #2 [#102]. Income from donations will depend on whether or not you enter the joint venture. Strategy A: Without a joint venture, your nonprofit organization's donations will increase by 5% and the other nonprofit's donations will increase by 5%—OR—Strategy B: With a joint venture, your nonprofit organization's donations will increase by 7% and the other nonprofit's donations will increase by 25%.

Participants were then asked to choose one option. The control condition simply omitted ranking information on donation earnings.

Results and Discussion

To test the prediction that high rankings amplify competition relative to intermediate rankings (and the control condition), we performed a binary logistic regression by using the following contrast: 2 (*high rankings*), −1 (*intermediate rankings*), and −1 (*control*). This contrast was significant ($B = -.46$, $Wald = 13.2$, $p < .001$), suggesting that the high rankings condition significantly differed from the average of both intermediate rankings and the control. Only 54% in the high rankings

condition ($n = 50$) maximized profit compared to 79% in the intermediate ranking condition ($n = 56$) and 86% in the control condition ($n = 56$). We also conducted follow-up individual comparisons in the context of their own set of orthogonal regressions. As predicted, a significant contrast emerged between the high and intermediate rankings (1, –1, 0: $B = -.57$, $Wald = 7.0$, $p < .01$), controlling for its orthogonal pair (1, 1, –2: $B = -.35$, $Wald = 5.9$, $p < .05$). Moreover, as expected, the contrast between the intermediate rankings and control was not significant (0, 1, –1: $B = -.25$, $Wald = .96$, $p > .32$), controlling for the orthogonal one (2, –1, –1: $B = -.46$, $Wald = .13.4$, $p < .001$).

Because the data from the control condition were much closer to the intermediate ranking condition than to the high ranking condition, the implication is that high rankings enhanced the social comparison process. Furthermore, the effect of rankings on competition transpired, although ranking information was arguably irrelevant to the nonprofit organization's goal of maximizing donation income. Indeed, the participants recognized this fact because a majority maximized joint gains across all conditions. Even so, the high rankings condition augmented social comparison concerns sufficiently to make the trade-off between disadvantageous inequality and profit a bit more difficult.

STUDY 2

Although high rankings appear to amplify social comparison, one possible explanation is that individuals in the high rankings condition of Study 1 chose suboptimal rates of donation growth to preserve the visibility of their nonprofit organization. Hence, their choice could be a profit-maximizing choice in the longer term that takes into account visibility effects instead of the result of competitive feelings brought about by social comparison per se. Study 2 addressed this issue by removing the choice of pay-offs and simply asking participants how competitive they would behave toward their rival. Study 2 also lowered the rankings in the high rankings condition to show that proximity to the top, instead of actually being at the top, suffices to generate the effect. To link the choice results in Study 1 directly to social comparison, Study 2 also captured ratings of the pain of social comparison (Bazerman et al., 1992; Brickman & Bulman, 1977).

Participants

A total of 49 undergraduates (22 women, 27 men) at a midwestern university received $8 for completing a 45-min packet of surveys.

Procedure

Participants read, "Imagine that you are the CEO of a nonprofit organization. You are thinking about a fundraising joint venture with a rival nonprofit organization. Income from donations will depend on whether or not you enter the joint venture." High and intermediate rankings contexts were presented randomly: "Suppose that you have the #9 [#209] rank title in donations earnings and the other nonprofit has the #10 [#210] rank title." Two questions followed each context, "How competitive would you feel toward the other nonprofit? (1 = *not competitive*, 7 = *very competitive*)" and "How painful would it be if the other nonprofit surpassed you in the rankings? (1 = *painless*, 7 = *painful*).

Results and Discussion

As predicted, individuals indicated that they would feel more competitive toward the rival nonprofit when they were ranked #9 and the rival nonprofit #10 ($M = 4.37$, $SD = 1.85$) than when ranked #209 and the rival #210 ($M = 3.65$, $SD = 1.81$), $F(1, 48) = 13.3$, $p < .01$. Individuals similarly indicated that they would feel more pain knowing that their rival surpassed them in the context of high ($M = 4.20$, $SD = 1.80$) versus intermediate rankings ($M = 3.35$, $SD = 1.63$), $F(1, 48) = 12.9$, $p < .01$. The correlation between competitiveness and the pain of social comparison was highly significant in the high ($r = .68$, $p < .001$) and intermediate rankings ($r = .71$, $p < .001$) conditions alike. Taken together, these results buttress the social comparison account, namely, that highly ranked rivals who are proximate to the top standard feel more competitive and anticipate more social comparison pain, as compared to rivals ranked farther away from this standard.

STUDY 3

Whereas Studies 1 and 2 suggest that high rankings intensify competition relative to intermediate ones, Study 3 directly tested the hypothesis that competition increases with the proximity to the top, following our claim that the unidirectional drive upward intensifies as a function of this proximity. Study 3 tested this prediction systematically by varying the rivals' distance from the standard. Study 3 also used a within-subjects design to underscore the strength of individual decision makers' preferences because some researchers feel that such designs enable individuals to make more consistent decisions (Camerer, 1995).

Participants

A total of 30 undergraduates at a midwestern university responded to an e-mail invitation for an online

study. A total of 100 randomly selected e-mail addresses from the undergraduate student directory were e-mailed but a few bounced back, yielding an approximate response rate of 30%. All online participants volunteered; they did not receive course credit or pay. We also note that online data collections for decision-making experiments tend to produce similar results as in-person ones (Birnbaum, 1999), with the added benefit of capturing a more diverse sample (Nosek, Banaji, & Greenwald, 2002).

Procedure

In a within-subjects design, participants read about a poker tournament:

> Imagine that you are playing in a 1-day poker tournament with 500 players. For the final round, you are deciding whether or not to team up with one of your rivals. Strategy A: If you play solo, your tournament earnings will increase by 5% and your rival's by 5%—OR—Strategy B: If you play as a team, your tournament earnings will increase by 10% and your rival's by 25%.

Participants were then asked, "In the following cases, which strategy would you pursue?" Participants then read verbatim, "Before the final round, you are ranked #3 in tournament earnings and your rival is ranked #4 . . ." and then indicated their strategy. Participants responded to four randomly presented iterations of the same question that varied the rankings (self vs. rival): #3 vs. #4, #6 vs. #7, #12 vs. #13, and #24 vs. #25.

Results and Discussion

We conducted a Generalized Estimating Equations (GEE) analysis[1] to test the prediction that competitive behavior would increase with the rivals' proximity to the top standard. The score statistic for the GEE analysis was significant, $\chi^2(3) = 15.81$, $p < .01$. We then conducted a linear contrast with the following weights: −3 (3 vs. 4), −1 (6 vs. 7), 1 (12 vs. 13), and 3 (24 vs. 25). This predicted linear pattern was significant, $\chi^2(1) = 14.02$, $p < .001$, whereas the two orthogonal patterns were not (quadratic: 1,−1,−1, 1), $\chi^2(1) = 1.84$, $p = .18$ (cubic: −1, 3, −3, 1), $\chi^2(1) = .84$, $p = .36$. Only 20% maximized joint gains when ranked #3 and their rival #4, compared to 23% when ranked #6 and rival #7, 47% when ranked #12 and rival #13, and 70% when ranked #24 and rival #25 (see Figure 1). Thus, Study 3 supports the prediction that competition increases as the rivals become increasingly proximate to the top standard.

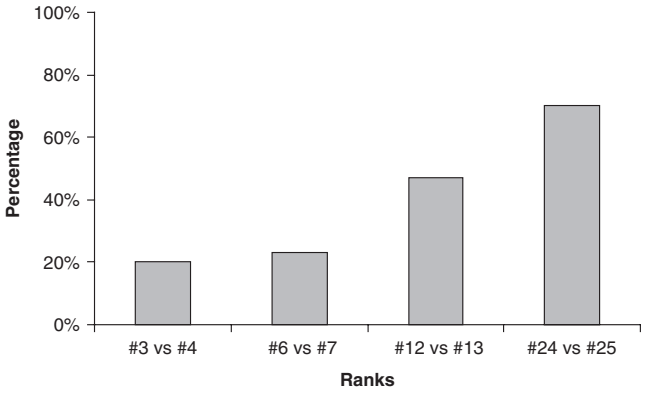

Figure 1 Poker: Percentage maximizing joint gains by rankings.

Beyond High Rankings

Studies 1 to 3 show that high rankings intensify competition relative to intermediate rankings and that competition grows increasingly stronger as rivals become more proximate to the top standard. However, we argued that high rankings should intensify competition because they indicate how far one is from a standard. Therefore, if this standard-based model is true, as Studies 1 to 3 suggest, then other rankings that signify a standard should likewise amplify competition compared to rankings that do not. Incidentally, this predicted pattern is somewhat reminiscent of the striking finding that bronze medalists are happier than silver ones (Medvec, Madley, & Gilovich, 1995). However, the present analysis focuses on social comparison and competition, whereas the medalist study focused on counterfactual thinking (e.g., Roese & Olson, 1993) following a competition.

Thus, Study 4 tested the prediction that competition will be greater when the rivals had either high rankings or bottom rankings that coincide with a valued standard, compared to intermediate rankings. Because previous research (Smith & Insko, 1987) suggests that academic achievement is an important dimension to our participant pool (i.e., students), Study 4 manipulated one's rank at a university as an indicator of academic achievement. Using class rankings, we tested the prediction that those who are proximate to an academic standard (ranked top or last in the class) would behave more competitively than those who are not proximate to one of these standards (e.g., ranked in the middle).

STUDY 4

Participants

A total of 68 undergraduates at a midwestern university participated in an online study, and the recruiting

process is described in Study 3. Two hundred e-mails were sent and the response rate was approximately 34%.

Procedure

Participants read the following:

> Imagine that you are studying for a final exam that is worth half of your grade and you are deciding whether to study with another classmate. Your decision will directly affect your performance on the final exam and indirectly affect your final grade in the course, cumulative GPA, and rank at the University.

Three questions varied the rivals' rankings and were randomly presented in a within-subjects design:

> Suppose that you are ranked #5 [#101] [#499] out of 500 at a university and the other classmate is ranked #6 [#102] [#500]. What would be your decision? Study Alone: Your percentage on the final will increase by 5% and the classmate's by 5%—OR—Study with Classmate: Your percentage on the final will increase by 10% and the classmate's by 20%.

Results and Discussion

Results from a GEE analysis supported the prediction that participants would prefer a more competitive strategy when the self and rival were ranked highly or at the bottom of the class than when ranked in the middle. The score statistic for the GEE analysis was significant, $\chi^2(2) = 17.22$, $p < .001$. We also conducted a follow-up contrast analysis with the following weights to test this quadratic pattern: 1 (*high rankings condition*), −2 (*intermediate rankings condition*), and 1 (*bottom rankings condition*). The predicted quadratic pattern was significant, $\chi^2(1) = 17.02$, $p < .001$, whereas the orthogonal linear pattern was not (−1, 0, 1), $\chi^2(1) = 2.13$, $p = .14$, suggesting that the intermediate rankings condition significantly differed from the high and bottom rankings conditions, which did not significantly differ from each other. A total of 59% in the high ranking, 81% in the intermediate ranking, and 69% in the bottom ranking conditions maximized exam percentage points (see Figure 2). Thus, it appears that rankings exert their effect through the standards they signify because the social comparison process intensified when a bottom ranking coincides with the standard of being last in the class.

STUDY 5

Although Study 4 supports our standard-based model, one might argue that social comparison concerns only increase at the endpoints of a distribution, a possible implication of range-frequency theory (Parducci, 1965, 1995). Accordingly, Study 5 used the setting of the *Fortune* 500, which is only a segment (Top 500) of the entire distribution of publicly traded companies. We predicted that competition would be greatest when rivals were ranked #3 and #4 and when ranked #500 and #501 (off the list), compared to ranks of #103 and #104. To illustrate the robustness of the effect, Study 5 also measured competition with a flipped trade-off where profit was coupled with equality and the unequal pay-off was advantageous but less lucrative.

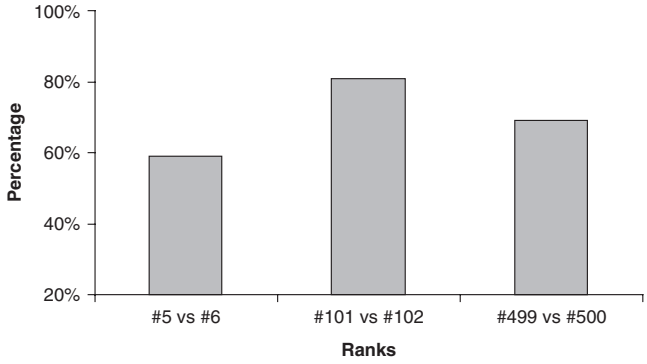

Figure 2 Class rank: Percentage maximizing joint gains by rankings.

Participants

A total of 72 undergraduates (33 women, 39 men) at two midwestern universities were recruited at the library and volunteered to participate in a brief study. Research assistants targeted students who were studying by themselves and the response rate was generally very high (approximately 90%). Groups of students were always avoided becaus e of the tendency for study groups to confer and compare their responses during the task.

Procedure

In a between-subjects design, participants in the high, intermediate, and bottom rankings conditions read,

> Imagine that you are the CEO of a company that is ranked #3 [#103] [#500] on the prestigious *Fortune* 500 and you are thinking about a possible joint venture with a rival company ranked #4 [#104] [#501, just off the list]. Profits will depend on whether or not you enter a joint venture.

Participants then chose "Strategy A: Without a joint venture, your company's profits will increase by 5% and

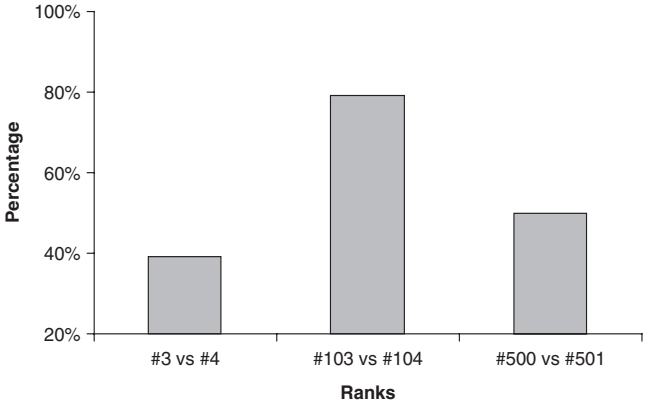

Figure 3 Fortune 500: Percentage maximizing joint gains by rankings.

your rival's profits will increase by 1%." or "Strategy B: With a joint venture, your company's profits will increase by 6% and your rival's profits will increase by 6%."

Results and Discussion

To test the prediction that competition would be greater among rivals ranked #3 and #4 and #500 and #501 (just off the *Fortune* 500), compared to rivals ranked #103 and #104, we performed a binary logistic regression by using the following contrast: 1 (*high rankings*), −2 (*intermediate rankings*), and 1 (*bottom rankings*). The contrast was significant ($B = -.53$, $Wald = 7.5$, $p < .01$), suggesting that the high rankings condition significantly differed from the intermediate rankings condition but not from the bottom rankings condition. Only 39% of the participants in the high rankings condition ($n = 26$) and 50% of the participants in the bottom rankings condition ($n = 22$) chose the more profit-maximizing, equal pay-off, compared to 79% in the intermediate rankings condition ($n = 24$, see Figure 3). We also conducted follow-up individual comparisons in the context of their own set of orthogonal regressions. As predicted, a significant contrast emerged between the high and intermediate rankings conditions (1, −1, 0: $B = -.90$, $Wald = 7.8$, $p < .01$), controlling for the orthogonal contrast (1, 1, −2: $B = .14$, $Wald = .66$, $p = .41$). The contrast between the intermediate and bottom rankings also was significant (0, 1, −1: $B = .67$, $Wald = 4.1$, $p < .05$), controlling for the orthogonal one (2, −1, −1: $B = -.38$, $Wald = 4.8$, $p < .05$).

Thus, competition also can increase when a bottom ranking coincides with a standard—in this case, just missing the *Fortune* 500 criterion—showing again that the ranking effect is not about high rankings alone. This data pattern also refutes a psychophysical counter-explanation for the effect found here. Psychophysics research (Sherif & Hovland, 1961; Volkmann, 1936; Zipf, 1949) suggests that a one-unit distance between the contiguous ranks of #3 and #4 may seem much larger than a one-unit distance between a ranking of #103 and #104. Hence, one might argue that perhaps competition only increases amid high rankings where the difference is greater. Yet, as Study 5 (and Study 4) suggest, this psychophysical account alone cannot explain this ranking effect because the difference between the ranking of #500 and #501 is actually smaller than the ranking of #103 and #104 yet is a point of increased, not decreased, competition. Again, the standard matters, not the ranking per se.

STUDY 6

Study 5 also implies, however, that competition can increase even amid intermediate rankings because the bottom rank of #500 of the *Fortune* 500 is also intermediate with regard to the rest of the population (or even the *Fortune* 1000). Because Study 5, however, did not make this characteristic of the *Fortune* 500 explicit, participants may have implicitly considered the list to be a complete distribution rather than a segment thereof. Study 6 thus seeks to underscore that the location of the ranking on the scale—top, bottom, or somewhere in the middle—is incidental; what matters is whether that ranking signifies a standard. In Study 6, we therefore tested the prediction that competition increases in the proximity of any valued standard, regardless of its overall rank.

Participants

A total of 73 undergraduates at a midwestern university participated in an online survey, and the recruiting process is described in Study 3. Two hundred e-mails were sent and the response rate was approximately 36%.

Procedure

Participants were assigned to one of three between-subjects conditions. Participants in the Top 100 Get Bonus Condition read, "Imagine that you are playing in a 1-day poker tournament with 500 players. Everyone who finishes in the Top 100 gets a $100 bonus." Then, all participants in this condition answered three randomly presented questions, "Suppose that, before the final round, you are ranked #2 [#50] [#100] in tournament earnings and your rival is ranked #3 [#51] [#101, just outside the bonus cutoff]. How competitive would you feel toward the rival?" At this point, participants

TABLE 1: Means, Standard Deviations, and Cell Sizes for Competitive Feelings by Condition and Rank

Rank	*#2 Vs. 3*	*#50 Vs. 51*	*#100 Vs. 101*	*#200 Vs. 201*
Top 100 Get Bonus Condition	5.14	4.29	6.05	—
	(2.06)	(1.77)	(1.28)	
	21	21	21	
Top 200 Control Condition	5.59	4.59	4.33	—
	(1.65)	(1.72)	(1.80)	
	27	27	27	
Top 200 Get Bonus Condition	5.64	—	4.16	5.72
	(1.50)		(1.72)	(1.54)
	25		25	25

indicated their response on a 7-point scale (1 = *not competitive*, 7 = *very competitive*).

Participants in the Top 200 Control Condition read the identical scenario, except, "Everyone who finishes in the Top 200 gets a $100 bonus." In this condition, being ranked #100 and the rival #101 was well within the bonus area. Participants in the Top 200 Get Bonus Condition read the identical scenario as the Top 200 Control Condition, except that the rankings were modified. The self was ranked #2 [#100] [#200] and the rival was ranked #3 [#101] [#201, just outside the bonus cutoff].

Results and Discussion

We conducted a repeated-measures ANOVA to test the predicted Context × Rank interaction on the reported competitive feelings. The within-subjects factor of Rank was significant, $F(2, 140) = 16.2$, $p < .001$, whereas the between-subjects factor of Context was not, $F(2, 70) = .54$, $p = .59$. However, as predicted, the Context × Rank interaction was significant, $F(4, 140) = 6.17$, $p < .001$), suggesting that the standard determines whether the ranking incites feeling of competitiveness (see Table 1 for means and standard deviations).

In the Top 100 Get Bonus Condition, a U-shaped pattern emerged. Participants expressed feeling more competitive when ranked highly (#2 vs. #3) and when ranked at the bonus standard (#100 vs. #101, just outside the bonus cutoff) compared to when ranked in the middle (#50 vs. #51). Thus, when a standard is at hand (e.g., missing the bonus cutoff), competition increases. The Top 200 Control Condition showed a different pattern. Because being ranked #100 with a rival ranked #101 was well within the bonus standard, participants expressed lower levels of competition in this ranking position. Finally, participants in the Top 200 Get Bonus Condition showed the same pattern of results as those in the Top 100 Get Bonus Condition. Participants expressed feeling more competitive when ranked #2 and rival #3 and when #200 and rival #201, just outside the bonus cutoff, compared to when ranked #100 and rival #101.

Thus, the standard, not the location of the ranking, determines competition. The very rankings that were a point of contention in the Top 100 Bonus Condition (#100 vs. #101) became a point of cooperation in the other two conditions, and planned comparisons indeed confirmed this pattern. Competition was significantly greater when participants were ranked #100 and the rival #101 in the Top 100 Get Bonus Condition than in the Top 200 Control Condition, $t(46) = 3.70$, $p < .01$, and the Top 200 Get Bonus Condition, $t(44) = 4.14$, $p < .001$, which did not significantly differ from each other, $t(50) = .35$, $p = .73$. Moreover, because these rankings were assigned from a tournament population pool of 500, we also can infer that competitive feelings do not always subside with intermediate rankings because standards placed amid intermediate rankings also can amplify competition. Study 6 therefore further underscores that wherever the standard is, even in the middle of a distribution, competition will intensify. Put differently, what matters most is the location of the standard and proximity to the standard; the ordinal rank itself is incidental.

The Ever-Increasing Upward Drive

Across multiple measures of competition (e.g., the choice between profit and disadvantageous inequality, the choice between profit and advantageous inequality, the pain of social comparison ratings, and feelings of competition), the preceding studies showed consistently not only that competition increases with high rankings but also that this high ranking effect is a more general phenomenon. Any rankings that signify a standard will amplify competition. But what is it about standards that increase competitive concerns? We thus begin to address the question of the underlying psychological mechanism.

Although previous research suggests that competition is greatest when the dimension and reference person are, respectively, relevant and commensurate to the self (e.g., Goethals & Darley, 1977; Tesser, 1988), that research assumes that "unidirectional drive upward" is fixed under these circumstances. The present analysis, however, calibrates the strength of this drive by manipulating the rivals' distance from the standard, holding constant the relevance of the dimension and commensurability of the rivals. According to the proposed model, the motivational drive upward, namely, the importance of doing well, becomes increasingly stronger as rivals approach a standard.

It is possible, however, that standards do not affect the motivational drive upward directly but rather do so indirectly by affecting the perceived commensurability of rivals. Although contiguous ranks were assigned to guarantee commensurability, contiguous ranks at different locations on the ranking scale may not all be equally commensurable. Specifically, a social comparison perspective (Goethals & Darley, 1977; Tesser, 1988) might suggest that rivals who are proximate to a standard are perceived to be more commensurate (e.g., #2 and #3) than rivals further away from the standard (e.g., #202 and #203). On the other hand, a possible extension of the psychophysics research described above (Sherif & Hovland, 1961; Volkmann, 1936; Zipf, 1949) might lead to the opposite prediction, namely, that competition increases in the proximity of a standard because differences between contiguous ranks are perceived to be greater than among less-proximate rankings.

Significantly, Studies 4 to 6 showed that a pure psychophysics mechanism (i.e., in relation to the top of the ranking scale) cannot account for the effect of standards on competition. Nevertheless, the possible extension of the psychophysical intuition to the more general case of standards leads to a prediction diametrically opposed to the traditional social comparison account. The latter, social comparison account, would propose increased commensurability of rivals (or decreased differences between them) in the proximity of standards as a potential mediator of the effect of proximity on competition. The psychophysics account, on the other hand, would propose increased differences between rivals (or their decreased commensurability) in the proximity of standards as a potential mediator of the standard effect.

Studies 7 and 8 therefore begin to explore the psychological mechanism underlying the effect of proximity to a standard on the unidirectional drive upward. Specifically, we examine whether this effect is mediated directly by the importance of doing well or indirectly through the perceived commensurability (either increasing or decreasing) of the rivals.

STUDY 7

Study 7 measured both the importance of doing well and the perceived difference in rank. The prediction was that high rankings, relative to intermediate ones, would be associated with an increase in the importance of doing well regardless of perceived difference in commensurability.

Participants

A total of 34 full-time employees (10 women, 24 men) concurrently enrolled in a part-time master's of business administration (MBA) program at a midwestern university participated in a questionnaire study as part of a class exercise. All those in attendance participated.

Procedure

In a between-subjects design, participants were assigned to either a high rankings or intermediate rankings condition. Participants read a modified version of the *Fortune* 500 scenario:

> Imagine that you are the CEO of a *Fortune* 500 company. Your company is currently ranked #5 [#405] and you are thinking about whether or not to enter a lucrative joint venture with your archrival whose company is ranked #6 [#406].

Participants were given no information, regarding payoffs or otherwise. Participants then responded to two questions about the *importance of doing well* ("How important is it for you to out-compete your archrival?" 1 = *not important*, 7 = *very important*) and the *perceived difference* in rank ("So your company's rank is #5 [#405] and your rival's company is #6 [#406]. How big is the difference in rank?" 1 = *small*, 7 = *large*).

Results and Discussion

A MANOVA was conducted on the importance and difference variables by condition. Results showed that participants in the high rankings condition felt that it was significantly more important to out-compete one's rival ($M = 5.33$, $SD = 1.40$) than did participants in the intermediate rankings condition ($M = 3.53$, $SD = 1.78$), $F(1, 32) = 10.4$, $p < .01$. As for the difference variable, participants in the high rankings condition ($M = 2.40$, $SD = 1.55$) were not significantly different from those in the intermediate rankings condition ($M = 2.53$, $SD = 1.84$), $F(1, 32) = .05$, $p = .83$. Thus, the implication is that high rankings, signaling proximity to the standard, underscored the importance of doing well; no support

was found for the perceived difference in rank. In fact, even when we control for difference as a covariate variable, the high rankings condition is still significantly different on the importance measure from the intermediate rankings condition, $F(1, 31) = 14.2$, $p < .01$.

Incidentally, these results also corroborate our operationalization of commensurability as contiguity of ranks. Here, whether one is ranked highly or intermediately, the perceived difference in rank does not vary, at least not in this between-subjects design. However, one could still argue that the difference account might still play a significant role where people can readily compare differences between high and intermediate rankings (Bazerman et al., 1992; Camerer, 1995; Hsee, Loewenstein, Blount, & Bazerman, 1999), which make the difference account more transparent. Thus, whereas Study 7 linked the importance of doing well and proximity to the standard in the absence of any significant change in the perceived commensurability of the rivals, Study 8 used a within-subjects design to test whether the availability of a comparison between different ranking position leads to changes in perceived commensurability that, in turn, also might mediate the effect of proximity to a standard on competition.

STUDY 8

Study 8 used a within-subjects design where participants could readily compare the difference between high and intermediate rankings. We asked participants to respond to a question about competition on a scale that ranged from cooperative to competitive (slightly different from the strictly competitive measure used in Studies 2 and 6) along with questions about the importance of doing well and the perceived difference in rank. In addition, instead of always having people one rank above their rival, we also included a reciprocal control condition where people are one rank below their, still commensurate, rival. We predicted that the importance of doing well, even when controlling for the perceived difference in commensurability, would be directly related to competitive behavior. No significant differences were predicted for being ranked one above or below the rival.

Participants

A total of 84 undergraduates (49 women, 35 men) participated at a midwestern university. Participants were recruited at the library and asked to volunteer for a brief questionnaire.

Procedure

In a within-subjects design, participants read about having high rankings on the first page,

> Imagine that you are a rock star, and you are ranked #3 out of 500 in sales revenue according to *Rolling Stones Magazine*. Imagine further that you are deciding whether or not to do a duet album with your archrival: a rock star who is ranked #4.

Participants then responded to the questions about *competition* ("How cooperative or competitive would you feel toward your archrival?" 1 = *cooperative*, 7 = *competitive*), the *importance of doing well* relative to rival ("How important would it be for you to out-compete your archrival?" 1 = *not important*, 7 = *very important*), and the *perceived difference* in rank ("So, you are ranked #3 and your archrival is ranked #4. How big is the difference in rank?" 1 = *small*, 7 = *large*). On the second page, participants read about intermediate rankings, "Now, imagine that you are ranked #303 out of 500 . . . [archrival] is ranked #304." Participants then responded to the three questions above. The order of presentation also was counterbalanced such that the first page was about intermediate rankings.

In addition to this within-subjects factor (RANK: high/intermediate), we also controlled for ranking position as a between-subjects factor (POSITION: one above/one below), in which the self was ranked just one below the rival (e.g., self #4/rival #3 and self #304/rival #303).

Results and Discussion

We conducted a repeated-measures ANOVA on the *competition*, *importance*, and *difference* measures by Rank and Position. As expected, there was no significant Rank × Position interaction for any of these three measures (all ps > .3). Thus, the implication is that these ranking effects are the same whether just one above or below one's rival. However, participants did express more competitive behavior with high rankings (M = 4.93, SD = 1.55) than intermediate ones (M = 3.27, SD = 1.64), $F(1, 82) = 52.4$, $p < .001$), felt it was more important to do well with high rankings (M = 4.95, SD = 1.66) than intermediate ones (M = 3.72, SD = 1.80), $F(1, 82) = 26.6$, $p < .001$), and felt the difference in rank was greater with high rankings (M = 3.92, SD = 2.11) than intermediate ones (M = 2.18, SD = 1.55), $F(1, 82) = 41.3$, $p < .001$. These results suggest the people become more competitive and feel it is even more important to do well with high rankings than intermediate ones. We also note that, in this within-subjects design, participants, not

surprisingly, recognized the difference in rank as being greater with high rankings than intermediate ones.

To examine the unique relationship that importance has with competition, irrespective of the perceived difference in commensurability, we conducted two sets of partial correlations focused on the ratings in the high-rankings and intermediate rankings conditions. For the high rankings condition, we correlated importance and competition while controlling for difference. As predicted, the relationship between importance and competition was strong and highly significant ($r = .60$, $p < .001$), suggesting that participants' importance ratings in high-rankings condition were directly related to their competition ratings, even while controlling for the perceived difference in commensurability. We also conducted the identical analysis using the participants' rating in the intermediate rankings condition. Again, importance and competition were significantly correlated, even when controlling for the perceived difference in commensurability ($r = .44$, $p < .001$). Thus, Studies 7 and 8 together suggest that proximity to the standard directly affects the importance of doing well and that the importance of doing well has a direct impact on competitive behavior; this psychological mechanism is not contingent on a perceived difference in commensurability.

GENERAL DISCUSSION

The social comparison literature has generally assumed that the level of competition between commensurate rivals on a mutually relevant dimension is fixed (e.g., Goethals, 1986; Goethals & Darley, 1977; Tesser, 1988). However, across multiple measures, across various contexts of interest to our participants, and across between- and within-subjects designs, the present analyses reveal how varying the rivals' distance from the standard can in turn vary this fundament process and competition itself. Studies 1 to 3 showed that high rankings, relative to intermediate ones, intensify competition, as indicated by an increase in competitive feelings, an increase in the pain of social comparison, and a reduction in the willingness to trade off disadvantageous inequality to maximize joint gains. Studies 4 to 6 revealed that this apparent high ranking effect is a far more general phenomenon, due not to rankings per se but rather to the standards that such rankings represent, because competition intensifies only when rankings coincide with a standard. Studies 7 and 8 began examining the psychological mechanisms underlying this standard effect, providing evidence that proximity to the standard directly impacts the unidirectional drive upward itself, as measured by the importance of doing well.

Theoretical Implications

Our ranking analysis fundamentally changes the conventional view of competition. Social psychologists have long recognized the importance of factors such as the relevance of the dimension at hand (Festinger, 1954; Tesser, 1988) and the commensurability of rivals (Goethals & Darley, 1977). Yet, social psychologists, as well as experimental economists (e.g., Kagel & Roth, 1995), have generally assumed that the "unidirectional drive upward" is fixed, either present or absent (e.g., Festinger, 1954; Goethals & Darley, 1977; Tesser, 1988), when relevance and commensurability are held constant. Our ranking analysis, however, introduces a new factor germane to our understanding of competition: the distance from a standard. By varying rivals' distance from a standard, we directly manipulate the central unidirectional drive and, in turn, the degree of competitive behavior.

Although the proximity to the standard largely and dramatically appears to lead to a direct impact on the unidirectional drive upward, we do note when people are under joint evaluation (Bazerman et al., 1992; Camerer, 1995), where people can systematically compare differences as in Study 8, the perceived difference in commensurability was perceived to be larger amid high rankings than intermediate ones. Although Studies 4 to 8 dismiss a pure psychophysics mechanism, an interesting question for social comparison theory remains. That is, according to the related attributes hypothesis (Goethals & Darley, 1977), the more commensurate the rivals, the greater the competition. However, the exact opposite pattern appears in Study 8. The more commensurate rivals were intermediately ranked ones, and they were less competitive. Thus, one interesting implication is that one's proximity to a standard can become so strong, the upward motivational force so strong, that issues of commensurability matter less in the proximity of a standard.

Despite these theoretical implications, one could question whether our decision-making methodology is appropriate for the hypotheses examined in the present studies. As Daniel Kahneman (2000) explained, however,

> The answer is that choice . . . is the fruit fly of decision theory. It is a very simple case, which contains many essential elements of much larger problems. As with the fruit fly, we . . . hope that the principles that govern the simple case will extend in recognizable form to complex situations. (p. xi)

We believe this statement legitimately applies to the trade-offs examined in the present analysis.

Implications for Social Capital

The present analysis also helps contribute to a broader discourse within the social sciences on social capital (see Putnam, 2000)—the value of social networks (e.g., Burt, 1992). Although economists, political scientists, sociologists, and others have been vocal on this issue, social psychologists have been mute on this debate, if not unaware, even though cooperation—the currency of social capital—is a topic with deep roots in social psychology.

The present analysis, however, broaches the possibility that rankings may have unintended, perhaps even deleterious, effects on cooperation. Our results suggest that people with high ranks are much less willing to cooperate, even when such collaborations have the potential to maximize profit or some other utility. Notably too, as mentioned above, we have demonstrated this effect in artificial situations. Although the effect size appears large under these conservative circumstances, one can only imagine how these results might understate the effect in the real world, where many highly ranked individuals are even more likely to be competitive as a function of self-selection than intermediately ranked individuals. Given this gross confound, making ranking information more salient among highly ranked, real-world rivals would likely further impede mutually beneficial collaborations. From a social capital perspective, rankings can thwart the development of cooperative networks, and the negative correlation between competition and socializing with others (Crocker, Luhtanen, Cooper, & Bouvrette, 2003) further underscores this point.

Conclusion

Rankings that coincide with a standard intensify the social comparison process to a greater extent than rankings that do not. Although the theoretical implications help uncover a new direction in social comparison research, the findings reported here simultaneously broaden our understanding of competition. The degree of competition between commensurate rivals on a mutually relevant dimension is not fixed but rather dynamic because "the unidirectional drive upward" fluctuates according to the rivals' distance from a standard. On a broader level, the present analysis uncovers a potentially important disadvantage of today's prevalent ranking culture for beneficial cooperation: Rankings can sometimes impede progress on the very performance dimensions they seek to enhance.

NOTE

1. Because the binary logistic regression assumes that the responses (Strategy A/Strategy B) are independent, we could not use this procedure in this within-subjects design. The appropriate statistical test to analyze these correlated binary responses is the Generalized Estimating Equations (GEE) analysis (Liang & Zeger, 1986). We conducted our GEE analyses by using the REPEATED statement in the GENMOD procedure in SAS.

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