

The Liability of Leading: Battling Aspiration and Survival Goals in the *Jeopardy!* Tournament of Champions

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We extend the variable risk preferences model of decision making to a competitive context in order to develop theory about how competition affects both focus of attention and risk taking. We hypothesize and find support for leader–follower differences in the channeling of attention to an aspiration or survival point. Our results indicate that leaders focus on their aspiration point, whereas followers’ focus of attention shifts between their aspiration and survival points. By identifying and elaborating on the different cognitive loads and social expectations related to the positions of leader and follower, we show that leaders are prone to take excessive risks to maintain their leadership position. We refer to this phenomenon as the liability of leading. Our study context is a naturally occurring experiment in strategic decision making, the *Jeopardy!* Tournament of Champions.

Key words: aspirations; attention focus; behavioral theory of the firm; risk taking; survival; variable risk preferences

History: Published online in *Articles in Advance*.

Introduction

Attention to aspiration and survival levels and their effect on risk taking have been assigned a major role in the work building on the behavioral theory of the firm (Argote and Greve 2007; Cyert and March 1963; Gavetti et al. 2007; March and Shapira 1987, 1992; Ocasio 1997). Although competition plays a central role in the behavioral theory of the firm, not much research in this tradition has centered on the role of competition in the formation of reference points and focus of attention. Studies have identified aspiration points based on a firm’s own past performance (*historical*), the performance of one or more similar organizations (*social*), or a combination of both. Empirical work considering the effects of past performance (historical) aspiration levels on risk taking report fairly consistent results. These studies show that risk taking decreases with distance above an aspiration point and increases with distance below an aspiration point (Miller and Chen 2004, Greve 1998, Iyer and Miller 2008). In contrast to the work on the effects of historical performance, the studies of the effect of socially defined aspiration levels on risk taking either report no significant effect or are inconclusive with regard to the direction of the effect when firms are above their social aspiration point (Audia and Greve 2006, Miller and Chen 2004). Studies reporting different results include the work of Greve (1998), Baum et al. (2005), and Iyer and Miller (2008). For firms operating above their social aspiration level, two of these studies report a negative relationship (Greve 1998, Iyer and Miller 2008) and the other reports a positive relationship (Baum et al. 2005) between distance above a

social aspiration level and risk taking. Additional studies report that increased risk taking when performance is above a social aspiration point is contingent on the quantity of slack (Chen 2008, Chen and Miller 2007), firm size (Greve 2008), and the degree to which performance exceeds the social aspiration level (Baum and Dahlin 2007).

Our conjecture is that the findings of a positive, a negative, and no significant effect of performance above a social aspiration level on risk taking stem from two reasons. First, the implicit assumption in most prior research is that decision makers were focused on their aspiration level because a survival level was not included in those analyses (see the work of Miller and Chen 2004 for an exception). By considering only performance relative to an aspiration level, the effect of shifts in managerial attention between aspiration and survival on risk taking could not be effectively studied. The models of risk taking we consider in this paper include both aspiration and survival levels. By including both reference points in the same model, we can test for the effects of shifts in focus of attention on risk taking.

The second contributory factor to the inconclusive results is that most prior work operationalized the social aspiration level for all firms as mean industry performance. Although some firms may consider the industry mean when evaluating performance, we think it unlikely that the focus of attention for all firms in an industry is on the industry mean. We posit that in a competitive context, the aspiration point is set by the leader’s performance, whereas survival is a function of the resources required to continue in a competition. Consequently,

competitors may focus either on the leader's position or on their survival level, rather than on industry mean performance. We also posit that the focus of attention on aspiration and survival levels is affected by whether a competitor is a leader or a follower. We argue that leaders focus almost exclusively on their aspiration point, their own position (e.g., maintaining the lead), and that followers focus on their aspiration point or their survival point when making risky decisions. We also investigate whether focusing on the leader's position affects the level of risk taking. We hypothesize and find support for the argument that leaders are prone to taking unnecessary risks to maintain their lead. We refer to this propensity to take unnecessary risk as the "liability of leading."

The context of our study is the *Jeopardy!* game show's Tournament of Champions (TOC). Several features of this natural experiment make it a desirable empirical context for examining how focus of attention and risk taking are affected by competition. First, competitors have the opportunity to advance from the first to the second round of the tournament in two ways. These two ways of advancing establish an aspiration point and a survival point we can consider in the same models. The position of the leader is clear to all competitors, as is the alternative survival point. This feature of the tournament enables us to overcome the difficulties in estimating aspiration and survival levels encountered in prior work (see Argote and Greve 2007). Second, the behavioral theory of the firm centers on a small number of key decisions made by managers, including major strategic decisions (Argote and Greve 2007). In the TOC, competitors must make nonroutine, high-stakes decisions in order to advance in the tournament. Although the competitors in the *Jeopardy!* tournament are not managers, our study context enables us to isolate some of the conditions faced by managers that give rise to the hypothesized effects. Third, tournaments in which rewards are based on rank and in which rivals strive to outperform each other are ubiquitous in business management but remain understudied. As Bothner et al. (2007, p. 209) wrote, "A few of the myriad examples in which individuals compete in tournament-type contests include executives striving for large shares of bonus pools... management schools striving for the top positions in the *Business Week* rankings, [and] investment banks competing for the top spots in league tables and tombstones."

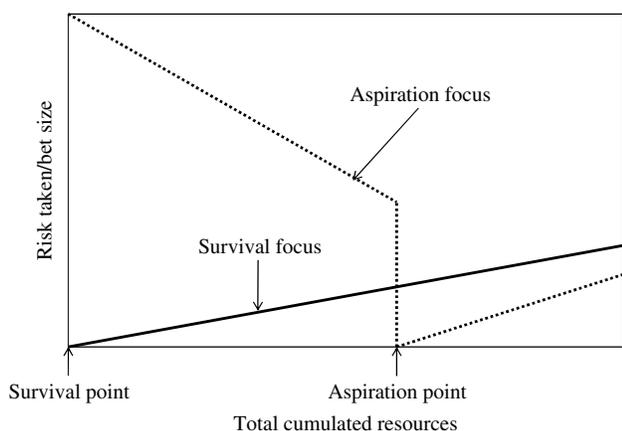
We sought to make four contributions to the research on focus of attention and risk taking. First, we extend the variable risk preferences model (March and Shapira 1987, 1992) to a competitive context. This extension draws attention to leader–follower differences in the channeling of attention and risk taking. Second, we deepen our understanding of the conditions under which attention is likely to shift or not shift between an aspiration level and a survival level. We show that a competitive structure channels leaders' focus of attention to a

single reference point, maintaining their current leading position. We also show that within the same competitive structure, followers are more likely to attend to more than one reference point. Third, by identifying and elaborating on the different cognitive loads and social expectations related to the positions of leader and follower, we advance the work considering dimensions of experience as they affect risk taking (Argote and Greve 2007). Fourth, we draw attention to the propensity among leaders to take unnecessary risks to stay in the lead, which we call the liability of leading.

Social Aspiration Levels, Focus of Attention, and Risk Taking

The theories of reference points, focus of attention, and risk taking support one of the most active research streams on strategic change and managerial decision making (Argote and Greve 2007). Studies have considered the effects of performance relative to a focal reference point on broad changes to a firm's overall strategy (Lant et al. 1992, Miller and Chen 1996, Audia et al. 2000) and the taking of more specific actions such as changing a radio station's format (Greve 1998) or participation in interfirm collaboration (Baum et al. 2005). A cornerstone of this research is the variable risk preferences model of decision making (March and Shapira 1987, 1992). In this model risk taking is controlled by two simple rules: The first rule suggests that when cumulated resources (depicted by the decision maker's position) are above the focal reference point, bet size is set so that in case of a failure, resources (i.e., the decision maker's position) would not fall below the focal reference point. The second rule applies when resources are below the aspiration point on which the decision maker is focusing. In this case, the bet size is set so that in the case of a successful bet, resources will surpass the aspiration level. Risk taking is sensitive, therefore, to (1) the risk taker's resources relative to the survival and aspiration level and (2) whether the risk taker's focus is on the survival reference point or on the aspiration level reference point. This means that risk taking can vary with a change in the focus of attention even if resources are unchanged. For example, a decision maker threatened with extinction could focus on his survival point and take a relatively small risk if his focus is on his survival point. However, this same decision maker could focus on his aspiration point and take a relatively large risk. These two basic risk functions are plotted in Figure 1. The first function, which starts from the origin and is marked by the solid line, assumes the risk taker focuses on survival and describes risk taking as increasing monotonically with resources. The second function depicts risk taking while focusing on the aspiration level and is denoted by the dotted line. It assumes that risk taking decreases as it approaches the aspiration level from below, and then it

Figure 1 Variable Risk Preferences Model



Source. March and Shapira (1992). Reprinted with permission from the American Psychological Association.

increases monotonically with resources above the aspiration level (see March and Shapira 1992).

The effect of aspiration levels on risk taking has been assigned a major role in the work building on the behavioral theory of the firm. The behavioral theory of the firm (Cyert and March 1963) suggests that an aspiration level is a weighted function of past performance (*historical*) and performance relative to other firms (*social*). Difficulties in estimating the relative weight to assign to historical and social performance have led researchers to study the effects of the two aspiration levels separately. The reported effects of performance—that is, the distance above and below historical performance—have been quite consistent. When historical performance (measured at time $[t - 1]$) is considered to be the aspiration point, these studies report that the group of firms operating below their aspiration level decreased risk taking as performance improved. For the group of firms operating above their aspiration point, these studies indicate that risk taking decreases as performance above their aspiration level increases.

The results concerning the effects of performance relative to a socially defined aspiration level on risk taking are, in contrast, quite mixed. Some studies report that performance above or below an aspiration level based on a comparison to other firms has no significant effect on risk taking (Audia and Greve 2006, Miller and Chen 2004), whereas others report a positive (Baum et al. 2005) or negative (Greve 1998, Iyer and Miller 2008) effect. For example, Miller and Chen (2004) reported that performance relative to a social aspiration point had no effect on the standard deviation of firms' returns. In their study, the social aspiration level for all firms was the industry mean return on assets (ROA). Studies reporting a negative relationship include Greve's (1998) study of the decision to change a radio station's format and Iyer and Miller's (2008) study of a firm's propensity to make an acquisition. Greve (1998) reported that radio

stations operating above their aspiration point (defined as mean market share in the industry) were less likely to make the risky strategic decision to change their radio station's format (e.g., New Age, Soft Urban). Iyer and Miller (2008) also found a negative relationship between performance above a social aspiration point (industry mean ROA) and the likelihood that a firm would make an acquisition. These findings contrast with the findings of Baum et al. (2005), who reported that firms performing above their social aspiration level (market share weighted by firm size) were more likely to undertake the higher risks associated with forming nonlocal syndicate ties. Two additional studies report a positive relationship between performance above a social aspiration level and risk taking, but only among firms with high levels of slack (Chen and Miller 2007) or performance far above their aspiration level (Baum and Dahlin 2007). Although multiple factors may be behind these mixed findings, we think that it is unlikely that all firms focus on industry mean performance (be it ROA, market share, or firm size) as their aspiration point. Instead, we think that the cognitive and social effects of competition channel decision makers' focus of attention toward the leader's position as a social aspiration level.

Competition, Social Aspirations, and Focus of Attention

Situational effects on attention are a basic principle of the behavioral theory of the firm. External, internal, and social factors are thought to affect which issues a decision maker focuses on and which solutions are considered acceptable (Ocasio 1997, Hoffman and Ocasio 2001). Ocasio (1997) argued that attention regulators include the rules of the game, players, structural positions, and resources. In a competition contestants occupy structural positions in terms of their rank, are also resource constrained, and must consider the rules of the game. Competitions define each position relative to the position of other competitors and are designed to identify a winner and rank the non-winners. Competing firms are vertically ranked (Bothner et al. 2007), and winning is usually a highly sought objective. The nature of competition increases the salience, importance, and uniqueness of the leader's position (Ku et al. 2005). We believe it is the uniqueness and salience of the leader's position that establishes it as the aspiration level for most competitors rather than the mean industry performance, as is assumed in prior research.

Although the social aspiration level is likely to be the position of the leader for all competitors, we expect that the characteristics associated with a competitive situation channel the attention of leaders and followers in somewhat different ways. We posit that holding the lead in a competition narrowly channels leaders' attention to maintaining their lead. This conjecture is supported by prior work in managerial decision making and social

psychology. First, March and Shapira (1987, 1992) suggested that decision makers focus on the reference point most proximate to their current position. In competitive situations it is highly likely that a leader is more proximate to his aspiration point (his own position) than to his survival point. Second, research in social psychology has shown that individuals have an inherent need to evaluate their abilities and, that in choosing referent others, they exhibit a unidirectional drive upward in the making of social comparisons (Festinger 1954). Consistent with this upward focus of attention, Medvec et al. (1995, p. 607) reported that, in the view of their study participants, “only a small percentage of the [Olympic] athletes’ thoughts were focused downward on those they beat.” Additional work in this vein has also shown that the presence of a competitor, even an inferior one, produces a self-evaluation threat that leaders make efforts to diminish (Muller and Butera 2007). Third, work on competitive dynamics has shown that the competitive repertoires of successful firms are narrower than those of their less successful counterparts (Ferrier et al. 1999, Miller and Chen 1996) and that the prevention of downward movement in car racing narrowed leaders’ focus of attention (Bothner et al. 2007).

In sum, we posit that the leaders narrow their focus of attention to their aspiration point because of the salience and uniqueness of the leaders’ position, the greater proximity to their aspiration point, and the lack of an upward basis for comparison.

HYPOTHESIS 1. *Leaders focus on their aspiration level when making a risky choice in a competition.*

We expect that the nature of competition does not have the same effect on the follower’s focus of attention. Although the leader’s position will still serve as the aspiration level for followers, the occupation of a lower rank in a contest may shift the attention of some followers to their survival point. The unique position of the leader at the top of a competitive ranking makes this position the most salient and easily observable social aspiration point for the followers as well as for the leader. The argument that a leader’s position is a focus of attention for nonleaders is supported by Park’s (2007) finding that firms performing below their aspiration level chose high-performing firms to imitate. This study showed that high-performing firms were viewed as role models rather than as strong competition to be avoided. Although we expect the position of the leader to be the salient social aspiration point, the fact that a follower trails the leader may cause a follower to question his ability to and chances of dethroning the leader (Bothner et al. 2007). This questioning is likely to direct the attention of followers to alternatives that do not require them to compete head-on with the leader. In line with the variable risk preferences model, we conjecture that followers may shift their focus of attention between their aspiration and survival points.

HYPOTHESIS 2. *Unlike leaders, followers also consider their survival level when making a risky choice in a competition.*

The Liability of Leading

To develop a theory concerning the level of risk that leaders take in a competition, we build on the concept of bounded rationality, a key concept in the behavioral theory of the firm (Cyert and March 1963). March (1997) suggested that when rationality is bounded, decision makers adopt alternative logics to guide choice. These logics also define what is appropriate and what directs actors’ attention to specific features of a situation. The logic of appropriateness (March and Olsen 2009) is most resonant with the social nature of competition we consider in this paper. The logic of appropriateness assumes that a decision maker is following rules that match appropriate behavior to the features of a situation he encounters. In describing the logic of appropriateness, March and Olsen (2009, p. 3) envisioned “actors following internalized prescriptions of what is socially defined as normal, true, right, or good, without, or in spite of, calculation of consequences and expected utility.” In other words, a decision maker following the logic of appropriateness makes decisions based mainly on the congruence between role expectations and an action, rather than on conscious calculations of costs and benefits (March 1997). When using the logic of appropriateness, March and Olsen (2009) suggested that decision makers ask questions such as, what kind of situation is this? Who am I? What is the appropriate thing to do given who I am? What would others expect me to do in this situation?

Defining the nature of a situation is central to the logic of appropriateness (Messick 1999). Although competition directs the attention of all competitors to the objective position of the leader in a competitive hierarchy, leadership also has an element of a socially defined identity that carries a great deal of importance (March and Shapira 1987). For many firms, sustaining industry leadership is a key organizational goal (Geroski and Toker 1996, Kato and Honjo 2006, Simon et al. 2006). For example, Smith et al. (2001, p. 59) quoted one top Compaq executive as saying, “It’s one thing to get in the lead. It’s another thing to hold on to it.” Moreover, Shapira (1995, p. 126) suggested that a statement by a senior manager—that “you have to be a risk taker, but you have to win more than you lose”—is an indication that risk taking and winning are important parts of the societal understanding of a manager’s role. It is this social importance of maintaining the lead, or winning, which causes leaders to focus on keeping their position at the top of a competitive hierarchy. If a leader is asking, “What is the appropriate thing to do given that I am the leader?” the most likely answer is to stay in the lead.

This is also the answer to the question, “What would others expect me to do in this situation?”

When focus of attention is based on social comparison, we propose that leaders often rely on the logic of appropriateness because this logic rests on the fulfillment of roles and identities that are socially defined. An expectation regarding what is the “right thing to do” is likely to induce some leaders to take greater risks to maintain their leadership position than would be prescribed by rational utility maximization. We expect that for leaders, the uniqueness of their position, the narrowing of attention, and the fulfillment of social expectations contribute to their taking unnecessary risks to maintain their position at the top of a competition.

HYPOTHESIS 3. Leaders are likely to take unnecessary risks to maintain the lead in a competition.

Method

Study Context

Opportunities to study the behavior of decision makers in high-stakes competitive situations are rare. In this paper we take advantage of a naturally occurring experiment in strategic decision making, the *Jeopardy!* TOC.¹ This is a three-round tournament held annually that begins with 15 competitors each year. Competitors are chosen for the tournament based on their exemplary play in the regular season in which they have typically won five games in a row (see the appendix for a complete description of the tournament rules). The tournament’s structure is similar to contests in track and field in which athletes with the fastest times among the non-winners advance to the next round of competition along with the winners of each qualifying race, or “heat.” Similarly, competitors in the *Jeopardy!* TOC can advance from the first to the second round of the tournament by either winning their qualifying game or having one of the top four scores amongst the non-winners. Competitors that advance in the tournament by having scores amongst the top four non-winners are referred to as “wild cards.” The two alternative ways of advancing in the tournament establish two focal points for the competitors—by winning (aspiration) and by wild card (survival). The presence of these two clear alternatives permits us to test our hypotheses regarding leader–follower effects on focus of attention and risk taking.

At the beginning of each TOC, the 15 competitors are divided into five groups of 3. Each group of three competes in isolation from the other TOC competitors to accumulate points by responding, in the form of a question, to general-knowledge clues of varying difficulty.² We use the word “points” here intentionally to emphasize that in these TOC games, unlike the regular season play, the competitors do not get to keep their points in the form of a cash award. Advancing in the tournament is the only objective in the first round of the TOC.

There is no tournament-related advantage to advancing as a winner.³ Competitors advancing as winners and wild cards are treated in exactly the same way during the second round of the tournament. Note also that the competitors in each group are completely unaware of the results of the games that preceded them in the first round of the competition. The importance of this isolation is that players competing later cannot adjust their strategies based on the outcomes of the earlier games. To determine the winner’s and the non-winners’ closing scores, the same final clue is posed to all three competitors. Before this final clue is posed, the competitors simultaneously decide how many of their current points to place at risk in order to advance in the tournament. This is the decision of interest in this paper. Competitors can risk any amount between zero and their entire score. Before determining the bet amount, competitors are aware of (1) the knowledge category from which the question will be drawn (but not the actual clue), (2) their competitors’ resources (number of points), and (3) the two ways of advancing in the tournament, by winning and by wild card. With these pieces of information, each competitor simultaneously decides how much he or she is going to risk on the final clue. The contestant with the highest score among the three players wins the first-round game and advances to the next round of the tournament. The two remaining players wait until all five of the first-round games have been completed to learn whether they will advance in the tournament as one of the top four scorers amongst the non-winners.

Data

Our data include the first-round decisions (bets) made by all competitors in the 11 tournaments held between 1990 and 2001 (a total of 55 games). The data were provided by the producers of the *Jeopardy!* show for the years 1990–1999. We videotaped the TOC in 2000 and 2001 and transcribed the shows into spreadsheet form. We excluded 7 of the 55 games because they were “runaway games” (Metrick 1995). Games are characterized as runaways when the leader has more than twice the nearest follower’s points before responding to the final clue. In these runaway games, the leader is assured of winning the game with a zero bet and therefore has no decision to make,⁴ and the followers have only a single reference point, advancing as a wild card. Our final data set includes 48 games. In the analyses that follow, we consider all 48 decisions made by leaders and 64 decisions made by followers (46 competitors in second place and 18 competitors in third place). We excluded followers from the data set when they had scores less than 4,000. We did so because even if these competitors risked all of their points, they were not likely to advance to the second round of the tournament as a wild card and hence did not have to make the kind of decision of interest in this paper.

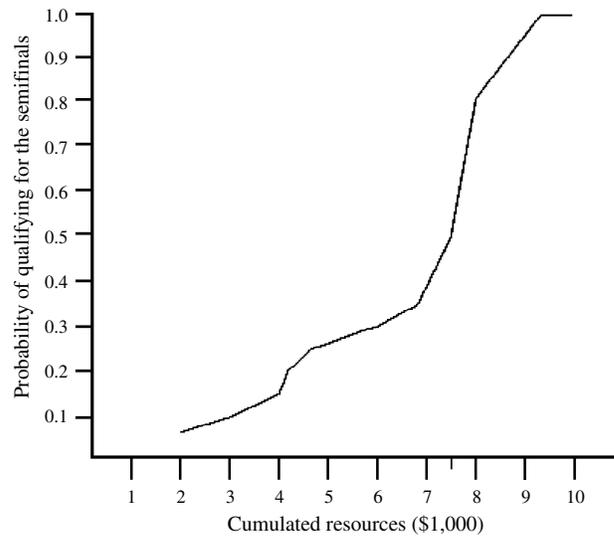
Dependent and Independent Variables

The amount of points a competitor places at risk on the last clue of his or her first-round game is our dependent variable. To test the hypotheses regarding leader–follower effects on focus of attention, we model whether the number of points risked is affected by attention to an aspiration level or a survival point, or both. The significance of focus will be evident in the level of risk taken.

Aspiration Point Focus. We have argued that the social aspiration level for all competitors is set by the leaders' performance and that leaders focus on their aspiration level, which is maintaining the lead. For the leaders the level of risk required to maintain the lead is affected by the follower's resources. As the gap between the leaders' resources and the nearest followers' resources increases, the level of risk needed to maintain the lead decreases; we refer to this level of risk as *aspiration point focus*. Therefore, we operationalize aspiration point focus for the leaders as their own score minus the second-place follower's score. For the followers this variable equals the amount by which the follower trails the leader (e.g., the leader's score minus his or her own score). We expect aspiration point focus to be significantly related to bet size for both leaders and followers.

Survival Point Focus. In our study context, as in many tournaments, survival is the ability to compete in subsequent rounds of a tournament. In other words, survival is "living to fight another day." Survival in the *Jeopardy!* TOC means advancing to the second round of the tournament as a wild card. To advance in the tournament as a wild card is the only alternative available to non-winners. As in the example of sporting contests conducted in heats survival among the non-winners in the TOC means having the highest scores amongst the non-winners. To identify the level (final score) likely to serve as a survival point, we estimated the likelihood that a competitor would advance in the TOC as a wild card with final scores between 2,000 and 9,300. We considered this score range because all non-winners with scores below 2,000 were dropped from the tournament, and all non-winners with scores equal to or greater than 9,300 advanced to the second round of the tournament. For scores between 2,000 and 9,300, we calculated the probability of advancing in the tournament as follows. We summed the number of competitors that attained wild card positions with scores equal to or below each score between 2,000 and 9,300 (in increments of 500). We then divided that count by the total number of competitors advancing in the tournament as a wild card in our data set ($N = 44$). For example, only 2 of the 44 contestants advanced to the second round of the TOC with a score of 2,000, equaling a 4.5% probability of advancing, whereas 35 of the 44 qualified with scores equal to or less than 8,000, equaling an 80% chance of advancing to the second round of the tournament. The resulting

Figure 2 Probability of Qualifying as a Wild Card



cumulative probability distribution is depicted in Figure 2. The cumulative probability distribution reveals 8,000 as the score likely to serve as a survival level because of the very sharp decrease in the probability of qualifying for the second round as a wild card with just a 500-point decrease in score, from 8,000 to 7,500. With this small decrease in score, the probability that a contestant would advance in the tournament falls from 80% to 50%.

Defining the Survival Point

Although we do not expect all competitors to be able to derive this exact payoff function, we are fairly certain that the key points (e.g., 2,000, 8,000, and 9,300) are widely known among the TOC competitors for three reasons. First, it is a safe assumption that the competitors have watched prior Tournaments of Champions or have visited one of the myriad websites that recap *Jeopardy!* games question by question, bet by bet, and as a result are aware of qualifying scores.⁵ Second, the strategy points articulated by contestants in the 2001 Tournament of Champions diary (Garen 2001) are consistent with an understanding of the key points in the payoff function. We were fortunate to receive a copy of the diary (Garen 2001), which consists of over 40 single-spaced, two-column pages of interviews with all 15 contestants from that year (note that we do not disclose the contestants' names). In the diary 12 of the 15 contestants explicitly discussed their betting strategy. For example,

A couple of strategy points, for those who might be interested. Going into the game, I figured it would take a minimum of 8,000 to advance to the next round.

\$8 K to \$9 K seemed a good bet to advance. I wanted to win the game, but not at the cost of trying to double [Rick]'s score.

It is also clear from the diary (Garen 2001) that the contestants were aware that scores below 2,000 were unlikely to qualify them for the second round as a wild card:

When I realized that any wager likely to bring me into contention would drop me below 2,000 if I missed, I decided to bet big.

The strategy points offered by the contestants in the diary (Garen 2001) and in an interview of another competitor by the authors are consistent with our claim that the competitors are aware of the major points in the payoff function.

Third, there is a high level of consistency among the qualifying scores across seasons. For each season we calculated the score that afforded an 80% chance of advancing in the tournament as a wild card based on all the preceding seasons' data (e.g., for season 3 we used the data from seasons 1 and 2; for season 7 we used the data from seasons 1 to 6). For the first two seasons, the score corresponding to an 80% of advancing as a wild card was between 7,400 and 7,600. For the remaining seasons, the score corresponding to an 80% chance of advancing settled to the 8,000 we use in our analyses.⁶ For these reasons we operationalize *survival point focus* as the absolute difference between a competitor's score and 8,000. We expect that survival point focus will be significantly related to the bet size for the followers but not for the leaders.

Confidence. It can be argued that competitors' confidence in their ability to respond to the Final Jeopardy! clue correctly would also affect the level of risk taken. Thus, we include a control variable, *confidence*, in our models. Following Metrick (1995) we used a competitor's realized success to capture a competitor's level of confidence that he or she would respond to the last clue correctly. Even though this measure is ex post, it arguably reflects a competitors' estimate of their chances of responding to the Final Jeopardy! clue correctly and is the only data available. *Confidence* enters the models as a dummy variable coded 1 for correct answers and 0 for incorrect answers.

Results

In Table 1 we report the descriptive statistics and correlations by score level for the leaders and the followers separately. The mean bet size is 2,868 for the leaders and 3,771 for the followers. The correlation between the distance from the aspiration and survival points is below the 0.50 level for both the leaders and followers. On average, the leaders and followers respond to the final clue correctly 62.5% and 52% of the time, respectively. The correlation between confidence and the two focal reference points is also below the 0.50 level for the leaders and followers. This indicates that multicollinearity is not a concern in our model estimations. However, that

mean bet size is lower for the leaders than for the followers raises the question of whether the total resources (number of points) a leader has is driving bet size rather than the distances from the focal reference points. We think this alternative explanation does not have traction for three reasons. First, the total resources (number of points) is not significantly correlated with bet size for the leaders. Second, only aspiration point focus is significantly correlated with bet size for the leaders, and this is the case both for leaders above and below the 8,000 threshold. Third, as we report in the regression models, only aspiration point focus has a significant effect on the bet size of the leaders, even when total resources (number of points) is included in the model.

Focus of Attention

In Table 2 we report the ordinary least squares (OLS) regression results with bet size as the dependent variable. The results reflect the adjusted standard errors for intragroup correlation. Hypothesis 1, which stated that leaders will focus on their aspiration level (e.g., maintaining the lead), is supported. Aspiration point focus is significant ($p < 0.01$), and survival point focus is not significant. Hypothesis 2, which stated that unlike the leaders, the followers will also consider their survival level when making a risky choice in a competition, is also supported. In data such as ours, the hypothesized variation in focus of attention is reflected in both focal points having an effect on risk taking (Miller and Chen 2004). Our results indicate that for the followers' aspiration point focus ($p < 0.05$) and survival point focus ($p < 0.01$) are both significant. The negative effect of distance above aspiration point is what we expect for a leader focused on maintaining his or her position in a competition. As the resource gap increases between a leader and a follower, the fewer resources a leader needs to place at risk to maintain the lead. Although the variable risk preferences model suggests a positive effect between the distance above an aspiration level and risk taking, the theory we develop in this paper suggests that a narrow focus on maintaining the lead will decrease the risk taken above a competitively determined aspiration point. For the followers the relationship between distance below aspiration point and risk taking is also negative. Combined with the significantly positive effect of the distance from the survival point, we think this result is indicative of the shift in attention between an aspiration level and a survival level, suggested by the variable risk preferences model.

To better understand the effects of the focal reference points, we compared the explanatory power of the models including the distances from the two focal reference points, aspiration and survival, with models that include total resources (number of points). Variable effect size and direction are robust to the addition of total resources (number of points) to the models. The models including

Table 1 Descriptive Statistics and Correlations

	Leader						Follower					
	Mean	S.D.	1	2	3	4	Mean	S.D.	1	2	3	4
All players												
1. <i>Bet size</i>	2,867.6	2,314.279					3,771.3	1,955.506				
2. <i>Aspiration point focus</i>	2,147.9	1,315.374	-0.557*				2,462.5	1,630.123	-0.028			
3. <i>Survival point focus</i>	1,364.6	1,217.163	-0.212	0.461*			1,875.0	1,097.183	0.332*	0.460*		
4. <i>Total resources (no. of points)</i>	8,622.9	1,728.268	-0.154	0.505*	0.666*		6,312.5	1,371.999	-0.332*	-0.403*	-0.907*	
5. <i>Confidence</i>	0.625	0.489	0.120	0.184	0.235	0.317*	0.516	0.504	0.105	-0.079	-0.169	0.080
Players with scores \geq 8,000												
1. <i>Bet size</i>	2,900.4	2,542.017					2,950.3	2,669.492				
2. <i>Aspiration point focus</i>	2,396.7	1,412.135	-0.537*				1,610.0	1,271.438	-0.472			
3. <i>Survival point focus</i>	1,590.0	1,401.563	-0.291	0.566*			600.0	535.413	-0.057	0.433		
4. <i>Total resources (no. of points)</i>	9,590.0	1,401.563	-0.291	.566*	1.000*		8,600.0	535.413	-0.057	0.433	1.000*	
5. <i>Confidence</i>	0.733	0.450	0.064	0.265	0.242	0.242	0.500	0.527	0.652*	-0.108	-0.433	-0.433
Players with scores < 8,000												
1. <i>Bet size</i>	2,813.1	1,944.030					3,923.3	1,784.569				
2. <i>Aspiration point focus</i>	1,733.3	1,044.312	-0.709*				2,620.4	1,649.743	0.004			
3. <i>Survival point focus</i>	988.9	711.162	0.061	-0.179			2,111.1	1,009.328	0.348*	0.411*		
4. <i>Total resources (no. of points)</i>	7,011.1	711.162	-0.061	0.179	-1.000		5,888.9	1,009.328	-0.348*	-0.411*	-1.000	
5. <i>Confidence</i>	0.444	0.511	0.237	-0.162	0.031	-0.031	0.519	0.504	-0.040	-0.081	-0.186	0.186

* $p < 0.05$.**Table 2 OLS Regression Results for Final Jeopardy!: Bet Size**

Variable	Leaders			Followers		
	Reference point	Total resources (no. of points)	Combined	Reference point	Total resources (no. of points)	Combined
<i>Aspiration point focus</i>	-1.275***		-1.126***	-0.274*		-0.272*
<i>Survival point focus</i>	0.292		-0.117	0.828**		0.673 [†]
<i>Total resources (no. of points)</i>		-0.286	0.194		-0.489**	-0.136
<i>Confidence</i>	748.976	8,889.808	976.670	642.658	514.489	615.376
Constant	4,871.102**	4,780.324**	3,166.156*	2,561.154**	6,591.266**	3,703.785
R^2	0.36	0.06	0.37	0.18	0.13	0.18
N	48	48	48	64	64	64

[†] $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; one-sided test.

only total resources (number of points) have much lower explanatory power than the models including the measures of aspiration point focus and survival point focus. The models including only total resources (number of points) have R^2 values of 0.06 for leaders and 0.13 for followers. The models including only the two reference points have R^2 values of 0.36 for leaders and 0.18 for followers. When total resources (number of points), aspiration point focus, and survival point focus are combined in the same model, total resources (number of points) is not significant, and the effect sizes and direction of both focal reference points remain the same for the leaders and followers. The only change in the combined model is the somewhat reduced significance level of the focal reference points for the followers. The significance levels for the aspiration point focus and survival point focus for the followers in the combined model are $p < 0.05$ and $p < 0.10$, respectively. We think this is attributable to the to the high correlation between total resources (number of points) and survival point focus, even though the variance inflation factor for the entire

model is only 3.61. The fact that the effect sizes and direction remain the same across the models buttresses our confidence in our interpretation that total resources is not the primary driver of bet size (Cohen and Cohen 1983, Greene 2003).

Excessive Risk Taking by Leaders

Hypothesis 3 stated that leaders take unnecessary risks to stay in the lead. To test this hypothesis, we need to identify competitors that were focused on staying in the lead. Then we need to compare the strategy (bet) they chose to alternative strategies. Leaders focused on staying in the lead are readily identifiable in the TOC. These competitors bet to attain in excess of twice the nearest followers score when the follower bets all of their resources (number of points). In the *Jeopardy!* game, this bet is referred to as the “shutout bet” (Metrick 1995). The shutout bet is an option available to the leaders that precludes a follower from gaining the lead even when the follower places all of their assets at risk and both the leader and follower respond to the final clue correctly. The best

Table 3 Examples of Excessive Risk Taken to Win

Position	Example number	TOC season (game)	Score before final	Bet amount	Final score	Probability of advancing to the second round		Evidence for excess risk
						With actual bet	With alternate bet	
Leader	1	3 (4)	6,600	4,801	1,799	0	Positive	The large (shutout) bets chosen by these leaders decreased their chances of advancing in the tournament to less than 10% after an incorrect response. Had they chosen the smaller bet to reach 9,300 instead, their chances of advancing in the tournament would have been significantly higher.
	2	11 (3)	7,800	6,201	1,599	0	Positive	
	3	5 (1)	8,200	6,300	1,999	0	Positive	
Follower	4	7 (2)	5,800	5,001	699	0	Positive	By choosing bets larger than the amount needed to reach 9,300, these followers reduced their chances of advancing in the tournament from 80%–100% to <50%.
	5	1 (2)	8,700	1,300	7,400	0.50	0.90	
	6	11 (1)	9,600	2,001	7,599	0.50	1.0	

score followers can attain is twice their points prior to the final clue. To calculate the bet required to shut out a follower, the leader doubles the follower’s score, adds one point, and subtracts his or her own score. For example, for a leader with a score of 8,200 facing a follower with a score of 7,200, the shutout bet equals 6,201. Doubling the followers score and adding 1, the leader arrives at 14,401 ($2 \times 7,200 + 1$) as the score required to shut out the follower. The leader then subtracts 8,200 from 14,401 to arrive at 6,201 as the shutout bet. The shutout bet ensures that the leader maintains the lead if he or she responds to the final clue correctly. Of course, if the leader responds incorrectly, his or her probability of advancing in the tournament is significantly reduced. We consider leaders that chose the shutout bet to be focused on maintaining their leading position.

The shutout bet advances the leader to the second round of the tournament with a probability of 1.00 if the leader responds to the final clue correctly. A score equal to or greater than 9,300 also advances a player from the first to the second round of the TOC with a probability of 1.00. All competitors with scores above 9,300 among the non-winners have advanced in all the tournaments. Thus a player has the option to bet an amount equal to 9,300 minus his or her score. In the example discussed above, a leader with a score of 8,200 would only have to risk 1,100. This bet is much smaller than the 6,201 shutout bet. The significance of this difference in bet size is seen when an incorrect response to the final clue is provided. Should a player not respond correctly, the smaller bet preserves a higher probability of advancing to the second round of the tournament. The intuition is that although the “upside” is the same for both bets—a 100% chance of advancing in the tournament with a correct response—the “downside” risk is not the same. The smaller of the two bets preserves a higher probability of

qualifying should the leader respond incorrectly. Consider again the situation of a leader and follower with scores of 8,200 and 7,200, respectively. The shutout bet equaled 6,201. If the leader chose the shutout bet and did not respond to the final clue correctly, his or her final score would equal 1,999. This score is associated with a 0% chance of advancing in the TOC. The much smaller bet to reach 9,300 would only reduce the leader’s score to 7,100. This score is associated with a 37% chance of advancing to the second round of the tournament. Additional examples of excessive risk taking are reported in Table 3. The examples are ordered from lowest to highest score for the leaders and followers. The situation described above occurred in the fifth TOC (see example 3). For each example we report the TOC season and game, the player’s score before the final clue, the bet amount, the player’s final score, and the probability of advancing to the second round of the TOC with this final score. We also report the player’s probability of advancing to the second round of the tournament had he or she chosen the alternative smaller bet to reach 9,300. When the shutout bet is larger than the bet required to reach 9,300, we consider the shutout bet to be the riskier of the two strategies. Choosing the shutout bet when it is the larger (riskier) option supports our contention that there is a liability of leading, a proneness to excessive risk taking to maintain the lead.

For most of the leaders in our sample (43 of 48), the shutout bet was larger than the bet needed to increase their scores to 9,300. As reported in Table 4, 56% of these leaders chose the riskier shutout bet. This result supports our contention that the narrowing of the cognitive field and the logic of appropriateness (March and Olsen 2009) associated with leadership incurs a “liability of leading.” Our confidence in this result is strengthened by evidence that leaders exhibit a similar tendency to take excessive risks across all score levels and the fact

Table 4 Frequencies of Excessive Risk Taking to Maintain or Attain the Lead

Position	All	Score levels		
		Less than 8,000	Greater than or equal to 8,000	Greater than or equal to 9,300
Leaders	0.56	0.69	0.50	0.43
<i>N</i>	43	13	30	14
Followers	0.19	0.14	0.29	0.50
<i>N</i>	21	14	7	2

Note. *N* equals the number of players in each condition.

that the followers did not take excessive risk to attain the lead.

We considered the frequency with which the leaders took excessive risks when their scores were below 8,000, equal to or greater than 8,000, or equal to or greater than 9,300 in Table 4. We think these score thresholds are important for several reasons. First, leaders respond to the final clue incorrectly 37.5% of the time. Second, in the event of an incorrect response, bets of the same size incur a steeper decrease in the probability of advancing in the tournament when a leader's score is equal to or greater than 8,000 than when the leader's score is below 8,000 (see Figure 2). Third, the 9,300 score threshold permits us to examine instances where there is no upside for a bet greater than zero. At score levels this high, players have a 1.00 probability of advancing in the tournament. Therefore, leaders with scores equal to or greater than 9,300 can only decrease their chances of advancing in the tournament if they bet more than zero and respond incorrectly. Consider the effect of a 2,000 bet on the downside risk for leaders with scores of 5,500, 8,500, and 9,500. Before the final clue, these leaders have a 38%, 85%, and 100% probability, respectively, of advancing in the tournament as a wild card with a zero bet. If these leaders respond to the final clue incorrectly, their chances of advancing in the tournament drop to 14%, 33%, and 50%, respectively. Across all three score levels, the leaders bet to win in 69% of the games in which they had scores below 8,000, in 50% of all the games in which they had scores equal to or greater than 8,000, and in 43% of the games in which they had scores in excess of 9,300. The fact that leaders with a wide range of scores exhibit a propensity to bet to win supports our hypothesis that a focus on maintaining the lead results in excessive risk taking.

Our results also indicate that a focus on attaining the lead had less of an effect on the risks taken by the followers. Identifying followers focused on attaining the lead is not as straightforward as it was for the leaders. However, we think there are two scores that indicate that a follower is focused on attaining the lead. A follower can target having a final score that is one point higher than the leader's score prior to the final clue. In such a case, the follower overtakes the leader with this

bet if he or she responds to the final clue correctly and the leader bets zero. Alternatively, a follower can target a final score that is one point higher than the leader's score minus the shutout bet.⁷ The follower overtakes the leader if the follower responds to the final clue correctly, the leader bets to shut out the follower, and the leader responds to the final clue incorrectly. Just as we did for the leaders, we compared the size of these bets to attain the lead with the size of the bet required to reach 9,300. Only 21 of the 64 followers faced the trade-off between a bet affording a higher probability of taking the lead and a bet that maximized their overall probability of advancing in the tournament. Only 4 (19%) of these followers chose the riskier strategy (see Table 4)⁸ As expected, the followers' propensity to take excessive risk to attain the lead was lower than the propensity of the leaders to take excessive risk to maintain the lead. We believe the greater risk taken by the leaders can be attributed to how competitive situations channel focus of attention toward a social aspiration level.

Alternative Explanations

Before discussing the implications of our findings, we consider two alternative explanations for our results: miscalculation and desire for certainty. Miscalculation could occur through simple math mistakes or in assigning probabilities to outcomes. Although in rare instances this may be a plausible explanation, the amount of time allotted before the competitors decide on their bet is allowed to stretch out for a few minutes, and production assistants provide contestants with a pencil and paper to ensure no math mistakes are made (Forrest and Lowenthal 1992, Harris 2006). Also, as the TOC diary (Garen 2001) reveals, competitors prepare for their matches extensively. These contestants are aficionados of the game who are highly likely to have viewed prior seasons of tournament play. Therefore contestants have had ample opportunity to learn from the outcomes of decisions made by their predecessors.

The desire for certainty of advancement associated with a win might also explain why the leaders bet to maintain their position. We think that this is not the primary driver of our results for several reasons. First, bets to win do not automatically advance the leader in the tournament. The likelihood of advancing with a bet to win is contingent on whether the leader responds to the final clue correctly or incorrectly. The frequency of correct responses among the leaders through the 11 tournaments in our data set is 62.5%. This means that neither the shutout bet nor the bet to reach 9,300 provides a competitor with certainty regarding whether he or she will win the game or not. That neither bet provides a competitor with a certain win suggests that a focus on maintaining the lead is the more plausible explanation for our results. Second, over half of the leaders that chose bets to maintain their lead would still have won

their game with a bet to reach 9,300. This bet wins the game if the leader responds to the final clue correctly and the follower chooses a small bet or responds to the final clue incorrectly. Third, the pattern of betting to win persists among competitors with scores well in excess of 9,300.

Discussion

We set out in this study to investigate how competition affects focus of attention and risk taking. We posited that leader–follower effects play an important role in channeling competitor attention and in the level of risk taken by the leaders. We hypothesized that when making a risky decision in a competitive situation, leaders focus on their aspiration point, and the followers, unlike the leaders, also consider their survival point. Our results provide evidence in support of these hypotheses. Only aspiration point focus had a significant effect on the leaders' bets. However, both aspiration point focus and survival point focus had a significant effect on the followers' bets. Our results indicate that the leaders narrowly focused on staying in the lead, whereas the followers shifted their focus of attention between their aspiration and survival points. This finding deepens our understanding of when attention is likely to shift between an aspiration level and a survival level by expanding the dimensions of experience that affect focus of attention to include competition.

Our paper enhances the work considering shifts in focal reference points by providing two arguments for the tendency of leaders to focus on their own position as their aspiration point. The first is a cognitive argument suggesting that being in the lead narrows the attention of the leader and makes him or her focus on winning (see also Kahneman and Lovallo 1993). The second argument derives from March's (1994) idea about rule following. In line with the logic of appropriateness, competitors who find themselves in the lead embrace a social role that is associated with winning. As March and Shapira (1987, p. 1413) argued, "Managers distinguish risk taking from gambling primarily because the society that evaluates them does." As Shapira (1995, p. 132) noted, this logic is nicely expressed by a colonel in Werfel's (1944) play who invokes the societal role of an officer (i.e., a leader) and dismisses calculation-based risk taking in favor of an obligatory action (see March 1994) by saying, "For a real man there is only one possibility."

The results also provide support for the phenomenon we refer to as the liability of leading. Over 50% of the leaders did not bet to maximize their chances of advancing to the second round of the tournament. Instead, they bet in risky ways that increased their probability of retaining the lead. The robustness of this result across resource (score) levels and the fact that the followers were not prone to excessive risk taking to attain the lead

increases our confidence that the primary driver of the excessive risk taking is position—that is, being a leader or a follower. By identifying how social expectations affect focus of attention and risk taking, we advance the work considering the dimensions of experience that affect risk taking (Argote and Greve 2007). The label "leader" should not have an effect on risk taking if the logic adopted was the logic of consequences. Our results, however, indicate that a high value is placed on the leadership position, indicating that alternative characterizations of performance may invoke different decision-making logics.

Implications for Future Research

The present study utilized a unique data set, a naturally occurring experiment in strategic decision making. In the context of the *Jeopardy!* Tournament of Champions, we are able to isolate leader–follower effects on the choice of strategies made by competitors. Similar to most strategic decisions, competitors in the TOC must commit resources without fully knowing the performance outcome of those commitments in order to advance in the tournament. An added benefit of our study context is that advancing in the tournament is the only reward, which eliminated the need to consider calculations of utility. Although the benefits of our study context are numerous, there are some limitations that should be considered.

The format of the tournament limits the number of competitors to three in each game. It is conceivable that the salience of the two reference points in the variable risk preferences model is strengthened in such situations. Mean performance might be a more salient aspiration point when there are a large number of competitors. Future research should consider if the leader–follower effects we find in our study persist when the number of followers increases. The format of the TOC also requires the competitors to make their decisions simultaneously and compete against each other most likely only once. Future research should consider whether the leader–follower effects on focus of attention and risk taking persist when competitive moves are made sequentially. It is possible that the identity of a competitor (Kilduff et al. 2010) and repeated interactions may affect the liability of leading.

Finally, in the TOC decisions are made by individuals. Although managers in the studies by MacCrimmon and Wehrung (1986) and Shapira (1995) have reported that contextual factors are more significant than differences in individual attitudes toward risk when making risky decisions; future work should consider whether individual differences moderate the leader–follower effects reported in this paper. It is also possible that a group (e.g., top management team) would make different decisions. Given that both the ego and the personality of the strategist have been shown to have strong effects

on the strategy decision process (see Hutzschenreuter and Kleindienst 2006 for a review), we think the results might vary with the strength a leader exerts over his or her team. Future research should consider whether and how the composition of a top management team affects the risk taking of leaders and followers. Clearly, the competitors did not operate as managers during the game, but several elements of real life material to risk choice in a competitive context were present. The situation was such that the competitors had incomplete information, the stakes were high, and there was an audience. As such, *Jeopardy!* provided quite a good arena for testing the major elements of risk-taking behavior. We acknowledge that there are differences between representing an organization and representing oneself; however, we believe that important lessons can be learned from the competitive situation that our contestants were in, battling aspiration and survival for high rewards in front of 20 million spectators.

Conclusion

Our paper advances the behavioral theory of the firm in several directions. The original behavioral theory of the firm emphasized risk avoidance. As Cyert and March (1963, p. 270) put it, “Firms attempt to avoid the uncertainties of competition by using standard industry practice and negotiated risk-avoiding agreements.” Yet in the epilogue to the 1992 edition (p. 227) of the *Behavioral Theory of the Firm*, they argue, “Because of its role in rational theories of choice and in theories of organizational learning, risk taking is a major concern of recent studies of decision making.” In the intervening period, the emphasis seems to have shifted to an understanding of risk taking and away from risk aversion. In this vein, the effect of aspirations on risk taking has been assigned a major role in the work building on the behavioral theory of the firm. March and Shapira’s (1992) variable risk preferences model includes both risk aversion and risk seeking and argues that risk taking is affected by the presence of two reference points, an aspiration point and a survival point. They have also argued that the focus of attention can shift between the two points and that it is the focus of attention along with the decision maker’s resources that determines whether the decision is going to be one of risk seeking or one that displays risk aversion.

Extending the variable risk preferences model to a competitive context highlights the importance of the leader–follower effects in the channeling of attention to either an aspiration point or a survival point. Our results indicate that competitors categorize their performance as to whether they are a leader or a follower, winner or loser. This comparison appears to have driven their risk taking to a larger extent than comparison to a mean performance level. By expanding the ways in

which decision makers evaluate their performance in a competitive environment, we can better explain the relationship between risk taking and performance above and below a social aspiration point. Our results indicate that the nature of competition—specifically, leader–follower effects and social expectations concerning what is the appropriate thing to do—combine to narrow the leaders’ focus of attention to their aspiration point, maintaining the lead. Future research on managerial risk taking should embrace the alternative logics espoused by March, including the logic of appropriateness. As March (1994, p. 101) expressed, “Both (logics) processes organize an interaction between personal commitment and social justification... both are plausible processes for reasoning.”

Acknowledgments

The authors gratefully acknowledge the comments of Linda Argote, Max Bazerman, Adam Brandenburger, Colin Camerer, Rachel Croson, and seminar participants at Duke University, Harvard University, Hebrew University, National University of Singapore, and New York University.

Appendix. *Jeopardy!* and Tournament of Champions Rules

Rules of the *Jeopardy!* Game

In *Jeopardy!* there are three players. The game is divided into three rounds: *Jeopardy!*, *Double Jeopardy!*, and *Final Jeopardy!* (Trebeck and Barsocchini 1990). Each of the first two rounds contains 30 clues. The 30 clues are divided into six categories with 5 clues in each. Within a category, the dollar value for each clue ranges from \$100 to \$500 in the *Jeopardy!* round and from \$200 to \$1,000 in the *Double Jeopardy!* round.

After the host, Alex Trebeck, announces the clue, the player who “rings in” first gets to respond to the clue (e.g., players are equipped with buzzers); the response is to be phrased in the form of a question. If the player responds correctly, that player picks the category and dollar amount of the next clue. If the player responds incorrectly, then one of the two remaining players can respond to the clue. Again, the player who rings in first is given the opportunity to respond to the clue. Correct responses increase and incorrect responses decrease the player’s score by the dollar value of the clue.

During the *Jeopardy!* and *Double Jeopardy!* rounds of play, players encounter “Daily Doubles.” When a Daily Double opportunity arises, players determine how much they wager on the success of their response. The player can bet up to the total amount he or she has accumulated to that point in the game. If a player’s score is below 500 in the *Jeopardy!* round or 1,000 in the *Double Jeopardy!* round, he or she is permitted to bet up to 500 and 1,000, respectively. Daily Doubles are clues that can only be answered by the player who selected that category and dollar amount.

All players with a positive score at the end of the *Double Jeopardy!* round play the final round of the game, *Final Jeopardy!* In *Final Jeopardy!* the players are shown a single category from which they are given the same clue. All players have 30 seconds to write down their responses. The players

know only the category, not the clue, before they decide how much to bet. Players cannot bet more than their score or less than zero. During a regular game (not a TOC game), the player with the highest score after Final Jeopardy! gets to keep the money he or she has won and can return to play another game with two new competitors. The other two players do not get to keep their money; they get consolation prizes. In the next section, we describe the special features of the annual Tournament of Champions.

Rules for the Tournament of Champions

The 10 years of data used in our analyses were taken from the annual *Jeopardy!* TOC competition held between 1991 and 2000. Fifteen contestants were selected to participate in the TOC based on their performance earlier in the given year. These players either won five consecutive games during the prior year or had the highest dollar winnings among those winning four games in a row. Also included in the TOC are the winners of two special tournaments held during the year, the Teen and College Championships.

The TOC consists of 10 games spread over a two-week period. Each of the 15 contestants plays in one of the first five games. The winners of each game and the four players with highest scores among the non-winners become semifinalists. We refer to the four players that progress to the second round based on their being among the four players with the highest scores amongst the non-winners in their qualifying round as wild cards. Each of the nine semifinalists plays in one of three games, and the winner of each game becomes a finalist. The three finalists play two games on two consecutive days, and the player that has the highest score in the two games combined becomes the champion. The champion wins \$100,000. The remaining two finalists receive the money they won in the two games but are guaranteed a minimum of \$15,000 for second place and \$10,000 for third place. Semifinalists who do not become finalists receive \$5,000 for participating in the show.

Endnotes

¹*Jeopardy!* is the longest-running general-knowledge quiz show in the United States. Over 17 million fans tune in to see who will win the top prize in the TOC, \$100,000. It would cost well over a million dollars to replicate this set of incentives in a laboratory setting.

²Unlike most question-and-answer games, the *Jeopardy!* host does not ask questions but instead provides “clues” (answers) that the contestants must then respond to based on the category. See the appendix for more details.

³All competitor scores are set back to zero at the start of the second round of the tournament. The competitors get no reward whatsoever based on their actual scores at the end of the first round, and their score is set to zero at the beginning of the second round. Therefore there is no value associated with the scores in the first round except for qualification in the second round.

⁴All of the leaders, in fact, bet zero in these games.

⁵For example, the *Jeopardy!* website (<http://www.jeopardy.com/>) and Brian Dominy’s *Jeopardy!* Database of Champions (<http://www.oddchange.com/jdoc>) both offer these types of data.

⁶When seasons 1 and 2 are excluded from our analyses, the results are unchanged; thus we report the results based on the entire data set in this paper.

⁷We include bets that are ± 200 points to account for competitor preferences to not to end up with a zero score and to accommodate any slight differences in mathematical calculations. The fact that players bet to avoid having zero scores is documented in Metrick (1995) and was confirmed by a participant at the Harvard Strategy Seminar Series who had been a *Jeopardy!* contestant.

⁸Follower do have the option to bet all of their points. Although this bet offers a small probability that the follower can win his or her first-round game, this bet is clearly aimed at maximizing a follower’s total number of points rather than on beating the leader.

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