

Money and Fame: Vividness Effects in the National Basketball Association

LONG WANG*

*MORS Department, Kellogg School of Management, Northwestern University,
Illinois, USA*

ABSTRACT

In his widely reprinted paper “On the Folly of Rewarding A, While Hoping for B,” Kerr argued that vividness was one of the major reasons for distorted rewards. Using both archival and survey data, the present paper directly tests Kerr’s proposal by investigating whether, how, and why highly visible behaviors are over-rewarded and less visible, but similarly (or more) important behaviors are under-rewarded. The National Basketball Association (NBA) was chosen as the domain of this study because scoring is particularly vivid, even though both non-scoring and scoring performances are critical for winning games. Findings from four studies demonstrated that the scoring performance of NBA players was weighed more heavily than their non-scoring performance. Scorers were rewarded with higher salaries and received more support in the NBA All-Star balloting than defenders, even though they might not necessarily make more contribution than their teammates. This pattern of findings suggests that the vividness effect may lead to pronounced differences in people’s judgments, especially when they face abundant real-world information with similar validity. Copyright © 2008 John Wiley & Sons, Ltd.

KEY WORDS the vividness effect; judgment and decision making; NBA

INTRODUCTION

Information varies in many ways. Information is vivid when it is “emotionally interesting, concrete, and imagery provoking; and proximate in a sensory, temporal, or spatial way” (Nisbett & Ross, 1980, p. 45). Theories suggest that people inferentially and judgmentally weigh information in accordance with its vividness (Nisbett & Ross, 1980). Thus, vividness is supposed to bias managerial judgment and decision making (Bazerman, 2002). Kerr (1975) argued more than three decades ago that vividness was one of the major reasons for distorted rewards in organizations. He suggested that certain behaviors are under-rewarded simply because they are less visible rather than less important. For example, “scoring baskets and

* Correspondence to: Long Wang, MORS, Kellogg School of Management, Northwestern University, IL, USA
E-mail: long-wang@kellogg.northwestern.edu

hitting home runs are more readily observable than feeding teammates and advancing base runners” (Kerr, 1975, p. 780).

A more recent poll revealed that Kerr’s folly of rewarding A, while hoping for B was still widespread in corporate America today (Kerr, 1995). Because of mixed empirical evidence on vividness effects in the experimental literature (Taylor & Thompson, 1982; Taylor & Wood, 1983), however, Kerr’s original arguments have not been adequately researched. Thus, this paper directly tests of Kerr’s proposal by exploring whether, how, and why individual and organizational representatives bias reward allocations when some tasks are more vivid than others.

In particular, the present research probes whether vividness may lead to distorted rewards in a real-world setting, in which highly visible behaviors are over-rewarded and less visible behaviors are similarly important, yet under-rewarded. Based on Kerr’s own example, I examined this phenomenon in the National Basketball Association (NBA). Using both archival and survey data, I tested the effects of vividness on NBA players’ salaries and selection as All-Stars.

Perhaps one of the most famous axioms in team sports, especially basketball, is “offense wins games, defense wins championships.” If this widely accepted adage is true, defensive prowess should carry more weight than offensive competency in NBA teams’ investments in their players. However, as a team game, basketball also needs different contributions from different players. A team cannot win without scoring; but at the same time it must prevent the other team from scoring more to win. Thus, defense should be at least as important as, if not more important than offense in the NBA (Chatterjee, Campbell, & Wiseman, 1994; Hofler & Payne, 2004).

As Kerr (1975) suggested, however, scoring baskets, is more vivid than blocking shots or rebounding. The most frequently referenced statistics of basketball concern scoring, probably because it is easily observed and attracts more attention. Although other aspects of performance, such as assists and rebounds, are also important, they may not be as exciting and observable as scoring. Thus, if it is vivid, NBA players’ scoring is likely to have a greater impact on their salaries and All-Star votes than their defensive performance. Therefore, I hypothesized that shooters will be paid more lavishly and receive more votes in the NBA All-Star balloting program than defenders or even all-around players. I tested my hypotheses in four studies using both archival and survey data. Study 1 showed the vividness effect of scoring on both salaries and All-Star votes based on publicly available data of current NBA players. Study 2 replicated the findings of Study 1 using survey data from NBA fans. It suggested that vividness might subconsciously work against one’s real beliefs. Studies 3 and 4 used behaviorally based measures to confirm the findings of the first two studies. I then discuss the findings in terms of their general implications for understanding vividness effects in organizational decision making.

Vividness

Vividness has a long history in the information processing literature. Tversky and Kahneman (1973, 1974) first documented that people can fall prey to availability heuristics because of easier retrieval. Some memories are easier to recall than others, and people may overestimate their chance of occurrence (Tversky & Kahneman, 1983). Thus, vivid events carry disproportional weight in shaping attitudes and opinions (Nisbett & Ross, 1980), especially in fuzzy or indistinct situations (Slovic, 1993) because people interpret ambiguous or complex information based on the most accessible concepts (Higgins, Rholes, & Jones, 1977).

When people make judgments, they first need to recall relevant information (Schwarz, 1998). This process depends on the nature of the content to be recalled and the ease with which it can be brought to mind (Schwarz & Vaughn, 2002). If the content to be recalled is vivid, it is more likely to be stored; it is also likely to be readily available, reducing the difficulty of recall. Vivid information may also activate greater cognitive elaboration than other information because it is more likely to be pondered and rehearsed (Nisbett & Ross,

1980). In particular, when people's attention is constrained, vivid information may attract more attention and weigh more heavily than "pallid and abstract propositions of substantially greater probative and evidentiary value" (Nisbett & Ross, 1980, p. 44). Thus, people are prone to overestimating unlikely but vivid events (Tversky & Kahneman, 1974).

Several studies support this logic. For example, Nisbett and Borgida (1975) showed that people based their predictions more on vivid case-based information than base rates. Stapel and Velthuisen (1996) found that people reported a higher likelihood of being a victim of a car accident when they had read a newspaper report of a car accident that is vivid rather than pallid. Vivid persuasion also influences jury judgments (Bell & Loftus, 1985): it biases perceptions of disputants (Wilson, Northcraft, & Neale, 1989) and causes observers to judge a defendant more harshly (Reyes, Thompson, & Bower, 1980). Vividness is also a particularly effective advertising strategy: Vivid imagery (Babin & Burns, 1997) and affect-laden photographs (Mitchell, 1986) affect consumers' attitudes toward an advertisement and their behavioral intentions to purchase a product.

Other studies, however, have demonstrated that vivid information does not always influence judgment more than pallid information (Taylor & Thompson, 1982; Werner & Latane, 1976, for reviews) and that it may even undermine persuasion (Frey & Eagly, 1993). In their comprehensive review, Taylor and Thompson (1982) found that empirical evidence of vividness effects was actually unclear in spite of the wide acceptance of the impact of vivid information. The effect of vividness appears to be far from simple (Nisbett & Ross, 1980), and the real-world conditions that are necessary to produce vividness effects are not always available in the laboratory (Taylor & Thompson, 1982; Taylor & Wood, 1983).

The current research is an attempt to examine whether, how, and why vividness, an important judgment and decision-making construct, may lead to distorted rewards in a real-world setting. The NBA offers an interesting context for studying vividness because the scoring performance of NBA players seems to satisfy all of the criteria of vivid information: "(1) emotionally interesting, (2) concrete and imagery provoking; (3) proximate in a sensory, temporal or spatial way" (Nisbett & Ross, 1980, p. 45). First, professional basketball activates the emotions of players, coaches, and fans. Second, scoring performance is easily observable and excites the imagination of a team's hopeful supporters. Finally, scoring is proximate and intense: Scoring dominates basketball coverage, reinforcing the impact on one's judgments and inferences. For example, when Kobe Bryant scored 81 points in one game, sports pages and commentary were buzzing. For the same reason, Wilt Chamberlain is always widely famous for his single-game 100-point scoring record rather than his single-game rebound record. In fact, many ardent fans do not know that he phenomenally grabbed 55 rebounds in a single game.

Staw and Hoang's (1995) study of the sunk cost effect of draft number on players' survival in the NBA also showed that scoring was a stronger predictor of playing time and survival in the league than any other performance component, suggesting that the vividness of scoring may also overly influence coaches. This discussion suggests that:

H1: Scoring performance is more positively related to vividness than non-scoring performance in the NBA.

Subjective assessment and fascination with "objective" criterion

Vividness is important because it leads to biased decision making (Tversky & Kahneman, 1973). Kerr (1975) argued that vividness was one of the major reasons behind biased compensation. Overpayment and inequity between pay and performance are not uncommon in professional sports. For example, Blass (1992) reported that wages in major league baseball increased with tenure independently of productivity gains. Yet, no clear data have shown that vividness is one of the causes.

Analyses of pay often suffer from two major assessment problems: subjective assessments and oversimplified quantifications. Subjective assessments, based on limited data of limited validity, are prone to

heuristics and biases (Tversky & Kahneman, 1974). Yet, subjective assessments are used in compensating both top executives and workers (Fast & Berg, 1975; Hayes & Schaefer, 2000), and have an important impact on many incentive contracts (Gibbons, 1998, 2005).

Oversimplified objective quantifications can also distort compensation decisions. Simple and quantifiable objective standards are useful when performance is predictable and easily quantifiable (Kerr, 1975). However, much organizational performance is neither predictable nor quantifiable; hence Kerr (1975) warns that such practices can easily backfire.

The vividness effect can enhance both subjective assessments and oversimplified quantifications. On the one hand, when people rely on subjective assessments, they tend to process information according to heuristic rules (Tversky & Kahneman, 1974). Highly vivid performance is more accessible and more likely to be overweighted in subjective assessments. On the other hand, a major criticism of using quantifiable objective standards is “overemphasis on highly visible behaviors” (Kerr, 1975, p. 780) when performance requires an array of visible and not so visible behaviors. This may be because less visible performance usually attracts less attention, leading to underestimates of its importance. Logically, the folly of underrewarding desired behavior can be attributed both to overemphasis on highly visible behaviors and underestimation of less vivid behaviors (Kerr, 1975).

Decisions about NBA players’ salaries are likely to be subject to the same biases. Scoring baskets is more readily observable than effectively passing the ball to teammates. Thus, scoring performance is likely to be weighted more than other types of performance in NBA teams’ salary calculations. In contrast, the relatively lower visibility of non-scoring performance may lead it to be underweighted in spite of its important overall contribution to team performance (Chatterjee et al., 1994; Hofler & Payne, 2004). Hence:

H2a: NBA players’ salaries are more likely to be predicted by their scoring than their non-scoring performance.

H2b: Vividness will positively mediate the relationship between NBA player’s scoring performance and their salaries.

Vividness persuasion and all-star voting

Vividness should also be evident in decisions regarding who should play on the All-Star team because the most vivid shooters often outshine other great players in the public and the media. As a result, the decisions of NBA fans may also be subject to the influence of vividness.

Vividness influences persuasion via three mechanisms (Nisbett & Ross, 1980; Taylor & Thompson, 1982). First, vivid information and non-vivid information compete for people’s constrained attention (Taylor & Thompson, 1982). Vivid information captures more emotional and cognitive attention, and therefore is likely to be more persuasive. Second, vivid information prompts more information processing and cognitive elaboration. Third, vivid information normally remains in memory longer, potentially activating additional information from memory that leads to the same inferential conclusions.

These explanations suggest how the vividness of scoring can affect NBA fans’ judgments and decisions. First, although scoring and non-scoring performances will compete for NBA fans’ attention when they watch a game, the emotional and sensory vividness of scoring is likely to draw more of their attention. Second, scoring performance may also activate greater cognitive elaboration, for example, via passionate discussions, than non-scoring performance such as assisting or rebounding. Consequently, scoring ability should be more persuasive than defensive prowess in shaping fans’ preferences for and support of NBA players. Third, the vividness of scoring should keep it in memory longer than non-scoring performance. Thus, the vivid information of scoring performance is more likely to be available to NBA fans when they vote for their favorite All-Star players. It may also stimulate additional memories of

similar information and activate favorable associations, strengthening fans' favorable judgments of high-scoring NBA players.

- H3a: NBA players' scoring performance is more likely to positively predict their All-Star votes than their non-scoring performance.
- H3b: Vividness will positively mediate the relationship between NBA players' scoring performance and their All-Star votes.

STUDY 1

Study 1 used archival data to examine the vividness effect in the NBA. Publicly available data provided unique advantages for testing my hypotheses because they not only included rich and real information about players' performance, salaries, and All-Star votes, but also allowed me to control for a whole set of real-world factors such as player's demographic information, tenure in the league. Also, to my knowledge, no previous study has documented the vividness effect outside the laboratory. Thus, using archival data might also provide some special value for the investigation of vividness effects in the real world.

Methods

Sample and data

The salary data¹ for 304 current NBA players, whose most recent contracts were signed between 1997 and 2005, were collected from the *USA Today* NBA salaries database. The performance data were collected from NBA official website, ESPN NBA webpage, and databasebasketball.com. Based on players' 2004–2005 salaries and contracts, I first determined the years when they signed their most recent contracts. I collected players' performance data as of the date they signed their contracts. For example, if a player signed his most recent contract on 1 August 2003, I collected his performance data in the 2002–2003 season. Because rookies did not have prior NBA performance, their data were not included.

Because All-Star ballot information was only available for the top 10 players in each region, I used All-Star voting data collected from the website of www.dfw.net for the 2003–2004 Season on 50 players.

Dependent variables

Salary and All-Star votes were the two dependent variables. Salary was based on each player's most recent contract. Because many players had multiple-year contracts, I averaged their salaries across the years of their contracts. For All-Star votes, I used the number of votes received in the 2003–2004 season. Both the salary and All-Star votes were log transformed to normalize the distributions.

Independent variables

Scoring performance. Scoring performance was measured by the number of points players scored per minute in each season. I used the number of points players scored per minute rather than per game to make the measure of scoring consistent with the measure of non-scoring performance. An analysis using per game measures produced similar results.

¹The salary data do not contain performance bonuses because that information was not readily available (Harder, 1992).

Non-scoring performance. To reduce multicollinearity, I used a composite index, developed by the *Sports News* and used by previous research (e.g., Harder, 1992), to measure non-scoring performance:

$$\text{Non - scoring} = \frac{\text{REB} + \text{ASST} + \text{BLK} + \text{STL} - (\text{FGA} - \text{FGM}) - (\text{FTA} - \text{FTM})}{\text{Minutes}}$$

where REB is the number of rebounds, ASST is the number of assists, BLK is the number of blocked shots, STL is the number of steals, FGA is the field goals attempted, FGM is the field goals made, FTA is the free throws attempted, FTM is the free throws made, and minutes is the number of minutes played.

This composite index² represents a standardized measure of non-scoring performance, and it reflects a player's overall non-scoring contribution to his team (Harder, 1992). But it may not fully represent all of the traditional statistics of non-scoring performance. Thus, I also tested my hypotheses by comparing the effects of each specific non-scoring performance subcategory (e.g., assists, blocks, rebounds, and steals) separately with that of scoring. The results of these additional analyses were in strong agreement with those reported below, which are more parsimonious.

Both scoring and non-scoring performance were standardized. As shown in Table 1, the correlation between scoring and non-scoring performance was negative and significant ($r = -.47, p < .01$). Although the correlation was relatively high, the two independent variables clearly represent two different constructs.

Vividness. In the NBA, a player's vividness is often reflected by regular media coverage. Thus, I measured vividness by the number of news reports of each player's performance in the online news archive. For the salary hypothesis, I counted the number of online newspapers covering each player's performance in the season right before he signed his most recent contract. For the All-Star vote hypothesis, I selected the online newspapers reporting each All-Star candidate's performance in the 2003–2004 season. I tried to restrict newspapers to those using vivid-related words to report performance to ensure that the papers reflected vividness of performance.³ I only included English news to reduce possible redundancy and variations caused by differences in languages and translation. I also log transformed the variable to normalize the distribution.

*Control variables*⁴

Like previous studies on the NBA (e.g., Harder, 1992; Kahn & Shah, 2005; Staw & Hoang, 1995), I used the following control variables to isolate other possible effects.

Years. For salary-related hypotheses, I included eight dummy variables for each year, with year 1997 as the reference category, to control for any time-specific variation.

Tenure. Players' tenure in the league was another control variable. Virtually all the players included in this study were subject to the 1999 collective bargaining agreement (NBA, January, 1999), which set specific salary caps based on years of service and established seniority-specific minima (Kahn & Shah, 2005). Clearly, players' salaries are affected by their years of service under this agreement. In particular, the rookie contracts are likely to be constrained most severely. Because I excluded rookies from my analyses, the results

²It is worth noting that the original equation included scoring-related measures such as field goals and free throws. To avoid any possible confusions, I also analyzed the data by using a modified equation without these scoring-related measures. The test results did not materially change. Thus, these results use the original equation.

³The news articles devoted to each NBA player might also include other information such as popularity, marketing, salary. The numbers reported here attempted to eliminate as many of these instances as possible.

⁴In the regression analysis, I also controlled for other variables such as contract length, age, performance ranking, All-Star status (for salary hypothesis). I tested my hypotheses with and without these additional control variables and the results did not materially change. They were not reported in the paper for the sake of simplicity.

Table 1. Correlations and summary statistics; sample: 304 observations

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11
1. Salaries	15.016	1.036	—										
2. Scoring performance	0.000	1.000	0.621**	—									
3. Non-scoring performance	0.000	1.000	0.061	-0.468**	—								
4. Vividness	4.534	1.010	0.605**	0.616**	-0.264**	—							
5. Tenure	5.182	3.350	-0.074	-0.074	0.151**	0.258**	—						
6. Minutes	3.064	0.444	0.648**	0.383**	0.141*	0.483**	0.197**	—					
7. Forward-center	0.056	0.230	0.022	-0.030	0.150**	0.048	0.124*	0.026	—				
8. Forward	0.283	0.451	0.048	0.094	0.005	0.028	-0.124*	0.052	-0.153**	—			
9. Center-forward	0.056	0.230	-0.006	-0.150**	0.223**	-0.080	0.115*	-0.037	-0.059	-0.153**	—		
10. Center	0.155	0.362	-0.020	-0.155**	0.290**	-0.197*	-0.034	-0.199**	-0.104	-0.248**	-0.104	—	
11. Guard	0.329	0.471	-0.047	0.062	-0.241**	0.104	-0.023	0.031	-0.170**	-0.440**	-0.170**	-0.299**	—
12. Year 2005	0.036	0.187	-0.016	-0.021	0.022	-0.059	-0.127*	-0.064	-0.047	0.152**	-0.047	0.063	-0.098
13. Year 2004	0.470	0.500	-0.387**	-0.303**	0.086	-0.183**	0.115*	-0.245**	0.086	-0.109	0.000	0.053	0.013
14. Year 2003	0.204	0.404	0.007	-0.034	-0.017	0.071	0.102	0.059	-0.052	-0.010	0.019	-0.013	0.028
15. Year 2002	0.092	0.290	0.144*	0.174**	-0.097	0.081	-0.120*	0.099	-0.078	0.053	-0.028	-0.073	0.068
16. Year 2001	0.079	0.270	0.240**	0.192**	-0.007	0.102	0.017	0.164**	0.035	0.060	-0.071	-0.024	-0.023**
17. Year 2000	0.072	0.260	0.222**	0.216**	-0.041	0.132*	-0.080	0.125*	-0.068*	0.022	0.043	-0.049	-0.006*
18. Year 1999	0.036	0.187	0.153**	0.036	0.009	-0.052	-0.106	0.001	-0.047	-0.04	0.106	0.063	-0.061
19. Year 1998	0.007	0.810	0.015	0.037	-0.024	-0.022	-0.041	-0.010	0.334**	-0.051	-0.020	-0.035	-0.057
12. Year 2005	—												
13. Year 2004	-0.183		—										
14. Year 2003	-0.098		-0.477**	—									
15. Year 2002	-0.062		-0.300**	-0.161**	—								
16. Year 2001	-0.057		-0.276**	-0.148**	-0.093								
17. Year 2000	-0.054		-0.263**	-0.141*	-0.089	-0.082							
18. Year 1999	-0.038		-0.183**	-0.098	-0.062	-0.057	-0.054						
19. Year 1998	-0.016		-0.077	-0.041	-0.026	-0.024	-0.023	-0.016					

* $p < 0.05$; ** $p < 0.01$; two-tailed test.

were unlikely to be influenced heavily by seniority-based differentiation after each player's years of service were controlled.

Position. I created five dummy variables (center, guard, center-forward, forward-center, and forward),⁵ with guard or forward being the reference category when testing H2a and H2b about salaries. In contrast, because of the simpler position categorization in the All-Star data, I used two dummy variables (center and forward) to test H3a and H3b about All-Star votes, with guard being the reference category.

*Playing time*⁶. NBA players' salaries and selection for All-Stars should also be related to their playing time. Thus, players' playing time in each season, in terms of minutes played, was controlled. The number of minutes was log transformed to improve normality.

Team performance. Because team performance might also have an impact on players' status, it was also controlled for in the analyses of All-Star voting. It was measured by winning ratio (number of games won divided by number of games lost). Because the contract years of NBA players vary and many players changed teams when they signed their new contracts, team performance was not controlled for the salary analyses.

Results

Overall, the vividness predictions were supported. Scoring performance was more highly correlated with vividness than non-scoring performance. Scoring was also more strongly related to salaries than non-scoring; and All-Star votes followed the same pattern. Vividness mediated the effects of scoring on both salaries and All-Star votes.

Tables 1 and 2 report the correlations among the study variables and descriptive statistics for the salary-related and All-Star voting-related variables, respectively. Tables 3 and 4 present the regression results.

H1 predicted that scoring performance would be more positively related to vividness than non-scoring performance. This hypothesis was supported: vividness was positively related to scoring performance

Table 2. Correlations and summary statistics; sample: 50 observations

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10
1. All-Star votes	5.679	0.331	—									
2. Scoring performance	0.000	1.000	0.433**	—								
3. Non-scoring performance	0.000	1.000	0.078	−0.518**	—							
4. Vividness	5.819	1.029	0.681**	0.499**	−0.099	—						
5. Tenure	7.340	3.983	−0.028	−0.277	0.168	0.142	—					
6. Salaries	6.811	0.364	0.372**	0.376**	−0.104	0.309*	0.339*	—				
7. Minutes	3.333	0.237	0.225	0.195	0.132	0.134	−0.450**	0.022	—			
8. Center	0.200	0.404	−0.054	−0.330*	0.409**	−0.263	−0.005	−0.019	−0.076	—		
9. Forward	0.400	0.495	−0.008	0.146	0.067	0.001	0.033	−0.085	−0.207	−0.408**	—	
10. Team performance	0.575	0.129	0.053	−0.216	0.350*	0.095	0.169	0.003	0.208	−0.015	0.088	—

* $p < 0.05$; ** $p < 0.01$; two-tailed test.

⁵The original dataset in *USA Today* categorized some of the players in more than one position. Some examples include Ben Wallace (Forward-Center) in 2003 and Tracy McGrady (F-G) in 2005. Thus, I created the dummy variables based on these categories.

⁶I originally chose to control both minutes and number of games because some bench players might not be measured clearly by one criterion alone. However, as expected, the two variables were highly correlated with each other ($r = .892, p < .01$). Hence, I dropped the numbers of games, and only used the numbers of minutes each player played for the final analyses.

Table 3. Results (standardized beta coefficients) of regression analysis for the effects of scoring and non-scoring performances on the salaries

Variable entered	Model 1	Model 2	Model 3	Model 4
Scoring performance		0.552*** (.049)	0.550*** (.049)	0.413*** (.052)
Non-scoring performance		0.244*** (.050)	0.241** (.051)	0.273** (.048)
Scoring* non-scoring			0.024 (.034)	0.024 (.032)
Vividness				0.279*** (.047)
Minutes	0.581*** (.104)	0.361*** (.101)	0.362*** (.101)	0.287*** (.099)
Tenure	0.037 (.014)	0.060 (.011)	0.059 (.011)	−0.009 (.011)
Forward-center	0.058 (.0223)	0.012 (.0193)	0.011 (.0193)	−0.015 (.0183)
Forward	0.053 (.0141)	−0.011 (.0121)	−0.011 (.0121)	−0.032 (.0114)
Center-forward	0.035 (.0214)	0.027 (.0189)	0.030 (.0189)	0.019 (.0179)
Center	0.149** (.0160)	0.077 (.0148)	0.081 (.0149)	0.071 (.0140)
Guard	0.030 (.0138)	0.004 (.0115)	0.005 (.0115)	−0.024 (.0109)
Year 2005	0.091 (.0764)	0.109 (.0629)	0.111 (.0630)	0.096 (.0594)
Year 2004	0.068 (.0733)	0.152 (.0603)	0.157 (.0604)	0.122 (.0570)
Year 2003	0.141 (.0735)	0.196 (.0605)	0.201 (.0606)	0.162 (.0572)
Year 2002	0.210 (.0740)	0.185 (.0610)	0.189 (.0611)	0.173 (.0576)
Year 2001	0.244 (.0743)	0.203 (.0612)	0.210 (.0614)	0.203 (.0579)
Year 2000	0.250 (.0744)	0.192 (.0613)	0.198 (.0624)	0.178 (.0580)
Year 1999	0.219 (.0762)	0.216 [†] (.0628)	0.219 [†] (.0629)	0.216* (.0593)
Year 1998	0.046 (.0913)	0.044 (.0753)	0.044 (.0754)	0.053 (.0711)
Overall model R^2	0.529	0.683	0.684	0.720
Adjusted R^2	0.504	0.664	0.663	0.701
Overall model F	21.487***	36.118***	34.077***	38.274***
N	304	304	304	304

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; [†] $p < 0.10$.

Table 4. Results (standardized beta coefficients) of regression analysis for the effects of scoring and non-scoring performances on the all-star voting

Variable entered	Model 1	Model 2	Model 3	Model 4
Scoring performance		0.586** (.063)	0.665** (.063)	0.198 (.064)
Non-scoring performance		0.445* (.063)	0.504* (.062)	0.296 [†] (.054)
Scoring* non-scoring			−0.252 [†] (.038)	−0.184 (.032)
Vividness				0.588*** (.045)
Center	−0.012 (.0127)	−0.103 (.0142)	−0.178 (.0142)	−0.004 (.0123)
Forward	0.067 (.0108)	−0.146 (.0110)	−0.163 (.0107)	−0.009 (.0092)
Team performance	0.023 (.0389)	0.036 (.0367)	0.110 (.0371)	0.021 (.0313)
Tenure	−0.097 (.015)	−0.011 (.015)	−0.050 (.015)	−0.210 (.013)
Salary	0.407* (.0138)	0.188* (.0152)	0.180 (.0148)	0.221 (.0123)
Minutes	0.156 (.0112)	−0.014 (.0112)	−0.092 (.0112)	−0.044 (.0093)
Overall model R^2	0.189	0.359	0.410	0.776
Adjusted R^2	0.073	0.231	0.274	0.497
Overall model F	1.627	2.806*	3.012**	5.747***
N	50	50	50	50

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; [†] $p < 0.10$.

($r = .62$, $p < .01$ in salary analyses, $r = .50$, $p < .01$ in All-Star vote analyses); its relationship with non-scoring performance was negative ($r = -.26$, $p < .01$ in salary analyses, $r = -.09$, *n.s.* in All-Star vote analyses).

H2a predicted that scoring performance would have a stronger impact on players' salaries than non-scoring performance. This hypothesis was supported. Model 1 in Table 3 was the baseline model including only control variables. To directly compare the variance accounted for by scoring and non-scoring performance, Model 2 added non-scoring and scoring performances. Adding both variables greatly improved the baseline model: compared with the baseline model, the R^2 improved significantly from 52.9 to 68.3% ($p < .001$). In model 2, both scoring ($\beta_{\text{scoring}} = .55$, $p < .0001$) and non-scoring ($\beta_{\text{non-scoring}} = .24$; $p < .001$) were positively related to salaries. As predicted, however, scoring was more significantly related to salaries than non-scoring: analyzing variance accounted for was in agreement with the prediction. When I added non-scoring performance to the equation of controls plus scoring performance predicting salaries, the R^2 change was .03 ($p < .001$). When I added scoring to the equation of controls plus non-scoring performance predicting salaries, the R^2 change was .15 ($p < .001$). Overall, H2 was supported: NBA players' salaries were more likely to be predicted by their scoring performance than their non-scoring performance.

Model 3 tests the interaction between scoring and non-scoring. Adding the interaction term did not significantly improve the model ($R^2 = .001$, $p = .49$). The interaction between scoring and non-scoring performances was also not significant ($\beta_{\text{scoring} \times \text{non-scoring}} = .024$, $p = .49$). This suggests that being good at both scoring and non-scoring does not necessarily enhance one's salary.

H2b predicted that vividness would positively mediate the relationship between scoring and salaries. The hypothesis was supported. Model 5 included vividness as another independent variable. It was significant and positive ($\beta = .28$, $p < .0001$), indicating a positive relationship between vividness and salaries. Mediation analyses supported the mediation effects of vividness. The results revealed a partial mediation effect of vividness based on Kenny, Kashy, and Bolger's (1998) approach. First, scoring was significantly related to salaries ($\beta_{\text{scoring}} = .62$, $p < .0001$). Second, vividness was significantly related to salaries ($\beta_{\text{vividness}} = .61$, $p < .0001$). Third, scoring was significantly related to vividness ($\beta_{\text{vividness}} = .62$, $p < .0001$). Fourth, a significant relationship between vividness and salaries existed ($\beta_{\text{scoring}} = .36$, $p < .0001$) when scoring was controlled for. Finally, the relationship between scoring and salaries was smaller, but still significant ($\beta_{\text{scoring}} = .40$, $p < .0001$) after controlling for vividness. A Sobel test confirmed the positive mediation effect of vividness on the relationship between scoring and salary ($Z = 6.01$, $p < .001$). In contrast, vividness negatively mediated the relationship between non-scoring and salary ($Z = -4.52$, $p < .001$).

H3a predicted that scoring would have a larger impact on All-Star votes than non-scoring performance. Model 1 in Table 4, the baseline model containing only the control variables, was not significant ($F(6, 42) = 1.63$, $p = .16$). Model 2 added non-scoring and scoring performances. Adding both variables significantly improved the baseline model (F change = 5.34, $p = .009$; R^2 change = .17, $p = .009$). Model 2 was significant ($F(8, 40) = 2.81$, $p = .014$); both scoring ($\beta_{\text{scoring}} = .59$, $p < 0.01$) and non-scoring ($\beta_{\text{non-scoring}} = .45$; $p = .03$) were positively and significantly related to All-Star votes. However, it was worth noting that without controlling for scoring performance, the relationship between non-scoring and All-Star votes is not significant ($\beta_{\text{non-scoring}} = .097$, *n.s.*).

Analyzing the variance accounted for by scoring and non-scoring performances suggests that scoring is related to All-Star votes more than non-scoring: the R^2 change was .08 ($p = .03$), when adding non-scoring performance to the equation of controls plus scoring performance predicting All-Star votes. In contrast, the R^2 change was .15 ($p < .01$) when adding scoring performance to the equation of controls plus non-scoring performance predicting All-Star votes. Overall, H3a was supported: scoring was a better predictor of All-Star votes than non-scoring.

Model 3 tests the interaction between scoring and non-scoring. Adding the interaction term marginally improved the model (F change = 3.34; $R^2 = .05$, $p = .08$). The interaction effect between scoring and non-scoring was negative and marginally significant ($\beta_{\text{scoring} \times \text{non-scoring}} = -.252$; $p = .08$). This

suggests that being good at both scoring and non-scoring might actually decrease a player's chance of being selected as an All-Star. Scoring ($\beta_{\text{scoring}} = .67, p < 0.01$) remained positive and significant in Model 3; so was non-scoring ($\beta_{\text{non-scoring}} = .50, p = 0.01$).

H3b predicted that vividness would positively mediate the relationship between scoring and All-Star votes. The hypothesis was supported. Adding vividness in Model 4 significantly improved the model: R^2 increased to 60.2%; adjusted R^2 increased to 50%. Using Kenny et al.'s (1998) approach, I found that (1) scoring was significantly related to All-Star votes ($\beta_{\text{scoring}} = .43; p < .0001$), (2) vividness was significantly related to All-Star votes ($\beta_{\text{vividness}} = .68, p < .0001$), (3) scoring was significantly related to vividness ($\beta_{\text{scoring}} = .50; p < .0001$), and (4) the relationship between scoring and All-Star votes was no longer significant with vividness controlled ($\beta_{\text{scoring}} = .12; p = .32$). A Sobel test confirmed the full mediation by vividness on the relationship between scoring and All-Star votes ($Z = 3.14; p < .001$), but not that between non-scoring and All-Star votes ($Z = -.68; p = .49$).

Although the results indicated that scoring was a stronger predictor of salaries and All-Star votes than non-scoring performance, two alternative factors might have influenced the results. First, scoring might actually be more important than non-scoring performance, rather than just being vivid. To investigate this possibility, I conducted an exploratory analysis using the performance data of the 50 All-Star candidate players in the 2003–2004 season. I ran regression analyses using team performance as the dependent variable and scoring and non-scoring performances as independent variables. The results indicated that All-Stars' scoring performance ($\beta_{\text{scoring}} = -.047, p = .771$) did not enhance their teams' performance more than their non-scoring performance ($\beta_{\text{non-scoring}} = .33; p = .05$) ($F(2, 47) = 3.34; p = .04$). Surprisingly, the correlation between scoring performance and their teams' performance was negative (but not significant $r = -.216, n.s.$). Because All-Star candidates only compose a small portion of all NBA players, this result might not fully capture the relationship between scoring and team performance. However, previous research has shown that the winning percentage of NBA teams was determined by both offensive and defensive statistics, and defensive prowess was critical for teams to win games (Chatterjee et al., 1994; Hofer & Payne, 2004). Thus, the importance of scoring alone was unlikely to explain the current results.

Second, the demand for shooters may be stronger than for defenders: "Dead-eye shooters are hard to find in today's NBA" (Stein, ESPN, 2006). Thus, it may be demand rather than vividness that drives great shooters' salaries. For the same reason, great shooters are likely to outshine great defenders in All-Star votes. To test this possibility, I compared scoring and non-scoring performances using converted standardized scores. A comparison of standardized scores between scoring and non-scoring performances, however, did not support this argument: the shooters in the top 10 ($t = -1.36; p = .16$), 20 ($t = -.40, p = .69$) and 30 percentiles ($t = -1.25, p = .90$) had equally good standardized scores as those of the top players at non-scoring performance. Similarly, comparing the relative standing of scoring with assists, blocks, rebounds, and steals, suggested that shooters might not be more desperately needed by the NBA teams than other types of players. In sum, the vividness effect, rather than the importance of scoring to teams or the demand for great shooters, seemed to be the underlying cause of the relationships reported here.

Discussion

Results in Study 1 showed that vivid scoring performance of NBA players carried more judgmental weight than the less observable non-scoring performance in both salaries and All-Star votes. Although it appears that NBA teams included non-scoring in their salary calculations, they overemphasized scoring. NBA fans also focused on scoring in their evaluation of players. Scoring was the only significant predictor of their All-Star votes, which were cast heavily for great shooters. The interaction between scoring and non-scoring performances was not significant in two regression analyses ($\beta_{\text{scoring}} = .024, p = .49$; $\beta_{\text{non-scoring}} = -.25, p = .08$), suggesting that all-around players were unlikely to be considered more favorably in terms of both salaries and All-Star balloting.

The media measure of vividness was significantly related to both dependent variables and scoring performance, but uncorrelated with non-scoring performance. The results of the mediational analyses indicated that this vividness measure partially accounted for the effect of scoring on salary and fully accounted for the effect of scoring on All-Star votes.

Study 1 demonstrated a clear and strong vividness effect in the real world as opposed to the lab. Yet, vividness may correlate with multiple variables in the real life. Although I tried to eliminate as many unrelated factors as possible, the media measure of vividness might still include unwanted noise. In addition, archival data alone cannot explain how NBA managers make salary decisions, or how fans vote for All-Stars. In particular, these data could not directly test whether decision makers fall victim to the influence of vividness for the reasons identified earlier (Nisbett & Ross, 1980) or if more complex factors might be involved (Taylor & Thompson, 1982). Thus, Study 2 used the NBA context and basketball fans' cognitive evaluations of salary and All-Star decisions to directly measure the effects of vividness.

STUDY 2

Study 2 used an online survey to assess basketball fans' perceptions of NBA players' scoring and non-scoring performances. Study 2 primarily investigated the reliability of Study 1's findings; it also attempted to explore the underlying mechanisms behind the vividness effects.

Methods

Participants and procedure

Using both online and on-campus advertisements, I recruited 137 basketball fans from a major Midwestern university and multiple online sports forums. All participants indicated that they were basketball fans and liked to watch NBA games. On a seven-point scale, their average liking of NBA games was 5.81 ($SD = 1.12$).

The survey contained 37 questions on basketball fans' perceptions of scoring and non-scoring performances. The first set of questions gave the fans five options (scoring, assisting, rebounding, stealing, and blocking), and asked them when they watched NBA games, (1) what they looked at first; (2) what was most memorable; (3) what was most eye-catching; and (4) what was most exciting about the game.

A second set of questions examined the vividness of scoring and non-scoring. Like previous research (e.g., Wilson et al., 1989), the fans rated eight attributes of scoring and individual facets of non-scoring performance on seven-point Likert scales (1 = not at all, 7 = very much): "attention getting," "interesting," "eye-catching," "dull," "exciting," "boring," "memorable," and "impressive."

A third set of questions presented three categories of players: shooters, defenders, and all-around players. The respondents rated, on seven-point Likert scales, how much attention each type of player would receive, and how valuable each type of player was to the team. Finally, the participants indicated the likelihood that each type of player would become an All-Star, and how each type of player would be compensated if they were the general manager of an NBA team.

Results

The findings of the online survey were consistent with those of Study 1. Scoring was clearly more vivid than any of the four major non-scoring performance factors in the minds of basketball fans. Table 5 documents their considerable agreement on the vividness of scoring: 75% reported that they looked at scoring first when watching NBA games; 66% thought that scoring was more memorable than other performance; 47% felt that scoring was most eye-catching; and 42% found that scoring was the most exciting aspect of performance.

Table 5. Percentages of the first four questions in Study 2

	What do you look at first?	Most exciting	Most eye-catching	Most memorable
Scoring (%)	74.5	42.3	46.7	65.7
Assisting (%)	10.9	11.7	13.9	8.0
Blocking (%)	3.6	14.6	16.8	12.4
Stealing (%)	2.9	28.5	16.1	8.8
Rebounding (%)	8.0	2.9	6.6	5.1

A factor analysis of the eight measures of the vividness of scoring and non-scoring led to one factor accounting for 49.19% of the variance in scoring, and 55.62% of the variance in non-scoring. The reliability of the resulting eight items (Cronbach's α) was 0.85 for scoring; and 0.88 for non-scoring. A paired *t*-test showed that scoring ($M = 45.51$, $SD = 6.68$) was significantly more vivid than non-scoring ($M = 41.67$; $SD = 8.25$) ($t = 4.42$; $p < .01$).

A MANOVA assessed the effect of scoring and non-scoring on salaries, using the basketball fans' responses to the salary questions for each type of player. Results revealed significant main effects of player type on both pay ($F(2, 396) = 18.05$; $p < .001$) and perceived contributions ($F(2, 396) = 5.69$; $p < .01$). Follow-up ANOVAS showed that the fans were likely to pay shooters ($M = 4.91$, $SD = 1.21$) more than defenders ($M = 4.53$, $SD = 1.33$) ($p < .05$) even though they believed that defenders ($M = 6.30$; $SD = 0.85$), rather than shooters ($M = 6.01$; $SD = 0.93$), would make more contributions to their teams ($p < .01$). Although the fans would pay all-around players ($M = 5.50$; $SD = 1.41$) more than either shooters ($p < .0001$) or defenders ($p < .0001$), all-around players were not evaluated more favorably than defenders in terms of their perceived team contributions ($M = 6.36$; $SD = 0.86$) ($p = .57$).

The fans also believed that shooters ($M = 5.58$; $SD = 1.08$) were more likely to become All-Stars than defenders ($M = 4.46$; $SD = 1.44$) ($t = 9.0$; $p < .001$); there was no difference in their perceived likelihood of selection for shooters and all-around players ($M = 5.61$; $SD = 1.19$) ($t = -.17$, $p = .86$).

Two separate regression analyses also assessed the effects of vividness and perceived value to one's team on both salaries and All-Star votes. Vividness was measured by the attention that each type of player received; perceived value was measured by how valuable each type of player was to his team. The results revealed that both vividness ($\beta_{\text{vividness}} = .32$, $p < .01$), and value to one's team ($\beta_{\text{value}} = .14$, $p = .02$), were significantly related to salary ($F(2, 336) = 26.802$, $p < .01$), and vividness accounted for more variance (R^2 change = .06 adding vividness to value vs. R^2 change = .01 adding value to vividness). Vividness had a similar effect on All-Star votes: the relationship between vividness and All-Star votes was significant and positive ($\beta_{\text{vividness}} = .66$; $p < .01$; $F(2, 334) = 130.87$; $p < .01$), and fans' perceived value of each type of player was not a significant predictor of All-Star votes ($\beta = .021$, $p = .62$).

Discussion

The results of Study 2 were consistent with the results of Study 1. Basketball fans perceived scoring as more vivid than non-scoring. Their responses suggest that scoring will affect both salaries and All-Star votes more than non-scoring. Even though defenders were perceived as more valuable than shooters, and at least as valuable as all-around players, these fans reported that they would pay them less and cast fewer votes for them in All-Star balloting. Vividness was an important underlying factor, and a significant predictor of both salaries and All-Star votes. This suggests that fans may actually de-emphasize the players' overall value to the team.

The results of Study 2 were based on general opinions; they did not measure specific players' performance. For the sake of comparison, Study 2's items arbitrarily categorized players as shooters, defenders, or

all-around players. This categorization may have been influenced by respondents' definitions of the player types. If the vividness of scoring leads to popularity, they might deem superstars as the shooters or all-around players and treat the not-so-great players as defenders. These potential biases may have contributed to Study 2's results. To address this limitation, Study 3 used behavior-based measures to test for vividness effects.

STUDY 3

Study 3 compared the vividness of specific scoring and non-scoring performances by manipulating the profiles of different types of players. Using behavior-based measures, I tested how vividness affected salary and All-Star vote decisions, and further investigated some of the mechanisms identified in Study 2.

Methods

Participants and procedure

Study 3 used two behavior-based online surveys: one for NBA salaries and another for All-Star votes. A total of 177 and 94 basketball fans responded to the two surveys, respectively. The recruiting procedure and criteria were identical to those of the second study. All the participants were avid NBA fans (on a seven-point Likert scale, $M = 5.87$; $SD = 1.19$). No one responded to both surveys.

Each survey included the profiles of seven hypothetical NBA players who were proficient in different ways (see Table 6, which was given to participants). For example, Player A in Table 6 was created to be good only at scoring: his points per game were 1 SD more than the NBA average; all of his other statistics were 1 SD below the NBA average. Players B, C, D, E, and F stood out on at least two performance statistics, but not scoring. Player G was created to be an all-around player: all of his performance statistics were around the NBA mean. The turnovers per game and the total number of games played last season were consistent across all seven players. The respondents also had access to the means and standard deviations of all performance

Table 6. The Profiles of players in Study 3

NBA players' statistics from last season

	Player A	Player B	Player C	Player D	Player E	Player F	Player G
Points/game	16.29	3.42	3.36	3.38	3.41	3.39	9.61
Assists/game	0.25	0.28	3.93	0.26	0.27	3.98	2.11
Rebounds/game	1.75	1.76	6.86	6.87	6.85	1.75	4.27
Steals/game	0.31	1.39	0.36	1.28	0.32	0.80	0.79
Blocks/game	0.36	1.21	0.46	0.43	1.16	1.25	0.65
Turnover/game	1.43	1.38	1.41	1.39	1.42	1.40	1.43
Total games played last season	72	72	72	72	72	72	72

The mean and standard deviations of all NBA players' statistics

Performance	<i>M</i>	<i>SD</i>
Points/game	9.62	6.25
Assists/game	2.09	1.86
Rebounds/game	4.30	2.55
Steals/game	0.79	0.49
Blocks/game	0.66	0.30
Turnover/game	1.42	0.80
Total games played last season	61.64	25.52

Note: In the survey, the order of presentation of the seven players was counterbalanced and their letters (e.g., A, B, C) were randomized.

statistics in the NBA. In both surveys, the order of presentation of the seven different players was counterbalanced.

In the salary survey, the respondents saw the following introduction:

Suppose that you are the general manager of an NBA team. Your team decides to sign several new players. (Players' basic information is on the following pages.) You need to determine how much your team would be willing to pay each of them. The pay range is from \$500 000 to \$5 Million per season. Your total budget is \$10 Million. How will you allocate the pay among these players?

The instructions were followed by the statistics of each player. Right after the respondents entered the amount they would pay each player, they were asked to indicate on a one to seven scale how impressive they thought each player was and how great a contribution they expected each player to make to their team. The participants were then asked to recall, based on the statistics they had just seen, what aspect of each player's performance was most important. Players were identified only by letter, for example, A, B, C. The letters were randomized. Participants could not go back to the previous pages to review prior information or answers. Finally, they were also asked which player they would choose if their budget only allowed them to select one player out of the seven.

The survey about All-Star votes resembled the salary survey, using exactly the same profiles, but a different scenario. The respondents rated on seven-point Likert scales how impressive each of the players was as a candidate for this year's All-Star game, how likely they would vote for each player to be an All-Star, and the contribution they believed that each player would make to his team. The respondents were then asked to recall the performance criterion that was most important for each player and which player they would support if they could only vote for one player for the All-Star team.

Results

The results of Study 3 were consistent with the findings in the first two studies. The profile of the shooter was more vivid to the respondents than those of the defenders. Scoring also had a stronger impact on both salaries and All-Star votes than non-scoring prowess.

In both surveys, scoring was more vivid than non-scoring. Overall, the shooter ($M = 5.18$, $SD = 1.29$) was perceived as more impressive than all of the other players. The one-way-repeated measures ANOVA tests contrasting the shooter with each of the other types of players were all significant at $p < .05$. Thus, scoring was more vivid than non-scoring when basketball fans looked at the statistics of different types of players.

The data also support the effects of vividness on both salaries and All-Star votes. Among the seven players, the shooter ($M = 14.22$, $SD = 1.11$) received the highest salary⁷ from the basketball fans: the one-way-repeated measures ANOVA ($F(6, 170) = 74.17$, $p < .01$) and pairwise comparisons comparing the shooter with all other players were all significant at $p < .01$. In addition, the respondents were more likely to vote for the shooter ($M = 4.82$, $SD = 1.77$) than for all of the other players. The one-way-repeated measures ANOVA tests contrasting the shooter and each other category of player were all significant at .05. Taken together, scoring performance had a larger impact for fans on both salaries and All-Star votes than non-scoring performance.

The post-experiment questionnaire also revealed that the shooter was the most frequent first choice when respondents could only select one player (all $ps \leq .01$ for one sample χ^2 tests). As seen in Table 7, 40% of the respondents⁸ chose the shooter over all of the other six players when they could only sign one player for their team; 52% voted for the shooter when they could only select one candidate to be an All-Star.

⁷The salary was log transformed for the ANOVA analyses.

⁸Only 149 participants responded to this question.

Table 7. Results of “select only one player” question in Study 3

	Player A	Player B	Player C	Player D	Player E	Player F	Player G
Points/game	16.29	3.42	3.36	3.38	3.41	3.39	9.61
Assists/game	0.25	0.28	3.93	0.26	0.27	3.98	2.11
Rebounds/game	1.75	1.76	6.86	6.87	6.85	1.75	4.27
Steals/game	0.31	1.39	0.36	1.28	0.32	0.80	0.79
Blocks/game	0.36	1.21	0.46	0.43	1.16	1.25	0.65
Turnover/game	1.43	1.38	1.41	1.39	1.42	1.40	1.43
Total games played	72	72	72	72	72	72	72
Salary survey: one player only (%)	39.6	4.7	17.4	8.7	2.0	6.7	20.8
All-Star survey: one player only (%)	51.6	2.2	8.8	1.1	6.6	5.5	24.2
Correct recall in <i>Salary survey</i> (%)	64.4	13	45.2	41.2	34.5	26.6	*
Correct recall in <i>All-Star survey</i> (%)	70.2	17.0	41.5	39.4	44.1	21.3	*

*Because accurate recall of the all-around players required respondents to recall more information than for the other types of players, its accuracy was not comparable to that of other players. Thus, I did not compare all-around player with other players in my analyses.

As in Study 2, two regression analyses compared the effects of vividness and perceived contributions. Both variables were significantly related to salaries ($F(2, 1234) = 179.30$; $p < .0001$; $\beta_{\text{vividness}} = .30$; $p < .0001$; $\beta_{\text{contribution}} = .19$; $p < .0001$) and All-Star votes ($F(2, 647) = 992.40$; $p < .0001$; $\beta_{\text{vividness}} = .54$; $p < .0001$; $\beta_{\text{contribution}} = .37$; $p < .0001$). However, vividness accounted for more variance than contributions for both salaries (R^2 change = .02 adding vividness to perceived contributions; $p < .01$ vs. R^2 change < .01 adding perceived contributions to vividness, $p < .01$) and All-Star votes (R^2 change = .10 adding vividness to perceived contributions; $p < .01$ vs. R^2 change = .05 adding perceived contributions to vividness, $p < .01$).

The data also seemed to support some of the mechanisms identified in Study 2. In the salary and All-Star surveys, 64 and 70.2% of the basketball fans, respectively, correctly recalled that points made per game were the most important aspect of the performance of the shooter (see Table 7). No other type of performance was recalled as accurately as the shooter's performance (all $ps \leq .01$ for one sample χ^2 tests).⁹ In sum, the results suggested that fans might process the information about shooters more carefully, and this information stayed in their memories longer than the information about other types of players.

Discussion

Study 3 corroborated the findings of the first two studies. As predicted, scoring was more vivid than non-scoring, and it influenced both salaries and All-Star votes more than non-scoring. Unlike Study 2, although all-around players were still evaluated more positively than most other types of players, the fans preferred the shooters over all-around players in both their salary and All-Star decisions. This suggests that the label of all-around players in Study 2 might also be vivid because the fans perceived them as more similar to shooters than to defenders. However, when the fans could only look at players' statistics, they seemed to be most attentive to scoring, evaluating shooters more favorably than all-around players.

In Study 3, non-scoring performance contained multiple performance dimensions. This may have accentuated the simplicity, rather than the vividness, of scoring, making shooters stand out. In addition, the naturally large variance of scoring might also make shooters more attractive than other players. Finally,

⁹Because accurate recall of the all-around players required respondents to recall more information than for the other types of players, its accuracy was not comparable to that of other players. Thus, I did not compare all-around player with other players in the survey.

despite their consistent results, none of the first three studies fully analyzed the relationship among scoring, non-scoring, winning, and return on investments. Study 4 addressed these issues.

STUDY 4

Study 4 has three major purposes: to replicate the results of Study 3 by breaking down the complexity of non-scoring performance and minimizing the potential effect of scoring's large variance; to manipulate the vividness of defense to test whether manipulated vividness affects fans' decisions; and to further explore the opinions of basketball fans to rule out some possible alternative explanations. In particular, Study 4 attempted to answer the following questions: (1) how would fans compensate different types of players; (2) whether fans would pay shooters higher salaries as an institutional norm; (3) how fans interpret the relationship between winning, scoring, and defense; and (4) how they view the relationship between enhancing team performance and other goals such as attendance and return on investment.

Methods

Participants and procedure

A total of 115 basketball fans were recruited from online basketball forums. They randomly answered one of two web surveys. No respondent participated in any of the previous studies. On a seven-point scale, their average liking of NBA games was 5.34 ($SD = 1.33$).

The first survey was similar to Study 3's. To reduce the potential effect of scoring's large variance, however, the survey provided rankings instead of real performance data for each player. The rankings were carefully chosen to reflect both real individual NBA statistics and the performance data used in Study 3. To simplify the sophistication of non-scoring performance in previous studies, I focused on comparing only defense and scoring. Thus, I only included three players in the survey: a shooter, a defender, and an all-around player. Table 8 presents the players and their rankings. The order and identifying letters (A, B, or C) of the players were counterbalanced using a Latin-square design; the performance categories of each player were also randomized.

The second survey was identical to the first survey except that the defender¹⁰ was manipulated to be more vivid. The manipulation repeated the defender's rankings, presenting the data again just when fans were

Table 8. The profiles of players in Study 4

	Player A	Player B	Player C
Points/game	Ranked as # 189	Ranked as #43	Ranked as #123
Assists/game	Ranked as # 178	Ranked as #171	Ranked as #121
Rebounds/game	Ranked as #45	Ranked as # 187	Ranked as # 126
Steals/game	Ranked as #186	Ranked as # 175	Ranked as # 122
Blocks/game	Ranked as # 58	Ranked as #188	Ranked as # 123
Turnover/game	Ranked as #168	Ranked as #165	Ranked as # 163
Total games played last season	72	72	72

¹⁰The same manipulation did not seem to work for the all-around player. The overall performance of all-around players might make them difficult to highlight. But the results of salary comparisons remained the same when I manipulated the vividness of the all-around player.

making their decisions. In addition, the defender was highlighted by the following statement “*Player A (B/C) is a truly tough defender. He was ranked #45 and #58 in rebounds and blocks among 436 currently active NBA players.*” In contrast, the shooter and all-around player were both presented in the same way as in the first survey, without highlighting the players’ data or making any special note of their rankings.

After making their decisions about salary recommendations, the participants answered a series of questions (see Appendix) on seven-point Likert scales, about their opinions on scoring, defense, player compensation, and winning. The order of the questions was randomized. Because All-Star players are typically very highly ranked, Study 4 only tested fans’ salary decisions in both surveys.

Results

The results continued to support the previous findings. With rankings as information, the shooter still received higher salaries ($M = 14.38$; $SD = .69$) than both the defender ($M = 13.94$; $SD = .78$) and the all-around player ($M = 13.66$; $SD = .89$) ($F(2, 60) = 22.85$, $p < .001$). This suggests that the variance of shooting did not account for the results of the previous studies.

The vivid manipulation in the second survey was effective: the fans perceived the defender as more vivid ($M = 4.38$, $SD = 1.17$) with the vivid manipulation than without it ($t = 2.81$, $p < .01$). As a result, they recommended marginally higher salaries to the defender ($M = 14.20$; $SD = .85$) than before ($t = 1.68$, $p < .10$). In contrast, however, neither the salaries nor the perceived vividness of the shooter and the all-around player significantly changed (all p s not significant). Even though the defender was highlighted, the shooter ($M = 14.57$; $SD = .73$) still received significantly more pay ($F(1, 51) = 14.76$, $p < .01$). This suggests that the natural vividness of the shooter is particularly strong. Yet, this might also suggest that shooters may be paid highly as an institutional norm, just like quarterbacks in football. The fans, however, did not seem to agree: 70% of them actually believed that the all-around players deserved the highest pay in the NBA, and 85% would pay the all-around players higher salaries if they were an NBA general manager. In contrast, only 3 and 10% of the fans preferred shooters in the same two questions and they did not seem to distinguish shooters from defenders in terms of hypothetical compensations. Thus, their real salary decisions suggested that vividness subconsciously reversed fans’ preferences and beliefs.

The fans’ general opinions further supported the vividness of scoring. A direct comparison between scoring and defense accentuated the vividness of scoring: 82% of the fans reported that they looked at scoring first when watching NBA games; 78% thought that scoring was more memorable than defense; 86% felt that scoring was more eye-catching than defense; and 86% found that scoring was more exciting than defense. This suggested that the comprehensiveness of non-scoring performance did not necessarily account for the vividness of scoring demonstrated earlier.

Two other alternative explanations also bear careful consideration. First, managers and fans might place more emphasis on scoring because they believe that scoring was more critical to winning or top scorers had the best athleticism and therefore were rare. However, fans’ responses showed that they were firm believers of the old adage that defense was more important than scoring in winning games ($t = 4.76$, $p < .001$). In addition, 93% rated all-around players as most athletically talented and only 15% thought that the NBA was short of top scorers, far behind both defenders and all-around players.

Second, because scoring is more exciting and entertaining, shooters might be more appealing to fans. Thus, in paying higher salaries to shooters, NBA managers might actually weigh team performance against other practical considerations, such as fan attendance and return on investment. Yet, the fans’ post hoc responses suggested that their decisions rested squarely on enhancing team performance. For them, winning games was more important to selling seats ($t = 3.17$, $p < .01$) and attracting loyal fans ($t = 9.76$, $p < .001$) than scoring or being an entertainingly offensive team. Thus, fans expected that a team would earn more money when it won games rather than simply enhancing its offensive prowess ($t = 6.29$, $p < .001$) or hiring great shooters ($t = 12.47$, $p < .001$). These results suggest that fans placed considerable importance on both

defense and winning. Simultaneously, however, the vividness of scoring seems to have biased their decisions. This might also explain why the fans agreed that shooters received more attention ($p < .0001$) although both defenders ($t = 6.92, p < .001$) and all-around shooters ($t = 2.75, p < .001$) were rated as more valuable to their teams than shooters.

Finally, the results of Study 4 provided mixed support for the mechanisms of vividness found before. Most of the fans correctly recalled both the defender and shooter in the end of the survey although in a regression analysis the reported vividness of each player right after their decision accounted for more variance in salaries than their perceived contribution (R^2 change = .05 adding vividness to perceived contribution; $p < .01$ vs. R^2 change = .02 adding perceived contribution to vividness, $p < .01$). They also did not differ in their preferences of different types of players when they were asked to only pick one player.

Discussion

Study 4 ruled out several alternative explanations and consistently supported the previous findings. Fans clearly perceived scoring as more vivid than defense although they placed considerable importance on the latter in terms of winning games. They also would pay shooters more, whether the data were presented in terms of raw performance data or rankings. Increased vividness also increased the salary of the defender. This suggests that vividness has an influential impact on salary decisions. In real life, however, the natural vividness of scoring seems to be powerful and ingrained. Thus, although enhanced vividness increased the defender's salaries, the vividness of scoring still made the shooter the highest paid. These results also suggest that vividness effects might subconsciously reverse preferences: although fans greatly valued defense and winning, they actually paid more to shooters, the most vivid, but less valuable players in their beliefs.

GENERAL DISCUSSION

Using both archival and survey data, this research documented the vividness effect in the NBA. Study 1 demonstrated that scoring was more vivid than non-scoring: scoring performance was more strongly related to salaries than non-scoring performance and All-Star votes displayed the same pattern. Study 1 also showed that vividness partially mediated the effect of scoring on salaries, and fully mediated the effect of scoring on All-Star votes. Study 2's survey of basketball fans supported the results in Study 1: the fans perceived scoring as more vivid than non-scoring. Vividness seemed to lead them to recommend paying shooters higher salaries than defenders even though they believed that defenders would make more contributions to their teams. Studies 3 and 4 replicated the results of the first two studies using behavior-based measures. The results suggested that scoring was more likely to affect salary recommendations and All-Star votes than non-scoring because of its vividness.

Theoretical contributions

This research enhances our understanding of vividness effects on judgments and decision making in several ways. It presents one of the first quantitative field studies to support the vividness effect. The results suggest that information competition and differential attention are important conditions for vividness effects (Nisbett & Ross, 1980). The research also explores some of the important mechanisms of the vividness effect.

The evidence of the vividness effect in a real-world setting responds to Hogarth's (1981, 2005) concerns about the generalizability of lab-based decision studies (such as those investigating vividness effects) to professional and real-world contexts. Taylor and Thompson (1982) noted that information competition and differential attention were overlooked in the experimental research on vividness. This might be one of the

reasons why there has been a discrepancy between the real-world experience of vividness and laboratory failures to produce a consistent vividness effect (Taylor & Thompson, 1982, for reviews). The current research supports this view, suggesting that excessive information and selective cognitive elaboration are important factors underlying the vividness effect. It also provides some insights into the kinds of situations in which vividness effects may bias judgment and decision making in the real world. The context for making judgments and decisions about NBA players' salaries and All-Star votes is characterized by an abundance of competing information and seemingly objective and reliable data. The vividness effect occurred in this context where shooting behavior, though not more important to the team, was over-weighted relative to defense in decisions about salaries and All-Star votes. This suggests that vividness may bias judgment and decision making most when a great deal of similarly valid information is available.

Second, the current research suggests that vividness may work subconsciously against one's expressed beliefs. Although fans placed considerable importance on defense and winning, they actually recommended higher salaries for shooters, who they believed to be less valuable to team performance. The inconsistency between their beliefs and their decisions suggests that the vividness biases their decisions, cognitively and emotionally, in an undetectable or subconscious way. Both mechanisms were discussed in the classic work on vividness (Nisbett & Ross, 1980; Taylor & Thompson, 1982). However, the current research provided only mixed evidence for both mechanisms. Future research might further explore the underlying mechanisms of vividness and investigate possible ways of reducing its apparently subconscious bias.

Practical implications

The current research also has several practical implications for organizational decision makers. Overall, it suggests that highly visible behaviors that occur in a context of abundant information are over-rewarded whereas less visible behaviors that are similarly important are under-rewarded.

This research also provides empirical evidence for Kerr's (1975) argument that vividness leads to distorted rewards. More than three decades ago, Kerr noted that vividness was one of the major reasons for distorted incentives in organizations. However, his argument was more speculative than empirical, and has been scarcely touched by subsequent research. The current findings support Kerr's view, suggesting that compensation may be subject to biased judgments and inferences because of vividness. This suggests that organizations might fall victim to the trap of overweighing vivid, but less important performance while overlooking critical, but less salient performance (Gibbons, 2005; Kerr, 1975). As a result, some vivid, but less important performance may become very important evaluation criteria. For example, "face time," that is, the more hours you work, the better, has been extensively used to measure employees' performance and some organizations have even formed a deeply ingrained culture of face time (Munck, 2001). However, it may not necessarily lead to higher productivity or efficiency. Thus, evaluations using face time may be due to its vividness rather than its importance.

The findings may also be relevant for reward-performance relationships in teams and groups. Organizations do not always tie pay closely to performance (Lawler, 1971). The current research suggests that some team members may be inadequately rewarded not because they are unimportant, but because their performance is less vivid than that of their teammates. In contrast, employees with high visibility are likely to be rewarded more than their less visible teammates even though they may not contribute as much to their groups. This phenomenon may be particularly evident in corporate America, where individual performance is likely to get more attention than team performance. On the one hand, employees who present themselves well or even sometimes inflate their accomplishments may be over-compensated even though their real performance may necessarily be more important than their teammates. On the other hand, employees who work diligently and selflessly as team players may be less vivid and thereby take a back seat simply because they do not visibly "show up" enough.

Finally, this research stimulates some provocative ideas concerning the folly of teamwork in the NBA. The findings of this research seem to be inconsistent with common beliefs about the importance and effectiveness of defense and team play. While most teams rely on teamwork and team chemistry to win games, individual scoring appears to be most important in determining a player's value. Defense may not carry as much weight in NBA teams' investment decisions even though it is critical for winning games. The popular saying that a championship is won by defense is widely esteemed and preached in the NBA (Broussard, 2004; Pippen, 2005). However, the vividness of scoring seems to create more incentives to score than to defend. Thus, this study raises the question of whether NBA teams may also succumb to the trap of rewarding A while hoping for B (Kerr, 1975).

Limitations and opportunities for future research

Like all research, these studies have strengths and limitations, which lead to avenues for future research. Among the strengths and limitations are the method used for the field data collection, the large number of control variables, some different insights provided by each study, and the representativeness of basketball fans as professional decision makers.

First, one of the strengths of the field data in this research is that I more accurately linked NBA players' contracts to their performance by collecting players' performance data as of the date they signed their contracts. Unlike previous studies, which used the salary and performance data from the same year (e.g., Harder, 1992), this method should reveal the real performance–salary relationship when teams sign players. However, since a player's salary can be related to a complex series of variables over the course of his career, the current results might be reinforced by longitudinal analyses.

Second, another strength of the model is the number of control variables used to isolate other possible effects and the preliminary work done to reduce the number of control variables that were redundant. Multiple analyses were also conducted to make sure that controlling for variables not included in the model would not make any significant change in the results. However, in carrying out similar research in another setting, serious attention needs to be paid to the choice and non-redundancy of control variables.

Third, these studies provided reasonably consistent evidence for the vividness effect. They were designed to be complementary to each other to provide some different insights. The results of the four studies, however, were not always consistent for all-around players. They seem to suggest different insights about how decision makers treat complex information, such as that of all-around players, and how they process such information relative to clearer or more vivid information, such as scoring. Thus, future studies might explore how vividness affects the cognitive evaluations of information with multiple attributes. Furthermore, future research might also investigate the underlying mechanisms of vividness in the context of more complex information.

Fourth, the web survey studies polled basketball fans rather than the actual decision makers of NBA teams. The decisions of basketball fans might not reflect those of professional sports managers. Because the archival evidence is consistent with the survey results, however, this suggests similar judgmental biases. The data are also consistent with prior research on experts and amateurs (Neale & Northcraft, 1986; Northcraft & Neale, 1987), which shows that they are both prone to decision biases. However, the findings of the current research could clearly be augmented by surveys of NBA managers or direct observations of their decision making. A future line of research might also probe how professional decision makers justify their decisions when they are biased by the vividness effect.

Finally, some competing interpretations of the data are also possible. For example, fan appeal for shooters may drive up their value because they are likely to attract more loyal audiences, bringing more economic benefits to their teams. By and large, this research suggests that shooters are more popular than other NBA players. Since NBA fans focus heavily on scoring, they may overlook defensive skills. Thus, great shooters are more likely to become superstars than great defenders and all-around players in the eyes of NBA fans. These superstars can have a substantially positive effect on revenues (Hausman & Leonard,

1997). However, winning games also has great appeal for NBA fans. For example, the Detroit Pistons' home games, including playoff games, were rarely sold out from the mid-1990s to 2001. But after the team won the 2004 championship, it not only led all of the other teams in attendance (ESPN NBA Statistics, 2006), but also developed a large fan following for road games (Detroit Pistons, at www.answers.com). A preliminary analysis using 1-year audience attendance data also suggests that winning games was positively related to audience attendance.¹¹ Fans' responses in Study 4 suggest that although NBA teams are profit driven, NBA managers and fans' competitive drive and zeal for wins may be heightened as well. Future researchers might investigate how NBA teams consider different factors to accommodate the needs of their fans.

In sum, no single study can solve all the design problems that one would like to solve to fully test the theory in the field. The current research does, however, provide reasonably consistent evidence of vividness in biased rewards and compensations. Its limitations also suggest several important avenues to augment and supplement existing theory.

CONCLUSIONS

By using both archival and survey data, this research presents strong empirical evidence of vividness in a real-world setting. It also represents an important extension to the research on vividness. The results suggest that vividness has important influences on complex and elaborated decisions. The vividness of certain components in natural and complex organizational settings seems likely to influence cognitive evaluations because such attributes grab more attention and unduly affect information processing (Taylor & Thompson, 1982; Taylor & Wood, 1983). This may lead to biased rewards and compensation in organizations. In particular, highly visible employees may be over-compensated, while less visible, but equally important employees may be under-compensated (Kerr, 1975).

Because conditions not typically created in the lab frequently exist in the real world (Taylor & Thompson, 1982), it is hoped that this study will encourage more field-based research exploring the cognitive biases and alternative explanations of the undue impact of vivid information. Finally, weighing information in proportion to its vividness may induce biased and risky decision making (Nisbett & Ross, 1980). Thus, another venue of future research might assess how to avoid or reduce the effects of evidentially weak but highly visible information on judgments and inferences.

ACKNOWLEDGEMENTS

I am extremely grateful to the valuable guidance, careful editing, and generous financial support of Jeanne Brett and Keith Murnighan. I also thank Adam Galinsky and Niro Sivanathan for their insightful feedback. A previous version of this paper benefited tremendously from the comments and suggestions of George Wright and three anonymous reviewers. I am very thankful for their reactions and ideas. An earlier version of this paper won the Academy of Management, OB division Outstanding Practical Implications Award.

APPENDIX* (The order of some questions was randomized)

1. If you were the general manager of one NBA team, how important is winning to you?
1 = not at all 2 3 4 5 6 7 = very important
2. If you were the general manager of one NBA team, how important is attracting fans/audience to you?
1 = not at all 2 3 4 5 6 7 = very important

¹¹Results are available upon request.

3. How important is defense to your team? (1–7)
1 = not at all 2 3 4 5 6 7 = very important
4. How important is scoring to your team? (1–7)
1 = not at all 2 3 4 5 6 7 = very important
5. How important is defense to winning the game?
1 = not at all 2 3 4 5 6 7 = very important
6. How important is scoring to winning the game?
1 = not at all 2 3 4 5 6 7 = very important
7. How important is scoring to selling tickets?
1 = not at all 2 3 4 5 6 7 = very important
8. How important is winning the games to selling out the seats?
1 = not at all 2 3 4 5 6 7 = very important
9. How important is having great shooters to selling out the seats?
1 = not at all 2 3 4 5 6 7 = very important
10. When you watch the NBA games, what do you look at first? (1–7)
(1) Scoring (2) Defense* (choices randomized)
11. What do you find most exciting when you watch NBA games?
(1) Scoring (2) Defense* (choices randomized)
12. Which kind of performance catches most of your attention when you watch NBA games?
(1) Scoring (2) Defense* (choices randomized)
13. Which kind of performance is most memorable to you after an NBA game?
(1) Scoring (2) Defense* (choices randomized)
14. When you watch NBA games, what kind of performance is most eye-catching to you?
(1) Scoring (2) Defense* (choices randomized)
15. Which type of team is likely to earn the most money?
(1) A winning team (2) An entertaining offensive team (*choices randomized)
16. Which type of team is most likely to attract loyal fans?
(1) A winning team (2) An entertaining offensive team (*choices randomized)
17. How valuable do you think shooters are to their teams?
1 = not at all 2 3 4 5 6 7 = very valuable
18. How valuable do you think defenders are to their teams?
1 = not at all 2 3 4 5 6 7 = very valuable
19. How valuable do you think all-around players are to their teams?
1 = not at all 2 3 4 5 6 7 = very valuable
20. How much public attention do shooters receive in the NBA?
1 = not at all 2 3 4 5 6 7 = a lot
21. How much public attention do defenders receive in the NBA?
1 = not at all 2 3 4 5 6 7 = a lot
22. How much public attention do all-around players receive in the NBA?
1 = not at all 2 3 4 5 6 7 = a lot
23. Which type of player deserves more compensation in the NBA?
(a) Shooter (b) Defender (c) All-around player (*choices randomized)
24. Which type of player is harder to find in today's NBA?
(a) Good shooter (b) Good defender (c) Good all-around player (*choices randomized)
25. Which type of player has more athletic talents?
(a) Good shooter (b) Good defender (c) Good all-around player (*choices randomized)
26. How important is defense to winning the game?
1 = not at all 2 3 4 5 6 7 = very important

27. How important is scoring to winning the game?

1 = not at all 2 3 4 5 6 7 = very important

*The order of some questions was randomized.

REFERENCES

- Babin, L. A., & Burns, A. C. (1997). Effects of print Ads pictures and copy containing instructions to imagine on mental imagery that mediates attitudes. *Journal of Advertising*, 26, 33–44.
- Bazerman, M. (2002). *Judgment in Managerial Decision Making* (5th ed.). NJ: John Wiley & Sons.
- Bell, B. E., & Loftus, E. F. (1985). Vivid persuasion in the courtroom. *Journal of Personality Assessment*, 49, 659–664.
- Blass, A. A. (1992). Does the baseball labor market contradict the human capital model of investment? *The Review of Economics and Statistics*, 74, 261–268.
- Broussard, C. (2004). Brown's Pistons do the little things, and win without superstars, *New York Times*, Retrieved from the Web 03/12/06 <http://www.nytimes.com/2004/06/17/sports/basketball/17detroit.html?ex=1142312400&en=05fc2087270d35c5&ei=5070>
- Chatterjee, S., Campbell, M. R., & Wiseman, F. (1994). Take that jam! An analysis of wining percentage for NBA teams. *Managerial and Decision Economics*, 15, 521–535.
- Detroit Pistons. www.answers.com/topic/detroit-pistons
- ESPN, NBA Attendance Statistics. <http://sports.espn.go.com/nba/attendance>
- Fast, N., & Berg, N. (1975). The Lincoln electronic company. In *Harvard Business School Case* 376–028. Boston, MA: HBS Press.
- Frey, K. P., & Eagly, A. H. (1993). Vividness can undermine the persuasiveness of messages. *Journal of Personality and Social Psychology*, 65(1), 32–44.
- Gibbons, R. (1998). Incentives in organizations. *Journal of Economic Perspectives*, 12, 115–132.
- Gibbons, R. (2005). Incentives between firms (and within). *Management Science*, 51, 2–17.
- Harder, J. W. (1992). Play for pay: Effects of inequity in a pay-for-performance context. *Administrative Science Quarterly*, 37, 321–335.
- Hausman, J. A., & Leonard, G. K. (1997). Superstars in the National Basketball Association: Economic value and policy. *Journal of Labor Economics*, 15, 586–624.
- Hayes, R., & Schaefer, S. (2000). Implicit contracts and the explanatory power of top executive compensation for future performance. *Rand Journal of Economics*, 31, 273–293.
- Higgins, E. T., Rholes, W. S., & Jones, C. R. (1977). Category accessibility and impression formation. *Journal of Experimental Social Psychology*, 13, 141–154.
- Hofler, R. A. & Payne, J. E. (2004). Efficiency in the National Basketball Association: A stochastic frontier approach with panel data. *Managerial and Decision Economics*, 27, 279–285.
- Hogarth, R. M. (1981). Beyond discrete biases: Functional and dysfunctional aspects of judgmental heuristics. *Psychological Bulletin*, 90, 197–217.
- Hogarth, R. M. (2005). The challenge of representative design in psychology and economics. *Journal of Economic Methodology*, 12, 253–263.
- Kahn, L. M. & Shah, M. (2005). Race, compensation and contract length in the NBA: 2001–2002. *Industrial Relations*, 44, 444–462.
- Kenny, D. A., Kashy, D. A., & Bolger, N. (1998). Data analysis in social psychology. In D. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *Handbook of social psychology* (Vol. 1, pp. 233–265). New York: McGraw-Hill.
- Kerr, S. (1975). On the folly of rewarding A, while hoping for B. *Academy of Management Journal*, 18, 769–783.
- Kerr, S. (1995). More on the folly. *Academy of Management Executive*, 9, 15–16.
- Lawler, E. E. (1971). *Pay and Organizational Effectiveness: A Psychological View*. New York: McGraw-Hill.
- Mitchell, A. A. (1986). The effect of verbal and visual components of advertisements on brand attitudes and attitude toward the advertisement. *The Journal of Consumer Research*, 13, 12–24.
- Munck, B. (2001). Changing a culture of face time. *Harvard Business Review*, 79, 125–131.
- National Basketball Association (NBA), and players NBA Association. *NBA Collective Bargaining Agreement*, January 1999.
- Neale, M. A., & Northcraft, G. B. (1986). Experts, amateurs, and real estate: Comparing expert and amateur negotiators in a novel task. *Organizational Behavior and Human Decision Processes*, 38, 305–317.
- Northcraft, G. B., & Neale, M. A. (1987). Experts, amateurs and real estate: An anchoring-and-adjusting perspective on property pricing decisions. *Organizational Behavior and Human Decision Processes*, 39, 84–97.

- Nisbett, R. E., & Ross, L. (1980). Assigning weights to data: The “vividness criterion.” In R. E. Nisbett, & L. Ross (Eds.), *Human Inference: Strategies and Shortcomings of Social Judgment* (pp. 42–62). Englewood Cliffs, NJ: Prentice-Hall.
- Nisbett, R. & Borgida, E. (1975). Attribution and the psychology of prediction. *Journal of Personality and Social Psychology*, 32, 932–943.
- Pippen, S. (2005). NBA Blog. May 19 2005 11:39AM, Retrieved from the Web 03/12/06 <http://www.nba.com/blog/blog30.html>
- Reyes, R. M., Thompson, W. C., & Bower, G. H. (1980). Judgment biases resulting from differing availability of arguments. *Journal of Personality and Social Psychology*, 39, 2–21.
- Schwarz, N. (1998). Accessible content and accessibility experiences: The interplay of declarative and experiential information in judgment. *Personality and Social Psychology Review*, 2, 87–99.
- Schwarz, N., & Vaughn, L. A. (2002). The availability heuristic revisited: Ease of recall and content of recall as distinct sources of information. In T. Gilovich, D. Griffin, & D. Kahneman (Eds.), *Heuristics and Biases: The Psychology of Intuitive Judgment* (pp. 103–119). New York: Cambridge University Press.
- Slovic, P. (1993). Perceived risk, trust, and democracy. *Risk analysis*, 6, 675–682.
- Stapel, D. A., & Velthuisen, A. S. (1996). Just as if it happened to me: The impact of vivid and self-relevant information on risk judgments. *Journal of Social and Clinical Psychology*, 15, 102–119.
- Staw, B. & Hoang, H. (1995). Sunk costs in the NBA: Why draft order affects playing time and survival in professional basketball. *Administrative Science Quarterly*, 40, 474–494.
- Stein, M. (2006). Dead-eye shooters are hard to find in today’s NBA, ESPN website, Retrieved from the Web 03/16/06 http://espn.go.com/nba/columns/stein_marc/1485794.html
- Taylor, S. E., & Thompson, S. C. (1982). Stalking the elusive ‘vividness’ effect. *Psychological Review*, 89, 155–181.
- Taylor, S. E., & Wood, J. V. (1983). The vividness effect: Making a mountain out of a molehill? In R. P. Bagozzi, & A. M. Tybout (Eds.), *Advances in Consumer Research* (pp. 540–542). Ann Arbor, MI: Association for Consumer Research.
- Tversky, A., & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive Psychology*, 5, 207–232.
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185, 1124–1131.
- Tversky, A. & Kahneman, D. (1983). Extensional versus intuitive reasoning: The conjunction fallacy in probability judgment. *Psychological Review*, 101, 547–567.
- USA Today*, NBA Salary Database, Retrieved from the Web 03/12/06 <http://asp.usatoday.com/sports/basketball/nba/salaries/>
- Werner, C., & Latane, B. (1976). Responsiveness and communication medium in dyadic interactions. *Bulletin of Psychonomic Society*, 8, 13–15.
- Wilson, M. G., Northcraft, G. B., & Neale, M. A. (1989). Information competition and vividness effects in on-line judgments. *Organizational Behavior and Human Decision Processes*, 44, 132–139.

Author’s biography:

Long Wang is a Ph.D. candidate at the Kellogg School of Management of Northwestern University. His research interests lies in managerial decision making, business ethics, creativity, conflict management and cross-cultural studies.

Author’s address:

Long Wang, MORS Department, Kellogg School of Management, Northwestern University, IL, USA.