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Hope Over Experience: Desirability and the Persistence of Optimism

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Abstract

Many important decisions hinge on expectations of future outcomes. Decisions about health, investments, and relationships all depend on predictions of the future. These expectations are often optimistic: People frequently believe that their preferred outcomes are more likely than is merited. Yet it is unclear whether optimism persists with experience and, surprisingly, whether optimism is truly caused by desire. These are important questions because life's most consequential decisions often feature both strong preferences and the opportunity to learn. We investigated these questions by collecting football predictions from National Football League fans during each week of the 2008 season. Despite accuracy incentives and extensive feedback, predictions about preferred teams remained optimistically biased through the entire season. Optimism was as strong after 4 months as it was after 4 weeks. We exploited variation in preferences and matchups to show that desirability fueled this optimistic bias.

Keywords

judgment, learning, prediction, preferences

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Samuel Johnson famously proclaimed that a second marriage reflects “the triumph of hope over experience” (Boswell, 1791/1874, p. 397). Researchers have amply documented the apparent triumph of hope: People are excessively optimistic about marriage (Baker & Emery, 1993), work (Hoch, 1985), sports (Radzevick & Moore, 2008), health (Weinstein, 1980), and life expectancy (Puri & Robinson, 2007). Yet two questions remain about whether hope triumphs over experience. First, does optimism persist as people acquire feedback from real-world experiences? And, second, is optimism actually caused by hope? Investigating these questions together is important, as many of life's most consequential decisions (e.g., about health, investments, or relationships) feature both strong preferences and the chance to revise beliefs in light of new information (e.g., medical exams, balance statements, or a second date).

Does Optimism Persist?

Does optimism persist as people acquire feedback about a desired outcome's likelihood and about the accuracy of prior predictions? According to rational theories of belief revision, ignorance enables optimistic biases, and, thus, ample feedback should eventually eliminate those biases (List, 2003). Indeed, researchers in economics (Coursey, Hovis, & Schulze, 1987;

Fraser & Greene, 2006) and psychology (Colvin & Block, 1994) have argued that the ability to learn from experience means that judgmental biases are less important than they might otherwise appear. However, other theories predict that optimistic biases will persist in the face of feedback. Kahneman and Lovallo's (1993) discussion of inside and outside views suggests that people often fail to apply the lessons of past experience to the particulars of a specific case (Buehler, Griffin, & Ross, 1994). Research on selective attention (Hart et al., 2009) suggests that people attend more to feedback when predictions are confirmed than when they are disconfirmed. In addition, research on motivated reasoning suggests that people distort the implications of information they receive (Kunda, 1990), or they convince themselves that their predictions were “almost right” (Tetlock, 1998).

It is possible that both camps are (at least partially) correct. We suggest that the accuracy of predictions about desirable outcomes improves with experience but remains optimistically biased nevertheless. This is because prediction accuracy is a function of both *bias* (e.g., how much people overestimate the

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likelihood of desirable events) and *discrimination* (how closely predictions correlate with objective outcomes; Yaniv, Yates, & Smith, 1991). It is important to note that bias and discrimination are independent. Consider, for example, two weather forecasters in New Haven, Connecticut: One predicts on every day of the year that the next day's temperature will be 50 °F. She is unbiased, because New Haven's average temperature is in fact 50 °F. But her predictions also show no discrimination—the correlation between her predictions and the actual temperatures is zero. The second forecaster's predictions properly distinguish warmer days from colder ones. Thus, he shows good discrimination, but his predictions average 60 °F and so are biased. Thus, the accuracy of a person's predictions, as measured by the correlation of those predictions with the actual outcomes, can improve while remaining biased.

It is not uncommon for predictions to be both biased and correlated with objective outcomes (e.g., Buehler et al., 1994; Burson, Larrick, & Klayman, 2006). Notably, the rational-updating hypothesis predicts that experience will both improve discrimination and reduce bias, but the persistence hypothesis predicts only the persistence of bias. A more nuanced prediction, drawing from research on motivated reasoning (Kunda, 1990) and self-predictions (Epley & Dunning, 2006), suggests that the information that experience provides will allow people to make increasingly discriminating predictions. However, such information will also allow a person to justify predictions that are biased in favor of that person's preferences. In other words, experience may improve discrimination but leave optimism intact.

Does Desire Drive Optimism?

Implicit in these hypotheses is the idea that desirability fuels optimistic predictions. But are optimistic biases actually driven by desire? After decades of research, this most elementary (and intuitively appealing) hypothesis—that preferences directly influence beliefs—has become a matter of some controversy. As highlighted in a recent review (Krizan & Windschitl, 2007), the few careful studies of the effect of desirability on optimism have largely produced null or weak findings. On this basis, Krizan and Windschitl concluded that “the empirical evidence for the desirability bias . . . is surprisingly thin” (p. 95). Bar-Hillel and Budescu (1992; Bar-Hillel, Budescu, & Amar, 2008) have similarly concluded that the desirability bias is “elusive.”

We are reluctant to generalize from these findings because the desirability manipulations on which they are based (e.g., a \$5 prize) simply may not have been large enough to induce the intensity of preference often experienced in consequential decisions. This is important because strong preferences may produce optimistic biases even if weak preferences produce none. Our field-study approach is in line with recent research in real-world situations (e.g., presidential elections; Krizan, Miller, & Johar, 2010) associated with very strong preferences. Such settings allow researchers to better evaluate the relation between desirability and optimistic biases.

This Research

To investigate our two main questions—whether optimism persists and whether it is influenced by desirability—we asked National Football League (NFL) fans to predict game outcomes before each week of the 17-week NFL season. Studying football predictions offered four important benefits over the very few studies that have previously considered experience and optimism (Buehler et al., 1994; Radhakrishnan, Arrow, & Sniezek, 1996; Weinstein, 1987). First, the 17-week season provided participants with quick, frequent, and unambiguous feedback over a significant (and nonarbitrary) duration of time, and thus it provided an ideal context for evaluating the effect of experience on optimism. Second, NFL fans' preferences for their favorite teams are strong and often held with a degree of intensity unlikely to be generated by incentives offered in the laboratory. Third, a number of alternative explanations for the effects of desirability, such as those implicating team strength and familiarity, can be controlled methodologically and statistically. Finally, unlike predictions in other emotionally important domains, football predictions offer the benefit of objective benchmarks—both *ex ante* and *ex post*—against which the accuracy of predictions can be evaluated.

Method

Participants and procedure

One week before the start of the 2008 NFL season, we invited 902 NFL fans to complete weekly online surveys; 728 (81%) completed at least one survey. These 728 fans had also completed a preseason survey indicating their favorite NFL team, allowing us to recruit relatively even numbers of fans of all 32 NFL teams. Each Wednesday of the NFL season, participants received an e-mail containing a link to an online survey asking them to predict the following week's NFL games.¹ After each survey, we awarded a \$25 amazon.com gift card to a random participant and additional prizes for accurate predictions.

Measures

Predictions. Every week, participants predicted the winner and the final point differential of each game. Each survey clearly explained the incentives for making accurate predictions. Participants could earn up to \$3.50 each week, but they were penalized as a function of the average absolute difference (AAD) between their predictions and the game outcomes. Specifically, we used the formula $\$3.50 - (\$0.25 \times \text{AAD})$, in which AAD was calculated across all of that week's games. Negative earnings did not cost our participants anything, and they knew this. The weekly and cumulative earnings of all participants were posted on a Web site devoted to the study (participants were identified using an ID they chose in Week 1), and they were paid with amazon.com gift cards at the end of the season. As an additional incentive, each week's best

Table 1. Participants' Characteristics and Attrition Analysis

Characteristic	Included group	Dropped group	Original sample
Number of participants	386	342	728
Male	56%	54%	55%
Age (years)	35.4	34.0	34.8
Team jerseys owned (mean number)	1.94	2.04	1.98
Follow NFL closely (1 = <i>not at all</i> , 5 = <i>extremely</i>)	3.95	3.71	3.85
Games watched per week	3.81	4.22	3.98
Enrolled in a fantasy league	38%	32%	35%
Wins of favorite team	50%	51%	50%
Probability of predicting favorite team will win	69%	70%	69%

Note: The included and dropped groups did not differ significantly on any variable except whether they followed the NFL closely ($p < .05$).

performer earned a \$50 gift card, which was delivered immediately, and we announced and congratulated these weekly winners on the Web site. Cumulative earnings ranged from \$0.15 to \$61.79 ($M = \$10.25$, $SD = \$10.18$).

Normative benchmarks. We used two normative benchmarks for participants' predictions: the actual outcome (point difference) and the point spread. The point spread reflects a game's expected point difference, as determined by professional bookmakers. This measure is unbiased (Simmons & Nelson, 2006) and thus provides an ideal standard of rational expectations.

Team quality. We assessed team quality using two measures: (a) the team's winning percentage through the previous week's games and (b) the probability that the team would make the Super Bowl, as estimated by the market prices for Super Bowl tickets at yoonew.com. Yoonew was a service that sold ticket futures for sporting events. Prices fluctuated depending on the likelihood that the team the buyer picked would make the event (i.e., prices for good teams are higher than prices for bad teams). Using price data provided by Yoonew, we inferred the market probability of each team making the Super Bowl at every point during the season. The prices were well behaved, with the aggregate probabilities summing appropriately to 200% throughout the season. These probabilities provide a more continuous measure of team quality than do win-loss records—especially early in the season—and arguably a more informed measure (Chen, Ingersoll, & Kaplan, 2008).

Team preferences. We assessed participants' preferences for teams in two ways. Prior to the start of the season, participants completed a survey indicating which team was their favorite, and they also rated how much they liked each team on a 9-point scale (1 = *very strongly dislike*, 9 = *very strongly like*).

Team familiarity. We also assessed participants' familiarity with teams in two ways. Prior to the start of the season, participants

completed a survey indicating how much they knew about each team on a 5-point scale (1 = *nothing*, 5 = *almost everything*). Additionally, each week of the season, they reported how much of each game they watched the previous week (response options were *none*, *just highlights*, *less than 1 quarter*, *up to 2 quarters*, *up to 3 quarters*, *more than 3 quarters*).

Win desirability. We randomly assigned half the sample to rate on a scale from 1 to 10 how much they wanted their favorite team to win their next game (0 = *I do not care whether my favorite team wins or loses*, 10 = *I desperately want my favorite team to win*). These ratings were obtained weekly, after predictions were made. We asked this of only half of the participants because we were concerned that asking this question might affect optimism; it did not.

Demographics. Our first survey collected standard demographic information and a variety of measures to assess NFL fandom (see Table 1).

Results

Sample characteristics

Seven hundred twenty-eight participants completed the pre-season survey and at least 1 week's predictions. Of these participants, 386 (53%) completed at least 14 of the 17 weekly surveys, our *ex ante* rule for inclusion in the study. This sample (45% female and 55% male, mean age = 35 years) was diverse in its rooting interests (each NFL team was listed as a favorite by a median of 22 respondents) and passionate about professional football (the median participant reported watching three games each week). It is important to note that our final sample was virtually identical to the sample of participants who were dropped (see Table 1). Across many measures, the only reliable difference was how closely each participant reported following the NFL, $t(665) = 3.14$, $p < .01$.

Optimism and experience

We first investigated whether fans made optimistic predictions, and, if they did, whether optimism persisted after experience. We analyzed participants' predictions each week of the season, estimating how often they predicted their favorite team would win and how often they predicted other teams would win. As shown in Figure 1, participants predicted their favorite team would win at least 60% of the time, and they predicted that all other teams would win approximately 50% of the time.² To formally test the relation between optimism and time, we regressed predicted outcome on favorite team (a dummy variable for games involving the participant's favorite team), week (centered), week-squared, and the relevant two-way interactions.³ This analysis revealed a nonsignificant Favorite \times Week interaction, $\beta = -0.006$, $z = -1.51$, $p = .13$, and a significantly positive interaction between favorite team and week-squared, $\beta = 0.003$, $z = 3.57$, $p < .001$. This latter result indicated that bias increased after an initial decline. The effect of favorite team was highly significant, $\beta = 0.42$, $z(385) = 9.07$, $p < .001$, and additional analyses confirmed that this bias was reliably positive in every week (all $ps < .01$).⁴

It is clear that optimism persists over time, but is there any evidence of learning? To investigate this question, we examined a second measure of accuracy: discrimination, which is the correlation between predicted and actual outcomes. As represented in Figure 2, this correlation improved systematically over the course of the season for games involving favorite teams, but not for games involving nonfavorite teams. To test this change in correlation, we added actual outcome to our

regression model, along with the relevant two-way interactions (between outcome and week, and between outcome and week-squared) and the corresponding three-way interactions (which included favorite team). This analysis revealed a significant Outcome \times Week interaction, $\beta = 0.005$, $z = 2.50$, $p < .05$, but this effect was qualified by a significant Favorite \times Outcome \times Week interaction, $\beta = 0.02$, $z = 2.49$, $p < .05$. Follow-up analyses revealed that the correlation between predicted and actual outcomes increased over the course of the season for favorite-team games, $\beta = 0.02$, $z = 2.45$, $p < .05$, but not for nonfavorite-team games, $\beta = -0.0008$, $z = -0.47$, *n.s.*⁵

This analysis reveals that participants learned from experience. Moreover, learning operated as rational models would predict—it was strongest for the teams that participants paid the most attention to: their favorites. This finding is in stark contrast to the analysis showing that optimism persisted in the face of 4 months of experience. This combination—persistent bias and improved discrimination—parallels the findings of Epley and Dunning (2006) on the “mixed blessing of self-knowledge.” These researchers found that self-predictions showed better discrimination and more bias than predictions about others. This occurs because although self-knowledge—like experience—provides information allowing improved discrimination, this same information can be used to justify desirable conclusions.⁶

Optimism and desirability

Although we have shown that optimism persisted for 17 weeks, we have not yet uncovered whether desirability was driving optimism. We conducted four distinct tests of this

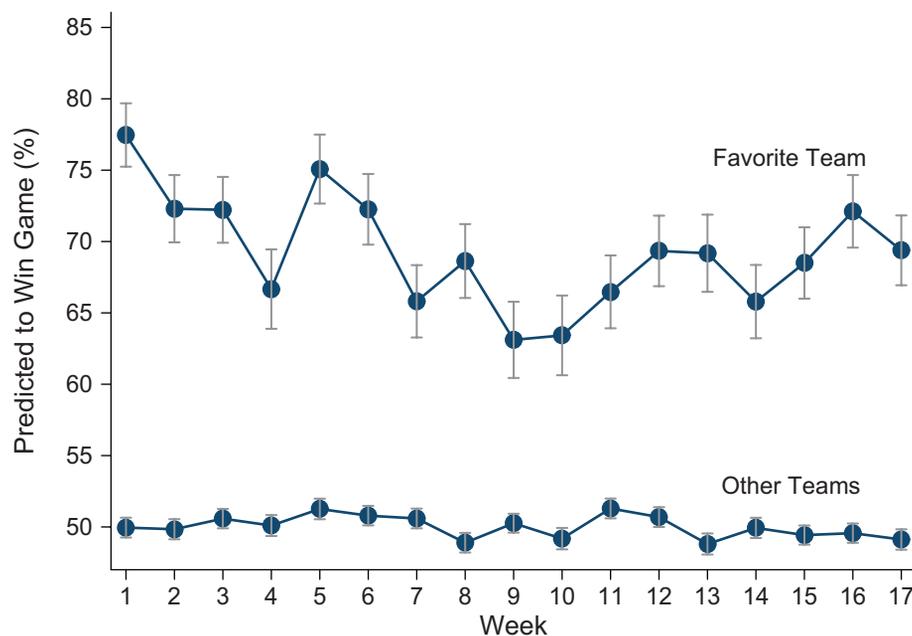


Fig. 1. Optimistic bias over time. Mean percentage of times that participants predicted that their favorite team would win and that nonfavorite teams would win for each week of the study. Error bars represent ± 1 SEM.

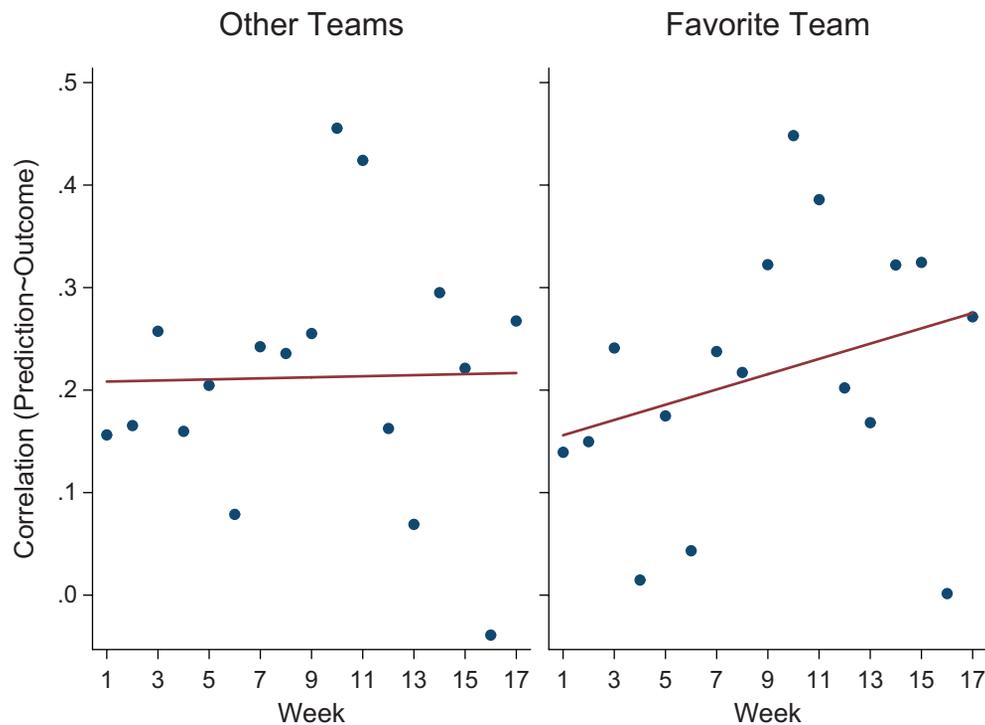


Fig. 2. Prediction-outcome correlations as a function of time. The scatter plots graph the correlation between participants' predicted winners and the actual winners separately for participants' favorite teams (right) and nonfavorite teams (left). The regression lines show the best linear fits of the weekly correlations.

hypothesis using a similar empirical strategy for each one. Each test regressed predicted outcomes (win-lose) on some measure of desirability.⁷ Except for the first baseline test, all models included the same set of control variables: two normative benchmarks (point spread and actual outcome), two measures of team quality (winning percentage and the market probability of making the Super Bowl), and two measures of team familiarity (preseason knowledge ratings and weekly TV exposure). The models also included team fixed effects and an indicator for the home team. We standardized all continuous variables. We dropped Week 1 from the analyses in order to accommodate lagged variables (e.g., TV viewing).

We first tested desirability bias using participants' favorite team. The baseline model—simply the unconditional relation between predicted outcomes and favorite teams—showed that the bias toward favorites was reliably positive, $\beta = 0.188$, $z(385) = 11.8$, $p < .01$. This means that participants were 19% more likely to predict a team would win the game when that team was their favorite. This effect was still significant, and in fact only slightly reduced, after we added our full array of control variables, $\beta = 0.164$, $z(385) = 10.1$, $p < .01$. The fact that optimistic bias was robust even after controlling for team strength indicates that the biasing effect of desirability was not a simple artifact of fans favoring good teams (cf. Radzevick & Moore, 2008). Similarly, our controls for team familiarity indicate that optimism is uniquely related to the desirability of a team and not merely to fans' greater familiarity with their favorites (cf. Kilka & Weber, 2000).

Next, we dropped the favorite-team designation, using instead the preseason liking ratings that participants assigned to each team along with our full set of control variables. This generalized our test of desirability beyond a single team for each participant. Results supported the desirability hypothesis: Predictions showed a strongly positive relation to team liking, $\beta = 0.0419$, $z(385) = 12.7$, $p < .01$.

A weakness of the liking ratings is that they were constant throughout the season and thus confounded with other attributes unique to a participant's relation with a particular team (e.g., a fan's personal history with a team). In contrast, the desirability ratings we collected each week from half the sample varied within season and therefore provided a very different source of variation in desirability. Using these desirability ratings instead of the favorite-team designation or liking ratings revealed a strongly positive relation between desirability and predicted outcomes, $\beta = 0.0504$, $z(385) = 3.29$, $p < .01$. This relation is important because it shows that optimistic biases vary with desirability even among a team's strongest fans.

So far, we have reported evidence of desirability bias using three different measures of desirability—favorite team, liking ratings, and week-to-week ratings of desirability—while including extensive controls for alternative explanations. Our final test of desirability bias moved from investigating the effect of desirability to investigating the effect of ambiguity, a necessary condition for motivated construal (Kunda, 1990; Marks, 1951; McGregor, 1938). We used the absolute value of the point spread as a measure of the ambiguity of the game's

outcome (Buckley & Sniezek, 1992). Large positive and large negative point spreads indicate very little doubt about which team will win. Conversely, point spreads near zero indicate significant ambiguity. This leads to the hypothesis that predictions about favorite-team performance will be most positively biased for games expected to be relatively close. That is, bias should be negatively related to the absolute point spread for predictions about favorites but not for nonfavorites.

We tested this notion by adding the absolute point spread, as well as the interaction between the absolute point spread and favorite team, to our prediction model. There was no main effect of absolute point spread, $\beta = -0.0004$, $z(385) = 0.13$, n.s. However, there was a significant interaction between the absolute point spread and favorite team, $\beta = -0.048$, $z(385) = -3.69$, $p < .01$. Figure 3 depicts this interaction by plotting the predicted probability of winning against the objective ex ante probability of winning, as determined by the point spread.⁸ As always, the standard by which we measured optimistic bias was the unbiased predictions about nonfavorite teams.⁹ Predictions about favorite teams are positively biased over the entire range of objective probabilities. Consistent with the desirability hypothesis, the bias was largest when the outcome was most ambiguous, peaking near the midpoint, when a favorite team had approximately a 50% chance of winning the game.

Figure 3 shows that, through much of the absolute-point-spread range, the optimistic bias was substantial—at or beyond 20%. In the eyes of people who desire them, relatively unlikely events, such as teams winning when objective observers pick them only 30% of the time, become 50/50 propositions. Events with a 50% probability of occurring become quite likely (i.e.,

70% probability), and events with a 70% probability become almost certain (i.e., 90% probability).

Discussion

Understanding the role of optimistic biases in consequential and emotional domains such as health, relationships, and investments requires studying judgments in circumstances in which passions are strong. Our study of football fans' predictions met this requirement. We found that people are optimistic in their predictions—they judge preferred outcomes to be more likely than nonpreferred outcomes. We extended this observation in two important ways. First, we showed that optimism persists despite extensive experience—football fans are as optimistic after 4 months of feedback as they are after 4 weeks of feedback. Second, we found strong evidence of the elusive desirability bias. Using four distinct tests, and a wide variety of control variables, we found that optimistic predictions were robust and uniquely related to the desirability of the outcome.

Overall, we showed that experience provides the same kind of “mixed blessing” (Epley & Dunning, 2006) as self-knowledge does: Optimistically biased judgments persist even while calibration improves. We do not purport to have shown that people cannot learn away their optimistic biases. It is possible that optimistic biases would diminish if people were given feedback in an even more explicit manner. Rather, our interest is whether people learn when they acquire feedback naturally. We showed that in an ecologically valid setting that is in many ways a best case for learning from experience (e.g., it includes

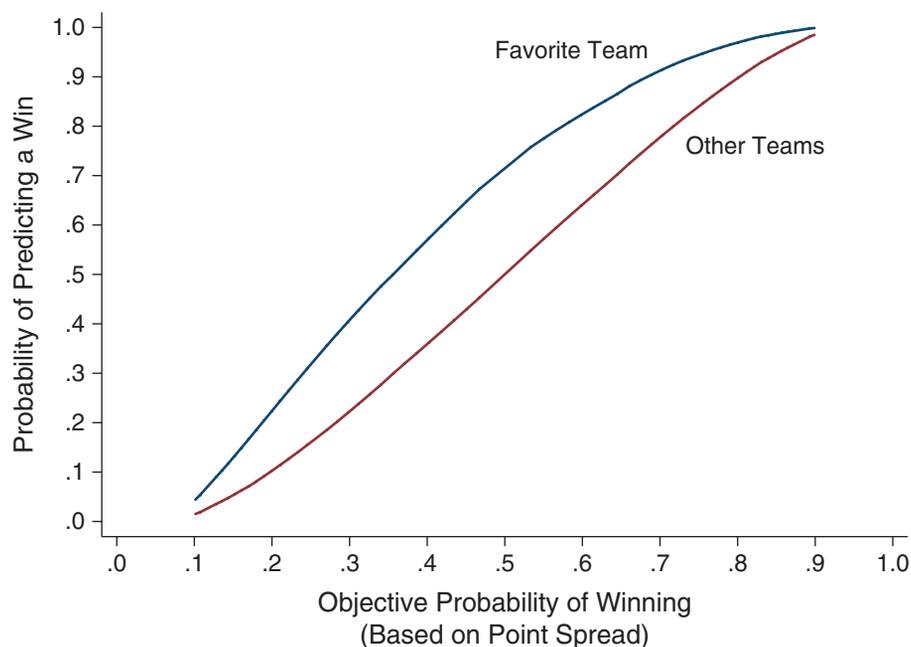


Fig. 3. Optimistic bias and ambiguity. Probability of predicting that a team would win as a function of the team's objective probability of winning (point spread). Results are shown separately for participants' favorite teams and nonfavorite teams.

feedback that is extensive, frequent, precise, and objective), optimistic biases persist.

One unanswered question is whether participants believe the predictions they make. Might they, out of loyalty, predict better outcomes for their favorite teams than they actually believe? This is a difficult question (cf. Williams & Gilovich, 2008). On the one hand, participants were incentivized for accurate predictions. On the other hand, these incentives may not have been large enough to swamp participants' loyalty motivation. Unfortunately, even a dramatic increase in accuracy incentives would not afford definitive insight into participants' true beliefs. If the bias persists, it could be argued that even those larger incentives were insufficiently large to overcome participants' loyalty motivation. If the bias is reduced, it could be argued that the larger incentives led some participants to bet against their favorite teams as a strategic hedge against the emotional pain associated with a favorite team's loss.

This is an important issue that deserves continued attention. Our approach was to submit participants' predictions to a battery of empirical tests designed to distinguish the desirability hypothesis from other explanations, such as loyalty. It would require a complicated form of loyalty to produce a bias that applies not only to favorite teams but also to teams that are merely well liked, that varies over the course of the season depending on the desirability of a win, and that does not apply when a favorite team is either very likely, or very unlikely, to win the game. In contrast, all of these results flow directly and parsimoniously from the desirability hypothesis. Thus, although we acknowledge the difficulty of assessing participants' true beliefs, we believe that the preponderance of evidence supports the desirability hypothesis.

It is unclear whether this kind of optimistic bias is rational. Any benefits from the hopes we observed must be set against the risk of disappointment when those hopes are not realized (Brickman, Coates, & Janoff-Bulman, 1978; Mellers, Schwartz, Ho, & Ritov, 1997). Does the tendency to make this trade-off reflect a "cost-benefit analysis" (Brown & Dutton, 1995, p. 1294)? An "optimal margin of illusion" (Baumeister, 1989)? These important questions remain controversial. We hope this demonstration of the nature and robustness of optimism can inform the rationality debate. Optimism is not the product of ignorance or inattention. Though perhaps more of a truce than a triumph, hope appears to be as fueled by experience as it is sobered by it.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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Notes

1. Participants could submit their predictions until 1 hr before Sunday's first game began. To give participants time to register their predictions before the games began, we excluded 10 games played

on Thursdays and Saturdays, asking participants to predict the 246 games played on Sundays and Mondays.

2. On average, participants' favorite teams won exactly 50% of their games. However, this should not be taken to imply that individual game judgments simply involved betting on chance events. Judging from the point spreads (see note 8 for more detail), the objective ex ante probability of a team winning ranged from 10% to 90% (interquartile range: 35%–65%).

3. Our estimation methodology is the same throughout the article. We used maximum likelihood probit regression because our dependent variable was binary. Observations were participant-games, with standard errors clustered on participant. We report results as the change in the probability of predicting a team will win as the result of a 1-unit change in the variable of interest.

4. Comprehensive regression results are available from the authors.

5. The analysis also revealed a significant Outcome \times Week-Squared interaction, $\beta = 0.003$, $z = 2.27$, $p < .05$, but this effect was not qualified by favorite team, $\beta = 0.0003$, $z = -0.16$, n.s.

6. Accuracy predicting the game's winner (i.e., correct/incorrect) also improved over time for games involving favorite teams, $\beta = 0.004$, $z = 2.47$, $p < .01$, but not for games involving only nonfavorite teams, $\beta = -0.0002$, $z = -0.47$, n.s.; the interaction between favorite and week was significant, $\beta = 0.004$, $z = 2.45$, $p < .01$. This pattern is consistent with our findings of persistent bias and increasing discrimination for predictions about favorite teams.

7. Every result in this article is also reliable using a continuous dependent variable (predicted point difference), with one exception: improved accuracy over time (see note 5). Using this measure, accuracy did not improve over time, and the magnitude of improvement did not differ as a function of favorite status.

8. We estimated the probability of winning given a particular point spread using logistic regression, based on the point spreads and outcomes of all NFL games from 1978 through 2009 ($N = 7,406$).

9. Using this standard ensured that we would not attribute to optimism what is merely due to regressive predictions (Burson et al., 2006; Moore & Healy, 2008).

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