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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

Disciplines
Experimental Analysis of Behavior | Other Social and Behavioral Sciences | Social Psychology

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Hope Over Experience: Desirability and the Persistence of Optimism

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Under review

Abstract

Many important decisions hinge on expectations of future outcomes. Decisions about health, investments, and relationships all depend on one's view of the future. Importantly, these expectations are often optimistic: People frequently believe preferred outcomes are more likely than is merited. Yet it is unclear whether optimism persists with experience and, surprisingly, whether it 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 NFL football predictions from NFL 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 four months as after four weeks. We exploit variation in preferences and matchups to show that desirability fuels this optimistic bias.

Hope Over Experience: Desirability and the Persistence of Optimism

Samuel Johnson famously proclaimed that a second marriage reflects “the triumph of hope over experience" (Boswell, 1791). 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, it remains unclear whether (1) hope triumphs *over experience* – do people persist in making optimistic judgments as they acquire feedback? – and, surprisingly, (2) whether optimism is actually caused by hope. Investigating these questions together is important, as many of life’s most consequential decisions (e.g., about health, investments, relationships) feature both strong preferences and the chance to revise one’s beliefs in light of new information (e.g., medical exams, balance statements, previous dates).

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 them (List, 2003). Indeed, researchers in both 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 rather than disconfirmed. And research

on motivated reasoning suggests that people may distort the implications of information they receive (Kunda, 1990) or convince themselves that their predictions were "almost right" (Tetlock, 1998).

It is possible that both camps are (at least partially) correct. We suggest that predictions about desirable outcomes improve with experience but remain optimistically biased nevertheless. This is because prediction accuracy is a function of both *bias* (e.g., how much people overestimate the likelihood of desirable events) and *discrimination* (how closely predictions correlate with objective outcomes) (Yaniv, Yates, & Smith, 1991). Importantly, bias and discrimination are independent. Consider, for example, two weather forecasters in New Haven, Connecticut. One predicts the next day's temperature to be 50^{o} Fahrenheit every day of the year. She is unbiased, because New Haven's average temperature is in fact 50^{o}. But her predictions also show no discrimination – the correlation between her predictions and actual temperatures is zero. The second forecaster's predictions show good discrimination, properly distinguishing warmer days from colder ones, but average 60^{o}, and so are biased. Thus, the accuracy of one's predictions, as measured by their correlation with 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 improve discrimination *and* reduce bias, while 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 experience provides will allow people to (1) make more discriminating predictions, but also to (2) justify predictions that are biased in favor of their

preferences. In other words, experience may improve discrimination while leaving 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. One reason for this is the paucity of research supporting the hypothesis. As highlighted in a recent review (Krizan & Windschitl, 2007), the few careful studies of the impact 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 actually quite thin" (p. 228). Bar-Hillel and Budescu (1992; 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 turning to "real world" settings associated with very strong preferences (e.g., presidential elections, Krizan, Miller, & Johar, 2010) in order 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 NFL football fans to predict game outcomes before each week of the 17-week NFL season. Studying football predictions offered many important benefits

over the very few studies previously considering 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 non-arbitrary) duration of time, providing an ideal context for evaluating the impact of experience on optimism. Second, preferences in this domain are strong, and often held with a degree of intensity unlikely to be generated by incentives offered in the lab. 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 football season, we invited 902 NFL fans to complete weekly online surveys; 728 (81%) completed at least one survey. These fans were among those who had previously completed a survey indicating their favorite NFL team, allowing us to recruit relatively even numbers of fans of all 32 NFL teams. Each Wednesday of the season, participants received an e-mail containing a link to a survey asking them to predict the following week's NFL games.[1] Each survey 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 final point differential of each game. Each survey clearly explained the incentives for making accurate predictions. A

participant's weekly earnings were determined by the across-game average absolute difference (AAD) between their predictions and the game outcomes, using the formula: $3.50 – ($.25 * AAD). Negative earnings did not cost our participants anything, and they knew this. The weekly and cumulative earnings of all participants were posted on a website devoted to the study (participants were identified using an id they chose in the first week), and they were paid in amazon.com gift cards at the end of the season. As an additional incentive, each week's best performer earned a $50 amazon.com gift card, delivered immediately, and the website announced and congratulated these weekly winners.[2]

Normative benchmarks. We used two normative benchmarks for participant 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 unusually ideal standard of rational expectations.

Team quality. We assessed team quality using two measures: (1) the team's winning percentage through the previous week's games, and (2) the probability that the team would make the Super Bowl, as estimated by the market prices for Super Bowl tickets at yoonew.com. Yoonew is a web-based service that sells tickets to future sporting events if a specific team participates in the event. Prices fluctuate depending on the likelihood a team will make the event (i.e., prices for good teams are higher than prices for bad teams). Using price data provided by the company, we inferred the market probability of each team making the Super Bowl at every point during the season. The prices are 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 won-loss records – especially early in the season – and arguably a more informed one (Chen, Ingersoll Jr, & 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 also rated how much they liked each team (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 (1 = *nothing*; 5 = *almost everything*). Additionally, each week of the season they reported how much of each game they watched the *previous* week, with the response options: 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 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 one week's predictions. Of these, 386 (53%) completed at least 14 of the 17 weekly surveys, our *ex ante* inclusion rule. This sample (45% female, M_{age} = 35) was diverse in its rooting interests (the

median team was the favorite team of 22 participants) and passionate about NFL football (the median participant reported watching 3 games each week). Importantly, our final sample was virtually identical to those who were dropped (see Table 1). Across many measures, the only reliable difference was how closely they reported following the NFL, $t(665) = 3.14$, $p < .01$.

Optimism and Experience

We first investigated whether fans made optimistic predictions, and, if so, whether optimism persisted with experience. We analyzed participants' predictions each week of the season, estimating how often they predicted their favorite team to win and how often they predicted other teams to win. As shown in Figure 1, participants predicted their favorite team to win more than 60% of the time every week of the season, while predicting all other teams to win approximately 50% of the time.[3] This optimistic bias was highest (77%) the first week of the season. The bias drifted to a low of 63% in midseason before increasing to approximately 70% at the end of the season. The bias was reliably positive in every week (all *p*s < .01).

So it is clear that optimism persists, but is there any evidence of learning? To investigate this, we analyzed a second measure of accuracy (discrimination) – the correlation between predicted and actual outcomes. As shown in Figure 2, this correlation improved systematically over the course of the season for games involving favorite teams, but not for games involving non-favorite teams. To formally test this pattern we regressed predicted outcome on actual outcome, week (centered), favorite team (a dummy variable for games involving the participant's favorite team), as well as all two-way interactions and the three-way interaction. We found a reliable three-way interaction, $\beta = .02$, $z = 2.43$, $p < .05$, indicating that the correlation between predicted and actual outcomes improved more over the course of the season for games involving favorite teams than those involving non-favorite teams.

This analysis of discrimination and experience reveals that participants were learning. Moreover, learning operated in the way rational models would predict – it was strongest for the teams participants paid the most attention to, their favorites. Interestingly, this stands 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 Epley and Dunning's (2006) work on the "mixed blessing of self-knowledge." They found that predictions about the self show 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.

Optimism and Desirability

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

Our empirical strategy is the same throughout this section. Each test regresses predicted outcomes on some measure of desirability. We use probit maximum likelihood regression since predicted outcomes are binary (win/lose).[4] 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 familiarity with the team (pre-season knowledge ratings and weekly TV exposure). The models also included team fixed-effects and an indicator for which is the home team. We standardized all continuous variables. Observations were participant-games, with standard errors clustered on participant. We dropped Week 1 from the analyses in order to

accommodate lagged variables (e.g., TV viewing). We report results in terms of the change in the probability of predicting a team will win due to a one-unit change in the variable of interest.

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 favorite bias 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 comports with the analysis in the previous section showing the mean likelihood of predicting favorite teams would win ranged from 63% to 77% over the course of the season. This effect is still significant, and in fact only slightly reduced, after adding our full array of control variables, $\beta = 0.164$, $z(385) = 10.1$, $p < .01$. 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 pre-season liking ratings participants assigned to each team along with our full set of controls. This generalized our test of desirability beyond a single team for each participant. Results were consistent with the desirability hypothesis, showing that predictions were strongly positively related to team liking, $\beta = .0419$, $z(385) = 12.7$, $p < .01$.

A weakness of the liking ratings is that they were constant throughout the season and thus confounded with other participant-team factors (e.g., history). In contrast, the desirability ratings we collected each week from half the sample varied within season, providing a very different source of variation in desirability. Using these desirability ratings instead of the favorite team

measure or liking ratings, we again found a strongly positive relation between desirability and predicted outcomes, $\beta = .0504$, $z(385) = 3.29$, $p < .01$. This relation is particularly 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. As a final test of desirability bias we moved from investigating the impact of desirability to the impact 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 evidence about 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 close to 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 non-favorites.

We tested this by adding the absolute point spread to the prediction model detailed above, as well as the interaction between the absolute point spread and favorite team. There was no main effect of absolute point spread, $\beta = -.0004$, $z(385) = 0.13$, *ns*. The main effect of favorite team was significant and very similar in size to previous models, $\beta = .156$, $z(385) = 9.34$, $p < .01$. Critically, there was a significant interaction between the absolute point spread and favorite team, $\beta = -.048$, $z(385) = -3.69$, $p < .01$. We depict this interaction in Figure 3 by plotting the predicted probability of winning against the objective *ex ante* probability of winning, as determined by the point spread.[5] As always, the standard by which we measured optimistic bias

was the predictions about non-favorite teams, which are shown to be unbiased.[6] Predictions about favorite teams are positively biased over the entire range of objective probabilities. Consistent with the desirability hypothesis, the bias is largest when the outcome is most ambiguous, peaking near the midpoint, when a favorite team has approximately a 50% chance of winning the game.

Figure 3 provides an apt summary of the overall pattern we observe. Most notable is the size and ubiquity of the distortion in the predictions made by fans with vested interests – through much of the range the optimistic bias is at or beyond 20%! In the eyes of those who desire them, relatively unlikely events, such as teams winning when neutral fans pick them only 30% of the time, become 50/50 propositions. 50% events become the quite likely 70%. And 70% events become an almost certain 90%.

Discussion

Understanding the role of optimistic biases in consequential and emotional domains such as health, relationships, and investments requires studying judgment 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. We extend this observation in two ways that are important for a deeper understanding of optimism. First, we show that optimism persists in the face of extensive experience – football fans are as optimistic after 4 months of feedback as they are after 4 weeks. Second, we find strong evidence of the elusive desirability bias. Using four distinct tests, we find that optimistic predictions are related to the desirability of the outcome. Overall, we show that experience provides the same kind of "mixed blessing" as self-knowledge: Optimistically biased judgments persist even while calibration improves.

We do not purport to show that people *cannot* learn away their optimistic biases. It is possible that optimistic biases would diminish if given feedback in an even more explicit manner. Rather, our interest is whether people learn when they acquire feedback naturally. We show that in an ecologically valid setting that is in many ways a "best case" for learning from experience (e.g., it includes feedback that is extensive, frequent, precise, and objective), optimistic biases persist.

But do participants really believe the predictions they make (Williams & Gilovich, 2008)? Might they, due perhaps to a sense of loyalty, predict better outcomes for their favorite teams than they actually believe? This is of course the point of providing incentives for accurate predictions. It is also the point of testing for desirability in widely varying ways. For example, it would require a particularly complicated form of loyalty to produce a bias that applies not only to favorite teams but also to those merely well liked, varies over the course of the season depending on the desirability of a win, and 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.

It is unclear whether this kind of optimistic bias is rational. Any benefits from the hope we observe 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 the "calculus of optimism" (Brown & Dutton, 1995)? An "optimal margin of illusion" (Baumeister, 1989)? These important questions remain controversial. We hope this demonstration of the nature of optimism, and its robustness, can inform the rationality debate. Our findings show that optimism is not the product of ignorance or

inattention. Though perhaps more of a truce than a triumph, hope appears as fueled by experience as it is sobered by it.

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Footnotes

1. They could submit their predictions until one hour before the survey's first game began. Although most NFL football games are played on Sundays and Mondays, a few are played on Thursdays and Saturdays. To give participants enough time to register their predictions before the games began, we asked them "only" to predict the 246 (out of 256) games played on Sundays and Mondays.
2. While this first-place incentive might induce risk-taking in predictions, there is no normative reason why this should interact with preferences.
3. Participants' favorite teams actually won exactly 50% of their games.
4. Every result in this paper is also reliable when tested using a more continuous dependent variable, predicted point difference. Comprehensive regression results are available from the authors.
5. We estimate the objective probability of winning given a particular point spread using logistic regression, based on the point spreads and outcomes of all NFL games, 1978-2009 (n=7,406).
6. Importantly, using this standard ensures that we do not attribute to optimism what is merely due to regressive predictions (Burson, et al., 2006; Moore & Healy, 2008).

Table 1

Sample Characteristics and Attrition Analysis

Characteristic	Included	Dropped	All
N	386	342	728
% Male	$56\%_a$	$54\%_a$	55%
Age	35.4_a	34.0_a	34.8
Jerseys owned	1.94_a	2.04_a	1.98
Follow NFL closely (1 = not at all; 5 = extremely)	3.95_a	3.71_b	3.85
Games watched per week	3.81_a	4.22_a	3.98
% in a fantasy league	$38\%_a$	$32\%_a$	35%
Win % of favorite team	$50\%_a$	$51\%_a$	50%
Probability of predicting favorite team will win	$69\%_a$	$70\%_a$	69%

Note. Means and percentages with different subscripts are significant at $p < .05$.

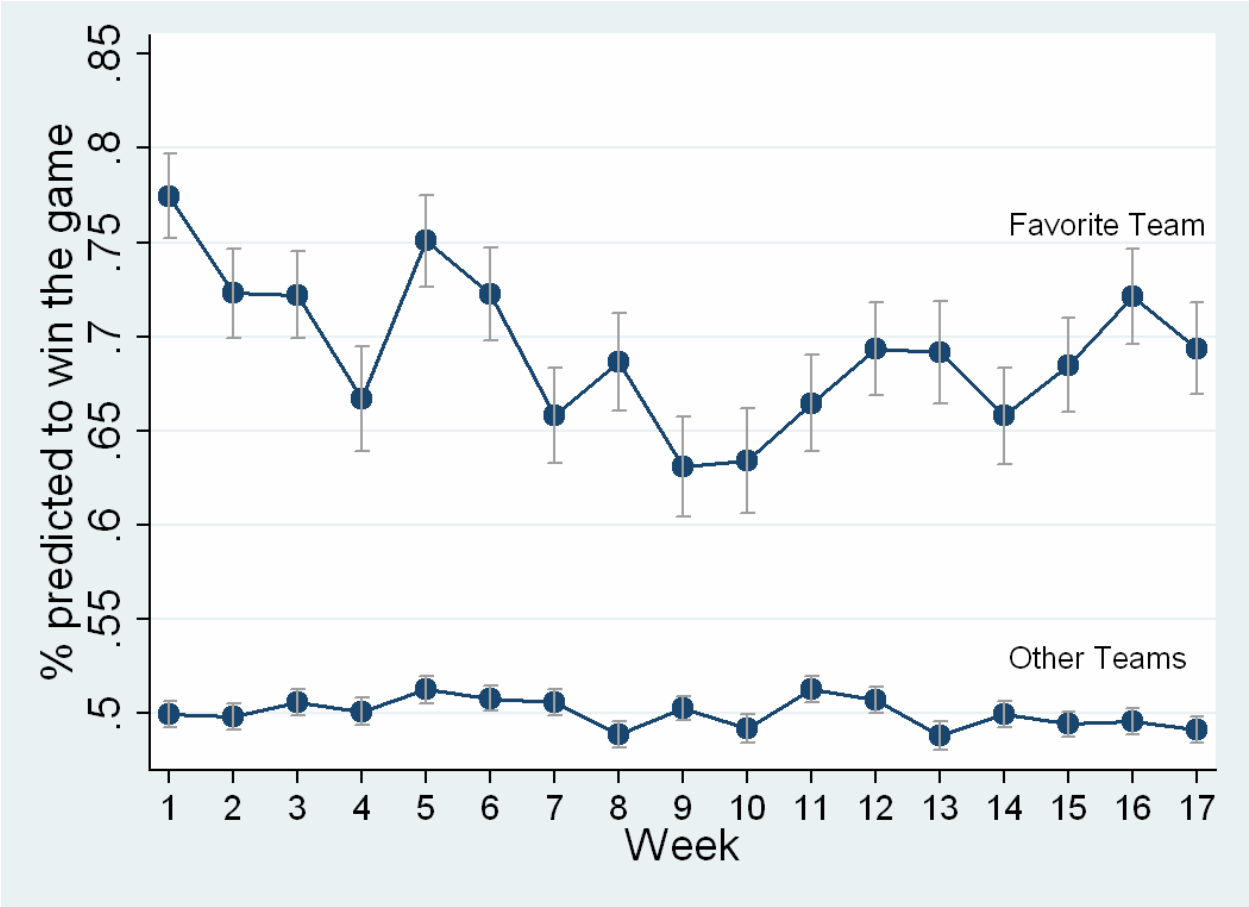

Figure 1. Optimistic bias over time. Percent of time participants picked a team to win a game. Shown are means for each week, split by whether or not a team was the participant's favorite.

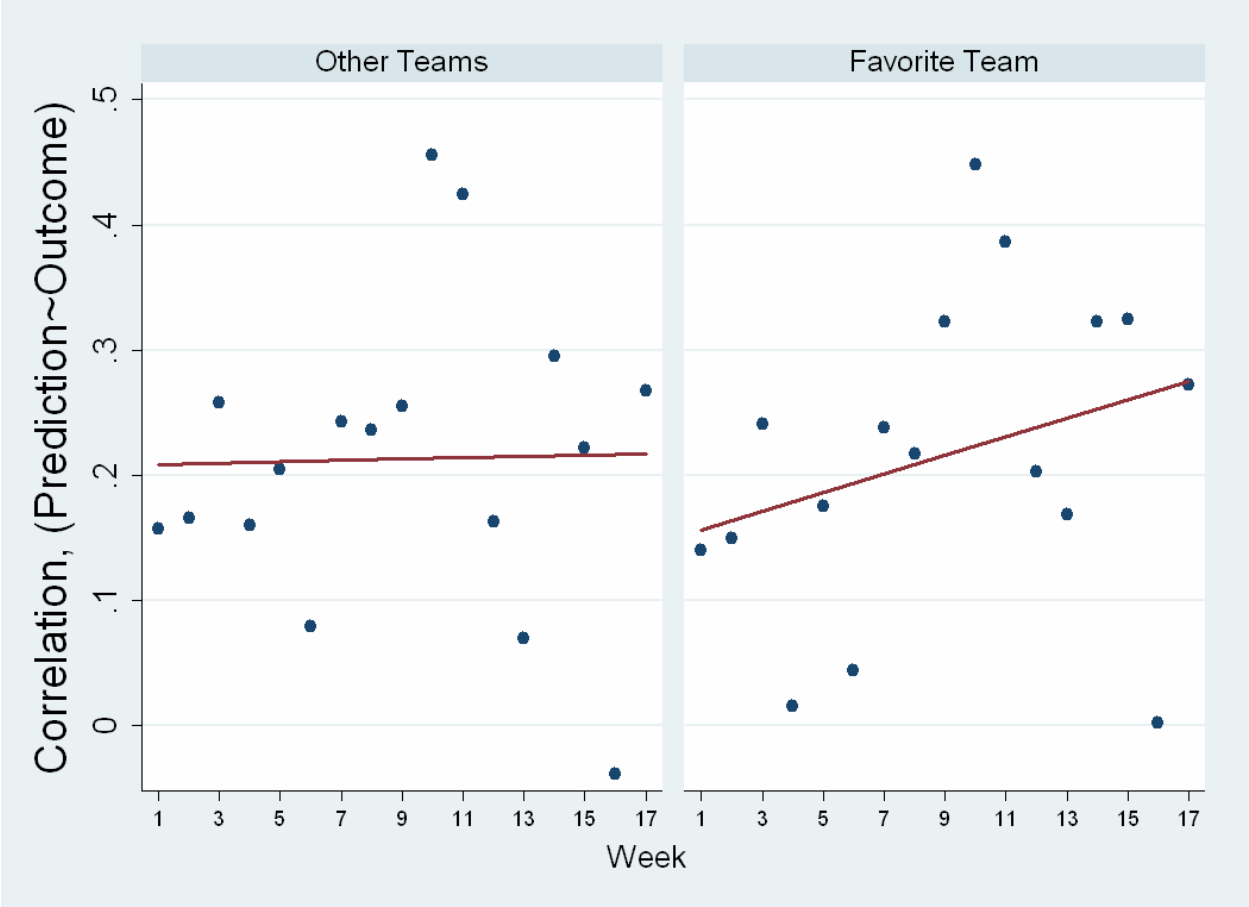

Figure 2. Prediction-outcome correlation over time. The correlation between the participants' predicted winners and the actual winners, for each week of the season. Lines are linear fits.

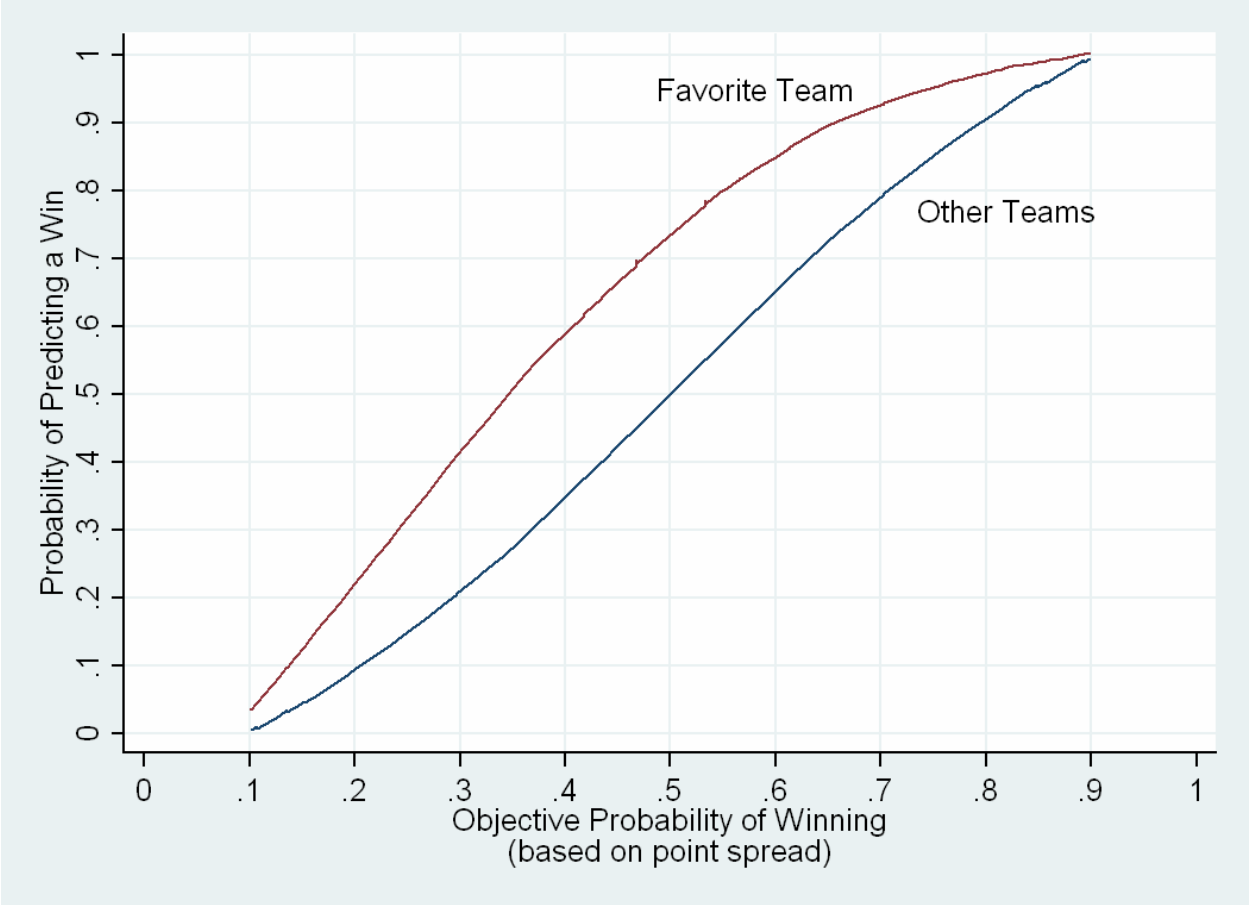

Figure 3. Optimistic bias and ambiguity. The probability a participant predicted their favorite team to win, as a function of the objective *ex ante* probability the team would win, based on the point spread.