Online Supplementary Materials

For:

Intuition Speed as a Predictor of Choice and Confidence in Point Spread Predictions

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Point Spread Tutorial
Based off of a tutorial obtained from Simmons and Nelson (2006)

This survey requires you to predict NBA basketball games against point spreads.

Do you know what point spreads are?

Response Options: Yes; No

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Please read all of the information on the next two pages very carefully. There will be two mandatory quiz questions at the end of this tutorial testing whether you have read the material. You MUST answer both quiz questions correctly to proceed in this study.

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To illustrate how point spreads work, consider the following example:

Miami Heat (-2.5) vs. Orlando Magic

In this example, the "(-2.5)" next to Miami is the point spread.

It indicates that Miami has to win by more than 2.5 in order to win the bet.
A bet on Orlando wins if Miami wins by less than 2.5, or if Orlando wins the game.

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Note that the point spread is always written in parentheses next to the team that must win by more than the spread in order to win the bet.

For example, if you see this:

Team A (-6.5) vs. Team B

Then a bet on Team A wins only if Team A wins by more than 6.5. Otherwise a bet on Team B wins.

Consider this final score:

Team A 105, Team B 100

Here a bet on Team B wins because Team A did not win by more than 6.5.

Consider this final score:

Team A 94, Team B 83

Here a bet on Team A wins because Team A won by more than 6.5.

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We will now ask you two quiz questions to determine whether you understand how to make predictions against point spreads.

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Imagine the following game:

California Avocados vs. Hawaii Pineapples (-3.5)

The final score of this game was:

Avocados 95, Pineapples 98

Who won the bet?

Response Options: Those who bet on the Avocados; Those who bet on the Pineapples

Page Break

Imagine the following game:

California Avocados (-11.5) vs. Hawaii Pineapples

The final score of this game was:

Avocados 100, Pineapples 85

Who won the bet?

Response Options: Those who bet on the Avocados; Those who bet on the Pineapples

<u>**Experimental Trials**</u>

Instructions: Please read these instructions very carefully.

The following questions will ask you to predict the outcomes of NBA basketball games that were played during the 2014-2015 NBA season. Specifically, you will be asked to make a prediction

about who will win each game, at times against a provided point spread. Additionally you will be asked to provide a confidence rating for each prediction.

For each game, you will be given information regarding which team is playing on its home court, the current records of the opposing teams, as well as information suggesting how good their offenses and defenses are.

Some games will feature a point spread next to the favoured team (e.g., "-5") others will not. For games that do not feature a point spread you are to simply predict the winner of the game based on the statistical cues given to you.

You do not have to know anything about basketball or the NBA to do this task. You will be able to make informed decisions based on the information you are given about the game.

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Example WIN Trial

	Home Team		**Visiting Team**	
Record	30-23		20-33	Record
Points Scored Per Game	99.2		100.7	Points Scored Per Game
Points Allowed Per Game	97.2		104.1	Points Allowed Per Game

Statistical cues varied between trials/games (see below). Above is an example of one game in which participants were asked to make a prediction regarding the outcome.

Which team do you believe will win the game?

Response Options: Home Team; Visiting Team

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On a 9-point scale ranging from 1 (not at all) up to 9 (extremely) how confident are you in your choice?

Response Options: 1 (Not at all); 2; 3; 4; 5; 6; 7; 8; 9 (Extremely)

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Example ATS Trial*

	Home Team		**Visiting Team**	
Record	30-23		20-33	Record
Points Scored Per Game	99.2		100.7	Points Scored Per Game
Points Allowed Per Game	97.2		104.1	Points Allowed Per Game

Which team do you believe will win against the spread?

Response Options: Home Team (-7.5); Visiting Team
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On a 9-point scale ranging from 1 (not at all) up to 9 (extremely) how confident are you in your choice?

Response Options: 1 (Not at all); 2; 3; 4; 5; 6; 7; 8; 9 (Extremely)

* WIN and ATS trials were presented in a randomized order. Therefore, despite the example shown above, it was not customary for participants to complete WIN and ATS trials for the same game successively.

Modified Cognitive Reflection Test
Primi, Morsanyi, Chiesi, Donati, and Hamilton (2016); Toplak, West, and Stanovich (2014)

1. Ellen and Kim are running around a track. They run equally fast but Ellen started later. When Ellen has run 5 laps, Kim has run 15 laps. When Ellen has run 30 laps, how many has Kim run?
2. In his class, Jerry was both the 15th tallest and 15th shortest student. How many students are in the class?
3. In an athletics team, tall members are three times more likely to win a medal than short members. This year the team has won 60 medals so far. How many of those have been won by short athletes?
4. A man buys a pig for $60, sells it for $70, buys it back for $80, and sells it finally for $90. How much has he made?

*For all items participants provided their answers in a free-entry text box.
**Items 1-3 taken from Primi et al. (2016); Item 4 taken from Toplak et al. (2014)

NBA Knowledge Items

1. On a 9-point scale ranging from 1 (no prior knowledge) up to 9 (a great deal of knowledge) how much knowledge would you say you have regarding the National Basketball Association (NBA).

Response Options: 1 (No prior knowledge); 2; 3; 4; 5; 6; 7; 8; 9 (A great deal of knowledge)

2. Did you pay attention to which team was playing at "home" when making your predictions?

Response Options: Yes; No

Game Information

Legend

Home Record: The win-loss record of the Home team
Home PSPG: The amount of points scored per game by the Home team
Home PAPG: The amount of points allowed per game by the Home team
Visiting Record: The win-loss record of the Visiting team
Visiting PSPG: The amount of points scored per game by the Visiting team
Visiting PAPG: The amount of points allowed per game by the Visiting team
Home Point Spread: The point spread applied to the Home team's final score given that the Home team is favoured. If the Home team is not favoured this cell will appear blank
Visiting Point Spread: The point spread applied to the Visiting team's final score given that the Visiting team is favoured. If the Visiting team is not favoured this cell will appear blank

Game Number	Home Record	Home PSPG	Home PAPG	Visiting Record	Visiting PSPG	Visiting PAPG	Home Point Spread	Visiting Point Spread
1	17-39	95.7	101.7	27-26	99.8	99.7		(-3.5)
2	12-41	89.8	100.5	21-33	95.8	97.2		(-3.5)
3	43-11	103.4	96.8	36-17	105.6	100.7	(-5)	
4	10-43	92.5	100.2	22-30	92.8	96.6		(-3)
5	33-21	99.7	97.3	33-22	102.2	99.3	(-2.5)	
6	11-42	97.5	106.1	29-25	105.9	104.7		(-6.5)
7	30-23	99.2	97.2	20-33	100.7	104.1	(-7.5)	
8	36-20	106	101	36-17	103.1	99.8	(-2)	
9	19-34	95.7	98.2	36-17	102.6	97.3		(-6)
10	13-40	99.1	106.2	21-31	95.5	99.5		(-1.5)
11	42-9	110.6	99.6	34-20	100.9	97.1	(-7.5)	
12	33-23	99.3	98	43-10	110.3	99.7		(-4.5)
13	34-21	102	99.1	29-26	106	104.9	(-4.5)	
14	35-19	106.7	100.7	34-19	100.7	96.7	(-2.5)	
15	36-19	107	101	19-34	100.2	104.2	(-10.5)	
16	10-44	92.4	100.4	34-22	102.6	99.1		(-8.5)
17	31-23	99	96.9	43-12	103	97		(-2.5)
18	22-33	98.3	99.6	33-22	99.5	97.9		(-2.5)
19	18-39	95.6	101.4	12-42	89.9	100.6	(-5.5)	
20	22-33	96	97.2	43-9	110.6	99.6		(-9)
21	30-25	102.1	97.2	20-34	100.3	103.8	(-8)	
22	37-20	106.1	101	22-31	94.5	97.1	(-8.5)	
23	13-41	99.2	106.3	20-32	100.8	102.4		(-2)

Game Number	Home Record	Home PSPG	Home PAPG	Visiting Record	Visiting PSPG	Visiting PAPG	Home Point Spread	Visiting Point Spread
24	21-33	98.3	99.8	34-20	102.2	99.1		(-3.5)
25	23-31	93.1	96.6	12-43	90.1	100.7	(-8)	
26	28-27	99.7	99.5	37-18	105.1	100.3		(-2)
27	35-21	102.1	99.2	31-24	98.8	96.9	(-3.5)	
28	37-18	103	99.6	12-42	97.8	106.2	(-14)	
29	20-34	95.7	97.7	34-21	100.9	97.4		(-4)
30	29-27	106	105	20-33	101	102.7	(-5.5)	
31	23-33	98.4	99.4	35-22	102.6	98.8		(-3)
32	31-25	101.2	98.6	23-33	96.2	97.2	(-5.5)	
33	38-20	105.9	100.7	37-19	104.9	100.3	(-2.5)	
34	44-12	102.9	96.8	39-20	105.8	100.5	(-4.5)	
35	21-33	101.3	102.9	10-45	92.3	100.5	(-7.5)	
36	36-21	101.9	98.7	22-32	94.2	97	(-7.5)	
37	38-18	103.2	99.6	37-20	106.9	100.7	(-2)	
38	31-25	98.3	96.7	12-44	90.4	101	(-12)	
39	12-43	97.9	106.3	33-24	99.4	98.3		(-7.5)
40	29-27	99.7	99.4	23-31	96.1	99.3	(-5)	
41	20-36	99.9	104.2	29-28	106.1	105.2		(-2)
42	21-34	95.6	97.4	14-41	99.5	106.4	(-6.5)	
43	19-35	100.2	104.6	41-14	100.3	95.5		(-8)
44	36-19	101.9	97.2	34-22	100.5	97.3	(-3.5)	

Game Level Statistics

Legend
Game Number: A numerical value assigned to each game prior to data collection
WIN Prediction RT: Mean $\log^{10}$ WIN prediction response times
Intuitive Confidence: Mean WIN prediction confidence ratings
Point Spread Magnitude: The magnitude of the point spread applied to the favoured team
ATS Predictions: The proportion of participants predicting the favourite against the point spread
Observations Excluded: The number of observations excluded. Observations were excluded due to a participant predicting the underdog to win the game (i.e., during a WIN prediction).

*All data reported in this table represents item-level data in which all observations where a participant predicted the underdog during a WIN prediction were removed. The total number of observation removed is reported in this table for each game.
** This table is ordered by WIN Prediction RT as to facilitate a visualization between WIN Prediction RT and our other key variables.

Game Number	WIN Prediction RT	Intuitive Confidence	Point Spread Magnitude	ATS Predictions	Observations Excluded
20	.7739	7.84	9.00	.82	1
32	.7862	6.78	5.50	.58	2
9	.7865	6.64	6.00	.82	6
35	.8007	6.79	7.50	.77	5
1	.8097	6.30	3.50	.83	8
6	.8103	6.62	6.50	.75	6
38	.8254	7.25	12.00	.47	5
17	.8301	6.85	2.50	.85	3
26	.8500	7.20	2.00	.93	2
36	.8530	7.10	7.50	.75	3
29	.8547	6.95	4.00	.78	3
39	.8574	7.04	7.50	.60	7
24	.8583	6.83	3.50	.78	3
28	.8614	7.75	14.00	.44	5
22	.8622	6.98	8.50	.84	1
2	.8627	6.58	3.50	.89	9
23	.8632	6.14	2.00	.84	6
15	.8644	7.40	10.50	.43	2
21	.8678	6.49	8.00	.46	3
31	.8683	6.79	3.00	.83	4
41	.8794	6.70	2.00	.93	8

Game Number	WIN Prediction RT	Intuitive Confidence	Point Spread Magnitude	ATS Predictions	Observations Excluded
11	.8807	7.09	7.50	.65	5
16	.8825	7.26	8.50	.83	4
44	.8836	5.65	3.50	.50	8
7	.8864	6.29	7.50	.44	10
8	.8882	5.49	2.00	.69	13
10	.8910	5.87	1.50	.83	16
37	.8952	5.47	2.00	.72	30
40	.8960	6.07	5.00	.45	6
18	.8984	6.12	2.50	.63	5
25	.8996	6.26	8.00	.47	5
34	.8996	6.38	4.50	.71	17
12	.9006	6.87	4.50	.89	0
14	.9023	5.60	2.50	.79	9
33	.9083	4.75	2.50	.54	5
19	.9221	5.75	5.50	.71	1
30	.9253	6.78	5.50	.55	2
42	.9281	6.00	6.50	.52	14
4	.9293	5.59	3.00	.73	11
3	.9300	6.30	5.00	.53	15
13	.9302	6.11	4.50	.64	15
43	.9351	7.15	8.00	.57	15
27	.9537	6.17	3.50	.55	2
5	.9551	4.67	2.50	.44	26

Individual Differences Analyses

Here we investigate whether various individual differences were associated with participants'
predictions and the speed at which they made these predictions in our sports betting task (See
Table 1).

Table 1

Experiment 1 Individual Differences Correlations

	M	*SD*	1	2	3	4	5	6
1. WIN Prediction RT	.86	.25	-					
2. Favourite WIN Predictions	9.69	1.91	.31***	-				
3. Favourite ATS Predictions	7.08	2.46	-.16*	.37***	-			
4. CRT	1.69	1.35	.21**	.25***	-.07	-		
5. NBA Knowledge	5.19	2.22	-.29***	-.01	.19**	-.03	-	
6. Home Court	1.17	.37	.11	.03	-.06	-.04	-.24***	-

Note. Pearson correlations (Experiment 1; $N = 248$). *WIN Prediction RT* = Participants' average
Log10 WIN prediction response times; *Favourite WIN Predictions* = Participants' number (out
of 11) of favourite WIN predictions; *Favourite ATS Predictions* = Participants' number (out of
11) of favourite ATS predictions; *CRT* = Participants' Cognitive Reflection Test score (out of 4);
NBA Knowledge = Participant's self-reported NBA knowledge (reported on a 9-point scale
ranging from 1 [No prior knowledge] to 9 [A great deal of knowledge]); *Home Court* =
Participant's self-reported consideration of home court advantage when making their predictions
(1 = Yes; 2 = No). *** $p < .001$, ** $p < .01$, * $p < .05$.

Examining the relation between the speed of participants' WIN predictions and the predictions themselves demonstrated that fast WIN predictions were associated with *less* predicting of favourites ($r(246) = .31$, $p < .001$) for simple WIN predictions but *more* predicting of favourites for ATS predictions ($r(246) = -.16$, $p = .015$). Moreover, examining this relation separately for low and high CRT performers revealed an interesting result. Specifically, for low CRT performers, fast WIN predictions were associated with *fewer* favourite WIN predictions ($r(117) = .43$, $p < .001$) while being unrelated to ATS predictions ($r(117) = -.06$, $p > .05$). We speculate that these unanticipated results emerged for low CRT performers due to fast responses in this sample not only indicating fluency and confidence but also carelessness (e.g., a lack of attention to the statistical information presented). Conversely, for high CRT performers, fast WIN predictions were unrelated to participants' WIN predictions ($r(127) = .02$, $p > .05$) yet were associated with a *greater* number of favourite predictions against the spread ($r(127) = -.25$, $p = .005$). This relation is consistent with our hypothesis that quickly generated intuitions are more likely to be endorsed in choice conflict scenarios.

References

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