Measuring MLB Team's Temperature and How it Relates to Win Percentage

The Major League Baseball season is unique in that teams play the most games of any professional league in the world. The MLB season is 162 games long, and it takes place over the course of the 6 hottest months of the year. Often times, these teams will play over 26 games in 30 days. With that being said, it is only natural for teams to go through hot streaks and cold slumps. That is why looking at a team's win percentage, what percent of games does a team win, is not always the most accurate indicator of current success. Instead, it would be more important to measure a team's success in recent games, rather than the whole season. One way to look at this, is by using Bill James' Temperature formula.

Bill James is regarded by most as the "father of modern baseball statistics." He famously coined the phrase "Sabermetrics," which refers to advanced baseball statistics and is now commonplace for avid baseball fans and statisticians. Among the many formulas and stats created by James, the one that measures a team's recent success is his "temperature" formula. The formula is based around the agreed upon room temperature of 72 degrees. When a team wins a game, the temperature gets hotter. Conversely, when a team loses, their temperature goes down, or gets colder. Each team begins the season at 72 degrees. When a game is played, the team's temperature is multiplied by 0.8958334. This is used to somewhat reset the temperature before the result of the game is inputted. If the team wins the game, 15 is added to their temperature. If they lose, nothing is added to their temperature. As teams go through hot streaks, their temperature will increase, but the higher a team's temperature is, the more degrees that the team drops with every loss. Similarly, the formula is designed so that wins for cold teams mean more than wins for hot teams. In the same way, losses hurt hot teams more than they hurt cold teams.

The question then becomes, can a team's temperature be compared to its win percentage in order to help indicate future results? Using the temperatures and win percentages of MLB teams going into the 2023 All-Star Break, can the results of the second half of the season be predicted?

To the right, are the temperatures and win percentages of each MLB team, as they go into the All-Star Break. The list is in alphabetical order by city name. The hottest team going into the All-Star break is the Atlanta Braves. They have a current temperature of 111.4 degrees. The next best team has a temperature of less than 100 degrees. Similarly, the Braves have the best win percentage in baseball, winning more than two-thirds of their games. The coldest team in baseball going into the break is, surprisingly, the Los Angeles Angels. The Angels are not one of the worst teams in the league, as their win percentage is just below .500. However, they have been in poor recent form, with a freezing cold temperature of 36.4 degrees. The team with the worst record in baseball is Oakland Athletics, and even they have a hotter temperature, 46.1 degrees.

Team	Temp	Win %
ARI	65.1	0.571
ATL	111.4	0.674
BAL	92.4	0.607
BOS	99.8	0.527
CHC	73.4	0.472
CHW	47.1	0.413
CIN	96.0	0.549
CLE	85.4	0.500
COL	38.6	0.374
DET	63.7	0.438
HOU	76.4	0.549
KCR	44.1	0.286
LAA	36.4	0.495
LAD	96.2	0.573
MIA	91.0	0.576
MIL	87.8	0.538
MIN	62.7	0.495
NYM	71.8	0.467
NYY	63.1	0.538
OAK	46.1	0.272
PHI	87.4	0.539
PIT	50.2	0.456
SaDP	81.3	0.478
SaFG	77.4	0.544
SEA	86.2	0.506
STL	71.8	0.422
TBR	52.7	0.624
TEX	50.9	0.571
TOR	88.9	0.549
WAS	63.6	0.400

Figure 1

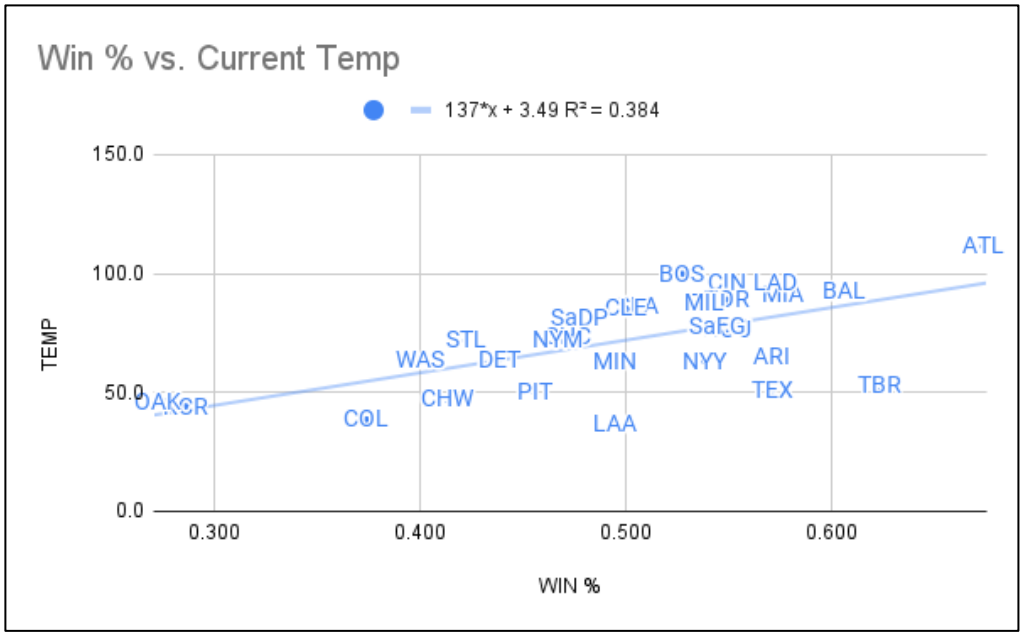

Figure 2

When plotting the temperature with a team's win percentage, it paints a picture of where teams stand compared to other teams with similar win percentages. In Figure 2, teams that sit below the line, are colder than expected for a team with that win percentage. Similarly, teams that are above the line, are hotter than expected for a team with that win percentage. The farther away from the line a team is, the hotter or colder they are. The line on Figure 2 represents the line of best fit for the data, and its equation is y=137x+3.49. Using this formula, the expected temperatures and the difference between the actual temperature and the expected temperature are shown in Figure 3. The three teams that stand out among the rest are the Tampa Bay Rays, Los Angeles Angels, and the Texas Rangers. All three of these teams have temperatures that are over thirty degrees lower than expected for a team with their win percentage. This indicates that these teams are significantly colder than the rest of the league. Furthermore, it could indicate that these teams will return to form soon and raise their temperature. The Tampa Bay Rays are the most interesting case heading into the all-star break. They had a season high temperature of 126.8 degrees after winning their first 13 games to open the season. They have the second-best win

percentage in the league, and yet they have the eighth lowest temperature in the league. Because of this large discrepancy, the Rays have the worst difference between temperature and expected temperature at -36.2 degrees of difference. The Rangers are not far behind the Rays. The Rangers had a season high temperature of 116.2 after winning 14 of 17 around the middle of the first half of the season. Currently, the Rangers have the seventh lowest temperature in the league and the third-worst difference between temperature and expected temperature. Look for the Rangers and the Rays to get hot quickly following the return to play.

Team	Temp	Win %	ExTemp	DELTA
TBR	52.712	0.624	88.93	-36.2
LAA	36.423	0.495	71.24	-34.8
TEX	50.892	0.571	81.78	-30.9
ARI	65.108	0.571	81.78	-16.7
COL	38.581	0.374	54.68	-16.1
PIT	50.160	0.456	65.90	-15.7
NYY	63.111	0.538	77.26	-14.1
CHW	47.119	0.413	60.08	-13.0
MIN	62.728	0.495	71.24	-8.5
HOU	76.382	0.549	78.76	-2.4
SaFG	77.408	0.544	78.08	-0.7
DET	63.657	0.438	63.52	0.1
KCR	44.070	0.286	42.63	1.4
NYM	71.764	0.467	67.42	4.3
WAS	63.555	0.400	58.29	5.3
CHC	73.432	0.472	68.14	5.3
OAK	46.143	0.272	40.72	5.4
BAL	92.424	0.607	86.61	5.8
MIA	90.993	0.576	82.41	8.6
PHI	87.415	0.539	77.38	10.0
TOR	88.898	0.549	78.76	10.1
STL	71.791	0.422	61.33	10.5
MIL	87.777	0.538	77.26	10.5
SaDP	81.280	0.478	68.95	12.3
SEA	86.155	0.506	72.76	13.4
CLE	85.405	0.500	71.99	13.4
LAD	96.206	0.573	82.00	14.2
ATL	111.392	0.674	95.85	15.5
CIN	95.982	0.549	78.76	17.2
BOS	99.767	0.527	75.75	24.0

Figure 3

The Los Angeles Angels are the probably most unpredictable team through the all-star break. A lot of this unpredictability comes from the uncertainty about the future of the best two-way player in baseball in around a century, Shohei Ohtani. The Angels may attempt to trade Ohtani as it gets closer to the trade deadline in an attempt to get something in return before Ohtani possibly joins another team in free agency after this season. The consensus currently is that if the Angels find themselves most likely out of the playoff hunt, they will trade Ohtani. If that is the case, the Angels will undoubtedly be a worse team than they would be with him. That

being said, the Angels are also currently without stand-out center fielder, Mike Trout, who is currently dealing with an injury. If the Angels do not trade Ohtani, and Trout is able to return sooner rather than later, look for the Angels to heat up, at least back to around room temperature.

The teams that are above the line and are uncharacteristically hot at the moment are the Boston Red Sox, Cincinnati Reds, and Cleveland Guardians. The Red Sox boast the best difference between temperature and expected temperature in the league at 24.0 degrees. They are only five games over .500, and yet they have a temperature of almost 100 degrees. The Cincinnati Reds have no doubt been one of the most dynamic and fun to watch teams this season. The play of Elly de la Cruz has been nothing short of spectacular. He has provided a spark to his franchise and is currently leading them to the fourth highest temperature in the league at 96.0 degrees. Finally, the Cleveland Guardians have won 45 games, and they have lost 45 games. This would lead one to believe that their temperature should be around 72 degrees, where the season began. Yet, the Guardians have a temperature of 85.4 degrees. The Guardians are relatively hot currently, and thus they could carry this on into the second half of the season and take home the AL Central pennant.

In conclusion, Bill James' temperature formula is another gift he has given the world of baseball. It gives amazing representation of how well a team is playing at the moment. Games in April are not indicative of success in July. This is why the temperature formula is so important when looking at teams' success as they enter the playoffs. For example, the New York Mets were amazing in the first half of the season in 2022. However, after the all-star break, the Mets were a shell of their former selves, giving up the division, and limping into the National League Wild Card Series. A series that the Mets would lose at home to a lower ranked team, the San Diego Padres. If the 2023 playoffs started today, it would be hard to have a lot of confidence in the

Rays or the Rangers. As the season goes on, it will be interesting to see if cold teams, like the Rays and Rangers, can get hot again, and if hot teams like the Red Sox will get cold, or play their way into the playoffs.