THE USE OF SITUATIONAL STRATEGIES AMONG MAJOR LEAGUE BASEBALL TEAMS

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INTRODUCTION

WHAT ARE SITUATIONAL STRATEGIES?

Situational strategies are offensive and defensive plays or decisions made by teams within each game. These plans of action may change from game-to-game, or even within each inning, depending on how a team is doing within the match.

HOW DO WE DEFINE "RISK?"

We define "risk" as the level of danger involved in any situation or decision made on the field. Based on our data set, we are positing that the collected baseball statistics that constitute risk within a certain situational strategy are strikeouts (SO), sacrifice flies (SF), sacrifice hits (SH), intentional bases on balls (IBB), stolen bases (SB), and caught stealing (CS). We have considered these variables to create a overall "Situational Strategy" by using the formula below; this number will be used throughout our findings.

$$outpoint = \frac{RPG}{27}$$
$$SFpoint = 1 - outpoint$$
$$SHpoint = \frac{1}{4} - outpoint$$

$$Situational\ Strategy = \frac{1}{4}SB + outpoint \times CS + SHpoint \times SH + SFpoint \times SF + \frac{1}{4}IBB$$

THE DATASET

Our dataset consists of 19 variables and 300 observations, collected from several baseball-related sources (see citation section). The data includes 10 years worth of information for all 30 Major League Baseball teams, from 2008 through 2017. These teams are classified by their abbreviations, League, and Division. We have included team data on regular season stolen base count, caught stealing, strikeouts, sacrifice hits and flies, intentional bases on balls, runs scored, hits, home runs hit, runs batted in, and runs per game. For each year, we also compiled data pertaining to whether or not each team made the playoffs, their average stadium attendance per home game, and the average age of their batters.

WHERE ARE THE TEAMS?

MLB teams are spread throughout the US, and split into two leagues, American and National. These leagues are not area-specific, and both cover coast to coast.

Distribution of Major League Baseball Teams

League
- American League
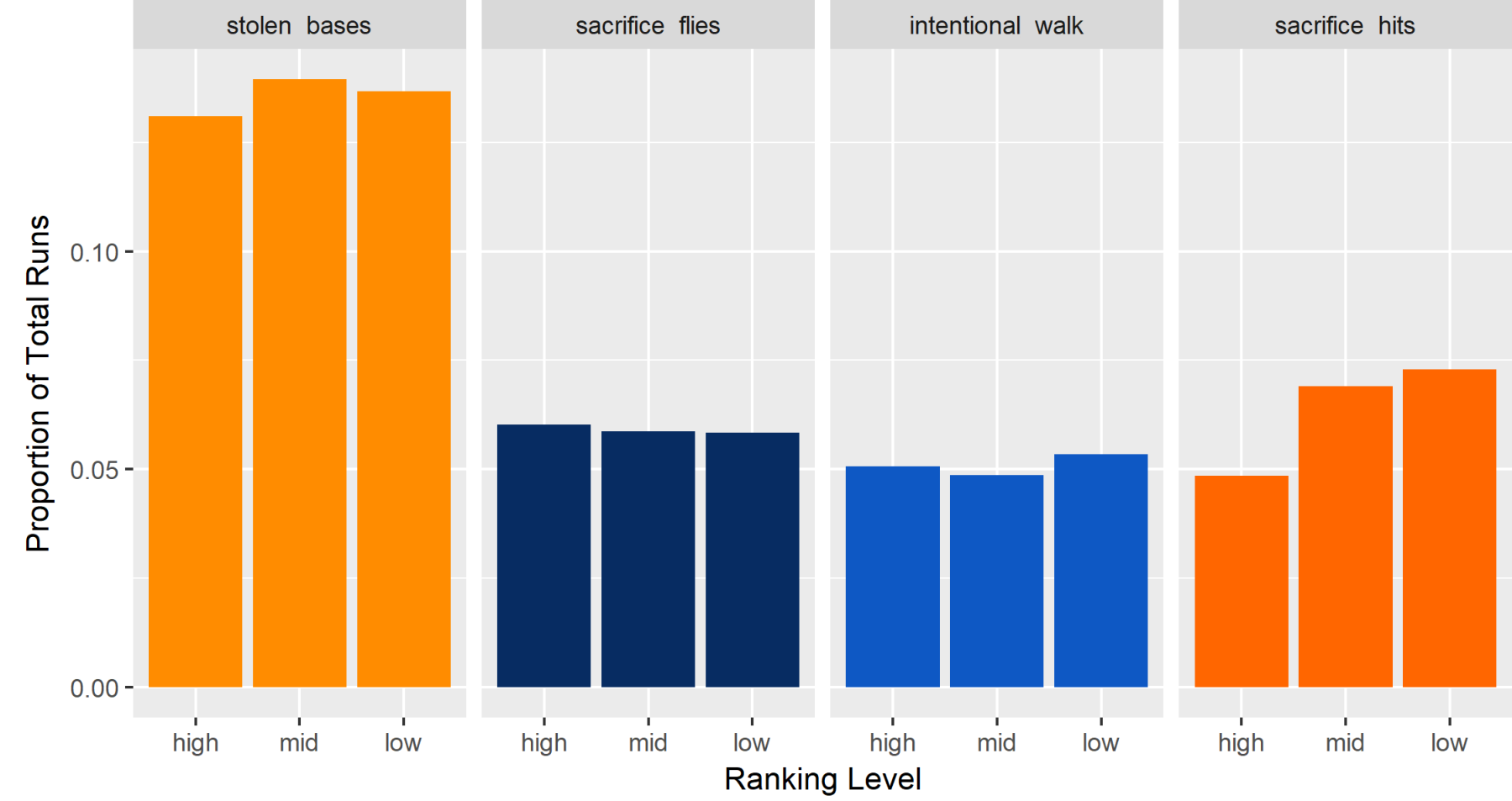- National League
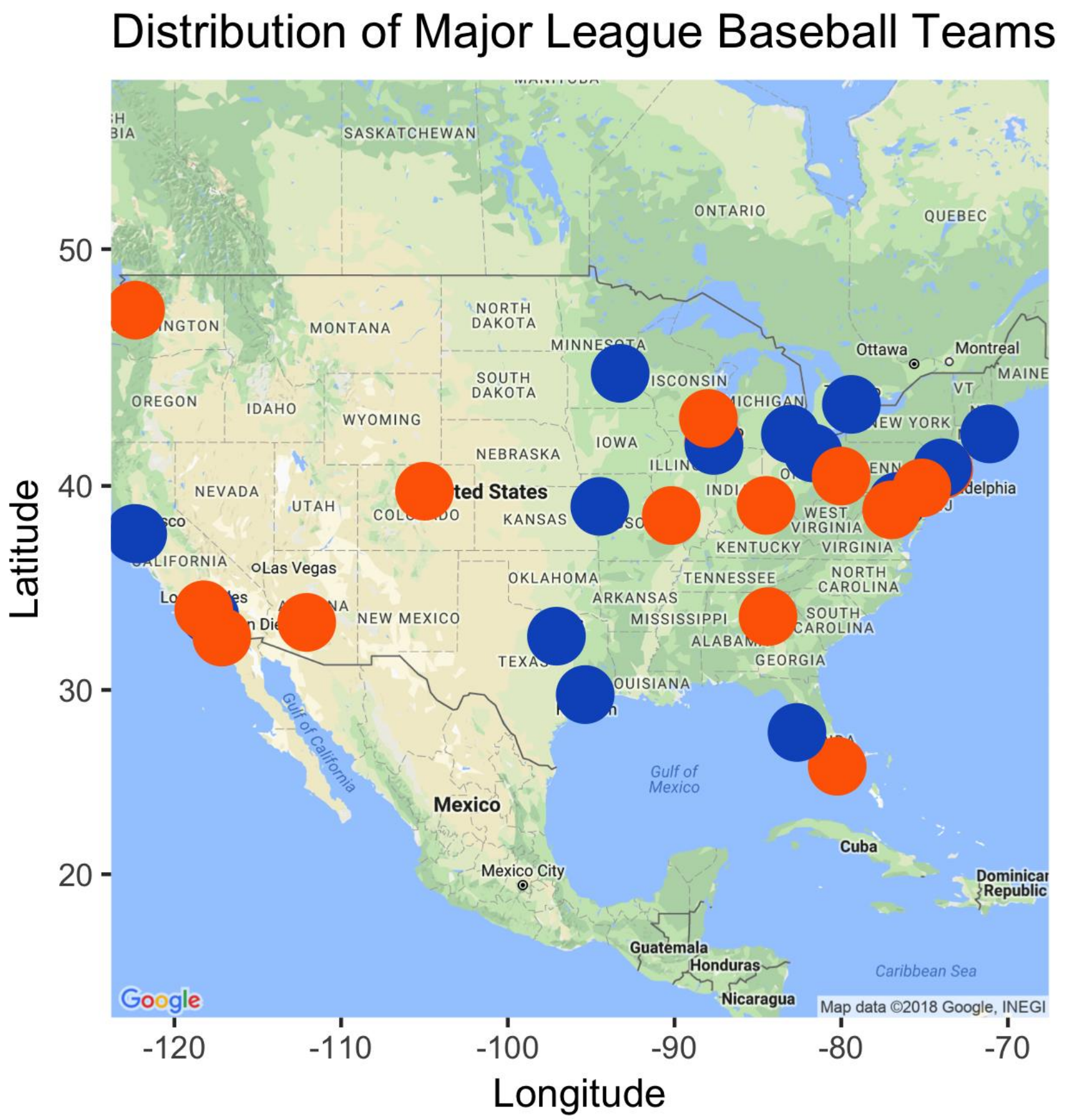
HOW IT'S CHANGING

Situation Strategy Score over 10 Seasons Facetted by Division and League
Lines represent Average Situation Strategy Scores Average Rankings are listed for each year
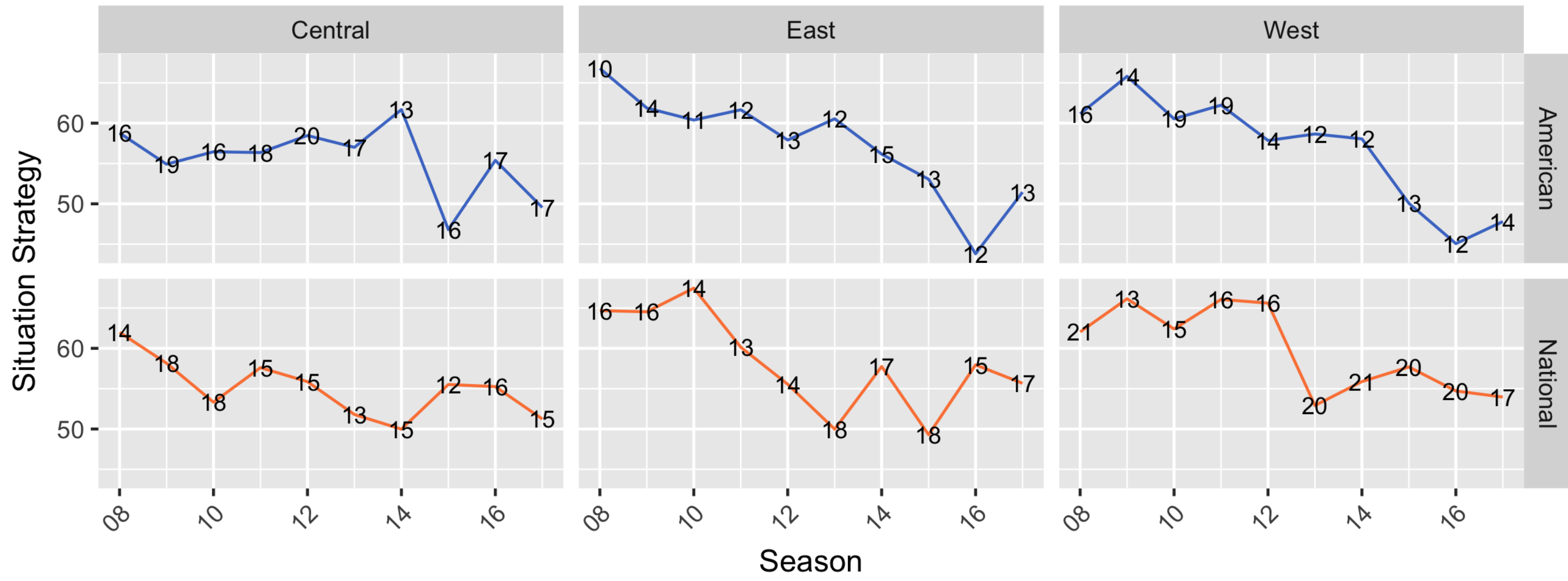
Within both leagues, the use of situational strategies seems to be falling slowly, as seen by the last 10 years of data. It appears that overall within the National League, lower scores lead to lower ranks on average. Conversely, lower situational strategy scores seem to lead to higher ranks within the American league
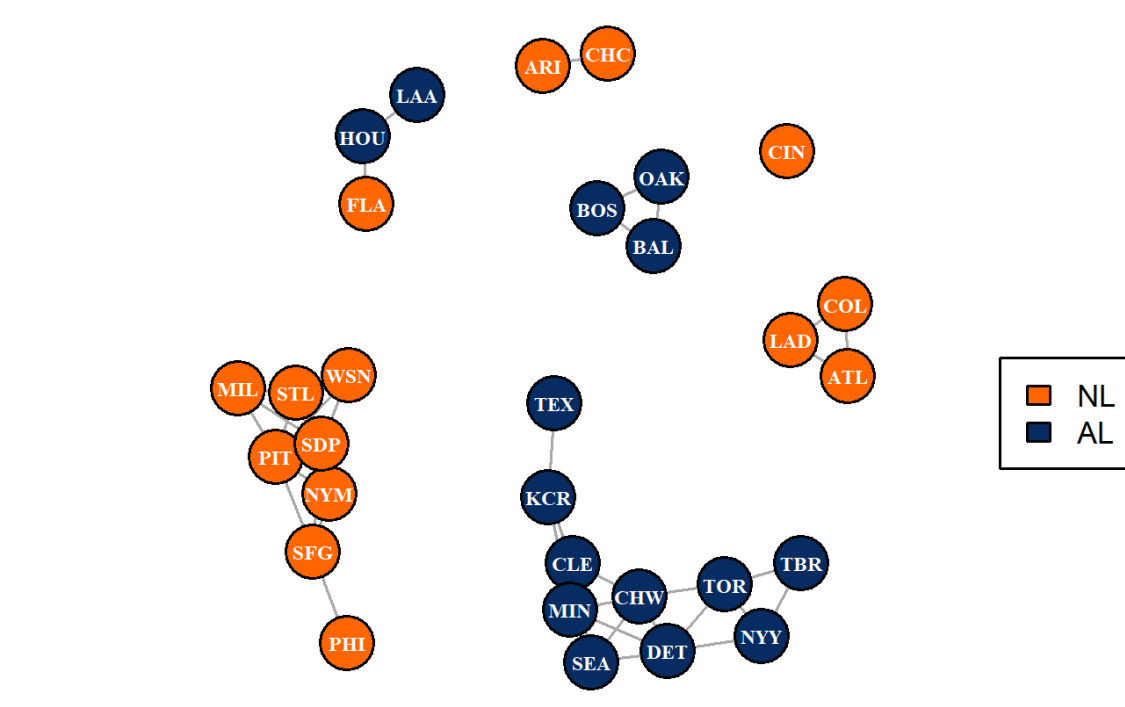
THE MAKEUP OF SITUATIONAL STRATEGY PLAYS

Similar Use of Strategy Tactics in Scoring Runs, Except in Sacrifice Hits
High = rank 1-12, mid = 13-17, low = 18-30

Sacrifice Hits for MLB Teams Similar Within Leagues, Not Between Leagues

Teams joined by edge if distance between total sacrifice hits in [0, 28]

Stolen bases make up the largest proportion of total runs over 10 years. Regardless of rank, teams utilize these strategies fairly equally, with the exception of sacrifice hits, meaning they value it less to gain points than mid and low level teams.

In practice, NL teams have pitchers (who are not strong batters) hit and AL teams do not, meaning that NL teams are more likely to use sacrifice hits to make up for this. Therefore, within their respective leagues, teams use these hits in a similar fashion, but the implementation of this strategy is different between leagues.

EITHER WAY, FANS ENJOY THE GAME!

Situational Strategy Score vs. Average Attendance Rate at Home Games
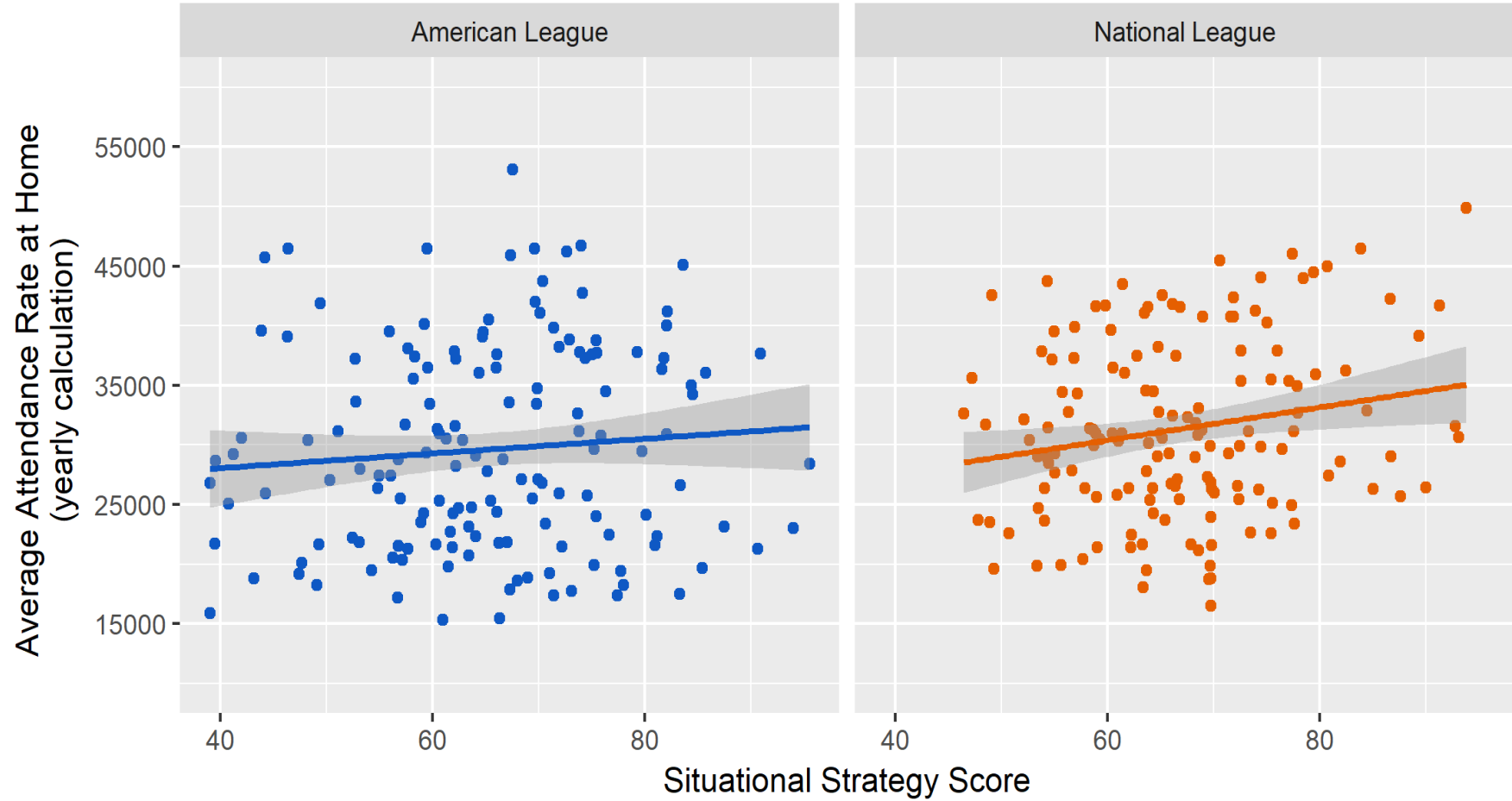
It may seem as though fans might enjoy watching a more "risky" game. However, no matter the league, the data shows that there is no correlation between the level situational risk strategy employed by each team and their average, home-game attendance levels.
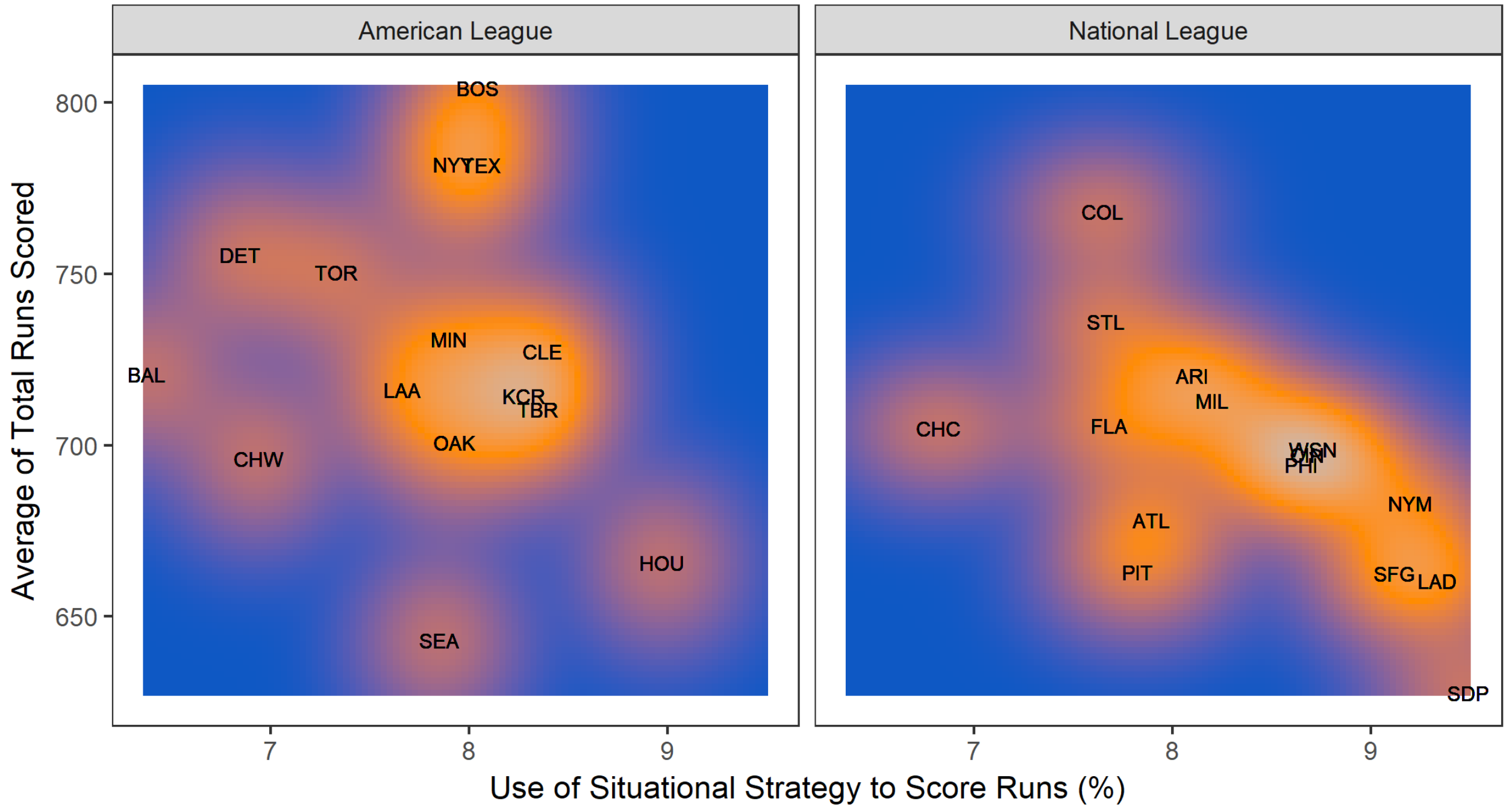
HIERARCHICAL CLUSTERING

Hierarchical Clustering of MLB Teams Based on Weighted Risk Strategy
Colored by League
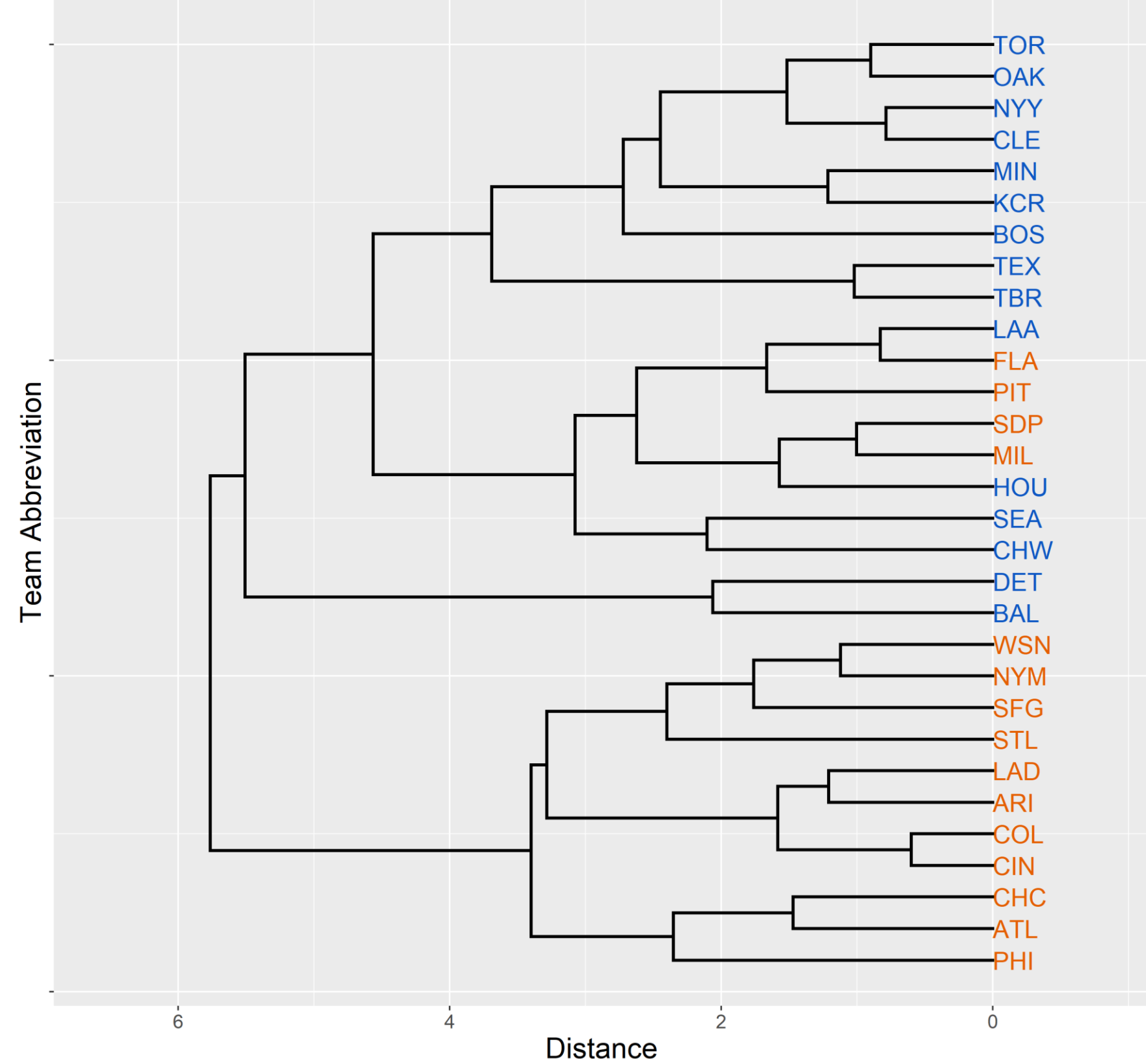
## HOW IT AFFECTS THE GAME

DOES IT WORK?

Reliance on Situational Strategy to Score Points in Lower-Scoring Teams of National League, No Pattern Among Teams of American League

Within the American League, there is no clear pattern between situational strategy usage rate and the total number of runs. However, a stronger pattern emerges for the National League; in these cases, teams that scored less runs seem to rely more on implementing situational strategies.

DOES SITUATIONAL STRATEGY MATTER?

Opposite Correlation Between Situational Strategy Usage & Average Ranking in Leagues
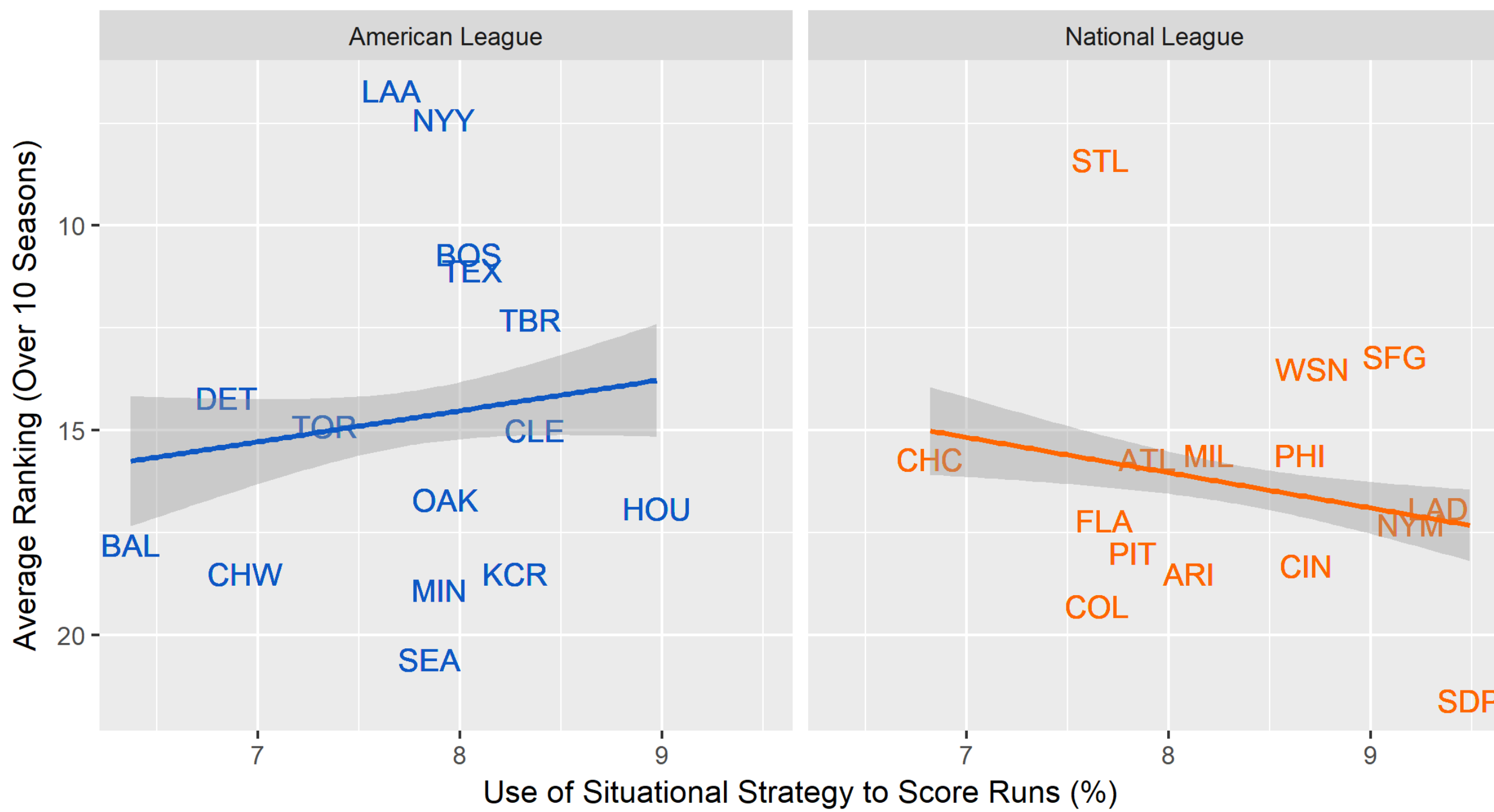
For the American League, there may be a slight correlation that shows that the more a team relies on situational strategy, the better their rank (with rank 1 being the best). Inversely, it is possibly that this trend is reversed for the National League, where we see the opposite affect. However, neither of these ideas can be proven within a 95% confidence interval.

SOURCES

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