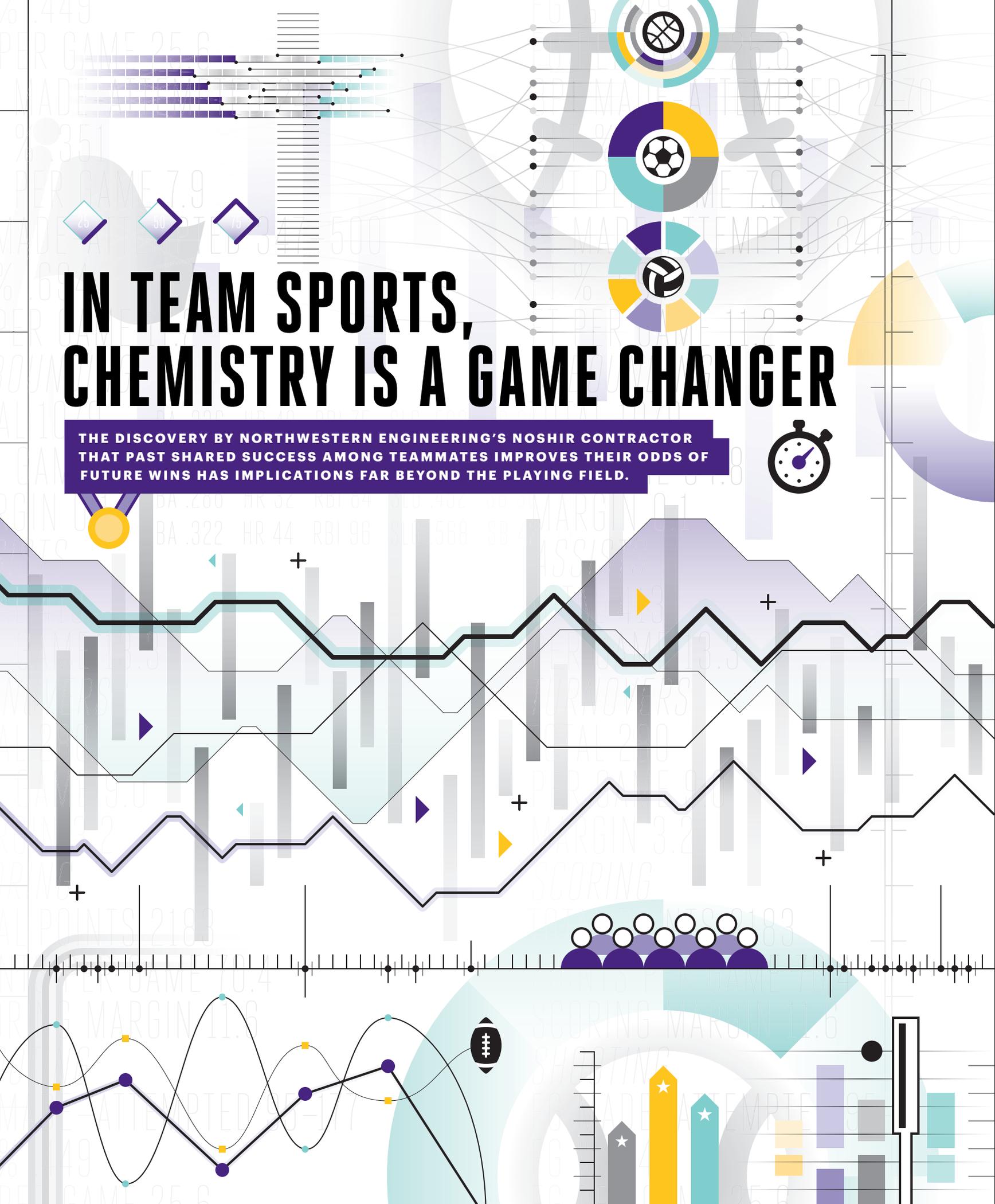


# IN TEAM SPORTS, CHEMISTRY IS A GAME CHANGER

THE DISCOVERY BY NORTHWESTERN ENGINEERING'S NOSHIR CONTRACTOR THAT PAST SHARED SUCCESS AMONG TEAMMATES IMPROVES THEIR ODDS OF FUTURE WINS HAS IMPLICATIONS FAR BEYOND THE PLAYING FIELD.





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**NOSHIR CONTRACTOR**

Jane S. and William J. White Professor of Behavioral Sciences in the McCormick School of Engineering, the School of Communication, and the Kellogg School of Management

>> When LeBron James, Dwyane Wade, and Chris Bosh signed with the Miami Heat of the National Basketball Association (NBA) as free agents in 2010, sports fans heralded the arrival of the league’s first “super team.”

Despite boasting a lineup featuring three of the league’s best players, the Heat began the 2011 season with a disappointing 9–8 record as its stars acclimated to their new roles as teammates. Looking back at the team’s inauspicious start, Northwestern Engineering’s Noshir Contractor isn’t surprised.

“Of course, individual players on a team make a difference, but so much focus is spent on finding those with the most talent,” Contractor says. “Other factors, like how people get along together or how well they trust each other, suggest that teams are defined not just as an aggregation of individuals and their attributes, but also by the relationships that existed previously among them.”

Contractor, Jane S. and William J. White Professor of Behavioral Sciences and professor of industrial engineering and management sciences in the McCormick School of Engineering, put this paradigm to the test. Teaming up with Brian Uzzi, Richard L. Thomas Professor of Leadership and Organizational Change at the Kellogg School of Management, and Satyam Mukherjee, a former post-doctoral fellow in the Northwestern Institute on Complex Systems, Contractor analyzed statistical data from professional sports leagues and online games, and found that past shared success among team members improved their odds of winning future games—results that could have implications far beyond sports.

**A FORMULA FOR SUCCESS**

“There’s a general sense in sports about the importance of team chemistry, but it’s a nebulous concept,” Contractor says.

“We wanted to be more rigorous about how we think about team chemistry. Psychology has shown that when you enjoy success together, you learn more from the experience, so we focused on players who played together on winning teams.”

The researchers studied individual player statistics from five data sets: NBA games and English Premier League soccer matches played between 2002 and 2013, Indian Premier League cricket matches from 2008 to 2012, and Major League Baseball games from 2002 to 2012. The group also studied 2011 game logs for Defense of the Ancients 2 (Dota 2), a multiplayer, team-based online battle game.

For each sport, researchers determined a team’s overall skill—the strengths of their individual players—by calculating player averages in key statistical categories, like points per game and assists per game in basketball, or goals per game and shots on goal in soccer. They also measured the number of times a pair of players were part of the same winning team, a metric they called “prior shared success.”

The group used linear regression modeling to examine the impact of a team’s past success on predicting the outcome of games during the season following each league’s data set. They found marked improvement in their predictions—between 2 and 7 percent—across each sport when prior shared success was included with the team’s overall skill compared to accounting for team skills alone.

“We looked at the results and thought, ‘Is this too good to be true?’” says Contractor, who also holds appointments in Kellogg and the School of Communication. “We even tested the robustness of the findings by using alternative measures of individual player statistics to compute skills variables, and the results held up.”

The outcome was surprising considering the distinct cultural differences between the sports that were studied. Baseball, for example, is driven by an “ethos of three”—three strikes before a player is out, three outs before an inning ends. Although the standard is unique to the American sport, the same patterns held true.

“You would think that differences that are more culturally constrained impact one-on-one team dynamics, but to find that they don’t, that our results transcend games and cultures—including a global enterprise like Dota 2—is notable,” Contractor says.

**BEYOND THE PLAYING FIELD**

While the availability of analytics made sports a natural industry to test, the insights gained from the team’s research applies in many more contexts, including business, academia, and even space travel. Contractor is currently working with NASA to study space crew simulations in hopes of better predicting the right combination of astronauts to maximize the crew’s performance and viability when teams are sent to Mars.

“Once you’ve gained as much as you can from bringing the right people together, you have to look for the next competitive advantage,” Contractor says. “Whether it’s in the workplace of the future on Earth or in deep space, understanding the relational predictors of team success is going to be very important.”

ALEX GERAGE