

NBA Network Analysis

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Research

Is it possible to analyze synergies between players and their reliances on superstar players?

Hypothesis

Teams tend to depend too much on star players in order to be successful.



NBA

- National Basketball Association (NBA).
- Professional basketball league in the United States.
- 30 teams.
- Founded in 1946.

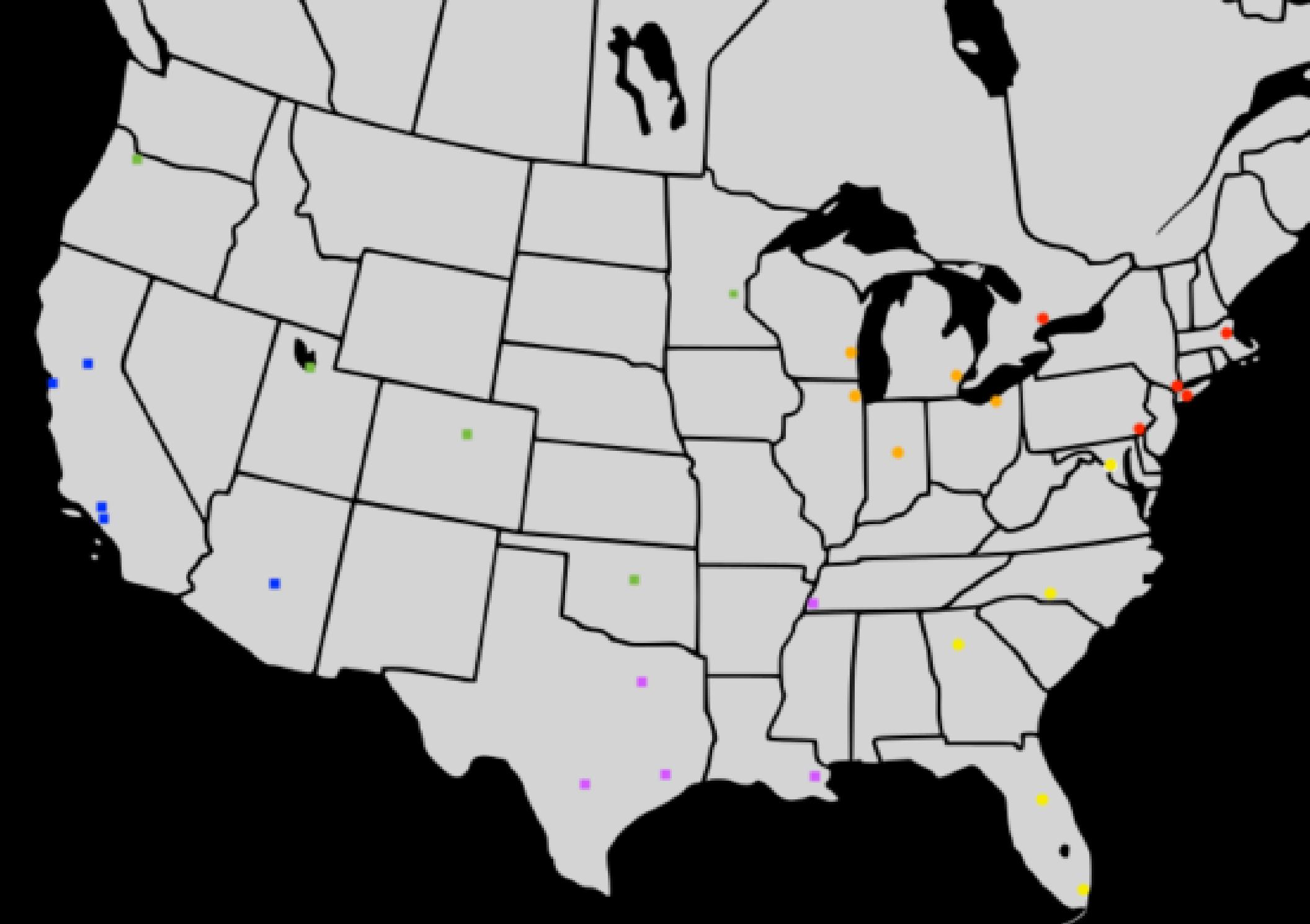


NBA API

- **nba_api** is an API Client for www.nba.com.
- This package intends to make the APIs of NBA.com easily accessible and provide extensive documentation about them.
- 136 Endpoints with Live Data Updates.
- Simple package installation for pip "pip install nba_api".

Endpoints Used

- Player.
- Teams.
- PlayerCareerStats.
- PlayByPlayV2.
- PlayerGameLog.
- LeagueGameFinder.



Data

- Player, PlayerCareerStats and PlayerGameLog provide data related Player Points, Wins, Loses, Games played.
- Teams and LeagueGameFinder provide data related to Team Wins, Loses, Games Played.
- From each of these, we made subset of data for **Los Angeles Lakers** Team for further Network Analysis.
- Where one subset is games played without a superstar, and one played with.

Our Focus



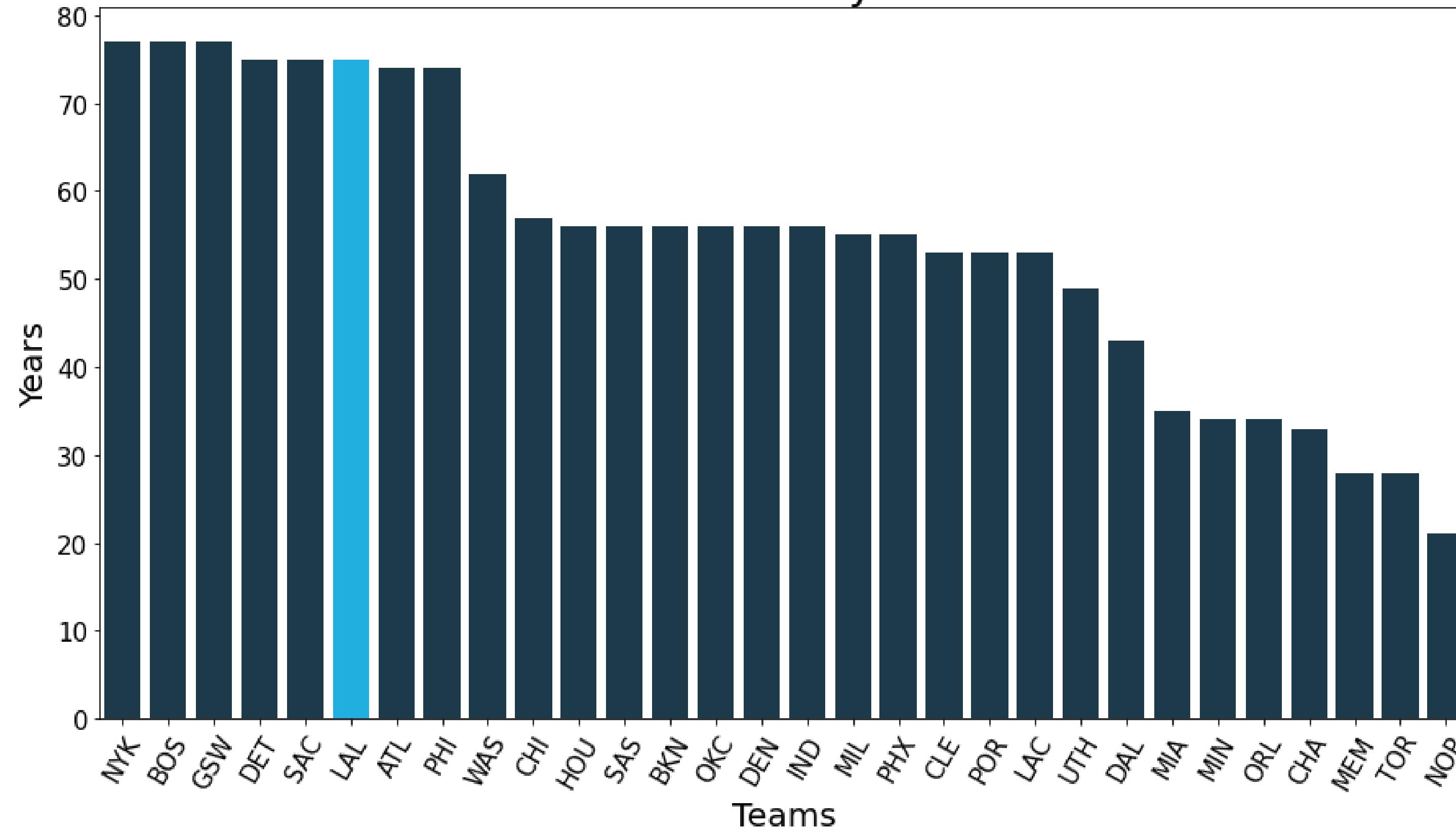
Los Angeles Lakers

- Professional basketball team.
- Founded in 1947.
- Winningest franchise in NBA history.
- Home of some of the biggest basketball figures:
 - Will Chamberlain.
 - Magic Johnson.
 - Kobe Bryant.
 - LeBron James.
 - Shaquille O'Neal.



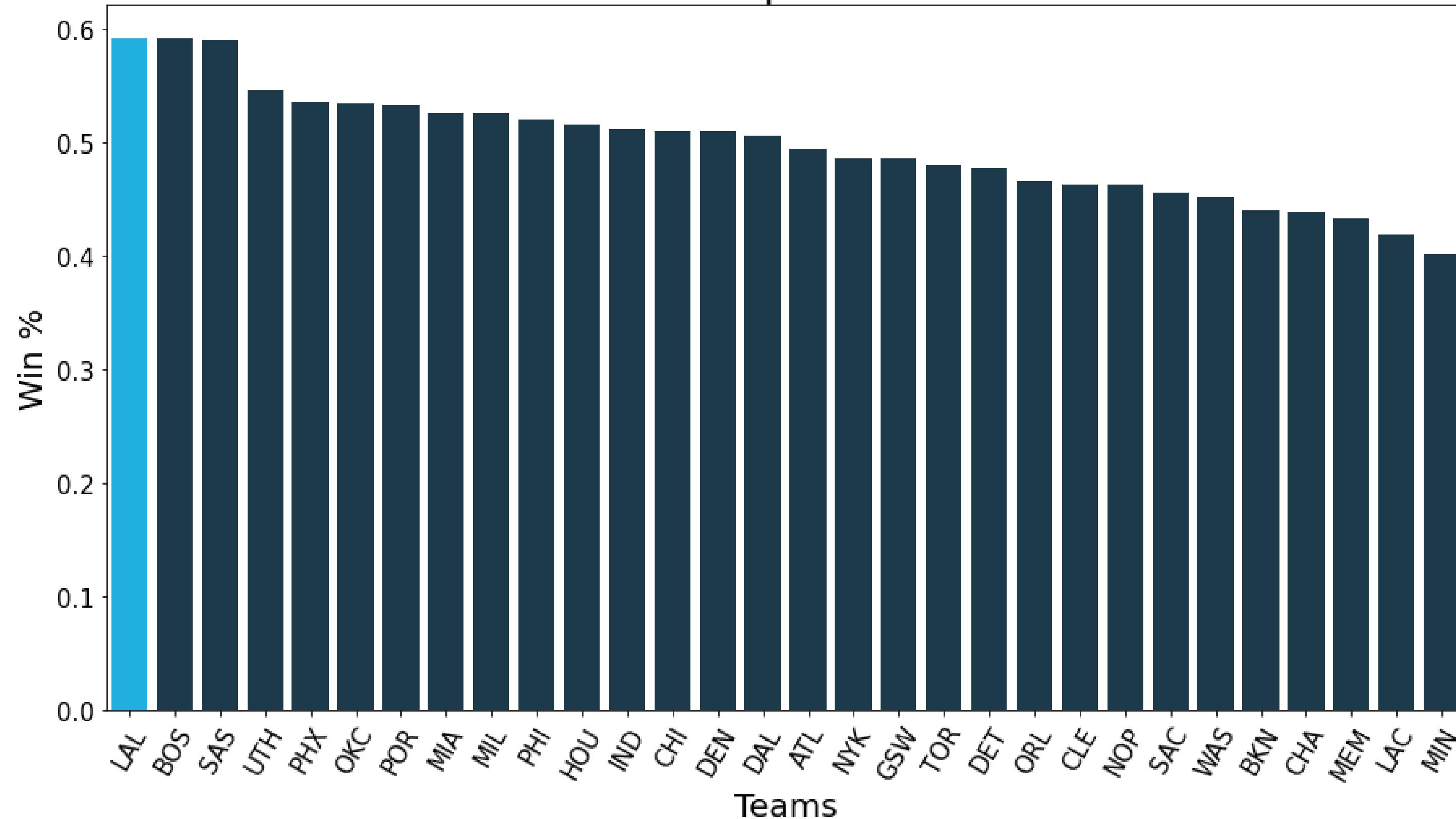
EDA

Franchise's years



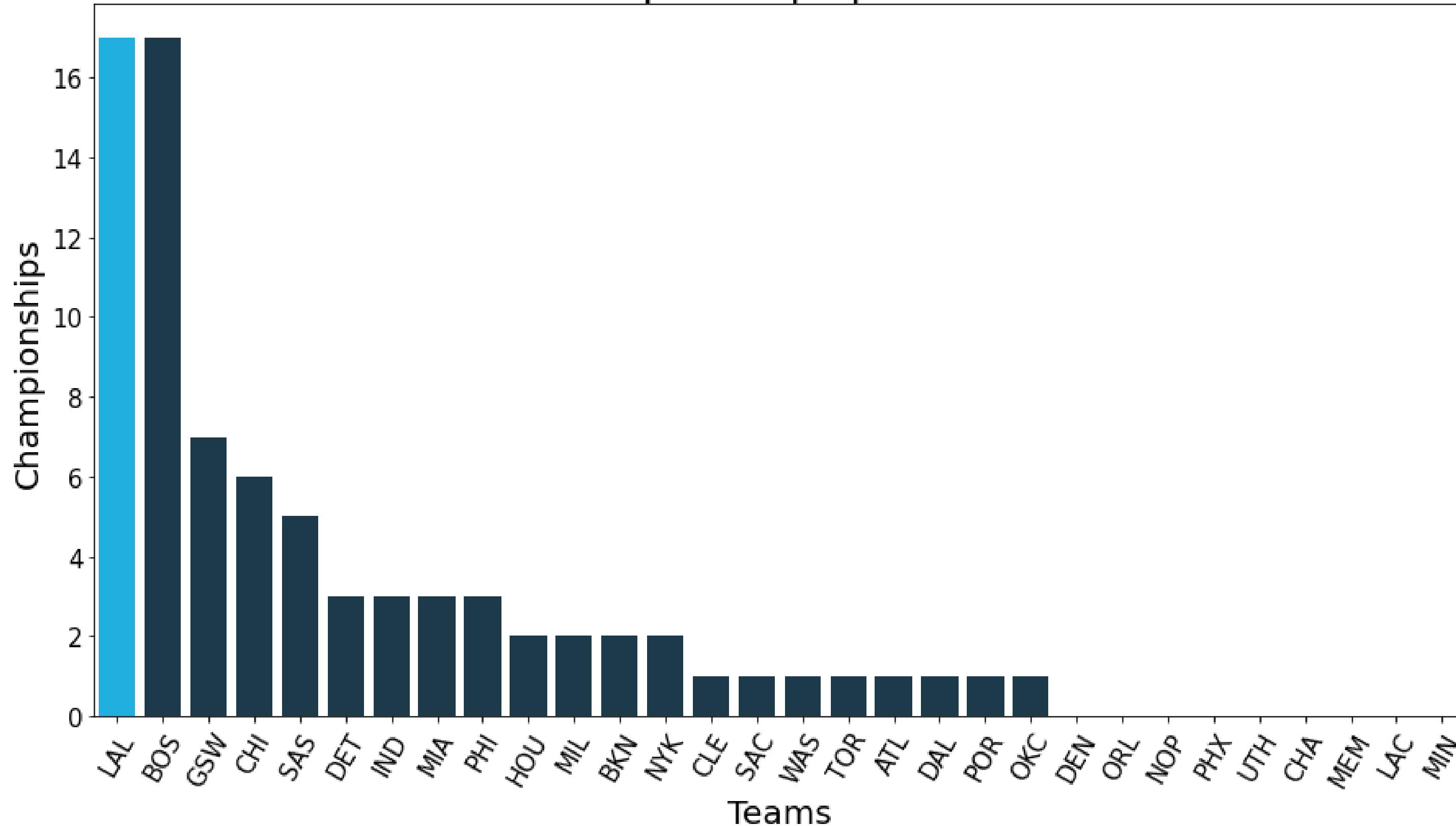
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Win % per team



EDA

Championships per team



Sports Network Analysis



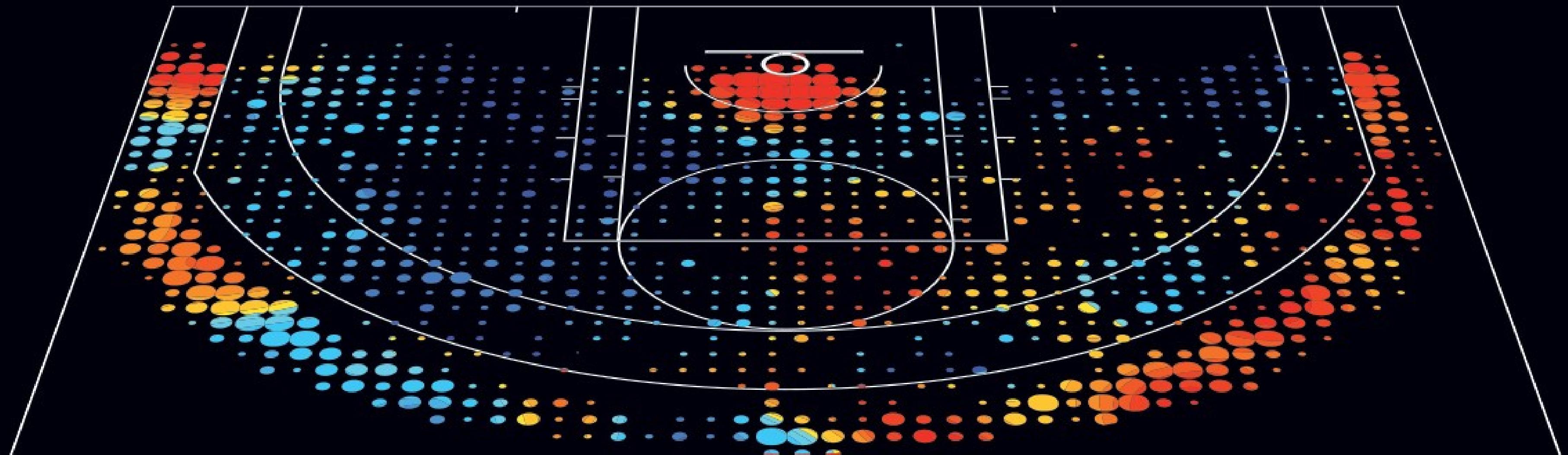
LeBron James

- NBA Superstar.
- Has been in the league for 19 years.
- Has played for: Cleveland, Miami and L.A.
- 4 x NBA Champion.
- 4 x Most Valuable player.



Basics to know

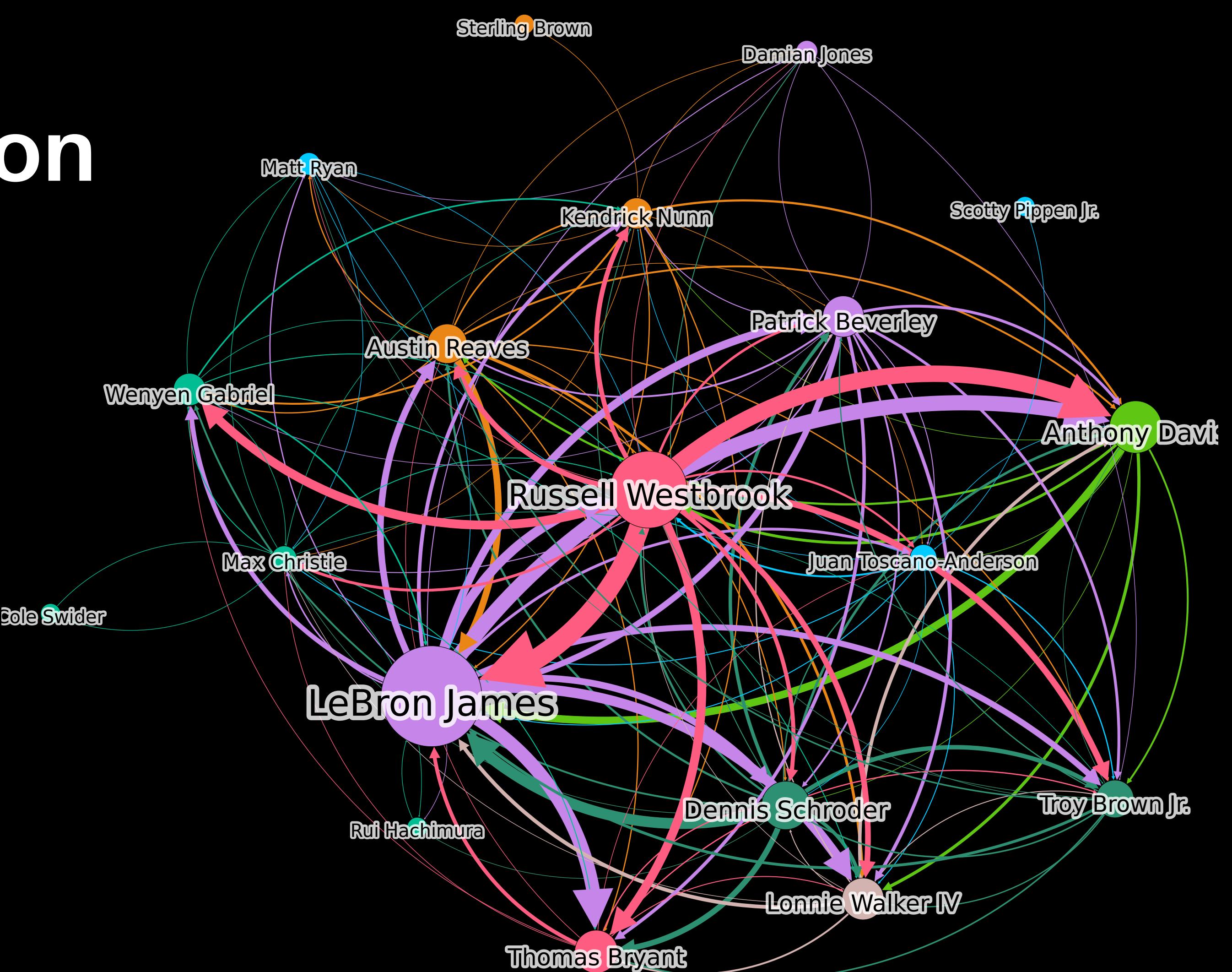
- Field goal.
- Assist.
- Scoring opportunity.



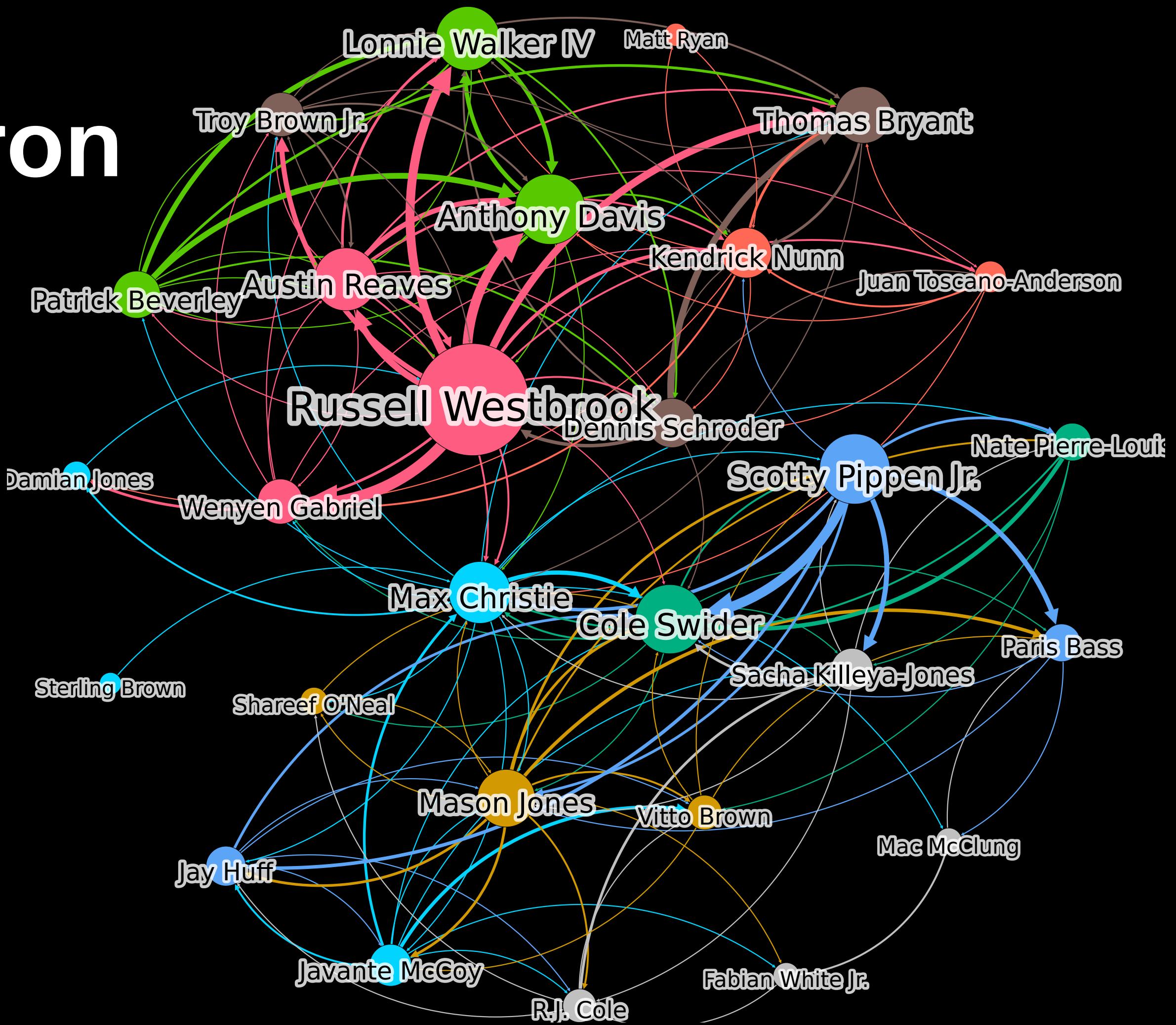
Synergy Analysis: Lakers With and Without LeBron

- Attributes: assists and field goal.
- Source node for assister and Target node for scorer.
- Weight given by recurring Source, Target event based on Field Goal made.
- Partitioned and Ranked by Weighted Degree.
- Directed Networks:
 - With: 19 nodes and 144 edges.
 - Without: 28 nodes, 154 edges.

With LeBron



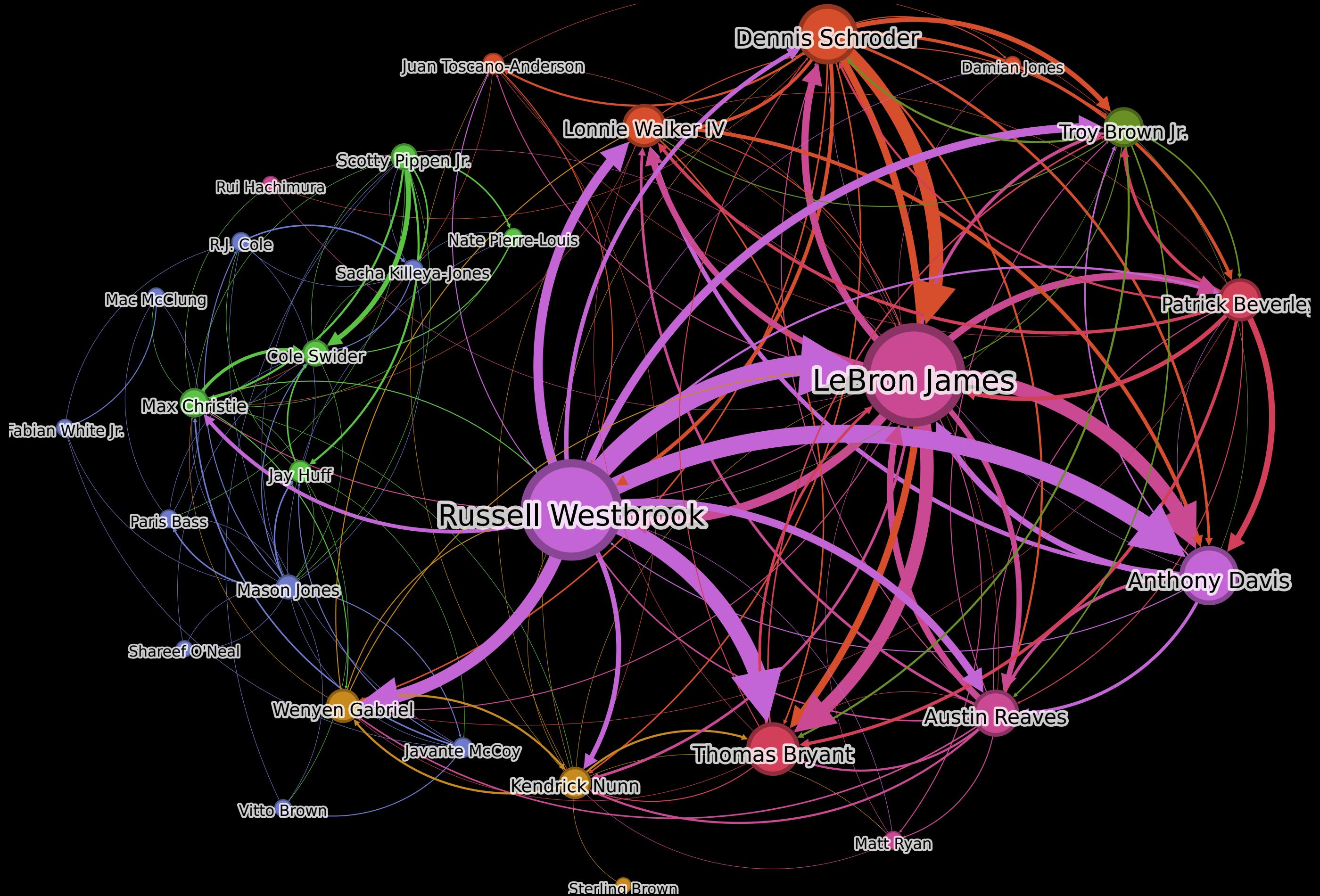
Without LeBron



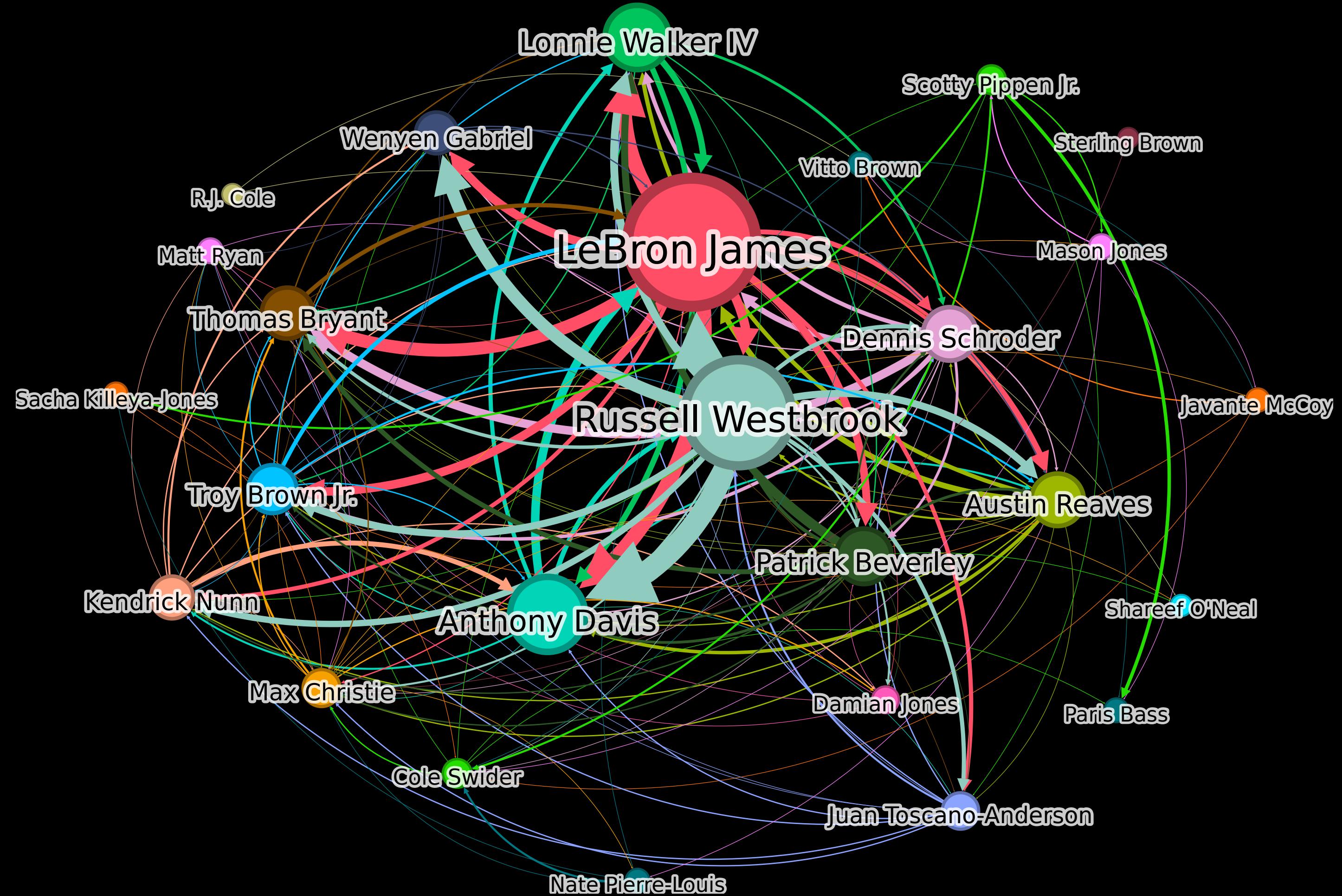
Synergy Analysis: Lakers Scoring Opportunities

- Attributes: assists and opportunities created
- Source node for passer and Target node for shooter.
- Weight given by recurring Source, Target event based on opportunity created.
- Partitioned and Ranked by Weighted Degree.
- Directed Networks:
 - With: 19 nodes and 144 edges.
 - Without: 28 nodes, 154 edges.

Won



Lost



Limitations

- Game on game analysis.
-

Further Analysis

- Game on game analysis.
-

Github Repository

Resources

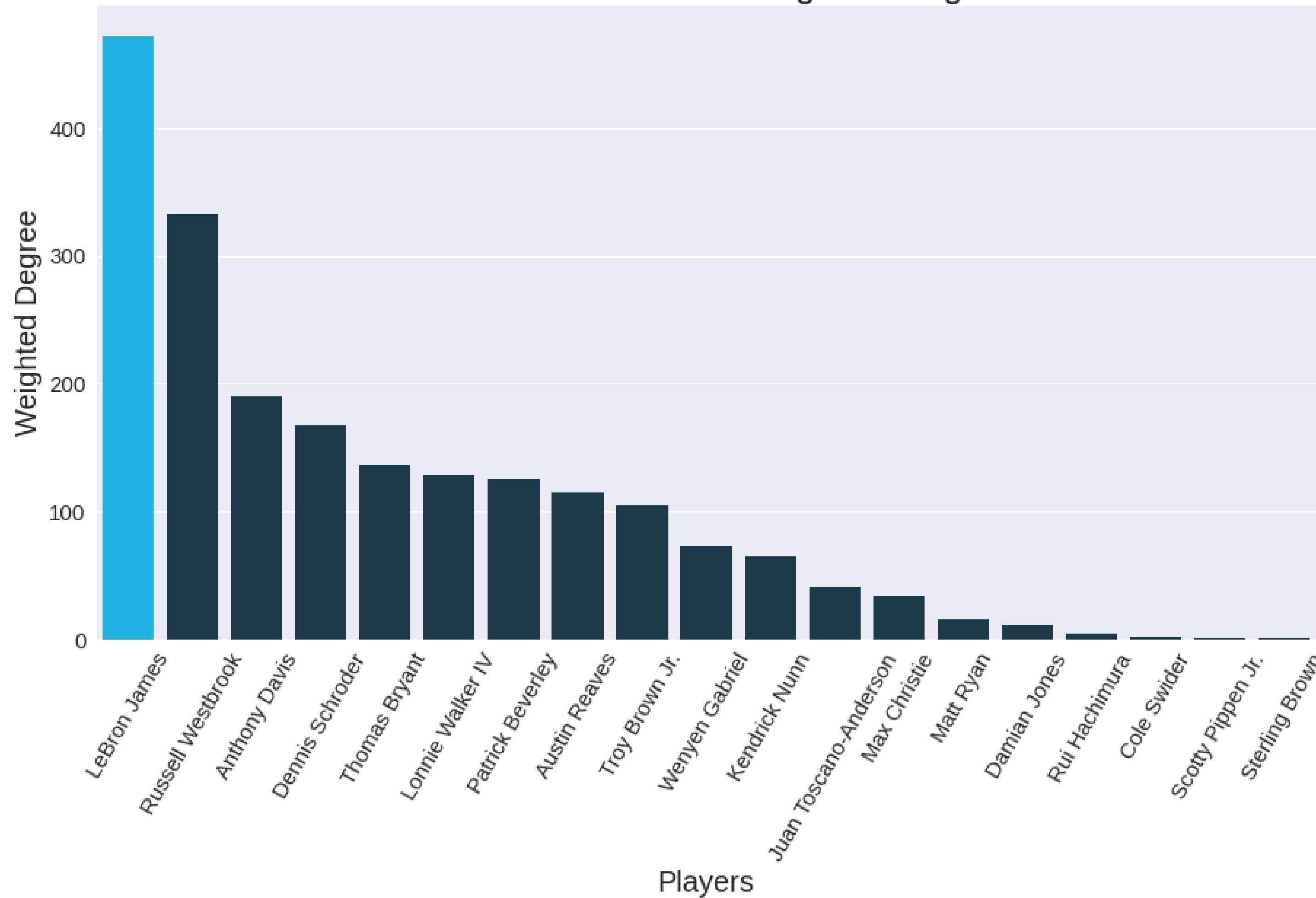
- https://github.com/swar/nba_api
- <https://www.basketball-reference.com/>
- https://www.researchgate.net/publication/316709317_Social_network_analysis_in_sport_research_an_emerging_paradigm
- https://www.researchgate.net/publication/313728507_Team_Sports_Performance_Analysed_Through_the_Lens_of_Social_Network_Theory_Implementations_for_Research_and_Practice

Thank you!

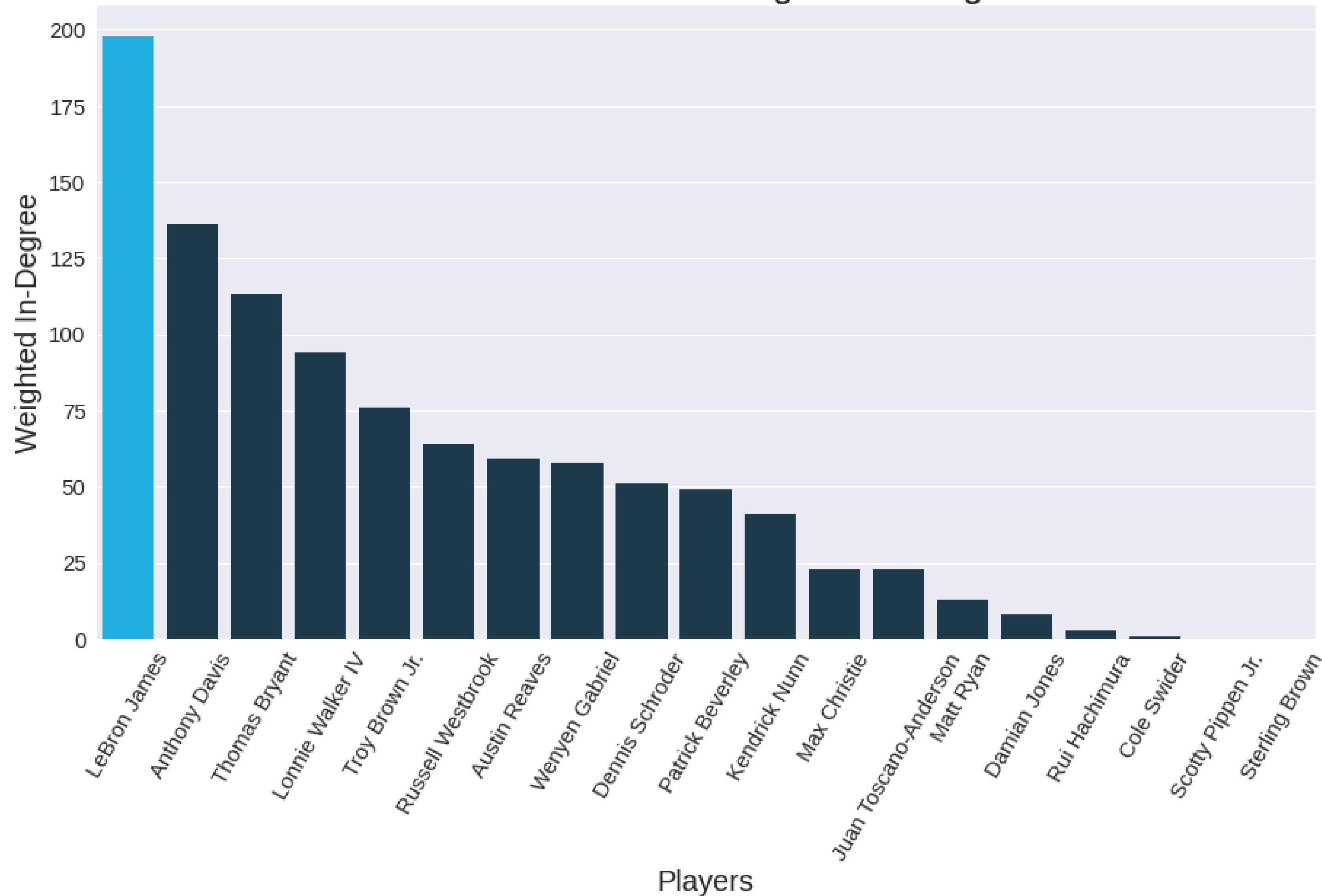


With Lebron Measures

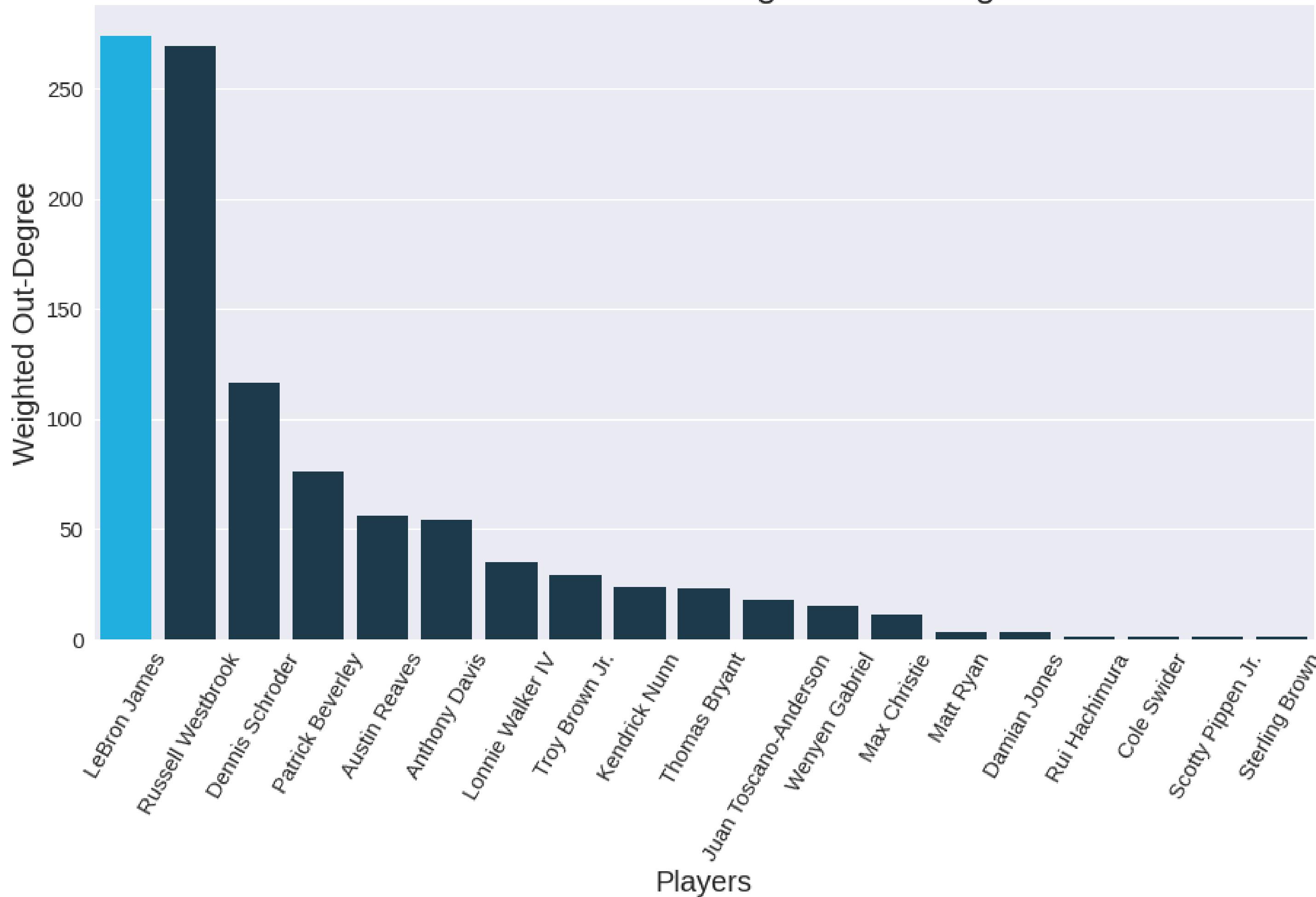
Network Measures - Weighted Degree



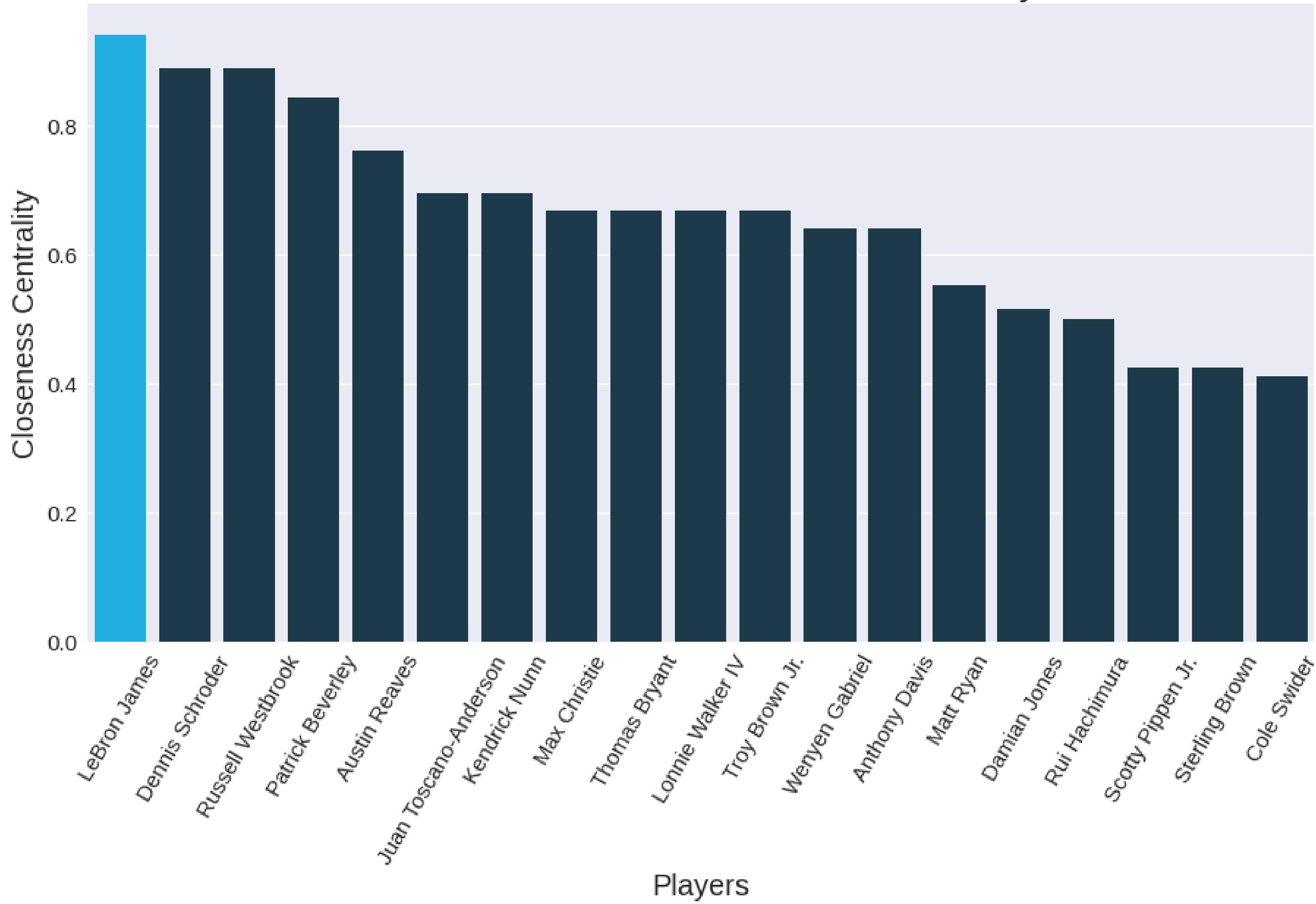
Network Measures - Weighted In-Degree



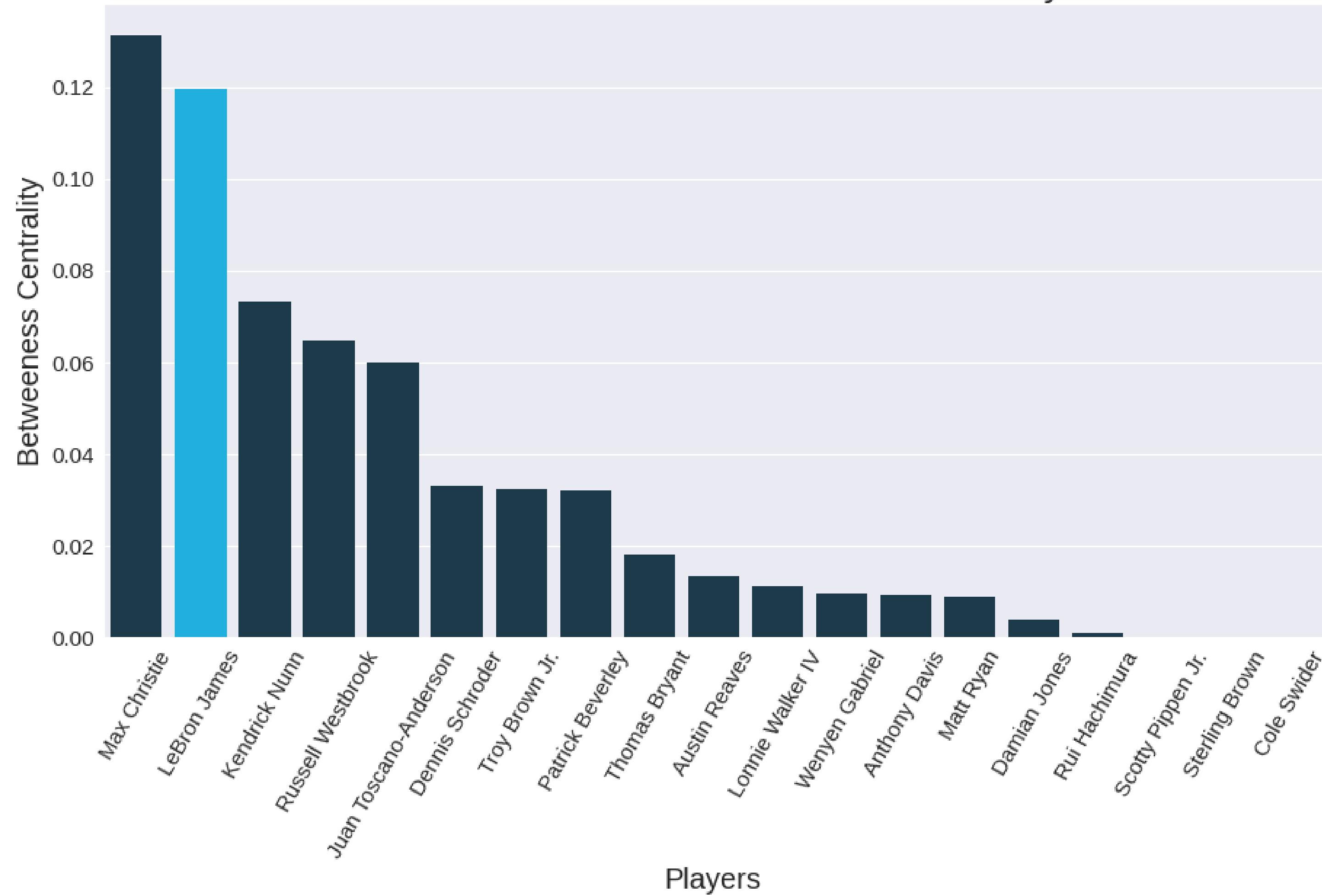
Network Measures - Weighted Out-Degree



Network Measures - Closeness Centrality

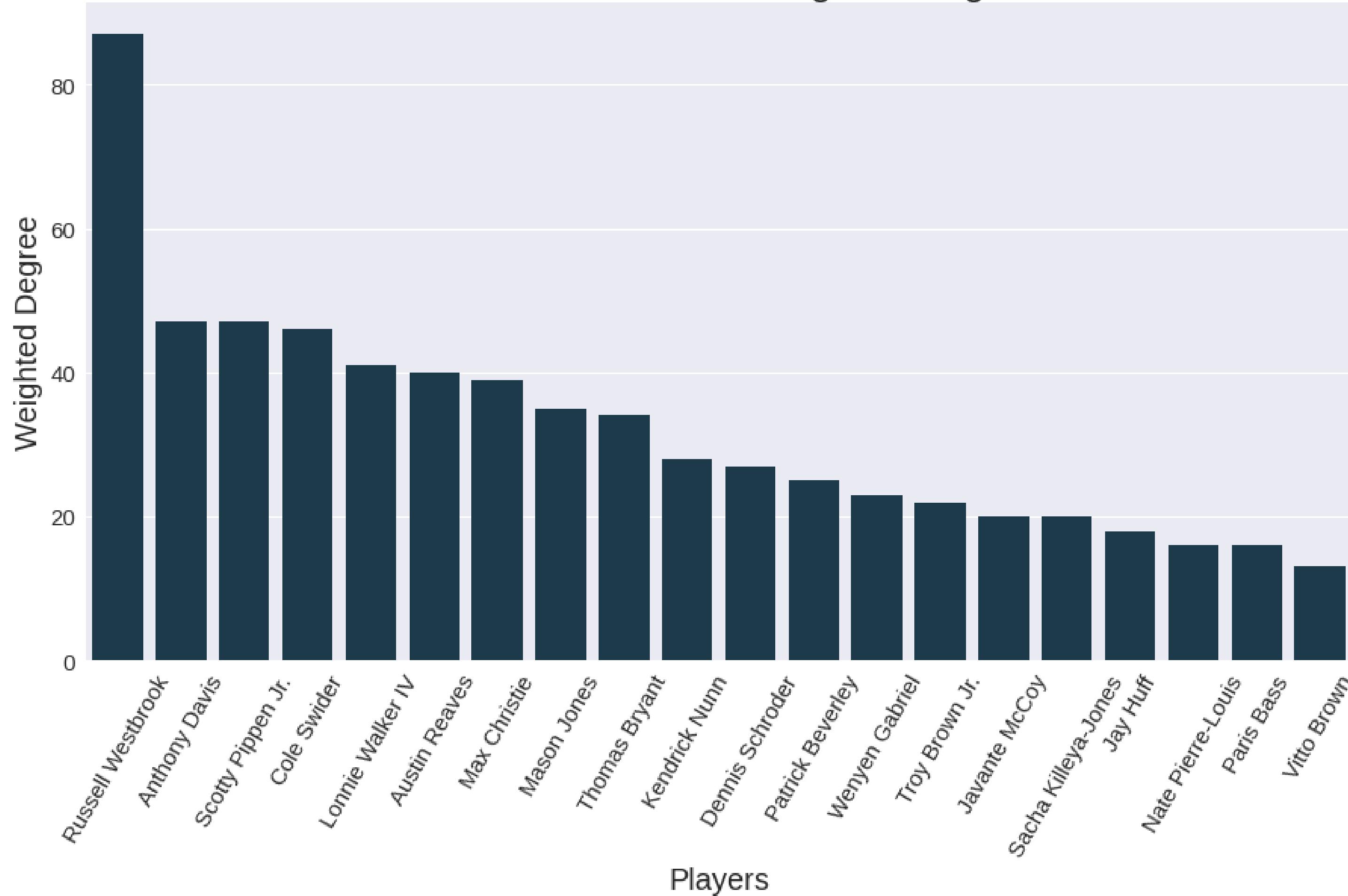


Network Measures - Betweenness Centrality

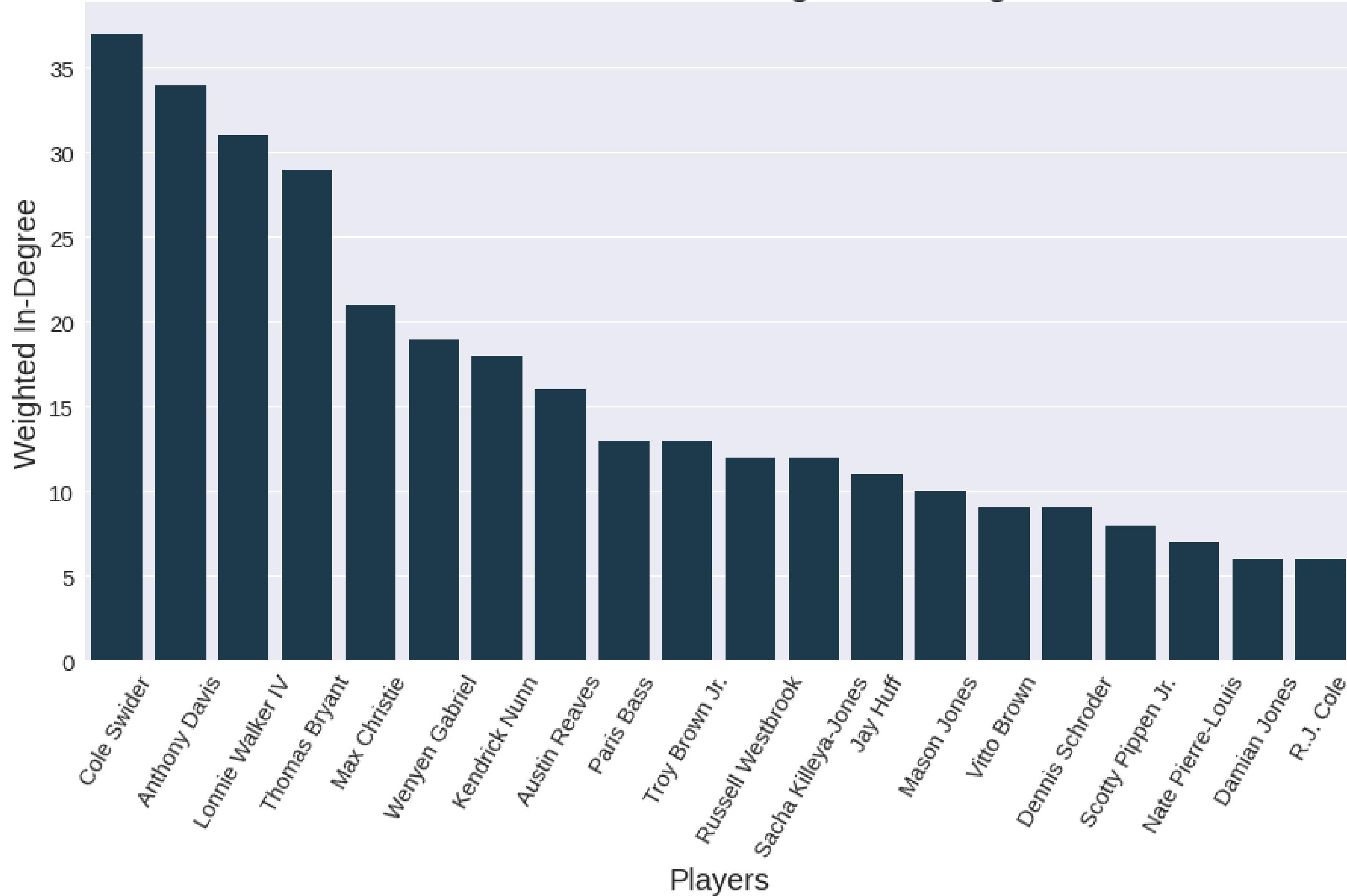


With Lebron Measures

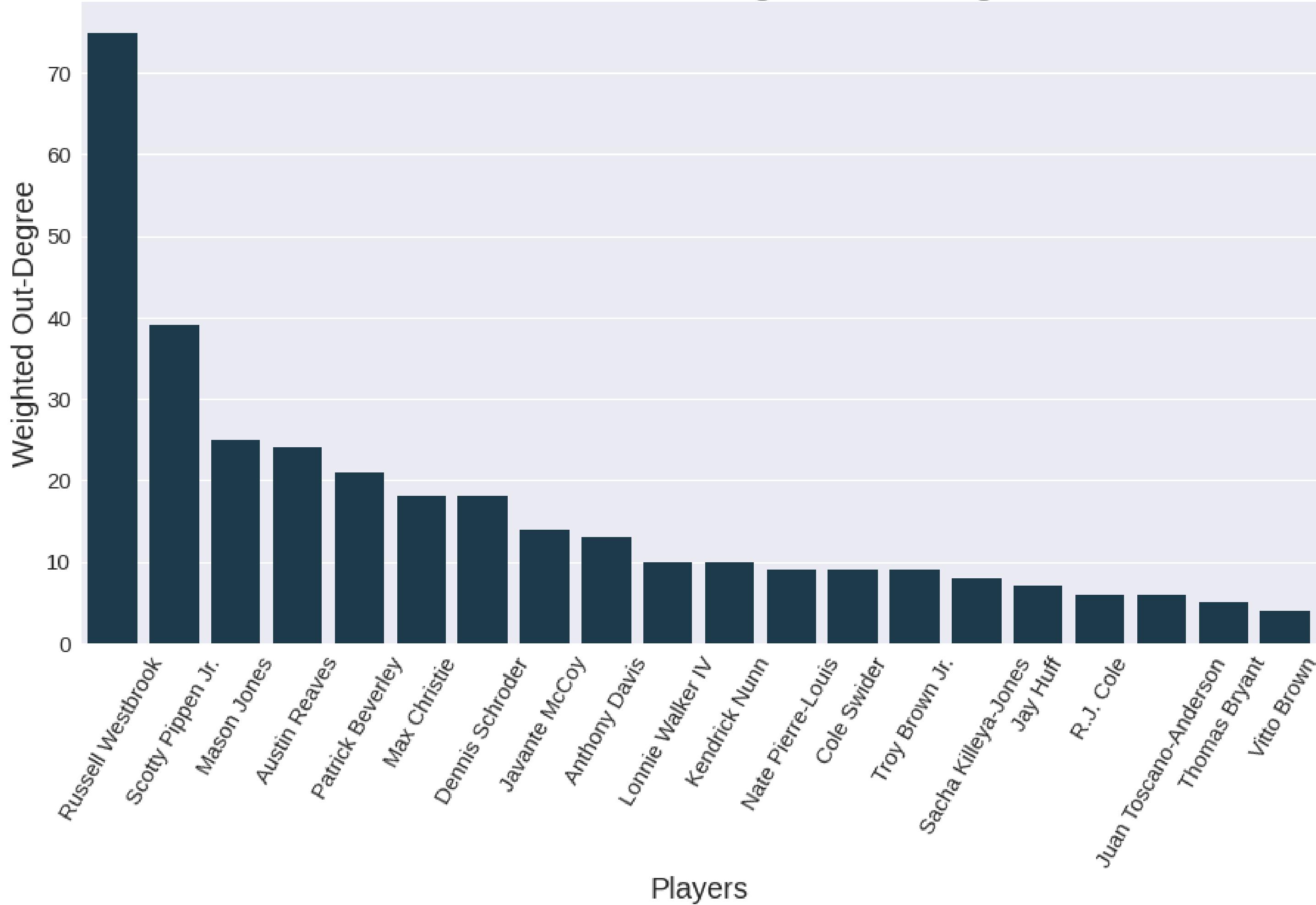
Network Measures - Weighted Degree



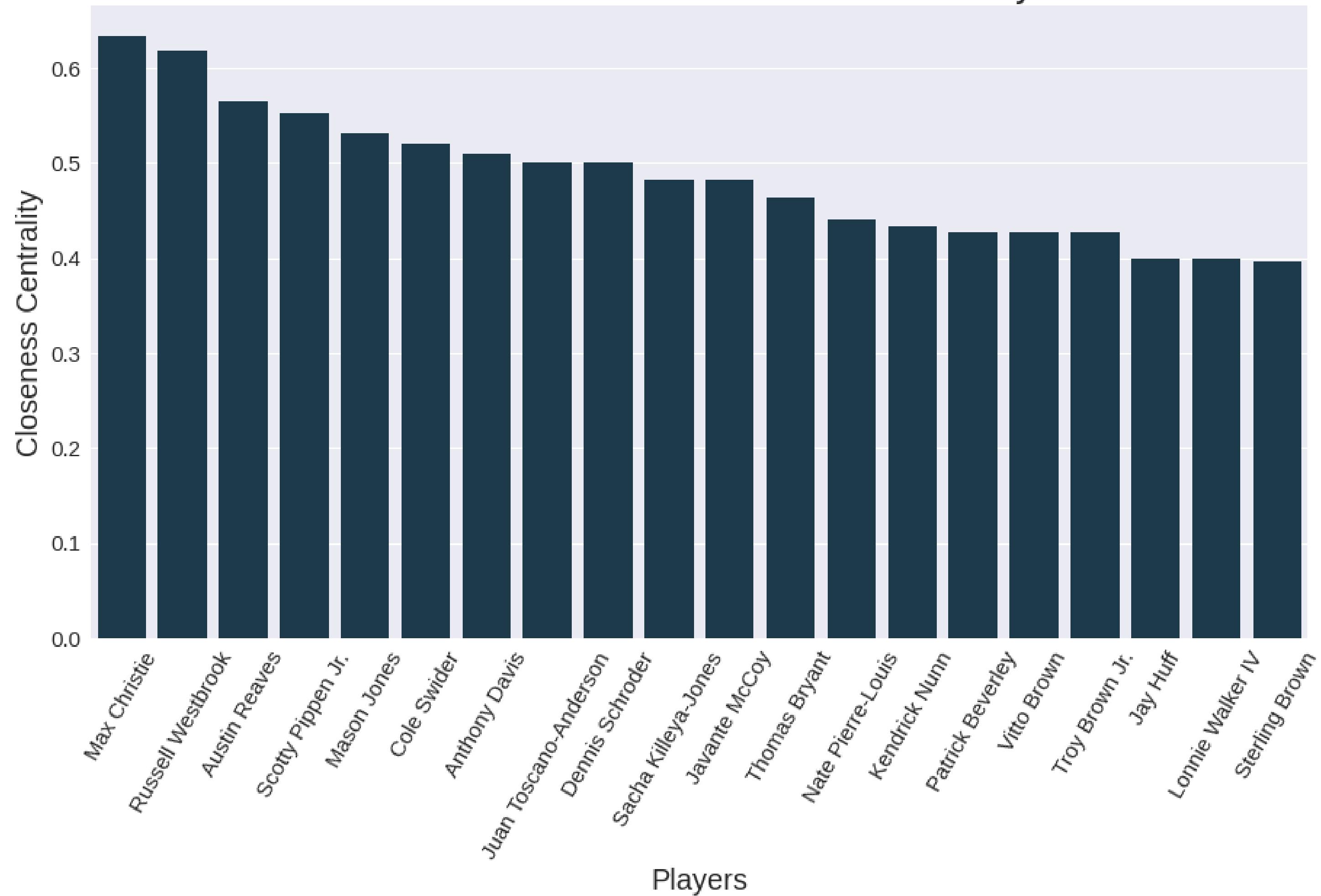
Network Measures - Weighted In-Degree



Network Measures - Weighted Out-Degree



Network Measures - Closeness Centrality



Network Measures - Betweenness Centrality

