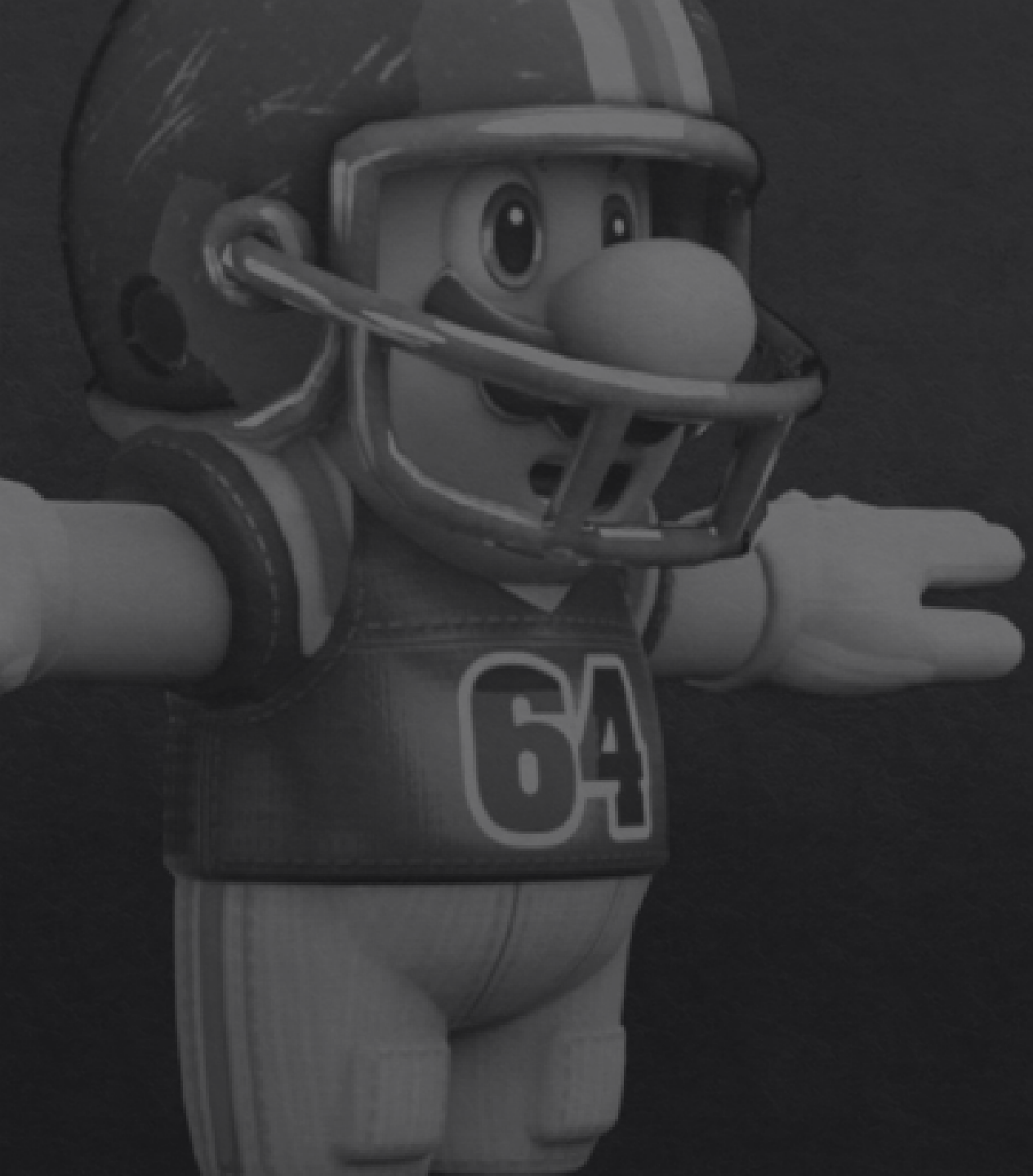
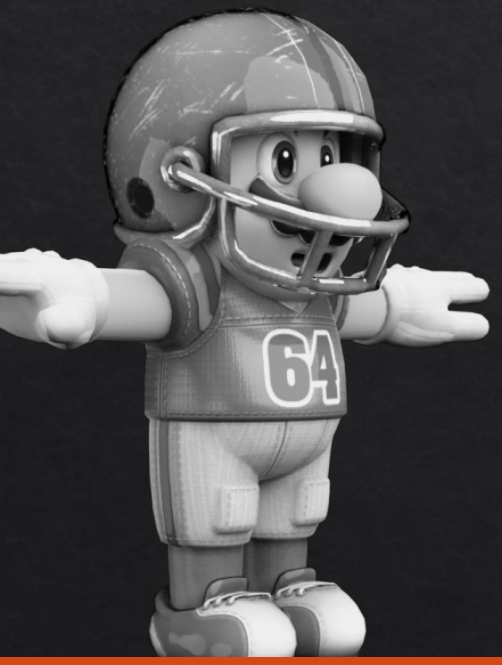
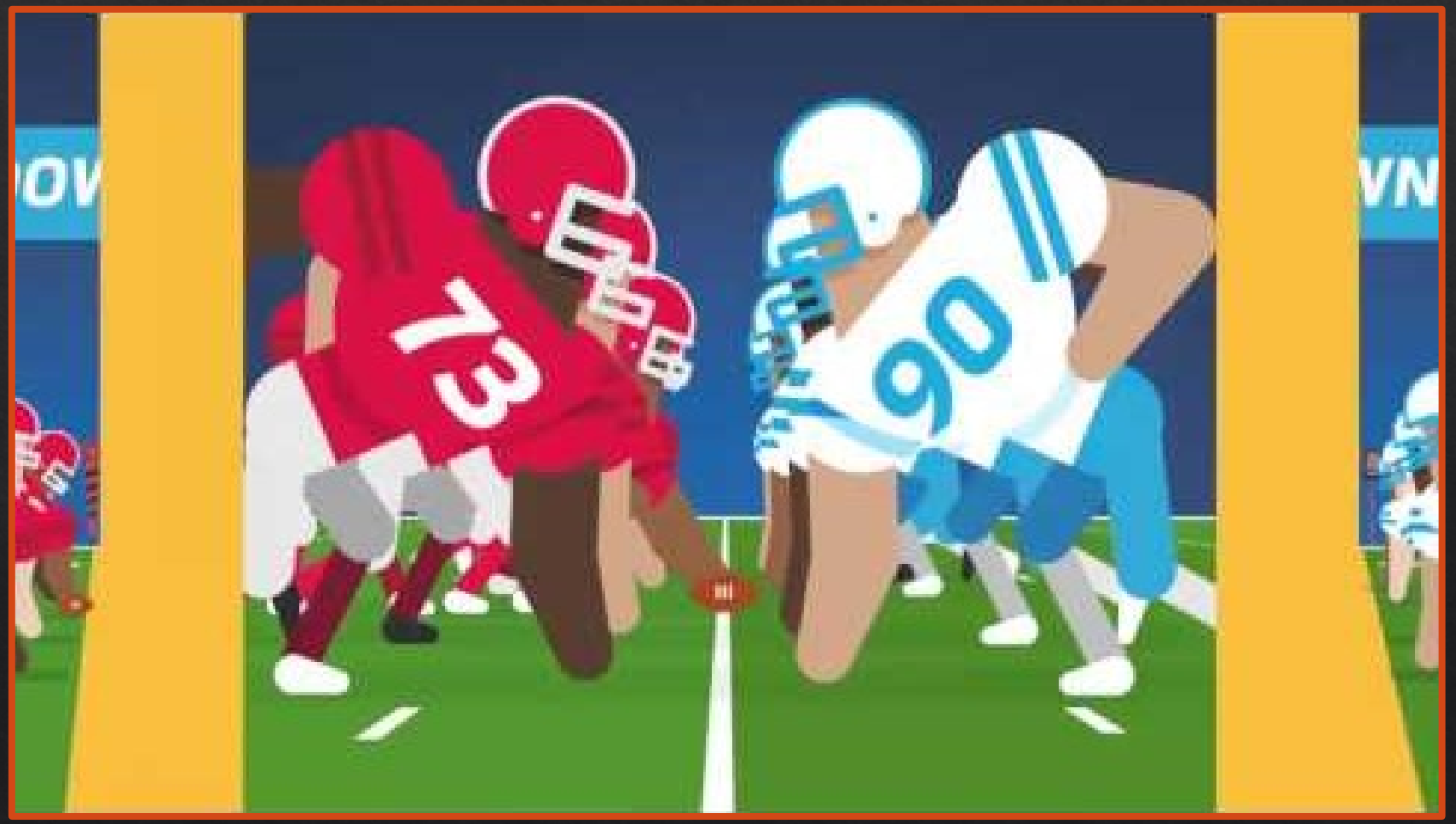


Football I

Produced by Dr. Mario | UNC STOR 538

Overview of Football



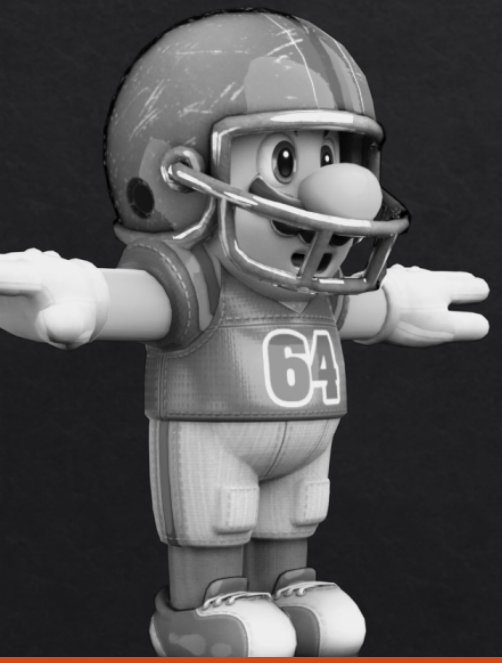


What Makes Teams Win

- Two Ways Offense Gains Yards
  - Passing
  - Rushing

YDS = Yards
ATT = Attempt

- Analysis by Bud Goode
  - Statistician from the 1960s
  - Passing YDS and Rushing YDS Not Effective
  - Showed YDS/ATT Good Predictors of Success
  - Measures of Efficiency are Better Than Counts
  - Both Passing and Rushing Attempts Use Up a Down
  - Downs in Football are Important Resources



What Makes Teams Win

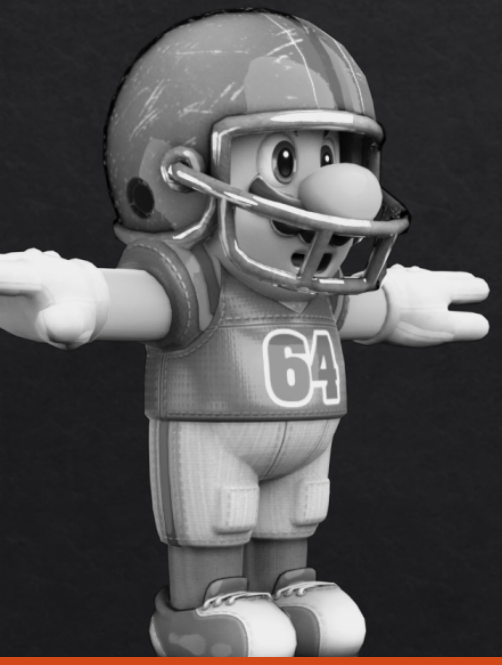
- Scoring Margin for a Team
  - Related to the Spread
  - Formula

$$Scoring\ Margin = PTS\ For\ - PTS\ Against$$

  - Positive Margin = Team Won
  - Negative Margin = Team Lost

- Offensive Predictors of the Scoring Margin
  - Passing YDS/ATT
  - Rushing YDS/ATT
  - TOs Committed

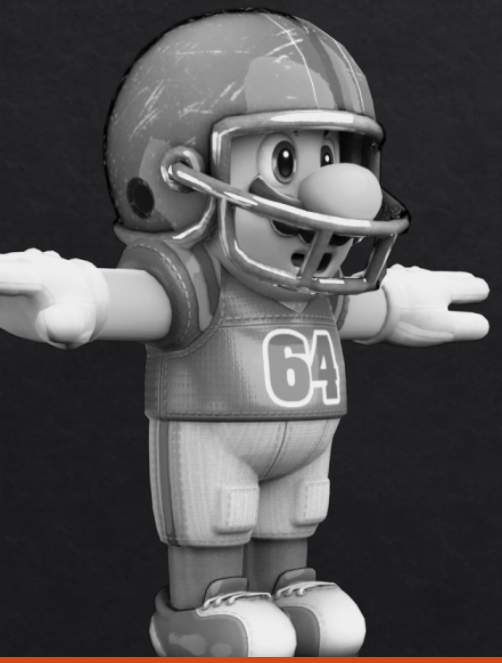
PTS = Points
YDS = Yards
ATT = Attempt
TO = Turnover



What Makes Teams Win

- Defensive Predictors of the Scoring Margin
  - Passing YDS/ATT Allowed
  - Rushing YDS/ATT Allowed
  - Defensive TOs Caused
- Differential Predictors of the Scoring Margin
  - Difference Between PEN
  - Difference Between Return TDs (Off Fumbles, Interceptions, Kickoffs, and Punts)

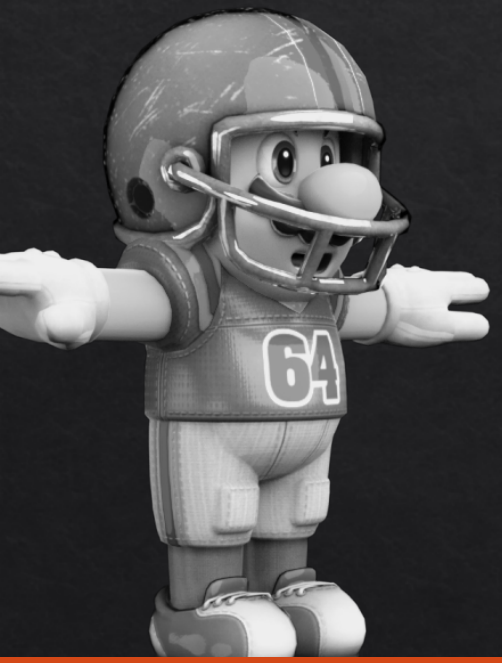
YDS = Yards
ATT = Attempts
TO = Turnover
PEN = Penalty
TD = Touchdown



What Makes Teams Win

- Regression on the Team Level
  - Covers 2003 – 2006 Seasons
  - All Predictors are Significant Except the Intercept
  - RSQ of 0.87
  - Standard Error of 35
  - Approximately 95% of the Time, the True Scoring Margin Would Be Within 70 Points

PTS = Points
YDS = Yards
ATT = Attempts
G = Games

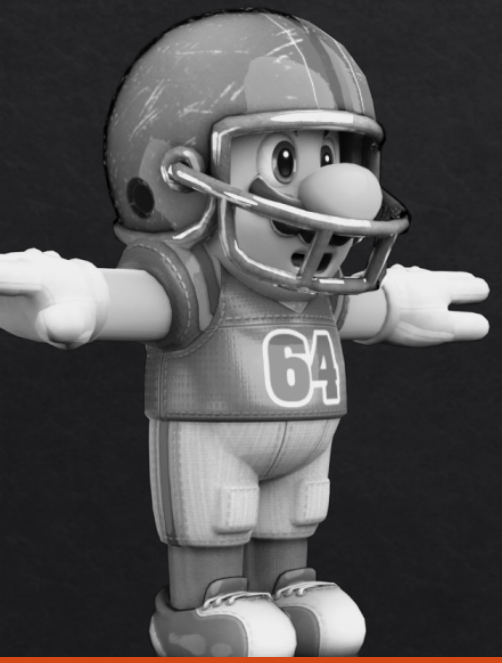


- Interesting Insight
  - Coefficients for Passing Efficiency Triple Coefficients for Defensive Efficiency
  - Extra Passing YDS/ATT Worth 61.67 PTS (+3.85 PTS/G)
  - Extra Rushing YDS/ATT Worth 26.44 PTS (+1.65 PTS/G)
  - What is the Problem with This Interpretation?

Based on 16 Game Season

What Makes Teams Win

Correlation Matrix of Predictors



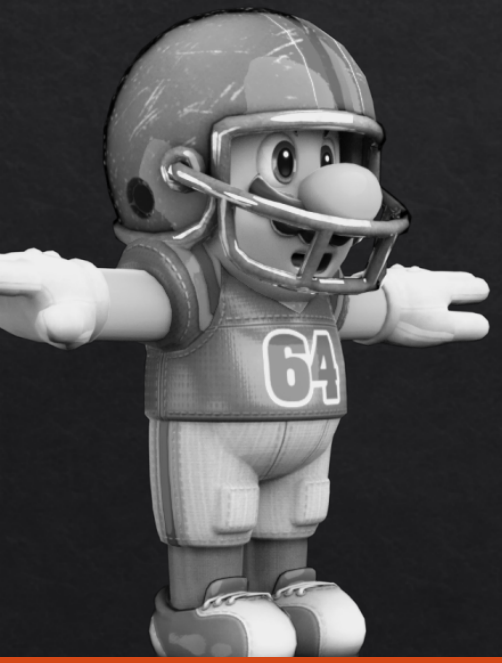
	Returned for TD	Penalty Differential	OFF Pass Yds. per Att.	OFF Rush Yds. per Att.	OFF Turnovers	DEF Pass Yds. per Att.	DEF Rush Yds. per Att.	DEF Turnovers
Returned for TD	1	–0.10949	0.07646	0.15469	–0.31181	–0.21578	–0.08204	0.37086
Penalty Differential	–0.10949	1	–0.17464	–0.03113	0.13023	0.06286	–0.1739	–0.10505
OFF Pass Yds. per Att.	0.07646	–0.17464	1	0.0999	–0.44827	0.01083	0.17965	0.15363
OFF Rush Yds. per Att.	0.15469	–0.03113	0.0999	1	–0.31013	0.06501	0.09502	–0.03066
OFF Turnovers	–0.31181	0.13023	–0.44827	–0.31013	1	–0.02521	–0.09825	–0.13314
DEF Pass Yds. per Att.	–0.21578	0.06286	0.01083	0.06501	–0.02521	1	0.2759	–0.29984
DEF Rush Yds. per Att.	–0.08204	–0.1739	0.17965	0.09502	–0.09825	0.2759	1	–0.14402
DEF Turnovers	0.37086	–0.10505	0.15363	–0.03066	–0.13314	–0.29984	–0.14402	1

What Makes Teams Win

- Modified Regressions for Scoring Margin
  - Regression Based ONLY on Passing Info (RSQ = 0.7)
  - Regression Based ONLY on Rushing Info (RSQ = 0.06)

- Impact of Turnovers
  - Offensive TOs Worth 3.7 Points
  - Defensive TOs Worth 3.4 Points
  - Overall, TO Worth Approximately 3.55 Points

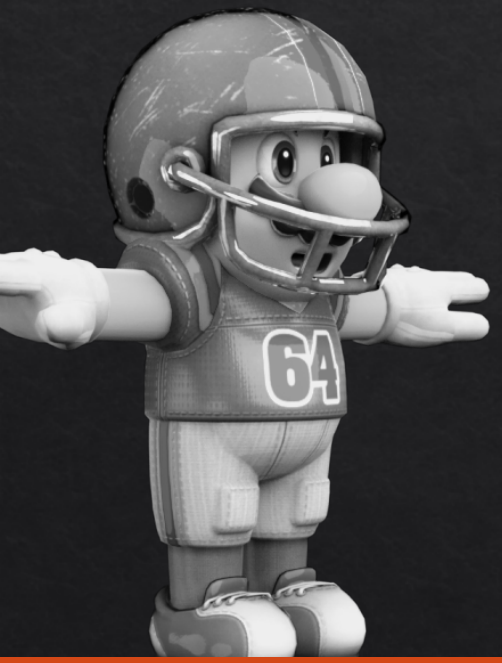
TO = Turnover

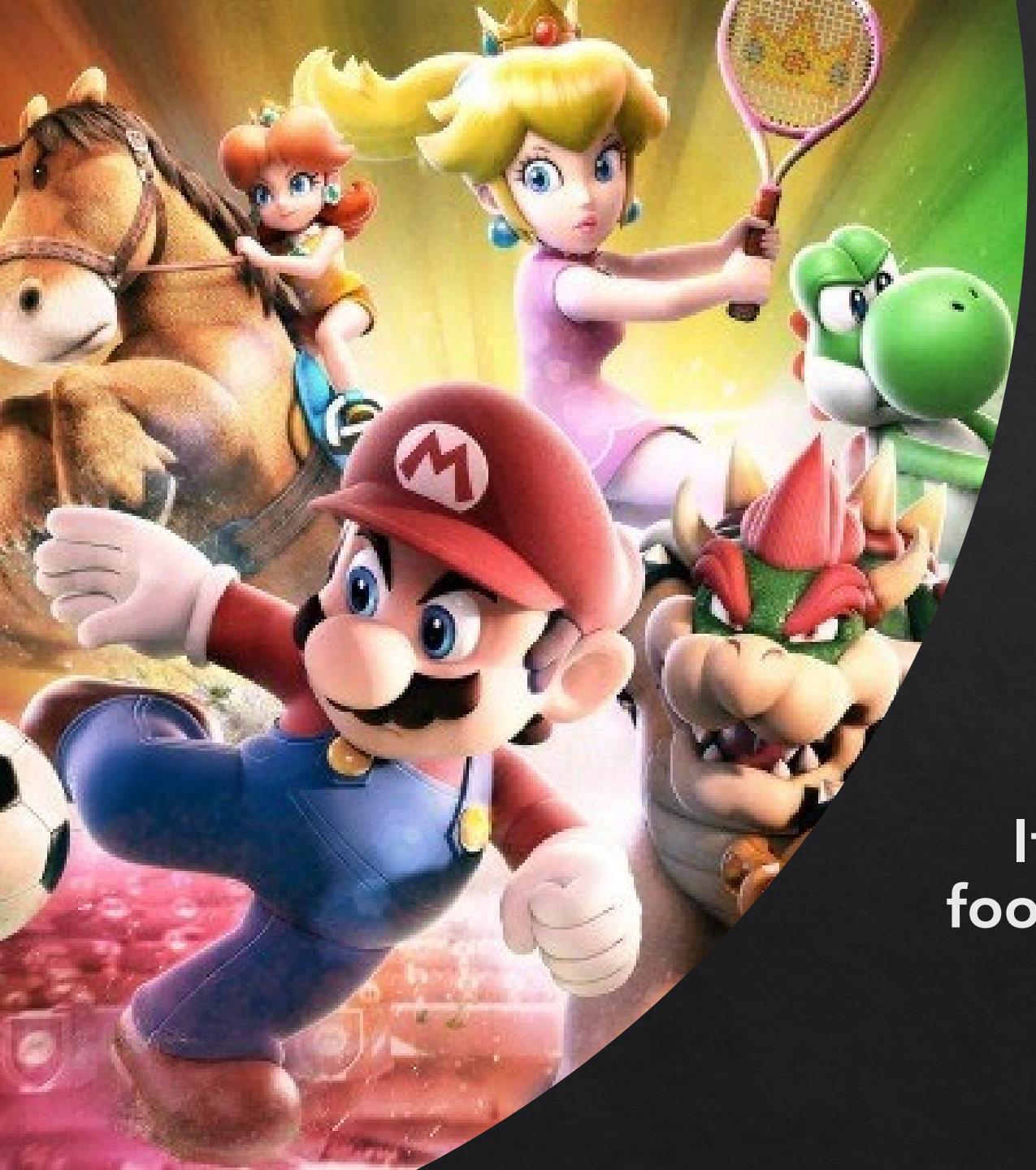


What Makes Teams Win

- Relationship Between Passing and Rushing Stats
  - Correlation of 0.10 Between Passing YDS/ATT and Rushing YDS/ATT
  - Many Believe Rushing Improves the Passing
  - Contradicts the Actual Seasonal Data
  - Why Low Correlation? Possibly Due to Payroll Decisions

YDS = Yards
ATT = Attempt





Final Inspiration

If you don’t remember if you played football, you probably played football.

- Mahatma Mario