

**SABR XXIV
ARLINGTON, TEXAS**

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**SPEED, STRIKEOUTS, (BASE
ADVANCEMENT), AND SCORING**

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INTRODUCTION

- ◆ INVESTIGATE EFFECTS ON SCORING OF
 - FAST RUNNERS
 - TEAM STRIKEOUTS
 - ADVANCING RUNNER FROM 2nd TO 3rd

- ◆ PRIMARY RESEARCH TOOL: MARKOV PROCESS MODEL
 - BASED ON TRANSITION PROBABILITIES BETWEEN THE RUNNERS & OUTS SITUATIONS
 - USES MATRIX ALGEBRA TO COMPUTE ALL POSSIBILITIES
 - FAST ALTERNATIVE TO SIMULATION
 - CALCULATES LONG-TERM AVERAGE RUNS PER GAME FOR A SPECIFIED LINEUP
 - APPLICATIONS:
 - * EFFECTS OF PLAYER PERFORMANCE ON SCORING
 - * STRATEGY ANALYSIS
 - * FINDING THE BEST BATTING ORDER

KEY ASSUMPTIONS

- ◆ PLAYERS HIT THE SAME IN ALL SITUATIONS EXCEPT WALK FREQUENCY ADJUSTED FOR RUNNERS & OUTS SITUATIONS, PITCHER BATTING NEXT
- ◆ ADVANCEMENT ON HITS AND OUTS BASED ON BATTER HAND AND RUNNER SPEED (1984-92 DATA)
- ◆ DOUBLE PLAYS, REACHING ON ERRORS BASED ON BATTER HAND, BATTER AND RUNNER SPEEDS (84-92)
- ◆ WP, PB, BALKS ACCORDING TO 1984-92 ML AVERAGES
- ◆ SB ATTEMPTS WITH RUNNER ON FIRST ONLY
- ◆ SACRIFICE BUNT TRIES BY PITCHERS ONLY

SPEED: RICKEY HENDERSON IN 1990

◆ MVP IN 1990

◆ 1990 PERFORMANCE AND ALTERNATIVES

	BA	OBP	SLG	HR	SB	CS	SB %
1990	.325	.439	.577	28	65	10	.87
RICKEY+	.325	.439	.577	28	108	19	.85
"CECIL"	.325	.439	.577	28	0	0	
"VINCE"	.292	.340	.400	6	65	10	.87

◆ STUDY METHOD: USE MODEL TO GET 1990 OAKLAND SCORING WITH EACH OF THE 4 ALTERNATIVES AS LEADOFF BATTER

- USE 1990 AS THE BASELINE
- COMPARE SCORING RESULTING FROM THE OTHER 3
- LINEUP:

LEADOFF (4 ALTERNATIVES)

LANSFORD

CANSECO

McGWIRE

D. HENDERSON

STEINBACH

JOSE

WEISS

GALLEGO

SPEED AND SCORING ANALYSIS RESULTS

◆ SCORING COMPARISON TO 1990 BASELINE

	<u>RUNS/GAME</u>	<u>RUNS/162 GAMES</u>
RICKEY+	0.018	2.9
"CECIL"	-0.080	-12.9
"VINCE"	-0.464	-75.2

- ◆ EXTRA 43 SB, 9 CS HAS LITTLE EFFECT (RICKEY+)
- ◆ SLOW RUNNER, NO SB TRIES WOULD COST 1 GAME PER SEASON ("CECIL") BASED ON 10 RUNS PER WIN
- ◆ RICKEY'S BATTING PERFORMANCE WORTH 7-8 WINS COMPARED TO "VINCE"

STRIKEOUTS: 1991 TIGERS

- ◆ SET AL RECORD FOR TEAM Ks IN A SEASON: 1185

- ◆ METHOD OF ANALYSIS: COMPARE MODEL ESTIMATES OF TEAM SCORING AT VARIOUS LEVELS OF STRIKEOUTS
 - USE 1991 FULL SEASON STATS (PHILLIPS, WHITAKER, TRAMMELL, FIELDER, TETTLETON, FRYMAN, DEER, INCAVIGLIA, CUYLER) AS THE BASELINE

 - SCALE BACK Ks TO 747 (TWINS Ks, LOWEST IN ML)

 - NO STRIKEOUTS AT ALL

 - ALSO ESTIMATE TWINS SCORING WITH 1185 Ks

- ◆ SCORING COMPARISONS TO BASELINE (ASSUMES ONLY CHANGE IS IN NUMBER OF STRIKEOUTS)

	RUNS/GAME	RUNS/162 GAMES
TIGERS: 747 Ks	0.106	17.2
TIGERS: 0 Ks	0.294	47.6
TWINS: 1185 Ks	-0.123	-19.9

BASE ADVANCEMENT: RUNNER ON 2nd, 0 OUTS (2,0)

◆ USE TEAM CONSISTING OF ALL THE SAME BATTER

- AL 1993 AVERAGE (LEAGUE TOTALS/14/9)
- RICKEY HENDERSON IN 1990

	BA	OBP	SLG	HR	K	SB	CS
AL 93 AVG	.267	.337	.408	16	103	12	7
RICKEY 1990	.325	.439	.577	28	60	65	10

◆ COMPARE TO BASELINE SCORING LEVELS:

- RUNNER ADVANCES ON EVERY NON-K OUT (1984-92 AVERAGE IS ABOUT 50%)
- REDUCE BATTING AVERAGE (WALKS UNCHANGED) IN (2,0) ONLY UNTIL SCORING IS REDUCED TO BASELINE LEVEL
- REPEAT PROCESS ASSUMING NEVER ADVANCE ON NON-K OUTS, AND INCREASE BATTING AVERAGE IN (2,0) ONLY UNTIL SCORING INCREASES TO BASELINE

ADVANCEMENT IN (2,0) RESULTS

◆ BASELINE SCORING

- ALL 1993 AL AVG TEAM: 5.032 RUNS PER GAME
- ALL 1990 RICKEY TEAM: 10.357 RUNS PER GAME

◆ SCORING WHEN ALWAYS ADVANCE (2,0) --> (3,1) ON NON-K OUTS

- ALL AL AVERAGE TEAM
 - * WITH NO CHANGE IN BATTING AVG: 5.071 R/G
(INCREASE OF 6 RUNS PER 162 GAMES)
 - * A DECREASE IN BATTING AVERAGE OF 22% IN (2,0)
WILL REDUCE SCORING TO THE BASELINE LEVEL
- ALL 1990 RICKEY HENDERSON TEAM
 - * WITH NO CHANGE IN BATTING AVG: 10.432 R/G
(INCREASE OF 12 RUNS PER 162 GAMES)
 - * A DECREASE IN BATTING AVERAGE OF 12% IN (2,0)
WILL REDUCE SCORING TO THE BASELINE LEVEL

ADVANCEMENT IN (2,0) RESULTS (CONTINUED)

◆ SCORING WHEN NEVER ADVANCE (2,0) --> (3,1) ON NON-K OUTS

- ALL AL AVERAGE TEAM
 - * WITH NO CHANGE IN BATTING AVG: 4.987 R/G
(DECREASE OF 7 RUNS PER 162 GAMES)
 - * A INCREASE IN BATTING AVERAGE OF 20% IN (2,0)
WILL RAISE SCORING TO THE BASELINE LEVEL
- ALL 1990 RICKEY HENDERSON TEAM
 - * WITH NO CHANGE IN BATTING AVG: 10.265 R/G
(DECREASE OF 15 RUNS PER 162 GAMES)
 - * A INCREASE IN BATTING AVERAGE OF 13% IN (2,0)
WILL RAISE SCORING TO THE BASELINE LEVEL

	BA	OBP	SLG	HR	K	SB	CS
AL 93 AVG	.267	.337	.408	16	103	12	7
“ -22%	.208	.288	.318	12	103	12	7
“ +20%	.320	.389	.490	19	103	12	7
RICKEY 1990	.325	.439	.577	28	60	65	10
“ -12%	.286	.408	.508	25	60	65	10
“ +13%	.367	.476	.652	32	60	65	10

SUMMARY AND CONCLUSIONS

- ◆ HIGH SB/FAST RUNNERS DO NOT INCREASE SCORING BY VERY MUCH
 - A RICKEY HENDERSON ADDS ABOUT 1 WIN A SEASON COMPARED TO A NO SB/SLOW RUNNER
 - A LOW OBP/HIGH SB PLAYER DOES NOT CONTRIBUTE MUCH TO THE OFFENSE, AND HURTS SCORING WHEN BATTING LEADOFF

- ◆ HIGH STRIKEOUT TEAMS SCORE LESS OTHER THINGS BEING EQUAL
 - DIFFERENCE OF ABOUT 2 WINS PER SEASON BETWEEN 1991 TIGERS AND 1991 TWINS FROM DIFFERENCE IN TEAM STRIKEOUTS
 - BUT TIGERS OFFENSE DEPENDS ON HR (LED 1991 AL WITH 209, 32 MORE THAN #2) AND HIGH OBP DUE TO WALKS (LED WITH 699, 52 MORE), BOTH OF WHICH LEAD TO HIGHER NUMBER OF STRIKEOUTS

- ◆ ADVANCING RUNNER IN (2,0) IS WORTH SOME DECREASE IN BATTING AVERAGE
 - ROUGH ESTIMATE: FOR AN AVERAGE PLAYER, INCREASING THE ADVANCEMENT PROBABILITY BY 0.5 OVERCOMES 20% DECREASE IN BA IN (2,0) SITUATION
 - FOR BETTER HITTERS, THE CORRESPONDING DECREASE IN BA IS SMALLER; FOR POORER HITTERS, THAT DECREASE IS LARGER
 - ANALYSIS COULD BE REPEATED FOR SPECIFIC PLAYERS IN A REAL LINEUP
 - OBJECTIVE DURING GAME MAY BE TO SCORE ONE RUN RATHER THAN MAXIMIZE SCORING