

world money_ball - kaggle dataset

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money_ball - Regression Project -

— Setup some data directories

Remove extreme outliers from each column of numerical data

```
# ...      remove rows where wins percentage is outside actual experience
# ...      according to wikipedia
# ...      least wins in modern era = 0.235 percentage
# ...      most wins in modern era = 0.763 percentage
# ...      most team hits in 1930 = 1783

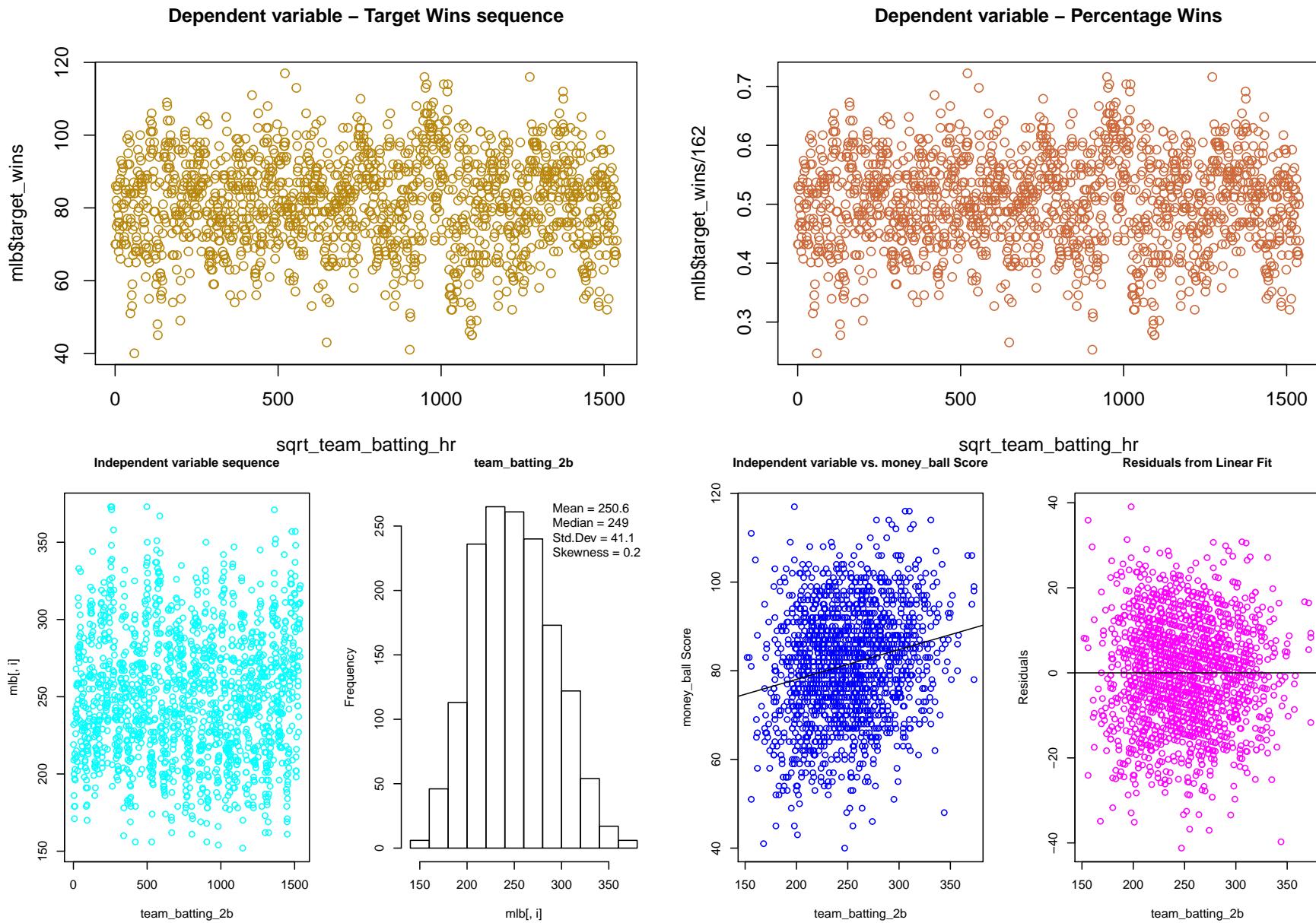
mlb <- mlb[!(mlb$target_wins / 162) < 0.235,]
mlb <- mlb[!(mlb$target_wins / 162) > 0.763,]

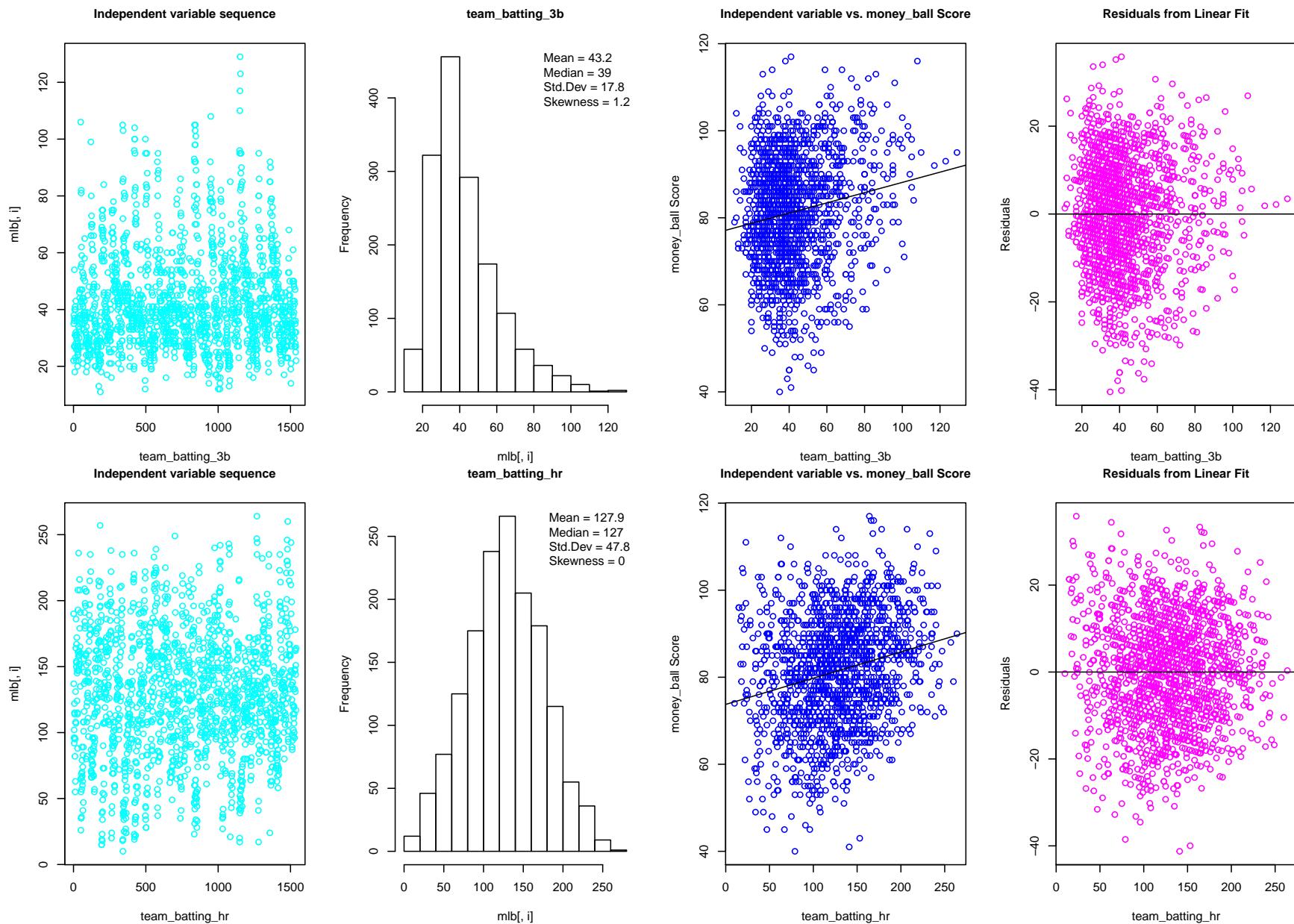
mlb <- mlb[!mlb$team_batting_h > (1783 * 162 / 154),]
mlb <- mlb[!mlb$team_pitching_h > (1783 * 162 / 154),]

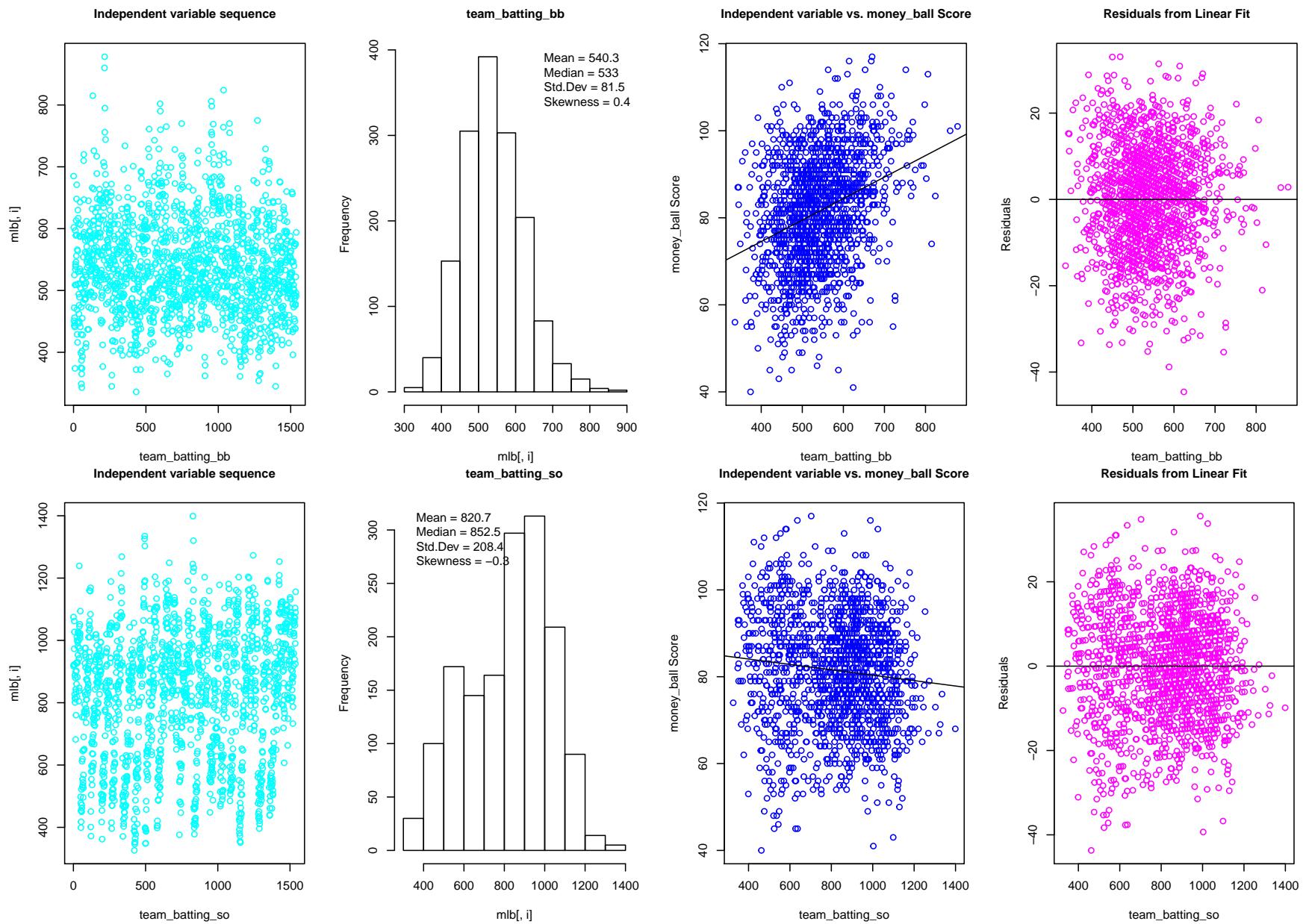
mlb <- mlb[!mlb$team_baserun_sb > (347 * 162 / 154),]

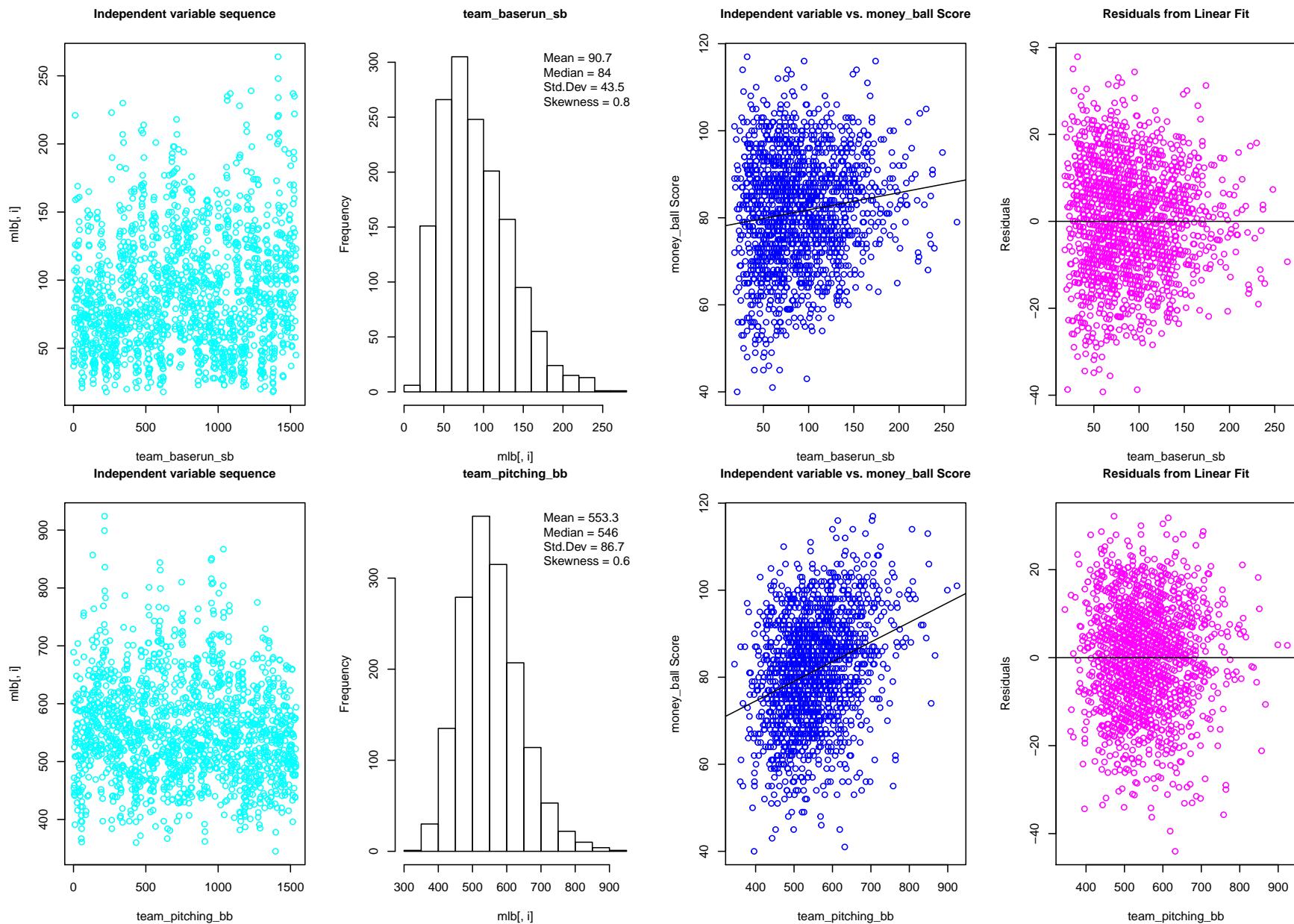
# ...      errors
# ...      Pre WW II : 1883 Philadelphia (NL), 639. ... # of games in season = 98
#...       Post WW II : 1945 Philadelphia (NL), 234 or 1946 Washington (AL), 211. ... # of games = 154
#...       Last time a team had 200 or errors was the 1963 NY Mets with 208. ... # of games = 162

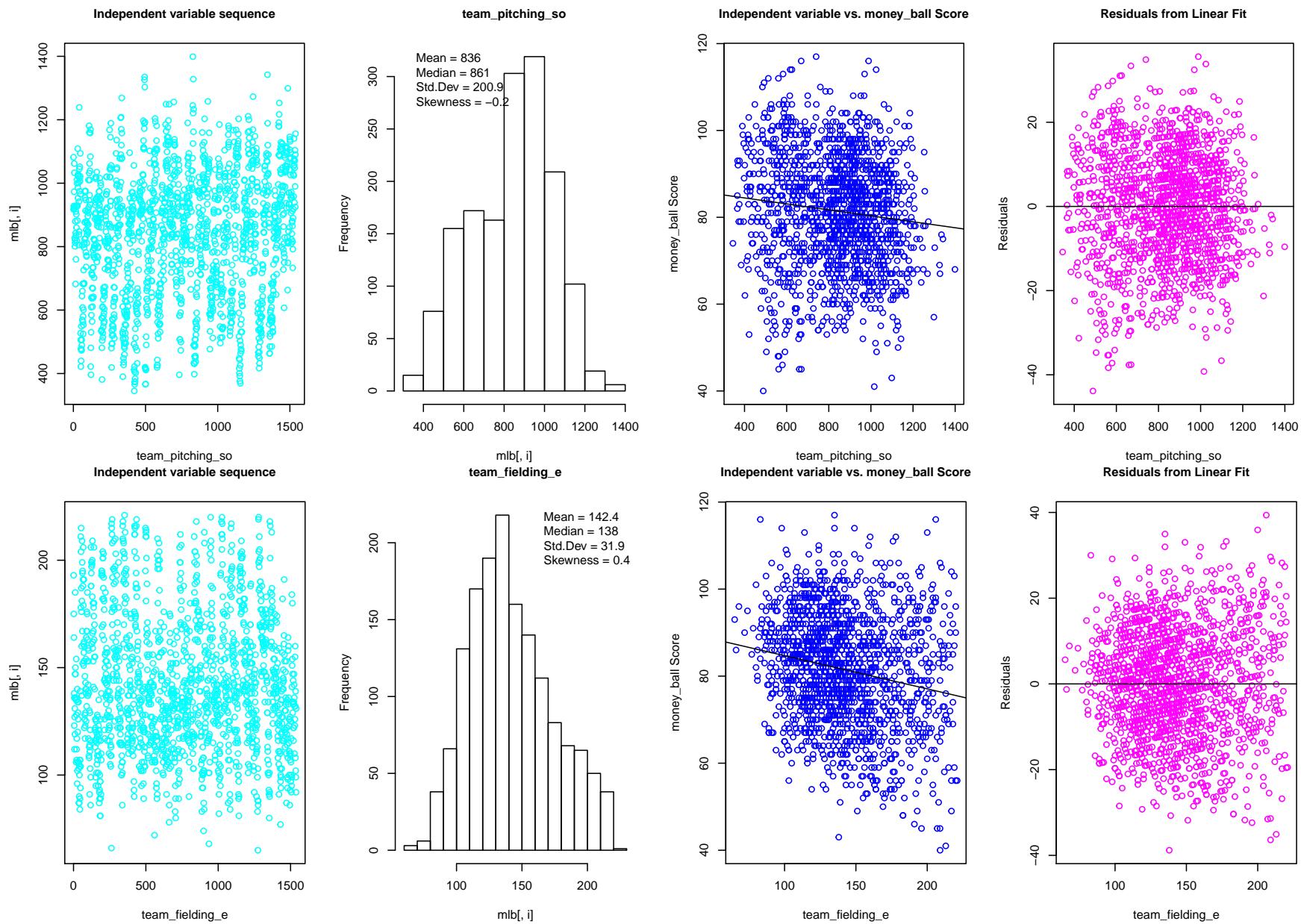
mlb <- mlb[!mlb$team_fielding_e > (211 * 162 / 154),]
```

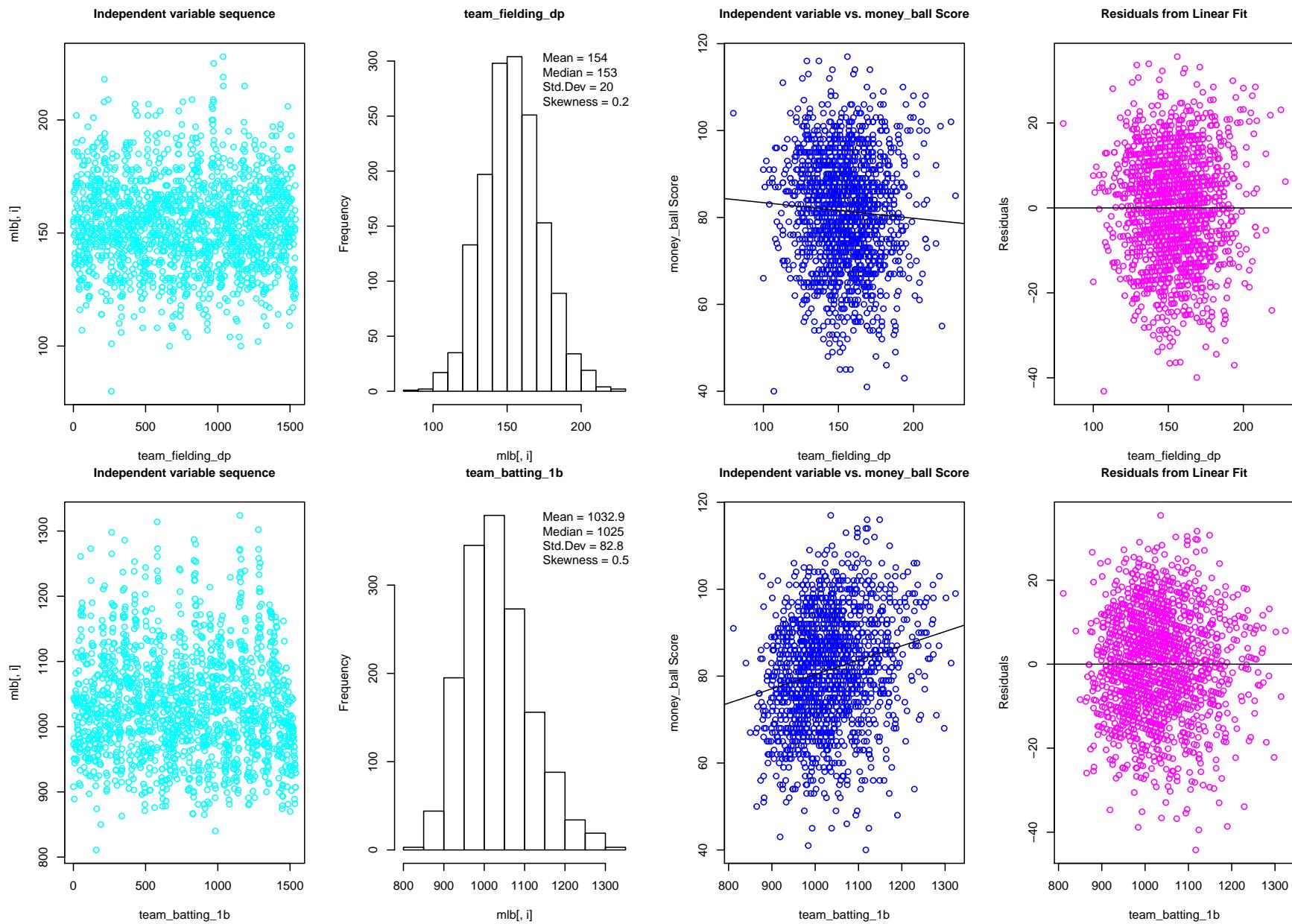


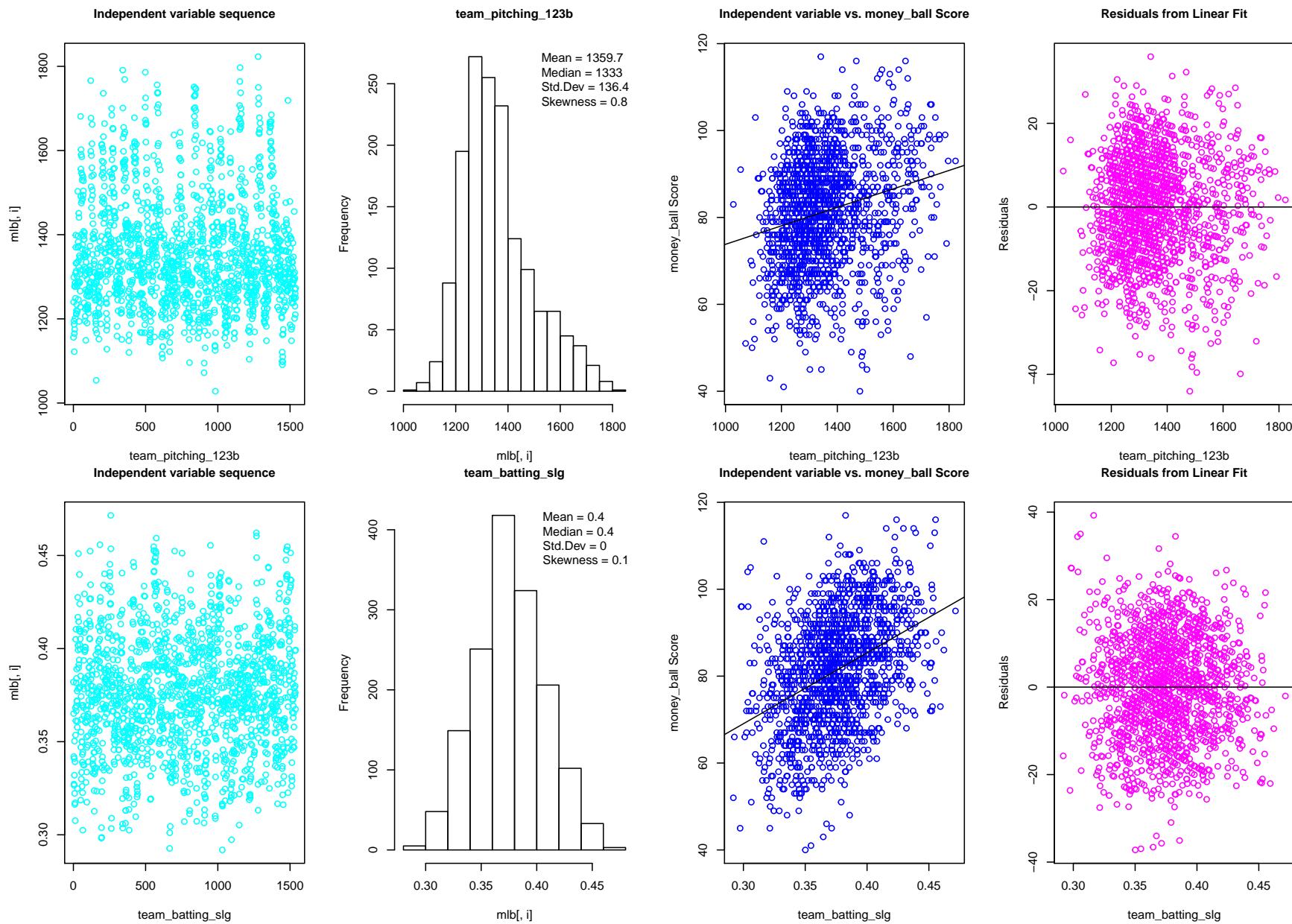


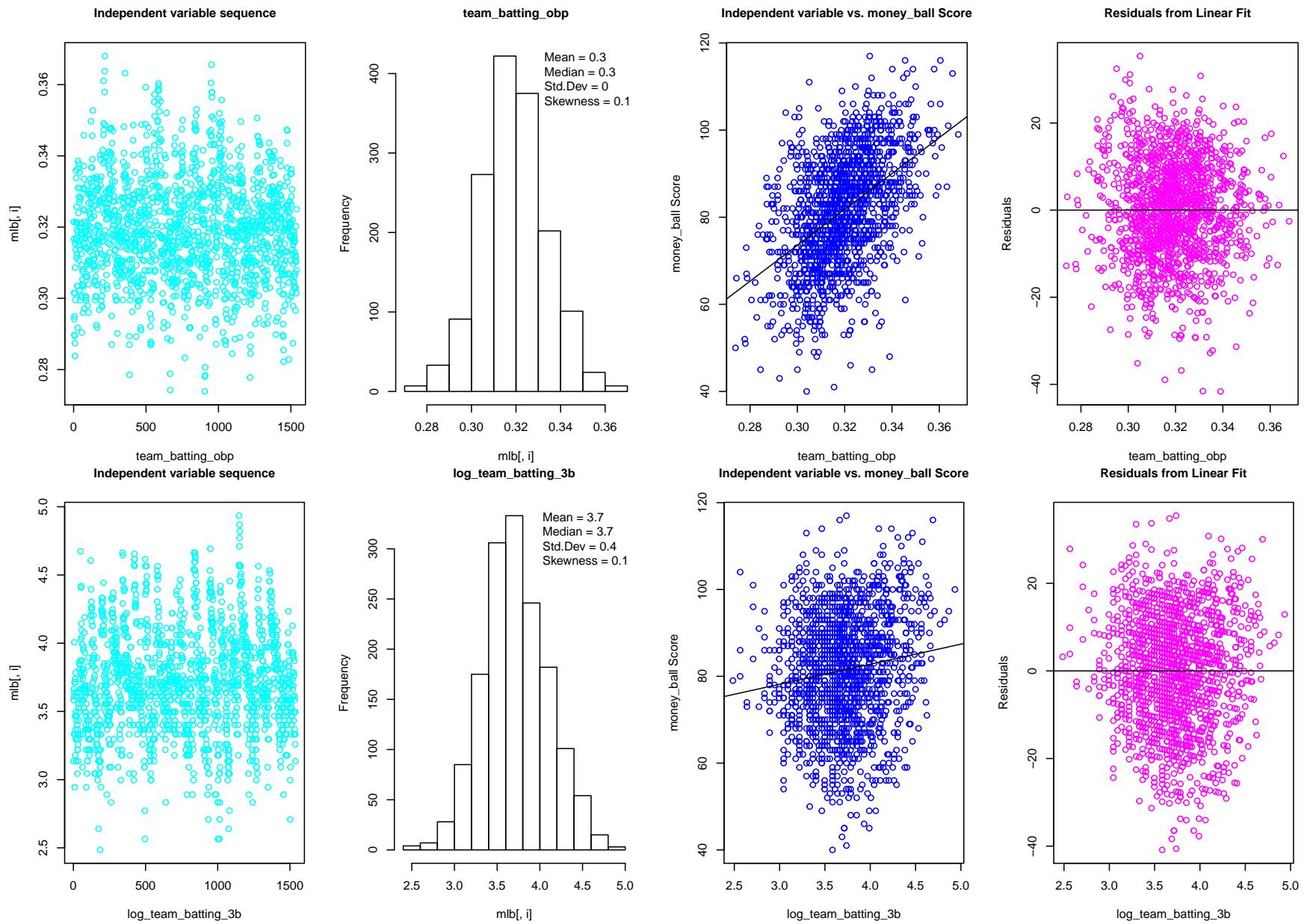


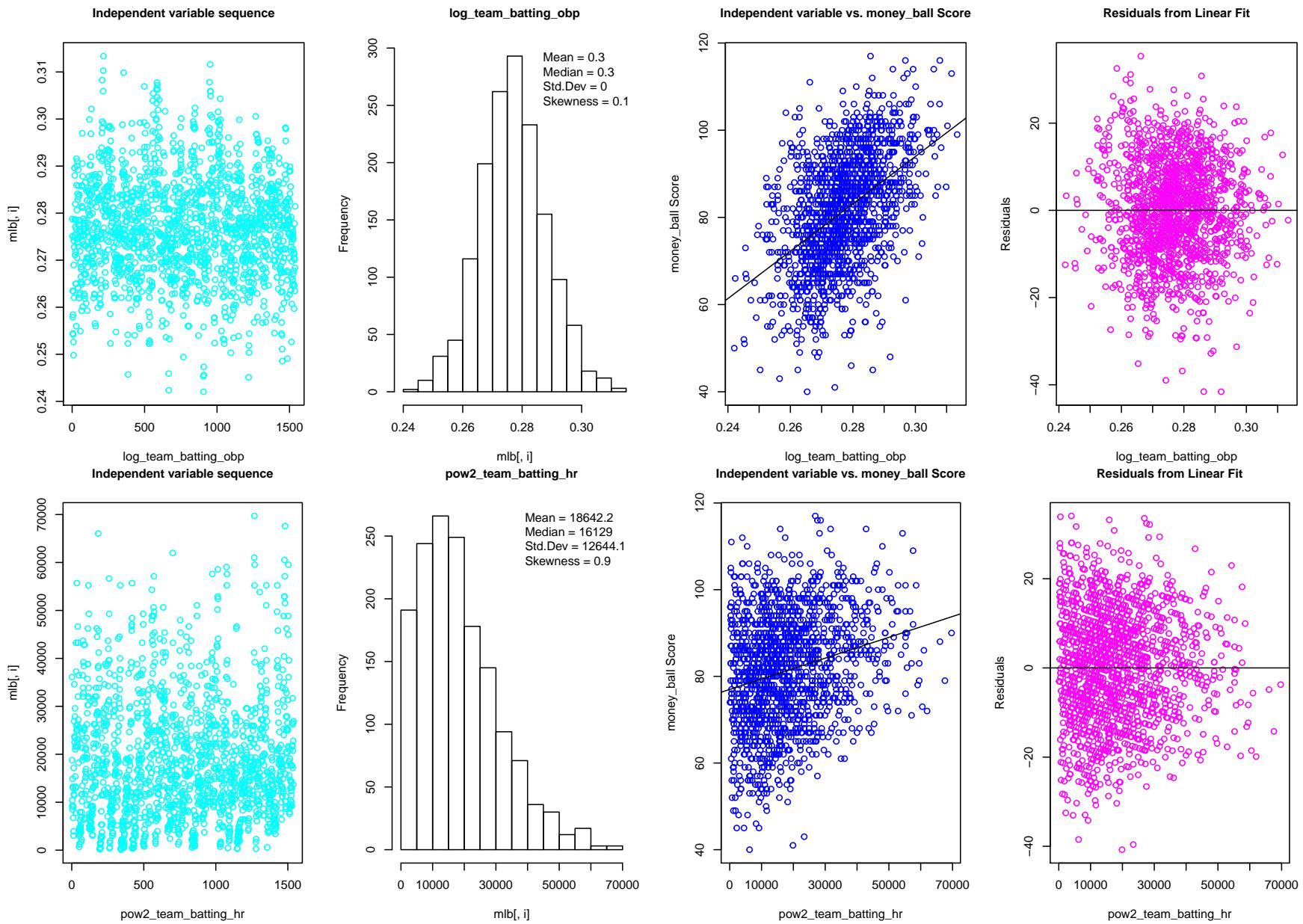


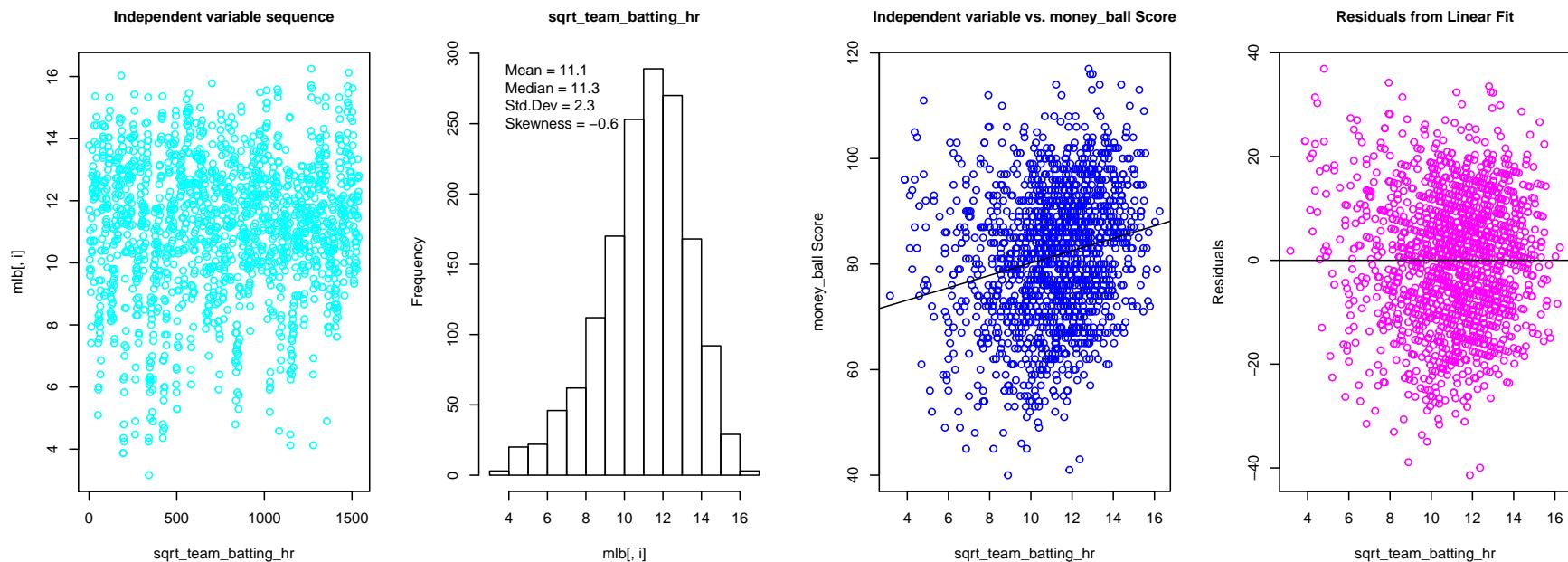






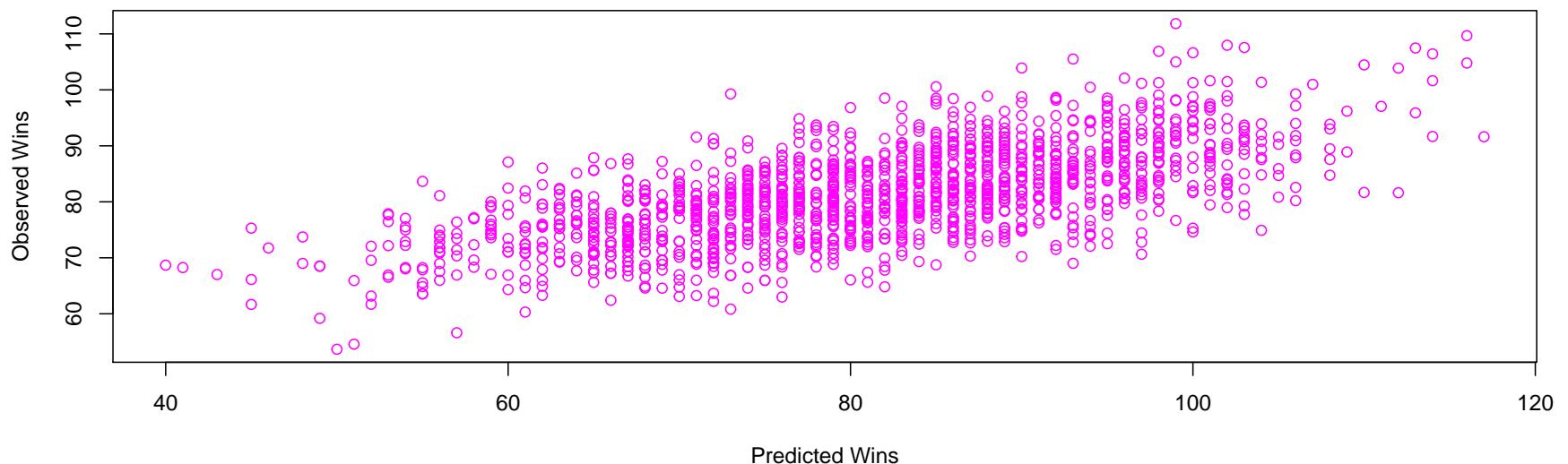






Make first data visualization plot for each column of dataset

Pred vs. Observed from Linear Fit



```
Call:
lm(formula = target_wins ~ ., data = model_df, na.action = na.exclude)
```

Residuals:

Min	1Q	Median	3Q	Max
-30.2966	-6.5940	0.0936	6.5821	30.3749

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	3.076e+02	1.069e+02	2.878	0.004054 **
team_batting_2b	1.492e-01	9.072e-02	1.645	0.100211
team_batting_3b	6.476e-01	1.669e-01	3.880	0.000109 ***
team_batting_hr	1.407e+00	2.954e-01	4.763	2.09e-06 ***
team_batting_bb	8.359e-02	1.092e-01	0.766	0.444044
team_batting_so	4.743e-04	4.066e-02	0.012	0.990694
team_baserun_sb	5.383e-02	8.221e-03	6.548	7.94e-11 ***
team_pitching_bb	-1.440e-01	9.414e-02	-1.529	0.126424
team_pitching_so	-2.368e-02	3.955e-02	-0.599	0.549377
team_fielding_e	-1.575e-01	1.205e-02	-13.075	< 2e-16 ***

```

team_fielding_dp      -9.880e-02  1.345e-02  -7.348 3.27e-13 ***
team_batting_1b       6.334e-03  5.179e-02   0.122 0.902682
team_pitching_123b    5.978e-02  3.577e-02   1.671 0.094913 .
team_batting_slg     -1.195e+03  3.789e+02  -3.154 0.001642 **
team_batting_obp      5.543e+03  2.760e+03   2.008 0.044805 *
log_team_batting_3b   -2.629e+00  2.835e+00  -0.927 0.353991
log_team_batting_obp  -6.059e+03  3.397e+03  -1.784 0.074664 .
pow2_team_batting_hr -1.068e-03  2.898e-04  -3.687 0.000235 ***
sqrt_team_batting_hr -7.657e+00  2.594e+00  -2.952 0.003205 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

Residual standard error: 9.829 on 1514 degrees of freedom

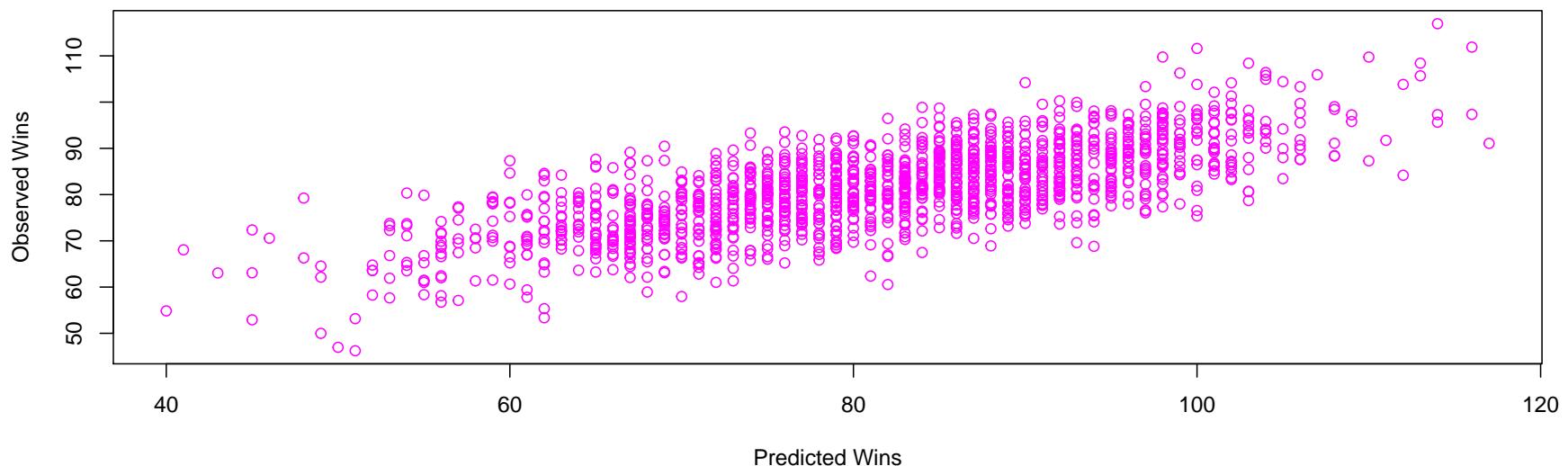
(6 observations deleted due to missingness)

Multiple R-squared: 0.4177, Adjusted R-squared: 0.4108

F-statistic: 60.33 on 18 and 1514 DF, p-value: < 2.2e-16

team_fielding_dp	team_baserun_sb	team_fielding_e
1.153358	2.023750	2.348900
log_team_batting_3b	team_batting_3b	pow2_team_batting_hr
18.737493	140.991126	213.366905
team_batting_2b	team_batting_1b	team_pitching_123b
221.303061	291.989474	377.921670
sqrt_team_batting_hr	team_pitching_so	team_pitching_bb
546.313501	1003.564598	1060.890434
team_batting_so	team_batting_bb	team_batting_slg
1142.170906	1260.732811	2241.147886
team_batting_hr log_team_batting_obp		team_batting_obp
3165.186079	22819.748095	26259.172686

Pred vs. Observed from Linear Fit with Interactions



Call:

```
lm(formula = target_wins ~ . * ., data = model_df, na.action = na.exclude)
```

Residuals:

Min	1Q	Median	3Q	Max
-31.2470	-6.0258	-0.0492	6.0233	27.8201

Coefficients:

	Estimate	Std. Error	t value
(Intercept)	-2.241e+04	1.791e+04	-1.251
team_batting_2b	3.961e+01	4.699e+01	0.843
team_batting_3b	9.076e+01	8.315e+01	1.092
team_batting_hr	7.469e+01	1.794e+02	0.416
team_batting_bb	-1.269e+02	6.490e+01	-1.955
team_batting_so	6.235e+01	2.331e+01	2.675
team_baserun_sb	7.663e+00	4.278e+00	1.791
team_pitching_bb	9.285e+01	5.438e+01	1.707
team_pitching_so	-6.054e+01	2.286e+01	-2.649
team_fielding_e	-2.619e+00	5.380e+00	-0.487

team_fielding_dp	-1.167e+01	7.057e+00	-1.654
team_batting_1b	-1.071e+01	2.649e+01	-0.404
team_pitching_123b	7.572e+00	2.361e+01	0.321
team_batting_slg	-2.968e+05	1.922e+05	-1.544
team_batting_obp	-5.954e+07	3.732e+07	-1.595
log_team_batting_3b	-6.530e+02	1.489e+03	-0.439
log_team_batting_obp	6.011e+07	3.763e+07	1.598
pow2_team_batting_hr	6.873e-01	7.267e-01	0.946
sqrt_team_batting_hr	1.816e+03	1.640e+03	1.107
team_batting_2b:team_batting_3b	1.259e-02	1.060e-02	1.189
team_batting_2b:team_batting_hr	-2.890e-02	8.673e-02	-0.333
team_batting_2b:team_batting_bb	3.350e-02	3.493e-02	0.959
team_batting_2b:team_batting_so	9.721e-03	2.055e-02	0.473
team_batting_2b:team_baserun_sb	-4.019e-05	2.729e-03	-0.015
team_batting_2b:team_pitching_bb	-2.490e-02	3.085e-02	-0.807
team_batting_2b:team_pitching_so	-6.429e-03	2.020e-02	-0.318
team_batting_2b:team_fielding_e	9.081e-03	4.825e-03	1.882
team_batting_2b:team_fielding_dp	-1.742e-03	5.391e-03	-0.323
team_batting_2b:team_batting_1b	-6.538e-03	2.999e-03	-2.180
team_batting_2b:team_pitching_123b	1.517e-02	7.912e-03	1.917
team_batting_2b:team_batting_slg	2.070e+01	1.451e+01	1.426
team_batting_2b:team_batting_obp	3.550e+02	1.073e+03	0.331
team_batting_2b:log_team_batting_3b	-1.879e+00	6.760e-01	-2.779
team_batting_2b:log_team_batting_obp	-6.377e+02	1.383e+03	-0.461
team_batting_2b:pow2_team_batting_hr	3.820e-05	1.190e-04	0.321
team_batting_2b:sqrt_team_batting_hr	4.021e-01	1.252e+00	0.321
team_batting_3b:team_batting_hr	-1.101e-01	1.925e-01	-0.572
team_batting_3b:team_batting_bb	4.044e-04	7.120e-02	0.006
team_batting_3b:team_batting_so	1.752e-02	4.161e-02	0.421
team_batting_3b:team_baserun_sb	-3.904e-03	5.426e-03	-0.720
team_batting_3b:team_pitching_bb	1.985e-02	6.671e-02	0.298
team_batting_3b:team_pitching_so	-1.391e-02	4.088e-02	-0.340
team_batting_3b:team_fielding_e	1.615e-02	8.827e-03	1.830
team_batting_3b:team_fielding_dp	-7.855e-03	1.001e-02	-0.784
team_batting_3b:team_batting_1b	1.445e-02	1.844e-02	0.784
team_batting_3b:team_pitching_123b	-1.966e-03	1.854e-02	-0.106
team_batting_3b:team_batting_slg	1.042e+02	7.207e+01	1.446
team_batting_3b:team_batting_obp	1.243e+03	1.939e+03	0.641
team_batting_3b:log_team_batting_3b	-9.914e-01	2.443e+00	-0.406

team_batting_3b:log_team_batting_obp	-1.992e+03	2.457e+03	-0.811
team_batting_3b:pow2_team_batting_hr	1.098e-04	2.541e-04	0.432
team_batting_3b:sqrt_team_batting_hr	8.941e-01	2.709e+00	0.330
team_batting_hr:team_batting_bb	1.928e-01	1.225e-01	1.573
team_batting_hr:team_batting_so	6.514e-02	7.684e-02	0.848
team_batting_hr:team_baserun_sb	3.084e-03	1.053e-02	0.293
team_batting_hr:team_pitching_bb	-1.038e-01	1.062e-01	-0.977
team_batting_hr:team_pitching_so	-6.664e-02	7.568e-02	-0.880
team_batting_hr:team_fielding_e	2.023e-02	1.802e-02	1.123
team_batting_hr:team_fielding_dp	1.412e-03	1.898e-02	0.074
team_batting_hr:team_batting_1b	-1.696e-02	4.815e-02	-0.352
team_batting_hr:team_pitching_123b	7.937e-02	4.182e-02	1.898
team_batting_hr:team_batting_slg	1.262e+02	4.879e+02	0.259
team_batting_hr:team_batting_obp	-2.062e+03	4.135e+03	-0.499
team_batting_hr:log_team_batting_3b	-7.896e-01	3.966e+00	-0.199
team_batting_hr:log_team_batting_obp	1.707e+03	5.218e+03	0.327
team_batting_hr:pow2_team_batting_hr	2.725e-04	4.881e-04	0.558
team_batting_hr:sqrt_team_batting_hr	-6.874e+00	8.952e+00	-0.768
team_batting_bb:team_batting_so	-1.335e-02	1.390e-02	-0.960
team_batting_bb:team_baserun_sb	8.852e-03	4.449e-03	1.989
team_batting_bb:team_pitching_bb	-3.232e-03	2.940e-03	-1.099
team_batting_bb:team_pitching_so	1.933e-04	1.435e-02	0.013
team_batting_bb:team_fielding_e	-1.567e-04	6.722e-03	-0.023
team_batting_bb:team_fielding_dp	2.040e-03	7.259e-03	0.281
team_batting_bb:team_batting_1b	1.993e-02	1.447e-02	1.377
team_batting_bb:team_pitching_123b	-4.321e-03	4.660e-03	-0.927
team_batting_bb:team_batting_slg	-1.194e+02	1.220e+02	-0.978
team_batting_bb:team_batting_obp	-2.848e+03	1.422e+03	-2.003
team_batting_bb:log_team_batting_3b	2.328e+00	1.750e+00	1.331
team_batting_bb:log_team_batting_obp	3.797e+03	1.877e+03	2.023
team_batting_bb:pow2_team_batting_hr	-1.985e-04	1.634e-04	-1.214
team_batting_bb:sqrt_team_batting_hr	-1.461e+00	1.487e+00	-0.982
team_batting_so:team_baserun_sb	-2.940e-03	1.835e-03	-1.602
team_batting_so:team_pitching_bb	1.944e-02	7.782e-03	2.498
team_batting_so:team_pitching_so	-5.024e-05	2.013e-05	-2.497
team_batting_so:team_fielding_e	-1.052e-02	3.020e-03	-3.483
team_batting_so:team_fielding_dp	1.726e-03	3.068e-03	0.563
team_batting_so:team_batting_1b	4.475e-03	9.278e-03	0.482
team_batting_so:team_pitching_123b	-6.638e-03	3.016e-03	-2.201

team_batting_so:team_batting_slg	-5.118e+01	9.301e+01	-0.550
team_batting_so:team_batting_obp	1.378e+03	5.997e+02	2.298
team_batting_so:log_team_batting_3b	7.258e-01	8.255e-01	0.879
team_batting_so:log_team_batting_obp	-1.752e+03	7.354e+02	-2.382
team_batting_so:pow2_team_batting_hr	-4.453e-05	7.987e-05	-0.558
team_batting_so:sqrt_team_batting_hr	-6.493e-01	8.037e-01	-0.808
team_baserun_sb:team_pitching_bb	-7.655e-03	3.955e-03	-1.935
team_baserun_sb:team_pitching_so	2.906e-03	1.783e-03	1.629
team_baserun_sb:team_fielding_e	8.644e-05	4.275e-04	0.202
team_baserun_sb:team_fielding_dp	3.241e-04	4.652e-04	0.697
team_baserun_sb:team_batting_1b	-2.793e-04	1.670e-03	-0.167
team_baserun_sb:team_pitching_123b	1.331e-03	1.415e-03	0.941
team_baserun_sb:team_batting_slg	-1.319e+00	1.229e+01	-0.107
team_baserun_sb:team_batting_obp	1.384e+02	1.037e+02	1.334
team_baserun_sb:log_team_batting_3b	1.413e-01	1.088e-01	1.298
team_baserun_sb:log_team_batting_obp	-1.939e+02	1.299e+02	-1.492
team_baserun_sb:pow2_team_batting_hr	-3.658e-07	1.208e-05	-0.030
team_baserun_sb:sqrt_team_batting_hr	-4.206e-02	1.043e-01	-0.403
team_pitching_bb:team_pitching_so	-6.704e-03	5.687e-03	-1.179
team_pitching_bb:team_fielding_e	-2.288e-03	5.726e-03	-0.400
team_pitching_bb:team_fielding_dp	-2.112e-03	6.286e-03	-0.336
team_pitching_bb:team_batting_1b	-1.579e-02	1.240e-02	-1.273
team_pitching_bb:team_pitching_123b	-2.829e-04	1.784e-03	-0.159
team_pitching_bb:team_batting_slg	7.147e+01	1.102e+02	0.648
team_pitching_bb:team_batting_obp	2.136e+03	1.177e+03	1.814
team_pitching_bb:log_team_batting_3b	-2.274e+00	1.749e+00	-1.301
team_pitching_bb:log_team_batting_obp	-2.774e+03	1.556e+03	-1.782
team_pitching_bb:pow2_team_batting_hr	1.346e-04	1.491e-04	0.903
team_pitching_bb:sqrt_team_batting_hr	4.098e-01	1.197e+00	0.342
team_pitching_so:team_fielding_e	1.043e-02	2.954e-03	3.531
team_pitching_so:team_fielding_dp	-1.846e-03	2.988e-03	-0.618
team_pitching_so:team_batting_1b	-7.710e-04	9.160e-03	-0.084
team_pitching_so:team_pitching_123b	2.440e-03	2.176e-03	1.121
team_pitching_so:team_batting_slg	5.228e+01	9.160e+01	0.571
team_pitching_so:team_batting_obp	-1.329e+03	5.887e+02	-2.257
team_pitching_so:log_team_batting_3b	-7.394e-01	8.129e-01	-0.910
team_pitching_so:log_team_batting_obp	1.692e+03	7.210e+02	2.346
team_pitching_so:pow2_team_batting_hr	4.501e-05	7.882e-05	0.571
team_pitching_so:sqrt_team_batting_hr	6.593e-01	7.844e-01	0.841

team_fielding_e:team_fielding_dp	4.264e-04	6.977e-04	0.611
team_fielding_e:team_batting_1b	6.071e-03	2.909e-03	2.087
team_fielding_e:team_pitching_123b	-6.425e-03	2.238e-03	-2.871
team_fielding_e:team_batting_slg	-1.496e+01	2.130e+01	-0.703
team_fielding_e:team_batting_obp	-1.381e+01	1.395e+02	-0.099
team_fielding_e:log_team_batting_3b	-1.992e-01	1.527e-01	-1.304
team_fielding_e:log_team_batting_obp	5.060e+01	1.710e+02	0.296
team_fielding_e:pow2_team_batting_hr	-1.395e-05	1.903e-05	-0.733
team_fielding_e:sqrt_team_batting_hr	-2.192e-01	1.801e-01	-1.218
team_fielding_dp:team_batting_1b	-1.736e-03	3.320e-03	-0.523
team_fielding_dp:team_pitching_123b	1.910e-03	2.501e-03	0.764
team_fielding_dp:team_batting_slg	-3.605e+00	2.283e+01	-0.158
team_fielding_dp:team_batting_obp	-2.225e+02	1.839e+02	-1.210
team_fielding_dp:log_team_batting_3b	3.081e-01	1.778e-01	1.733
team_fielding_dp:log_team_batting_obp	2.977e+02	2.252e+02	1.322
team_fielding_dp:pow2_team_batting_hr	6.251e-07	1.833e-05	0.034
team_fielding_dp:sqrt_team_batting_hr	2.272e-02	1.712e-01	0.133
team_batting_1b:team_pitching_123b	2.089e-03	3.011e-03	0.694
team_batting_1b:team_batting_slg	5.456e+01	2.359e+01	2.313
team_batting_1b:team_batting_obp	-5.400e+02	5.806e+02	-0.930
team_batting_1b:log_team_batting_3b	-1.761e+00	7.438e-01	-2.367
team_batting_1b:log_team_batting_obp	6.025e+02	7.591e+02	0.794
team_batting_1b:pow2_team_batting_hr	1.501e-05	7.391e-05	0.203
team_batting_1b:sqrt_team_batting_hr	-2.452e-01	6.482e-01	-0.378
team_pitching_123b:team_batting_slg	-9.587e+01	3.630e+01	-2.641
team_pitching_123b:team_batting_obp	3.199e+02	5.280e+02	0.606
team_pitching_123b:log_team_batting_3b	1.753e+00	6.541e-01	2.680
team_pitching_123b:log_team_batting_obp	-3.097e+02	6.898e+02	-0.449
team_pitching_123b:pow2_team_batting_hr	-5.831e-05	6.597e-05	-0.884
team_pitching_123b:sqrt_team_batting_hr	-3.181e-01	5.294e-01	-0.601
team_batting_slg:team_batting_obp	-4.920e+06	4.402e+06	-1.118
team_batting_slg:log_team_batting_3b	1.764e+02	3.153e+03	0.056
team_batting_slg:log_team_batting_obp	7.135e+06	5.642e+06	1.264
team_batting_slg:pow2_team_batting_hr	-7.720e-02	6.239e-01	-0.124
team_batting_slg:sqrt_team_batting_hr	-3.221e+03	7.254e+03	-0.444
team_batting_obp:log_team_batting_3b	-1.054e+04	3.571e+04	-0.295
team_batting_obp:log_team_batting_obp	2.651e+07	1.704e+07	1.556
team_batting_obp:pow2_team_batting_hr	4.978e+00	4.415e+00	1.128
team_batting_obp:sqrt_team_batting_hr	6.839e+04	4.158e+04	1.645

log_team_batting_3b:log_team_batting_obp	1.387e+04	4.441e+04	0.312
log_team_batting_3b:pow2_team_batting_hr	-8.780e-04	4.376e-03	-0.201
log_team_batting_3b:sqrt_team_batting_hr	2.268e+01	5.063e+01	0.448
log_team_batting_obp:pow2_team_batting_hr	-5.951e+00	5.618e+00	-1.059
log_team_batting_obp:sqrt_team_batting_hr	-7.873e+04	5.076e+04	-1.551
pow2_team_batting_hr:sqrt_team_batting_hr	-1.902e-02	2.492e-02	-0.763
	Pr(> t)		
(Intercept)	0.211119		
team_batting_2b	0.399406		
team_batting_3b	0.275241		
team_batting_hr	0.677173		
team_batting_bb	0.050809 .		
team_batting_so	0.007569 **		
team_baserun_sb	0.073512 .		
team_pitching_bb	0.087979 .		
team_pitching_so	0.008172 **		
team_fielding_e	0.626490		
team_fielding_dp	0.098320 .		
team_batting_1b	0.686129		
team_pitching_123b	0.748440		
team_batting_slg	0.122710		
team_batting_obp	0.110841		
log_team_batting_3b	0.661072		
log_team_batting_obp	0.110382		
pow2_team_batting_hr	0.344481		
sqrt_team_batting_hr	0.268466		
team_batting_2b:team_batting_3b	0.234833		
team_batting_2b:team_batting_hr	0.739052		
team_batting_2b:team_batting_bb	0.337732		
team_batting_2b:team_batting_so	0.636305		
team_batting_2b:team_baserun_sb	0.988251		
team_batting_2b:team_pitching_bb	0.419691		
team_batting_2b:team_pitching_so	0.750328		
team_batting_2b:team_fielding_e	0.060059 .		
team_batting_2b:team_fielding_dp	0.746643		
team_batting_2b:team_batting_1b	0.029414 *		
team_batting_2b:team_pitching_123b	0.055423 .		
team_batting_2b:team_batting_slg	0.154004		
team_batting_2b:team_batting_obp	0.740862		

team_batting_2b:log_team_batting_3b	0.005521 **
team_batting_2b:log_team_batting_obp	0.644772
team_batting_2b:pow2_team_batting_hr	0.748202
team_batting_2b:sqrt_team_batting_hr	0.748244
team_batting_3b:team_batting_hr	0.567587
team_batting_3b:team_batting_bb	0.995469
team_batting_3b:team_batting_so	0.673848
team_batting_3b:team_baserun_sb	0.471888
team_batting_3b:team_pitching_bb	0.766124
team_batting_3b:team_pitching_so	0.733722
team_batting_3b:team_fielding_e	0.067463 .
team_batting_3b:team_fielding_dp	0.432958
team_batting_3b:team_batting_1b	0.433370
team_batting_3b:team_pitching_123b	0.915594
team_batting_3b:team_batting_slg	0.148448
team_batting_3b:team_batting_obp	0.521444
team_batting_3b:log_team_batting_3b	0.684974
team_batting_3b:log_team_batting_obp	0.417785
team_batting_3b:pow2_team_batting_hr	0.665742
team_batting_3b:sqrt_team_batting_hr	0.741388
team_batting_hr:team_batting_bb	0.115870
team_batting_hr:team_batting_so	0.396744
team_batting_hr:team_baserun_sb	0.769698
team_batting_hr:team_pitching_bb	0.328697
team_batting_hr:team_pitching_so	0.378754
team_batting_hr:team_fielding_e	0.261671
team_batting_hr:team_fielding_dp	0.940695
team_batting_hr:team_batting_1b	0.724679
team_batting_hr:team_pitching_123b	0.057888 .
team_batting_hr:team_batting_slg	0.795960
team_batting_hr:team_batting_obp	0.618154
team_batting_hr:log_team_batting_3b	0.842213
team_batting_hr:log_team_batting_obp	0.743539
team_batting_hr:pow2_team_batting_hr	0.576729
team_batting_hr:sqrt_team_batting_hr	0.442668
team_batting_bb:team_batting_so	0.337172
team_batting_bb:team_baserun_sb	0.046849 *
team_batting_bb:team_pitching_bb	0.271813
team_batting_bb:team_pitching_so	0.989253

team_batting_bb:team_fielding_e	0.981402
team_batting_bb:team_fielding_dp	0.778736
team_batting_bb:team_batting_1b	0.168794
team_batting_bb:team_pitching_123b	0.353920
team_batting_bb:team_batting_slg	0.328196
team_batting_bb:team_batting_obp	0.045416 *
team_batting_bb:log_team_batting_3b	0.183554
team_batting_bb:log_team_batting_obp	0.043280 *
team_batting_bb:pow2_team_batting_hr	0.224843
team_batting_bb:sqrt_team_batting_hr	0.326152
team_batting_so:team_baserun_sb	0.109347
team_batting_so:team_pitching_bb	0.012602 *
team_batting_so:team_pitching_so	0.012659 *
team_batting_so:team_fielding_e	0.000512 ***
team_batting_so:team_fielding_dp	0.573698
team_batting_so:team_batting_1b	0.629629
team_batting_so:team_pitching_123b	0.027926 *
team_batting_so:team_batting_slg	0.582202
team_batting_so:team_batting_obp	0.021738 *
team_batting_so:log_team_batting_3b	0.379413
team_batting_so:log_team_batting_obp	0.017349 *
team_batting_so:pow2_team_batting_hr	0.577254
team_batting_so:sqrt_team_batting_hr	0.419352
team_baserun_sb:team_pitching_bb	0.053149 .
team_baserun_sb:team_pitching_so	0.103450
team_baserun_sb:team_fielding_e	0.839771
team_baserun_sb:team_fielding_dp	0.486025
team_baserun_sb:team_batting_1b	0.867237
team_baserun_sb:team_pitching_123b	0.346978
team_baserun_sb:team_batting_slg	0.914494
team_baserun_sb:team_batting_obp	0.182278
team_baserun_sb:log_team_batting_3b	0.194464
team_baserun_sb:log_team_batting_obp	0.135820
team_baserun_sb:pow2_team_batting_hr	0.975841
team_baserun_sb:sqrt_team_batting_hr	0.686916
team_pitching_bb:team_pitching_so	0.238657
team_pitching_bb:team_fielding_e	0.689527
team_pitching_bb:team_fielding_dp	0.736865
team_pitching_bb:team_batting_1b	0.203313

team_pitching_bb:team_pitching_123b	0.874049
team_pitching_bb:team_batting_slg	0.516794
team_pitching_bb:team_batting_obp	0.069921 .
team_pitching_bb:log_team_batting_3b	0.193603
team_pitching_bb:log_team_batting_obp	0.074903 .
team_pitching_bb:pow2_team_batting_hr	0.366781
team_pitching_bb:sqrt_team_batting_hr	0.732063
team_pitching_so:team_fielding_e	0.000427 ***
team_pitching_so:team_fielding_dp	0.536791
team_pitching_so:team_batting_1b	0.932934
team_pitching_so:team_pitching_123b	0.262453
team_pitching_so:team_batting_slg	0.568268
team_pitching_so:team_batting_obp	0.024164 *
team_pitching_so:log_team_batting_3b	0.363173
team_pitching_so:log_team_batting_obp	0.019107 *
team_pitching_so:pow2_team_batting_hr	0.568064
team_pitching_so:sqrt_team_batting_hr	0.400738
team_fielding_e:team_fielding_dp	0.541239
team_fielding_e:team_batting_1b	0.037067 *
team_fielding_e:team_pitching_123b	0.004161 **
team_fielding_e:team_batting_slg	0.482476
team_fielding_e:team_batting_obp	0.921168
team_fielding_e:log_team_batting_3b	0.192316
team_fielding_e:log_team_batting_obp	0.767318
team_fielding_e:pow2_team_batting_hr	0.463599
team_fielding_e:sqrt_team_batting_hr	0.223590
team_fielding_dp:team_batting_1b	0.601198
team_fielding_dp:team_pitching_123b	0.445297
team_fielding_dp:team_batting_slg	0.874569
team_fielding_dp:team_batting_obp	0.226539
team_fielding_dp:log_team_batting_3b	0.083303 .
team_fielding_dp:log_team_batting_obp	0.186448
team_fielding_dp:pow2_team_batting_hr	0.972799
team_fielding_dp:sqrt_team_batting_hr	0.894423
team_batting_1b:team_pitching_123b	0.487999
team_batting_1b:team_batting_slg	0.020871 *
team_batting_1b:team_batting_obp	0.352529
team_batting_1b:log_team_batting_3b	0.018065 *
team_batting_1b:log_team_batting_obp	0.427515

```

team_batting_1b:pow2_team_batting_hr      0.839134
team_batting_1b:sqrt_team_batting_hr      0.705246
team_pitching_123b:team_batting_slg      0.008353 **
team_pitching_123b:team_batting_obp      0.544749
team_pitching_123b:log_team_batting_3b   0.007459 **
team_pitching_123b:log_team_batting_obp   0.653547
team_pitching_123b:pow2_team_batting_hr   0.376908
team_pitching_123b:sqrt_team_batting_hr   0.548003
team_batting_slg:team_batting_obp        0.263862
team_batting_slg:log_team_batting_3b     0.955410
team_batting_slg:log_team_batting_obp    0.206280
team_batting_slg:pow2_team_batting_hr     0.901544
team_batting_slg:sqrt_team_batting_hr    0.657135
team_batting_obp:log_team_batting_3b     0.767909
team_batting_obp:log_team_batting_obp    0.119923
team_batting_obp:pow2_team_batting_hr    0.259678
team_batting_obp:sqrt_team_batting_hr    0.100273
log_team_batting_3b:log_team_batting_obp 0.754851
log_team_batting_3b:pow2_team_batting_hr  0.841009
log_team_batting_3b:sqrt_team_batting_hr 0.654185
log_team_batting_obp:pow2_team_batting_hr 0.289629
log_team_batting_obp:sqrt_team_batting_hr 0.121130
pow2_team_batting_hr:sqrt_team_batting_hr 0.445519
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

Residual standard error: 9.476 on 1361 degrees of freedom

(6 observations deleted due to missingness)

Multiple R-squared: 0.5134, Adjusted R-squared: 0.4523

F-statistic: 8.397 on 171 and 1361 DF, p-value: < 2.2e-16

```

# ... -----
# ... save data frame for SAS input file
# ... -----
moneyball_sas_input <- mlb

sas_dir <- "~/sas/SASUniversityEdition/myfolders/stats_ii"
setwd(sas_dir)

```

```
write.csv(moneyball_sas_input, file = "moneyball_training_set_cleaned.csv", row.names = FALSE, na = ".")  
  
setwd(home_dir)  
setwd(data_dir)  
write.csv(moneyball_sas_input, file = "moneyball_training_set_cleaned.csv", row.names = FALSE, na = ".")  
setwd(home_dir)
```