Andy Tse
X-407.9
3/8/17

Buster Posey

1. To run the code in order to calculate the statistics:

```
> #### Range of the Vector and the Code
>
> rbi <- c(0,21,67,72,103)
> rbi
[1]   0  21  67  72 103
> range(rbi)
[1]   0 103
>
> #### Calculating the Mean
>
> mean(rbi)
[1] 52.6
>
> ### Calculating the Median
>
> median(rbi)
[1] 67
```

2.
```
> ### Reading the Data to get information on CSV file:
>
> posey <- read.csv('./posey.csv')
> head(posey)
  Year wRC.   G   AVG  AB  R   H X2B X3B HR RBI SB SO
1 2009  -51   7 0.118  17  1   2   0   0  0   0  0  4
2 2010  134 108 0.305 406 58 124  23   2 18  67  0 55
3 2011  116  45 0.284 162 17  46   5   0  4  21  3 30
4 2012  163 148 0.336 530 78 178  39   1 24 103  1 96
5 2013  133 148 0.294 520 61 153  34   1 15  72  1 70
```

3.
```
> ### Regression Analysis and the Summary of It
> regr <- lm(wRC. ~ R + H + RBI, posey)
> print(regr)

Call:
lm(formula = wRC. ~ R + H + RBI, data = posey)

Coefficients:
(Intercept)            R            H          RBI
   -0.31380     -1.38072      1.62502     -0.09111

> summary(regr) # Overall Summary of Regression

Call:
lm(formula = wRC. ~ R + H + RBI, data = posey)

Residuals:
     1      2      3      4      5
-52.56  19.00  66.95  -8.86 -24.53

Coefficients:
```

```
            Estimate Std. Error t value Pr(>|t|)
(Intercept) -0.31380   77.93368  -0.004    0.997
R           -1.38072   18.39135  -0.075    0.952
H            1.62502    5.43062   0.299    0.815
RBI         -0.09111   10.76176  -0.008    0.995

Residual standard error: 91.02 on 1 degrees of freedom
Multiple R-squared:  0.7169,    Adjusted R-squared:  -0.1324
F-statistic: 0.8441 on 3 and 1 DF,  p-value: 0.644
```

4.

There are many ways to measure the best statistic in baseball, whether it is on the offensive side or defensive side. From the dataset that is given, it has only measured in the offensive performance. For example, according to the article on CBS Sports, the Eye on Baseball Staff states, “The fewer baserunners, the fewer chances for runs. The fewer runs, the better chance you have of winning the game,” where the authors define that WHIP is the best metric that is simple and easy to understand. WHIP is an acronym for Walks + Hits/Innings Pitched (CBS Sports). It is also an indication that it's one of the easier metrics to calculate and more accurate (Wired). The table below explains a better view on how the offensive performance could be measured as an example from the article “Which Baseball Statistic Is the Most Important When Determining Team Success?”, where the author, Adam Houser indicates that Home Runs are not the measurement of success(The Park Place Economist Volume XIII). It is indicated that having more bases ran than your opponent from the first to third bases have been much more of a factor. K per 9 is an example of a defensive statistic where the pitcher strikes out the opponent every 9 innings of the baseball game. By calculating is to use multiply the number of strikeouts by nine and divide by the innings pitched.

TABLE 5
Regression Results Best Statistic:

Explanatory Variables	â	Std. Error	t	Sig.	R^2
BA	591.768	82.312	7.189	0	0.259
OBP	605.572	59.435	10.189	0	0.412
SLG	285.704	33.741	8.468	0	0.326
STL	0.466	0.181	2.572	0.011	0.043
WHIP	-97.222	8.49	-11.451	0	0.47
K per 9	7.092	1.417	5.004	0	0.145
Field	1931	344.736	5.601	0	0.175
Payroll	n/a	n/a	5.285	0	0.159

By comparing the contract details with Buster Posey's salary, the nearest competitor that matches Buster Posey was Mike Piazza. According to the data from the article “Buster Posey contract analysis: How did other catchers age?”, Grant Brisbee, “It's hard to find a good comparable player for Buster Posey,”(McCovey Chronicles) where he addresses that in Posey's career, there has not been one baseball player that could match his statistics in on-base plus slugging (OPS+) or WAR (Wins Above Replacement). The statistics for Buster Posey (12 career WAR, 146 OPS+) has determined that he is also one of the leaders in terms

of making significant plays to win championships. The reason that Buster Posey is having a large contract determines not only on the offensive statistics that he has earned, also the accomplishments that he has earned such as being the World Champion twice, Rookie of the Year, and a MVP. He is also have other comparable athletes such as Rudy York, Joe Torre and Carlton Fisk for the top five for OPS (140, 133, 130) respectively.

Based on the information that is given from the original computations of wRC+, it is not significant that it is the most important measure of statistic. According to the information from Fangraphs, Neil Weinberg states, “Even the best statistics, things like wRC+, are imperfect” (Fangraphs), where it determines that it is one of the more complicated statistic to measure. RBI (Run Batted In) isn't the necessary measure either because it has only been more of the offensive measurements to determine. An example for the RBI metric determines that over 100 RBI is average during the season. For example, in the same source, the wRC+ of Mike Trout produces all positive statistic for every season that he has played, while Buster Posey has one season with a negative wRC+ which is 2009. The only difference is that Posey is on a 9-year contract, while Trout has a six year contract. In addition, by comparing the wRC+ metric for both players, from 2014 to now, the numbers have been consistent within the range during the 2009-2013 seasons, shown on question 2 earlier with Buster Posey's information.

The comparision between Buster Posey's current statistics and Mike Trout's information are shown below. It has shown that Mike Trout's more recent statistic is comparable to Buster Posey's season during 2009-2013 with the RBI, and wRC+. However, Trout is a great home-run hitter, which is not as important as a factor comparatively. The second player that would also be another comparison is Mike Piazza, which the data is up until 2007, where his wRC+ is much higher than Buster Posey's during the late 1990s to early 2000s, with the exception of the first season that he has started, which is 1992. In addition, Mike Trout also have an up and down year for wRC+, however, Piazza have played longer in the Major League Baseball than the other players have listed.

Buster Posey's Current Statistics:

Season	G	PA	HR	R	RBI	SB	BB%	K%	ISO	BABIP	AVG	OBP	SLG	wOBA	wRC+	BsR	Off	Def	WAR
2014	147	605	22	72	89	0	7.8 %	11.4 %	0.179	0.319	0.311	0.364	0.49	0.371	142	-3.4	25.5	7	5.5
2015	150	623	19	74	95	2	9.0 %	8.3 %	0.153	0.32	0.318	0.379	0.47	0.363	136	-1.8	24.4	8.2	5.5
2016	146	614	14	82	80	6	10.4 %	11.1 %	0.147	0.303	0.288	0.362	0.434	0.341	116	-3.1	9.1	10.8	4

Mike Trout's Statistics Overall:

Season	Team	G	PA	HR	R	RBI	SB	BB%	K%	ISO	BABIP	AVG	OBP	SLG	wOBA	wRC+	BsR	Off	Def	WAR
2009	Angels (R)	39	187	1	29	25	13	9.6 %	15.0 %	0.146	0.423	0.36	0.418	0.506	0.416	144				
2009	Angels (A)	5	20	0	1	0	0	20.0 %	30.0 %	0	0.444	0.267	0.421	0.267	0.351	115				
2010	Angels (A)	81	368	6	76	39	45	12.5 %	14.1 %	0.163	0.42	0.362	0.454	0.526	0.445	173				
2010	Angels (A+)	50	232	4	30	19	11	11.6 %	14.2 %	0.122	0.346	0.306	0.388	0.429	0.368	116				
2011	Scorpions (R)	25	111	1	12	5	3	4.5 %	29.7 %	0.075	0.347	0.245	0.279	0.321	0.273	45				
2011	Angels (AA)	91	412	11	82	38	33	10.9 %	18.4 %	0.218	0.39	0.326	0.414	0.544	0.421	156				
2011	Angels	40	135	5	20	16	4	6.7 %	22.2 %	0.171	0.247	0.22	0.281	0.39	0.296	87	1.8	-0.2	2.4	0.7
2012	Angels (AAA)	20	93	1	21	13	6	11.8 %	17.2 %	0.221	0.476	0.403	0.467	0.623	0.464	179				
2012	Angels	139	639	30	129	83	49	10.5 %	21.8 %	0.238	0.383	0.326	0.399	0.564	0.409	167	14.1	64.2	13	10.3
2013	Angels	157	716	27	109	97	33	15.4 %	19.0 %	0.234	0.376	0.323	0.432	0.557	0.423	176	7.8	70.1	3.3	10.5
2014	Angels	157	705	36	115	111	16	11.8 %	26.1 %	0.274	0.349	0.287	0.377	0.561	0.402	167	6.5	58.1	-8.4	7.9
2015	Angels	159	682	41	104	90	11	13.5 %	23.2 %	0.29	0.344	0.299	0.402	0.59	0.415	172	3.3	59.9	2.1	9
2016	Angels	159	681	29	123	100	30	17.0 %	20.1 %	0.235	0.371	0.315	0.441	0.55	0.418	171	9.3	67.7	0.7	9.4

Mike Piazza's Statistics Overall:

Season	Team	G	PA	HR	R	RBI	SB	BB%	K%	ISO	BABIP	AVG	OBP	SLG	wOBA	wRC+	BsR	Off	Def	WAR
1992	Dodgers	21	74	1	5	7	0	5.4 %	16.2 %	0.087	0.268	0.232	0.284	0.319	0.279	76	0	-1.9	0	0
1993	Dodgers	149	602	35	81	112	3	7.6 %	14.3 %	0.243	0.322	0.318	0.37	0.561	0.401	150	-0.9	36.3	16.5	7.4
1994	Dodgers	107	441	24	64	92	1	7.5 %	14.7 %	0.222	0.33	0.319	0.37	0.541	0.384	139	-1.1	20.8	3.9	3.8
1995	Dodgers	112	475	32	82	93	1	8.2 %	16.8 %	0.26	0.365	0.346	0.4	0.606	0.427	168	0.1	40.9	4.5	6
1996	Dodgers	148	631	36	87	105	0	12.8 %	14.7 %	0.227	0.352	0.336	0.422	0.563	0.416	165	-1.5	50.2	0.6	6.6
1997	Dodgers	152	633	40	104	124	5	10.9 %	12.2 %	0.277	0.363	0.362	0.431	0.638	0.452	183	0.6	66.9	5.5	9.1
1998	3 Teams	151	626	32	88	111	1	9.3 %	12.8 %	0.242	0.335	0.328	0.39	0.57	0.405	151	0.2	40.8	6.7	6.6
1999	Mets	141	593	40	100	124	2	8.6 %	11.8 %	0.272	0.283	0.303	0.361	0.575	0.39	131	-0.5	24.2	4.8	4.5
2000	Mets	136	545	38	90	113	4	10.6 %	12.7 %	0.29	0.313	0.324	0.398	0.614	0.423	153	0	39.4	5.3	5.8
2001	Mets	141	573	36	81	94	0	11.7 %	15.2 %	0.272	0.302	0.3	0.384	0.573	0.395	143	-0.9	31.2	-2.2	4.6
2002	Mets	135	541	33	69	98	0	10.5 %	15.2 %	0.264	0.276	0.28	0.359	0.544	0.381	136	-3.9	20.3	8	4.6
2003	Mets	68	273	11	37	34	0	12.8 %	14.7 %	0.197	0.301	0.286	0.377	0.483	0.37	126	-4	4.9	2.6	1.6
2004	Mets	129	528	20	47	54	0	12.9 %	14.8 %	0.178	0.281	0.266	0.362	0.444	0.344	108	-7	-1.9	-11.2	0.5
2005	Mets	113	442	19	41	62	0	9.3 %	15.2 %	0.201	0.26	0.251	0.326	0.452	0.334	103	-3.3	-1.7	-3.6	0.9
2006	Padres	126	439	22	39	68	0	7.7 %	15.0 %	0.218	0.29	0.283	0.342	0.501	0.358	121	-6.2	6	-0.7	1.9
2007	Athletics (A+)	3	11	2	2	4	0	18.2 %	27.3 %	0.667	0.25	0.333	0.455	1	0.569	240				
2007	Athletics (AAA)	3	17	0	1	1	0	0.0 %	17.6 %	0.118	0.5	0.412	0.412	0.529	0.413	145				
2007	Athletics	83	329	8	33	44	0	5.5 %	18.5 %	0.139	0.318	0.275	0.313	0.414	0.318	92	-2.9	-6.1	-7.9	-0.3

Measuring metrics in baseball by the biometrics has become an interesting trend. The purpose of using biometrics is to determine if there could be more improvement in offensive stats. For example, in the article, “The Rise of Biometrics Tracking in Sports”, Don Basile states, “Notably, the Playing Rules Committee for MLB approved two devices for use during the 2016 season: the Motus Baseball Sleeve, which measures stress on elbows, and Zephyr Bioharness, a kind of smart sensor patch that monitors heart and breathing rates,”(Don Basile) where he has indicated that the player's health is another way to measure how good the player can get in terms of performance on the field. Using those items that have been mentioned from the quotes have indicated that there will be a rising level of data that becomes more granular and accurate. The purpose is to help the players to improve their training in order to succeed.

No, wRC+ is not a good method to measure the overall statistic for baseball because the p-value is over 0.05. It has been concluded that p-value shows that wRC+ is not a significant measure of the overall baseball statistic, since it is 0.2377, however, the model is a great fit based on the given r-squared values. Based on the regression results from the summary in R, there is no correlation between runs, hits, and RBI. It is much easier to run simple statistics as mentioned earlier to compute the metric for batter's performance. As mentioned earlier, the best statistic to use is Walks + Hits/Innings Pitched. However, RBI is also another important measure to consider. If the player plays the pitcher position, the K per 9 is the best statistic in order to win the game.

Recommendations:

- If there is an unlimited budget, the other alternative to bring in is Mike Piazza.
- OPS+ is one of the better metrics to prove for a batter's performance because it is an accurate measure to make great plays to become a winner.
- Make better decisions in predicting accuracy by having a better metric, particularly not using wRC+.
- Utilize biometrics in order to have better performance to the players.

References:

Bales, Jonathan. “My 5 Favorite Stats for Daily Fantasy Baseball”. Fantasy Labs. May 13, 2015. http://www.fantasylabs.com/articles/my-5-favorite-stats-for-daily-fantasy-baseball/

Brisbee, Grant. “Buster Posey contract analysis: How did other catchers age?”. McCovey Chronicles. March 29, 2013 http://www.mccoveychronicles.com/2013/3/29/4163206/buster-posey-contract-analysis-giants-extension-tithing

Basile, Don. “The Rise of Biometrics in Sports.” Don Basile. April 25, 2016. http://donbasile.me/the-rise-of-biometrics-tracking-in-pro-sports/

Eye on Baseball Staff. “What is the best pitching stat?” CBS Sports. November 19, 2012. http://www.cbssports.com/mlb/eye-on-baseball/21056639/what-is-the-best-pitching-stat

Houser, Adam. “Which Baseball Statistic Is the Most Important When Determining Team Success?” The Park Place Economist Volume XIII, Volume 13. 2005. https://www.iwu.edu/economics/PPE13/houser.pdf

Makice, Kevin. “Choosing the Best Fantasy Baseball Stats to Track”. Wired. April 26, 2012. https://www.wired.com/2012/04/best-fantasy-baseball-stats/

Weinburg, Neil. “Stats to Avoid: Runs Batted In (RBI)”. Fangraphs. October 24, 2014. http://www.fangraphs.com/library/stats-to-avoid-runs-batted-in-rbi/