

# **Is It Just Enjoying Beer & Kettle Corn? The Correlation Between Spring Training Performance and Regular Season and World Series Performance**

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*MLB Spring Training draws much attention both in popular writing and academic research. Research on pre-season performance and its correlation to performance in the regular season following is not exclusive only to baseball. Still, no study has examined correlations between pre-season performance and playoffs performance. This study examines the correlation between Spring Training performance and performance during regular season and World Series. Analyzing 212 players statistics between the years 2008-2018 in Spring Training, regular season and World Series it was found that Spring Training performance has significant correlations with performance in regular season and more importantly in the World Series.*

*Keywords: spring training, world series, performance analysis, baseball, game indicators*

## **INTRODUCTION**

MLB Spring Training draws much attention both in popular writing and academic research. Some focus on the economic impacts (e.g., Kelsh, 2018; Holeywell, 2011) or attendance (Donihue, Findla & Newberry, 2007). Others focus on performance and records (e.g., summers, 2012; Kinzy, 2018). The main question regarding the performance level and records is how significant is performance in Spring Training games in connection the performance of individual players and teams during the regular season. The level of performance and statistics in Spring Training has great interest to players, owners, managers, fans, and fantasy league players (Summers, 2012).

Research on pre-season performance and its correlation to performance in the regular season following is not exclusive only to baseball. Previous researches were held in American Football (NFL) (Jianakoplos, & Shields, 2012); Basketball (NBA) (Beech, 2007) Australian football (McCaskie, Young, Fahrner & Sim, 2019) and soccer (in Italy) (Francioni, Figueiredo, Lupo, Conte, Capranica & Tessitore, 2016). Jianakoplos and Shields found that preseason winning percentages did provide significant information about regular season winning percentages in the 1970-1991 seasons in the NFL (2012). Beech showed that teams with better preseason records in the NBA also had better regular season records, especially for the poorer teams (2007). It is important to note that his results were not statistically significant due to the small sample sizes. Summers indicates that performance in spring training games is not as strongly correlated, especially when using small samples from one year at a time. However, he found that preseason performance over a five-year period is significantly related to regular season performance, both for teams and for players (2012).

As important performance in regular season is, eventually teams aim to get to the playoffs and win titles (García, Ibáñez, De Santos, Leite & Sampaio, 2013). Winning a game for a team or performing well for an individual player has a different importance in regular season and in playoffs games. While in the regular season you can lose three games in a row and remain in competition, if you lose two of three playoff games in a row you can be eliminated (García et al., 2013).

Yet, no study has examined the relationship between Spring Training performance and World Series performance or to indicate if there is a way to predict World Series performance based on the performance in periods of the regular season.

Therefore, this study seeks to examine the correlation between Spring Training performance and performance in the World Series and the regular season.

## METHOD

MLB provides statistics on their website (**MLB.com**) for performances of individual players (<http://mlb.mlb.com/stats/sortable>). Data for the eleven seasons (2008 – 2018) of performance of individual players, that their teams made it to the World Series, in Spring Training games, in regular season and in broken down to monthly statistics in each season were compared with their performance in World Series.

278 cases of 212 players were analyzed- some made it twice to the World Series (56) and some three times (10). In each case their batting average, OPS (on base percentage plus slugging parentage), homeruns and RBI's (runs batted in) were compared.

## RESULTS

Partial correlations among World Series and regular season statistics and Spring Training statistics are presented in table 1. World Series MVP award was not found significantly correlated to any of the Spring Training stats or regular season stats. World Series homeruns (**WSHR**) was found be to significantly correlated to both Spring Training homeruns (**SPHR**) ( $r=0.190$ ;  $p<0.001$ ) and Spring Trainings RBI (**SPRBI**) ( $r=0.140$ ;  $p<0.05$ ). Also, **WSHR** was found significantly correlated to regular season homeruns (**RSHR**) ( $r=0.424$ ;  $p<0.001$ ), regular season RBI (**RSRBI**) ( $r=0.331$ ;  $p<0.001$ ), regular season OPS (**RSOPS**) ( $r=0.339$ ;  $p<0.001$ ) and regular batting average (**RSBA**) ( $r=0.154$ ;  $p<0.05$ ). World Series RBI (**WSRBI**) was found to be significantly correlated to both **SPHR** ( $r=0.120$ ;  $p<0.05$ ) and **SPRBI** ( $r=0.145$ ;  $p<0.05$ ). Also, **WSRBI** was found significantly correlated to regular season homeruns (**RSHR**) ( $r=0.441$ ;  $p<0.001$ ), regular season RBI (**RSRBI**) ( $r=0.451$ ;  $p<0.001$ ), regular season OPS (**RSOPS**) ( $r=0.383$ ;  $p<0.001$ ) and regular batting average (**RSBA**) ( $r=0.266$ ;  $p<0.001$ ). World Series batting average (**WSBA**) was not found significantly correlated any of the Spring Training stats or regular season stats. World Series OPS (**WSOPS**) was not found significantly correlated to any of the Spring Training stats and was to be significantly correlated to regular season stats- **RSHR** ( $r=0.198$ ;  $p<0.001$ ), **RSRBI** ( $r=0.173$ ;  $p<0.001$ ) and **RSOPS** ( $r=0.153$ ;  $p<0.05$ ).

**RSHR** was found significantly correlated to **SPHR** ( $r=0.419$ ;  $p<0.001$ ), **SPRBI** ( $r=0.361$ ;  $p<0.001$ ), **SPOPS** ( $r=0.256$ ;  $p<0.001$ ) and Spring Training batting average (**SPBA**) ( $r=0.126$ ;  $p<0.05$ ). **RSRBI** was found significantly correlated to **SPHR** ( $r=0.362$ ;  $p<0.001$ ), **SPRBI** ( $r=0.380$ ;  $p<0.001$ ), **SPOPS** ( $r=0.242$ ;  $p<0.001$ ) and **SPBA** ( $r=0.163$ ;  $p<0.001$ ). **RSBA** was found significantly correlated only to **SPBA** ( $r=0.138$ ;  $p<0.05$ ). **RSOPS** was found significantly correlated to **SPHR** ( $r=0.159$ ;  $p<0.001$ ), **SPRBI** ( $r=0.163$ ;  $p<0.001$ ) and **SPOPS** ( $r=0.166$ ;  $p<0.001$ ).

**TABLE 1**  
**PARTIAL CORRELATIONS AMONG WORLD SERIES STATS, SPRING TRAINING AND REGULAR SEASON STATS**

|              | <b>WSHR</b> | <b>WSRBI</b> | <b>WSBA</b> | <b>WSOPS</b> | <b>RSHR</b> | <b>RSRBI</b> | <b>RSBA</b> | <b>RSOPS</b> | <b>SPHR</b> | <b>SPRBI</b> | <b>SPBA</b> | <b>SPOPS</b> |
|--------------|-------------|--------------|-------------|--------------|-------------|--------------|-------------|--------------|-------------|--------------|-------------|--------------|
| <b>WSMVP</b> | .299**      | .317**       | .229**      | .306**       | 0.09        | 0.069        | 0.067       | 0.091        | -0.01       | 0.024        | -0.018      | -0.025       |
| <b>WSHR</b>  |             | .683**       | .227**      | .509**       | .424**      | .331**       | .154*       | .339**       | .190**      | .140*        | 0.003       | 0.051        |
| <b>WSRBI</b> |             |              | .302**      | .461**       | .441**      | .451**       | .266**      | .383**       | .120*       | .146*        | 0.042       | 0.063        |
| <b>WSBA</b>  |             |              |             | .885**       | 0.06        | 0.087        | 0.077       | 0.025        | -0.06       | -0.017       | -0.006      | -0.047       |
| <b>WSOPS</b> |             |              |             |              | .198**      | .173**       | 0.092       | .153*        | 0.002       | 0.024        | -0.008      | -0.017       |
| <b>RSHR</b>  |             |              |             |              |             | .876**       | .323**      | .692**       | .419**      | .361**       | .126*       | .256**       |
| <b>RSRBI</b> |             |              |             |              |             |              | .467**      | .644**       | .362**      | .380**       | .163**      | .242**       |
| <b>RSBA</b>  |             |              |             |              |             |              |             | .782**       | -.050       | .079         | .138*       | .065         |
| <b>RSOPS</b> |             |              |             |              |             |              |             |              | .159**      | .163**       | .109        | .166**       |
| <b>SPHR</b>  |             |              |             |              |             |              |             |              |             | .700**       | .272**      | .517**       |
| <b>SPRBI</b> |             |              |             |              |             |              |             |              |             |              | .409**      | .495**       |
| <b>SPBA</b>  |             |              |             |              |             |              |             |              |             |              |             | .894**       |
| <b>SPOPS</b> |             |              |             |              |             |              |             |              |             |              |             | 1            |

\*\* $p < 0.001$ ; \* $p < 0.05$

A similar procedure was performed with broken down to monthly statistics. In table 2 are presented the partial correlations among World Series, Spring Training and regular season stats and monthly regular season stats of the months April through June. World Series MVP award was found significantly correlated to April batting average ( $r=0.150$ ;  $p<0.05$ ). **WSHR** was found be to significantly correlated to April homeruns (**APHR**) ( $r=0.300$ ,  $p<0.001$ ), April RBI (**APRBI**) ( $r=0.248$ ,  $p<0.001$ ), April OPS (**APOPS**) ( $r=0.184$ ;  $p<0.001$ ), May Homeruns (**MAHR**) ( $r=0.205$ ;  $p<0.001$ ), May RBI (**MARBI**) ( $r=0.140$ ;  $p<0.05$ ), May OPS (**MAOPS**) ( $r=0.151$ ;  $p<0.05$ ), June homeruns (**JNHR**) ( $r=0.364$ ;  $p<0.001$ ), June RBI (**JNRBI**) ( $r=0.271$ ;  $p<0.001$ ) and June batting average (**JNBA**) ( $r=0.136$ ;  $p<0.05$ ).

**WSRBI** was found be to significantly correlated to **APHR** ( $r=0.252$ ,  $p<0.001$ ), **APRBI** ( $r=0.316$ ,  $p<0.001$ ), **APBA** ( $r=0.172$ ;  $p<0.001$ ), **APOPS** ( $r=0.227$ ;  $p<0.001$ ), **MAHR** ( $r=0.304$ ;  $p<0.001$ ), **MARBI** ( $r=0.253$ ;  $p<0.001$ ), **MAOPS** ( $r=0.156$ ;  $p<0.05$ ), **JNHR** ( $r=0.269$ ;  $p<0.001$ ) and **JNRBI** ( $r=0.282$ ;  $p<0.001$ ).

**WSBA** was found significantly correlated only to **JNOPS** ( $r=0.314$ ,  $p<0.001$ ). **WSOPS** was found be to significantly correlated to **APRBI** ( $r=0.138$ ,  $p<0.005$ ), **MAHR** ( $r=0.145$ ;  $p<0.05$ ), **MAOPS** ( $r=0.140$ ;  $p<0.05$ ), **JNHR** ( $r=0.128$ ;  $p<0.05$ ) and **JNOPS** ( $r=0.204$ ;  $p<0.001$ ).

**SPHR** was found be to significantly correlated to **APHR** ( $r=0.208$ ,  $p<0.001$ ), **APRBI** ( $r=0.214$ ,  $p<0.001$ ), **MAHR** ( $r=0.316$ ;  $p<0.001$ ), **MARBI** ( $r=0.248$ ;  $p<0.001$ ), **JNHR** ( $r=0.246$ ;  $p<0.001$ ) and **JNRBI** ( $r=0.192$ ;  $p<0.001$ ).

**SPRBI** was found be to significantly correlated to **APHR** ( $r=0.180$ ,  $p<0.001$ ), **APRBI** ( $r=0.225$ ,  $p<0.001$ ), **APOPS** ( $r=0.129$ ;  $p<0.05$ ), **MAHR** ( $r=0.276$ ;  $p<0.001$ ), **MARBI** ( $r=0.289$ ;  $p<0.001$ ), **JNHR** ( $r=0.164$ ;  $p<0.001$ ) and **JNRBI** ( $r=0.163$ ;  $p<0.001$ ).

**SPBA** was found significantly correlated only to **MARBI** ( $r=0.123$ ,  $p<0.05$ ). **SPOPS** was found be to significantly correlated to **APRBI** ( $r=0.141$ ,  $p<0.005$ ), **MAHR** ( $r=0.185$ ;  $p<0.001$ ), **MARBI** ( $r=0.162$ ;  $p<0.001$ ), **JNHR** ( $r=0.173$ ;  $p<0.001$ ) and **JNRBI** ( $r=0.169$ ;  $p<0.001$ ).

**TABLE 2**  
**PARTIAL CORRELATIONS AMONG WORLD SERIES STATS, SPRING TRAINING AND MONTHLY**  
**REGULAR SEASON STATS (APRIL-JUNE)**

|       | APHR   | APRBI  | APBA   | APOPS  | MAHR   | MARBI  | MABA   | MAOPS  | JNHR   | JNRBI  | JNBA   | JNOPS  |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| WSMVP | .050   | .106   | .150*  | .121   | .013   | -.014  | .008   | -.004  | .091   | -.034  | .114   | -.011  |
| WSHR  | .300** | .248** | .083   | .184** | .205** | .140*  | .026   | .151*  | .364** | .271** | .136*  | -.035  |
| WSRBI | .252** | .316** | .172** | .227** | .304** | .253** | .025   | .156*  | .269** | .282** | .100   | -.057  |
| WSBA  | .011   | .066   | .062   | .023   | .065   | .051   | .076   | .090   | .036   | .038   | .060   | .314** |
| WSOPS | .122   | .138*  | .080   | .103   | .145*  | .097   | .069   | .140*  | .128*  | .102   | .100   | .204** |
| RSHR  | .686** | .614** | .250** | .453** | .689** | .608** | .085   | .291** | .720** | .621** | .102   | -.028  |
| RSRBI | .559** | .686** | .311** | .402** | .627** | .703** | .182** | .338** | .621** | .742** | .195** | -.053  |
| RSBA  | .257** | .358** | .523** | .455** | .208** | .312** | .357** | .325** | .213** | .366** | .389** | -.079  |
| RSOPS | .528** | .501** | .454** | .612** | .479** | .460** | .281** | .423** | .517** | .477** | .268** | -.054  |
| SPHR  | .208** | .214** | -.005  | .088   | .316** | .248** | .014   | .109   | .246** | .192** | -.044  | -.068  |
| SPRBI | .180** | .225** | .083   | .129*  | .276** | .289** | .021   | .078   | .164** | .163** | -.053  | -.066  |
| SPBA  | -.015  | .072   | .056   | -.017  | .083   | .123*  | .099   | .064   | .058   | .105   | .005   | -.087  |
| SPOPS | .080   | .141*  | .025   | .029   | .189** | .162** | .093   | .108   | .173** | .169** | -.059  | -.079  |

\*\* $p < 0.001$ ; \* $p < 0.05$

In table 3 are presented the partial correlations among World Series, Spring Training and regular season stats and monthly regular season stats of the months July through September. Similar correlations to April-June breakdown were found.

**TABLE 3**  
**PARTIAL CORRELATIONS AMONG WORLD SERIES STATS, SPRING TRAINING AND MONTHLY**  
**REGULAR SEASON STATS (JULY-SEPTEMBER)**

|       | JLHR   | JLRBI  | JLBA   | JLOPS  | AUHR   | AURBI  | AUBA   | AUOPS  | SEHR   | SERBI  | SEBA   | SEOPS  |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| WSMVP | .048   | .053   | .045   | .055   | .032   | .044   | -.037  | .001   | .062   | .081   | .037   | .016   |
| WSHR  | .362** | .330** | .278** | .353** | .325** | .199** | .018   | .155*  | .289** | .296** | .032   | .016   |
| WSRBI | .382** | .370** | .309** | .359** | .332** | .303** | .113   | .200** | .328** | .429** | .120*  | .026   |
| WSBA  | .081   | .072   | .071   | .061   | .052   | .071   | .069   | .050   | .038   | .101   | .040   | -.069  |
| WSOPS | .212** | .166** | .164** | .215** | .163** | .117   | .030   | .088   | .113   | .148*  | .000   | -.071  |
| RSHR  | .791** | .700** | .366** | .538** | .757** | .624** | .226** | .453** | .704** | .664** | .135*  | .084   |
| RSRBI | .679** | .773** | .437** | .521** | .653** | .734** | .328** | .451** | .593** | .733** | .199** | .055   |
| RSBA  | .301** | .459** | .556** | .478** | .318** | .454** | .486** | .431** | .251** | .402** | .511** | .186** |
| RSOPS | .628** | .604** | .502** | .633** | .595** | .565** | .385** | .548** | .555** | .566** | .400** | .220** |
| SPHR  | .346** | .270** | .040   | .139*  | .337** | .292** | .030   | .168** | .298** | .255** | -.022  | -.023  |
| SPRBI | .289** | .274** | .094   | .145*  | .281** | .275** | .119   | .188** | .270** | .278** | .061   | -.031  |
| SPBA  | .128*  | .114   | .122*  | .112   | .129*  | .151*  | .110   | .105   | .108   | .118   | .122*  | .005   |
| SPOPS | .233** | .184** | .091   | .142*  | .239** | .221** | .100   | .174** | .188** | .180** | .070   | -.020  |

\*\* $p < 0.001$ ; \* $p < 0.05$

Unlike Summers' (2012) findings, performance in Spring Training games was found strongly correlated to regular season performance. Each statistical category in Spring Training was found strongly correlated to its matching category in regular season- **SPHR** with **RSHR** ( $r=0.419$ ;  $p<0.001$ ), **SPRBI** with **RSRBI** ( $r=0.361$ ;  $p<0.001$ ), **SPBA** with **RSBA** ( $r=0.138$ ;  $p<0.05$ ) and **SPOPS** with **RSOPS** ( $r=0.166$ ;  $p<0.001$ ). Summers indicated that performance in Spring Training was found not as strong due to using small samples from one year at a time (2012). However, Summers found that preseason performance over a five-year period is significantly related to regular season performance both for teams and for players (2012). So, using a substantially larger sample and longer period of time in the current study provided more significant results.

Furthermore, in relation to the initial objective of this current study, performance in Spring Training games was found correlated to World Series performance in 2 of the statistical categories- **SPHR** with **WSHR** ( $r=0.190$ ;  $p<0.001$ ) and **SPRBI** with **WSRBI** ( $r=0.146$ ;  $p<0.005$ ).

Therefore, linear regression models were run in order to determine which statistical categories of the one found correlated influence in explaining the variance of the performance both in World Series and regular season.

As shown in table 4 monthly regular season statistics and World Series statistics were found significantly related to the MVP award of the World Series explaining 58.7% of the variance. No spring training statistics were found significant to be included in the regression model.

**TABLE 4**  
**LINEAR REGRESION RESULTS, EXPAINING WORLD SERIES MVP**

| <b>Construct</b>               | $\beta$ | Std. Error | <b>SR<sup>2</sup></b> | <b>Model adjusted R<sup>2</sup></b> |
|--------------------------------|---------|------------|-----------------------|-------------------------------------|
| <b>Constant</b>                | 1.68    | 0.348      |                       |                                     |
| <b>JNAVG</b>                   | 0.392   | 0.146      | 0.256                 | 0.587                               |
| <b>JNRBI</b>                   | -0.405  | 0.138      | 0.086                 |                                     |
| <b>WSRBI</b>                   | 0.284   | 0.126      | 0.119                 |                                     |
| <b>AUBA</b>                    | -0.212  | 0.121      | 0.049                 |                                     |
| <b>WSHR</b>                    | 0.253   | 0.117      | 0.039                 |                                     |
| <b>APBA</b>                    | 0.242   | 0.113      | 0.039                 |                                     |
| <b>MARBI</b>                   | -0.226  | 0.108      | 0.041                 |                                     |
| <b><math>p&lt;0.001</math></b> |         |            |                       |                                     |

The only statistic category that was significantly related to the World Series homeruns was the regular season homeruns that explains 17.5% of the variance. As shown in table 5 monthly regular season statistics were found significantly related to the World Series RBI explaining 17.7% of the variance. No spring training statistics were found significant to be included in the regression model.

**TABLE 5**  
**LINEAR REGRESION RESULTS, EXPAINING WORLD SERIES RBI**

| <b>Construct</b>               | $\beta$ | Std. Error | <b>SR<sup>2</sup></b> | <b>Model adjusted R<sup>2</sup></b> |
|--------------------------------|---------|------------|-----------------------|-------------------------------------|
| <b>Constant</b>                | 0.122   | 0.020      |                       |                                     |
| <b>SERBI</b>                   | 0.267   | 0.222      | 0.139                 | 0.177                               |
| <b>JLRBI</b>                   | 0.232   | 0.222      | 0.038                 |                                     |
| <b><math>p&lt;0.001</math></b> |         |            |                       |                                     |

The only statistic category that was significantly related to the World Series batting average was the regular season average that explains 1.3% of the variance.

As shown in table 6 monthly regular season statistics were found significantly related to the World Series OPS explaining 10.3% of the variance. No spring training statistics were found significant to be included in the regression model.

**TABLE 6**  
**LINEAR REGRESION RESULTS, EXPAINING WORLD SERIES OPS**

| <b>Construct</b>                 | $\beta$ | Std. Error | <b>SR<sup>2</sup></b> | <b>Model adjusted R<sup>2</sup></b> |
|----------------------------------|---------|------------|-----------------------|-------------------------------------|
| <b>Constant</b>                  | 0.447   | 0.020      |                       |                                     |
| <b>JLOPS</b>                     | 0.254   | 0.407      | 0.046                 | 0.103                               |
| <b>JNOPS</b>                     | 0.247   | 0.395      | 0.057                 |                                     |
| <b><math>p &lt; 0.001</math></b> |         |            |                       |                                     |

The same procedure was done with regular season statistics. No Spring Training statistics were found to be significantly related to any regular season statistics and only monthly regular season statistics were found significantly related to regular season statistics.

## CONCLUSIONS

This study aimed to examine the correlation between Spring Training performance and performance in the World Series and the regular season. These findings have great interest to players, owners, managers, fans, and fantasy league players (Summers, 2012).

Performance in Spring Training games was found directly correlated to Spring Training performance in World Series Performance in 2 statistical categories- homeruns and RBI. Furthermore, each statistical category in Spring Training was found strongly correlated to its matching category in regular season. These findings are very significant since each statistical category in regular season was found strongly correlated to its matching category in World Series.

So, this study found that Spring Training performance has a great impact on performance in regular season and more importantly in the World Series. These findings can be used as practical tolls for players, owners, managers, fans, and fantasy league players.

Conducting similar research in other sports, in which there is an organized league system (not just friendly matches) that the majority of the regular season roster plays in, can give a broader picture regarding the connection between pre-season performance and post season performance in general and not only in MLB.



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