



大聯盟球員如何拿高薪

—

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研究動機&目的

Research Motivation & Purpose

研究動機&目的

Research Motivation & Purpose

動機

世界十二強棒球賽甫結束，對於棒球的熱忱尚未結束的我們，想要對世界棒球殿堂——大聯盟做更深入的分析。大聯盟球員的薪資差距極大，少則數十萬多則上千萬，希望找出球團給薪的標準並建議有志進入大聯盟的各位朝這方面努力。

目的

探討球員的哪些表現或因素影響薪資的多寡最多





研究方法

Research Analysis

研究方法

Research Method

搜尋
2019, 2018, 2017大
聯盟球員的薪資、各
項表現數據、年齡

Step1

Step2

先將球員分為投手群
和打者群，並將薪資
分成三群：100萬以
下、100萬~1000萬、
1000萬以上

利用迴歸分析看
p-value顯不顯著

Step3

Step4

再用PCA分析找出各
薪資群的投手和打者
有哪些特質



資料蒐集方式

Data collection

資料收集

Data collection



薪資

<https://www.usatoday.com/sports/mlb/salaries/2014/player/all/>



年齡

<https://www.baseball-reference.com/players/m/mileywa01.shtml>



各項表現

http://www.espn.com/mlb/stats/pitching/_/year/2014/type/expanded-2/order/false



棒球數據解釋

Explanation

棒球數據解釋

Explanation

投手

GP : 出賽次數
IP : 投球局數
H : 被安打
BB : 四壞球保送
SO : 三振
W : 勝投數
L : 敗投數
WAR : 球員的綜合評價
ERA : 防禦率
AGE : 年紀
SALARY : 薪資

打擊

AB : 打數
R : 得分
RBI : 打點
SB : 盜壘成功
CS : 盜壘失敗
BB : 四壞球保送
SO : 被三振
AVG : 打擊率
OBP : 上壘率
SLG : 長打率
WAR : 球員的綜合評價
AGE : 年紀
SALARY : 薪資



研究結果

Research Analysis

2017Pitching

| 2017 P10w

	intercept	GP	IP	H	BB
10w	240561	-3317	1012	996	3636
sd	25846	294	97	103	162
p-value	0.0113	0.00776	0.00907	0.0105	0.00197

	SO	W	L	WAR	ERA	age
10w	-791	-13306	-4174	36422	-15094	5550
sd	40.6	826	267	1650	5033	364
p-value	0.00262	0.00384	0.00407	0.00205	0.0955	0.00426

n		r	adj. r	p-value
13		0.999	0.993	0.00542

| 2017 P10w



pc_num

ERA	SO	WAR	W	L
+	-	-	-	+

→ 廢物型(受傷)投手

GP	H	IP	W	L
-	-	-	-	+

→ 隊友不幫忙型(陳偉殷)投手

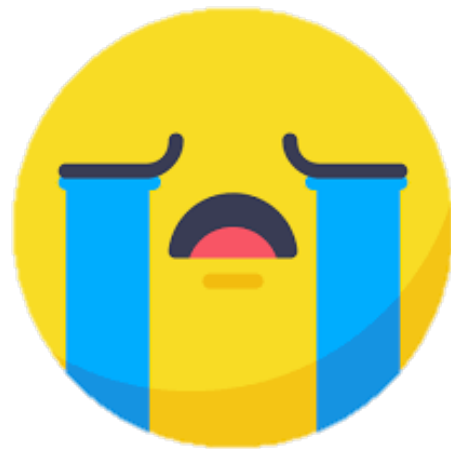
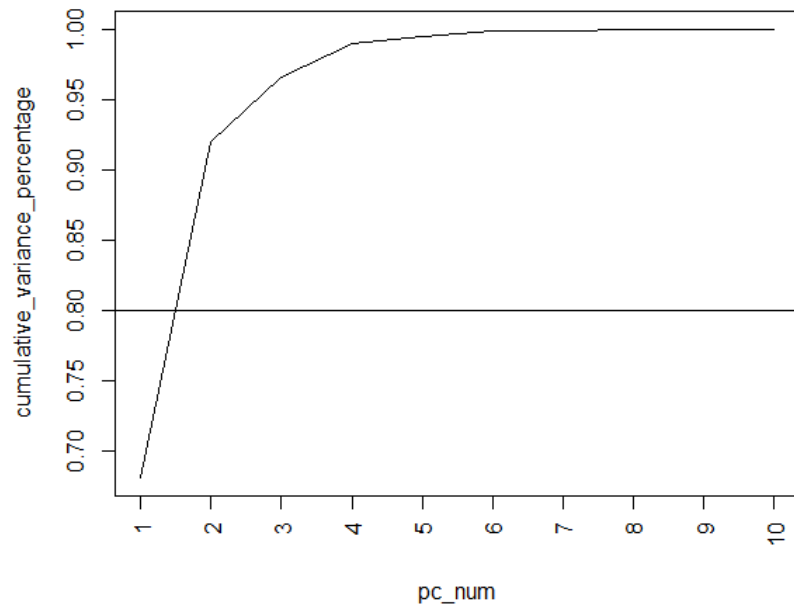
| 2017 P100w

	intercept	GP	IP	H	BB
100w	-20391431	806764	17556	-73652	-74624
sd	10259209	396593	64864	33142	48115
p-value	0.0642	0.0589	0.79	0.041	0.14

	SO	W	L	WAR	ERA	age
100w	-10611	-113642	270923	753373	1307248	259740
sd	15525	209578	297886	605545	1330381	105096
p-value	0.504	0.595	0.377	0.231	0.34	0.0251

n		r	adj. r	p-value
27		0.506	0.198	0.182

| 2017 P100w



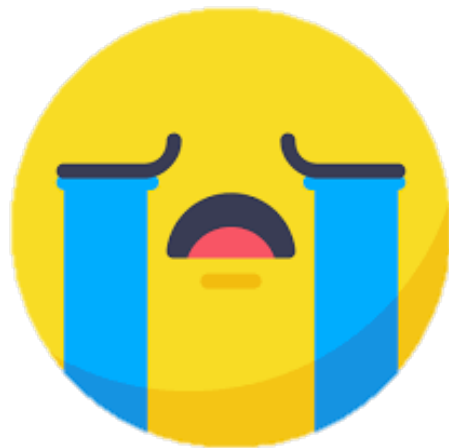
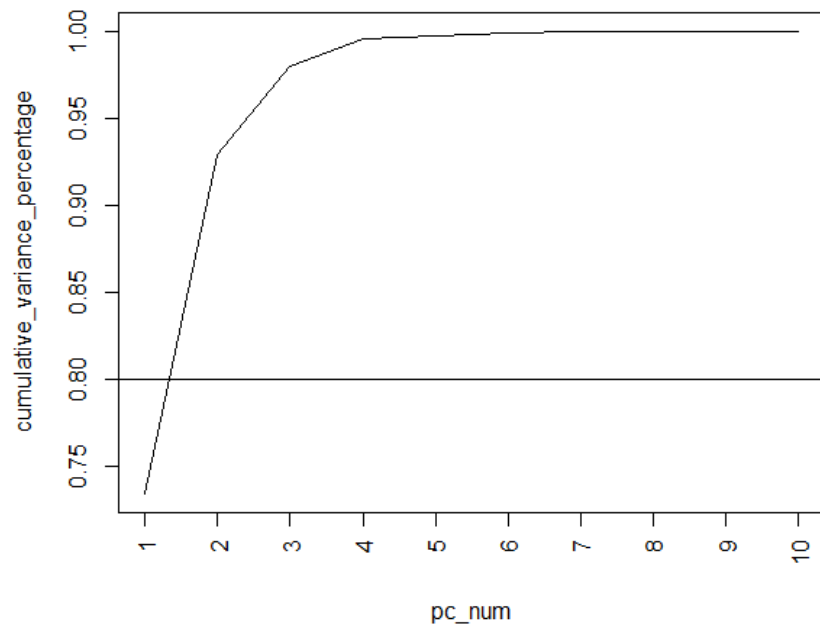
| 2017 P1000w

	intercept	GP	IP	H	BB
1000w	-25102	-1396167	-118964	230711	-170986
sd	46090058	4391545	487656	194940	260458
p-value	1	0.759	0.813	0.271	0.53

	SO	W	L	WAR	ERA	age
1000w	31740	1148229	-1126648	912644	3649099	883512
sd	66651	1389545	1124499	2649900	6093559	952121
p-value	0.647	0.433	0.346	0.739	0.566	0.381

n		r	adj. r	p-value
19		0.535	-0.0456	0.557

| 2017 P1000w



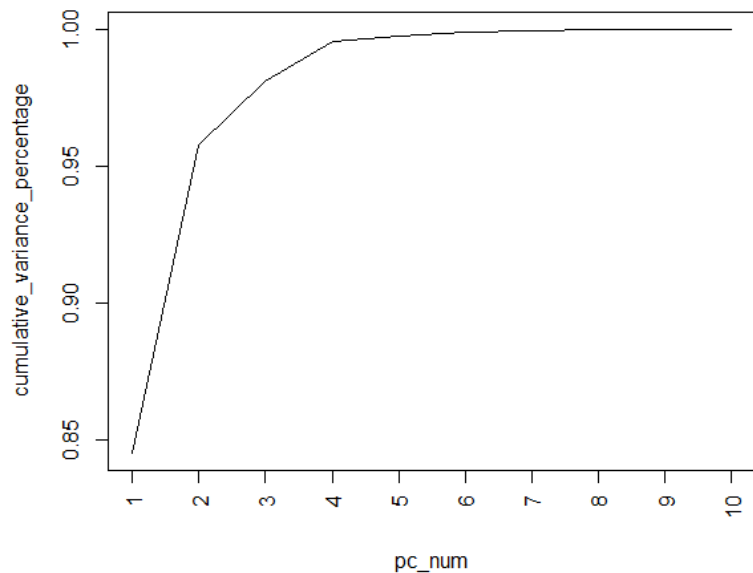
| 2017 P

	intercept	GP	IP	H	BB
all	-31600198	-315563	203309	-107010	-183265
sd	18929457	681516	155270	78634	84031
p-value	0.102	0.645	0.197	0.18	0.0341

	SO	W	L	WAR	ERA	age
all	10365	658036	-46205	-1096776	1391917	1034463
sd	33088	495182	536563	1057315	3026783	264265
p-value	0.755	0.19	0.932	0.305	0.648	0.000285

n		r	adj. r	p-value
59		0.453	0.339	0.000547

| 2017 P



ERA	WAR	L	W	SO
+	-	+	-	-

→ 廢物型(受傷)投手

IP	GP	H	SO	age
-	-	-	-	-

→ 體力差的控球型投手

2018Pitching

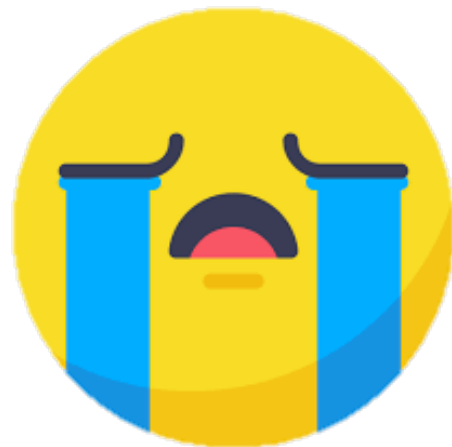
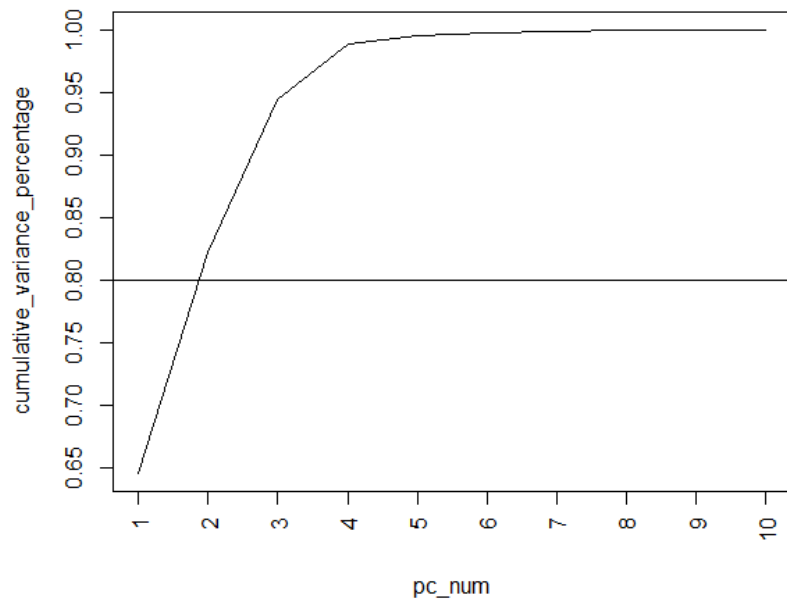
| 2018 P10w

	intercept	GP	IP	H	BB
10w	281898	9080	2893	-910	-2141
sd	526776	16528	2435	1396	1627
p-value	0.602	0.592	0.256	0.526	0.211

	SO	W	L	WAR	ERA	age
10w	65.6	-2152	-10914	-24408	-10162	-187
sd	607	5703	11429	15616	38434	10987
p-value	0.916	0.712	0.357	0.142	0.796	0.987

n		r	adj. r	p-value
24		0.325	-0.194	0.769

| 2018 P10w



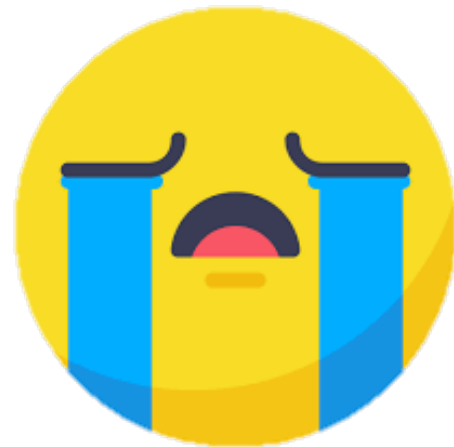
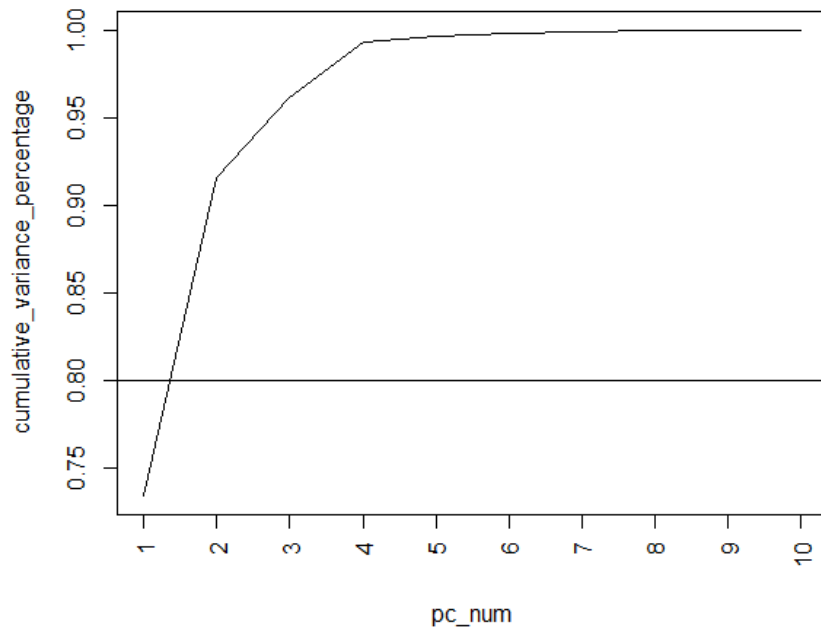
| 2018 P100w

	intercept	GP	IP	H	BB
100w	-8496251	-519970	143467	-73159	-26236
sd	18176586	552190	115327	72493	71569
p-value	0.651	0.371	0.245	0.339	0.722

	SO	W	L	WAR	ERA	age
100w	-19674	112633	-340427	419347	3361193	352236
sd	25146	320416	342349	1451074	3101469	349323
p-value	0.454	0.733	0.346	0.779	0.307	0.34

n		r	adj. r	p-value
20		0.469	-0.12	0.638

| 2018 P100w



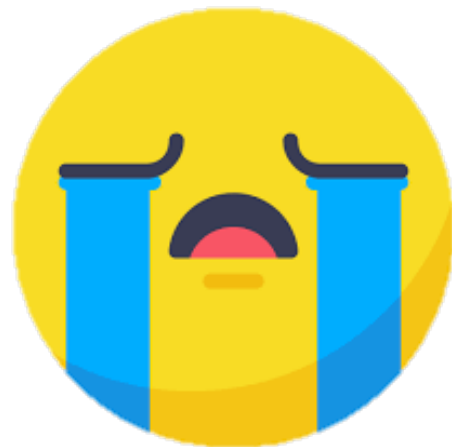
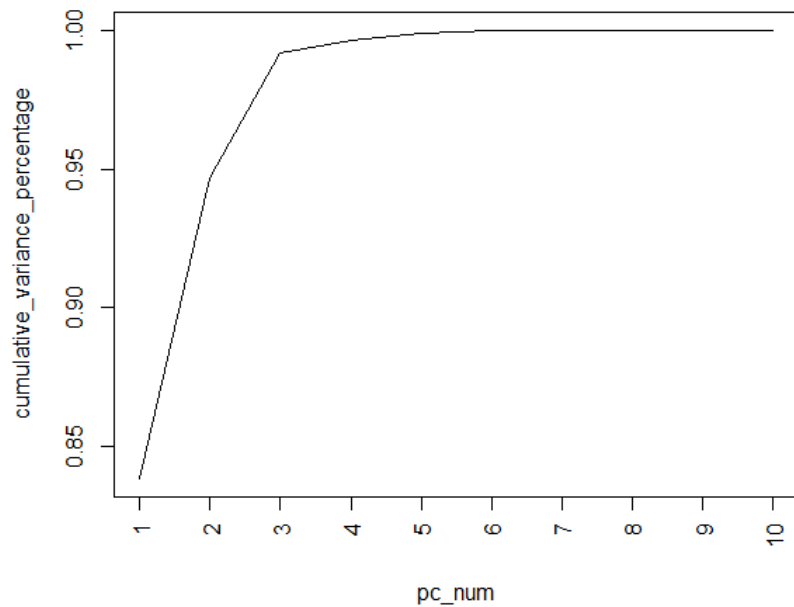
| 2018 P1000w

	intercept	GP	IP	H	BB
1000w	-197906043	6981766	-1245830	222425	-534929
sd	480102119	13485671	2153669	1270544	680232
p-value	0.708	0.64	0.604	0.872	0.489

	SO	W	L	WAR	ERA	age
1000w	-108917	2197364	4599287	11480635	10729283	2698479
sd	499718	5821823	8063525	17556569	28667591	5096545
p-value	0.841	0.731	0.608	0.56	0.733	0.633

n		r	adj. r	p-value
14		0.415	-1.54	0.973

| 2018 P1000w



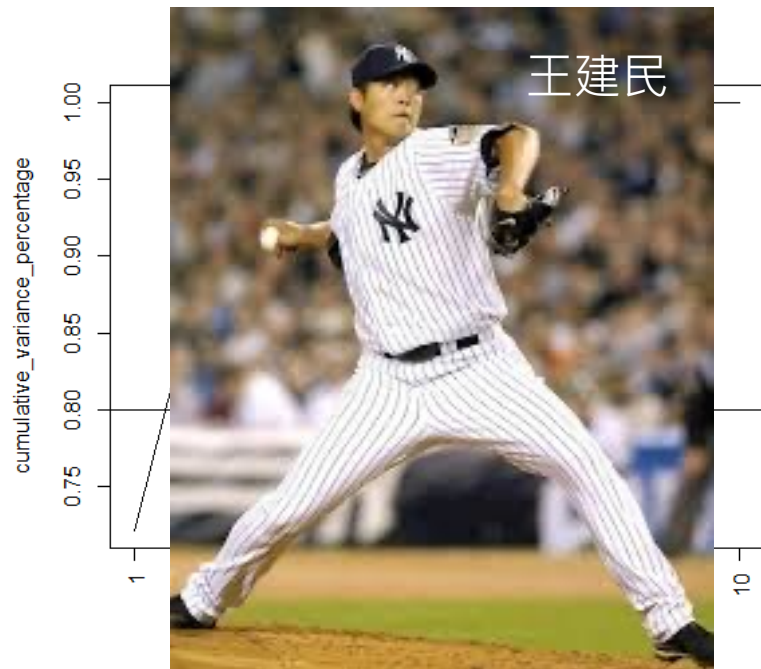
| 2018 P

	intercept	GP	IP	H	BB
all	-72378895	-912626	162161	-25342	21145
sd	20507991	729885	126279	80943	73358
p-value	0.000944	0.217	0.205	0.756	0.774

	SO	W	L	WAR	ERA	age
all	-7120	575923	462241	452821	3118857	2049815
sd	32630	312043	451386	829540	2489951	254677
p-value	0.828	0.07112	0.311	0.588	0.217	2.15E-10

n		r	adj. r	p-value
58		0.637	0.56	0.000000154

| 2018 P



ERA	WAR	SO	W	IP
+	-	-	-	-

→ 廢物型(受傷)投手

H	GP	IP	L	age
-	-	-	-	-

→ 滾地球投手

2019Pitching

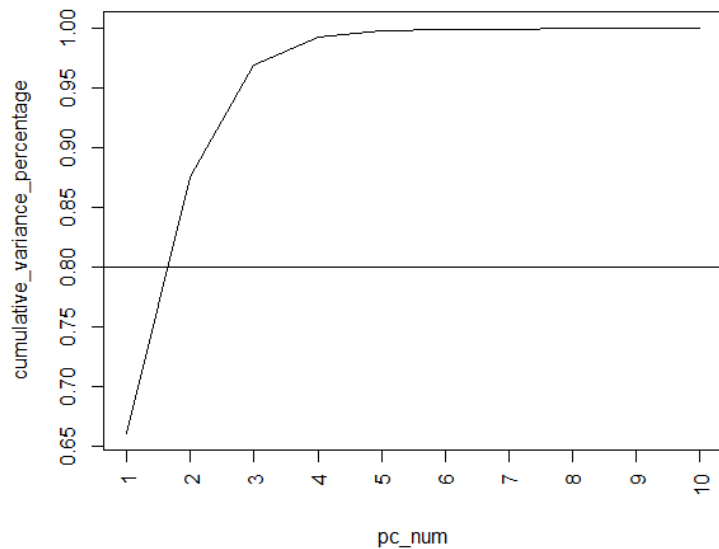
| 2019 P10w

	intercept	GP	IP	H	BB
10w	115832	-30690	5006	-210	-1658
sd	270535	9229	1619	1272	793
p-value	0.681	0.0127	0.0175	0.874	0.0748

	SO	W	L	WAR	ERA	age
10w	-1823	26128	18410	-4920	-21254	23407
sd	459	4699	4793	9480	34507	7697
p-value	0.0054	0.00085	0.00636	0.62	0.557	0.0188

n		r	adj. r	p-value
18		0.943	0.862	0.00185

| 2019 P10w



ERA	L	WAR	W	H
+	+	-	-	+

→ 廢物型(受傷)投手

IP	GP	H	SO	age
-	-	-	-	-

→ 菜鳥滾地球投手

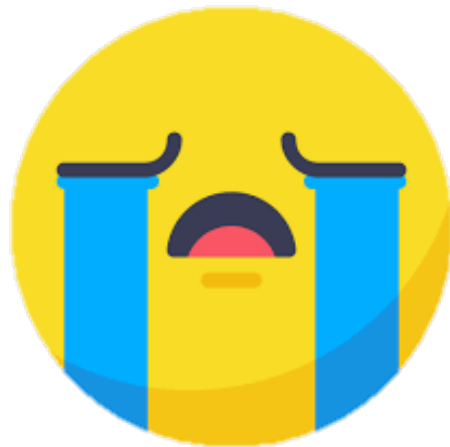
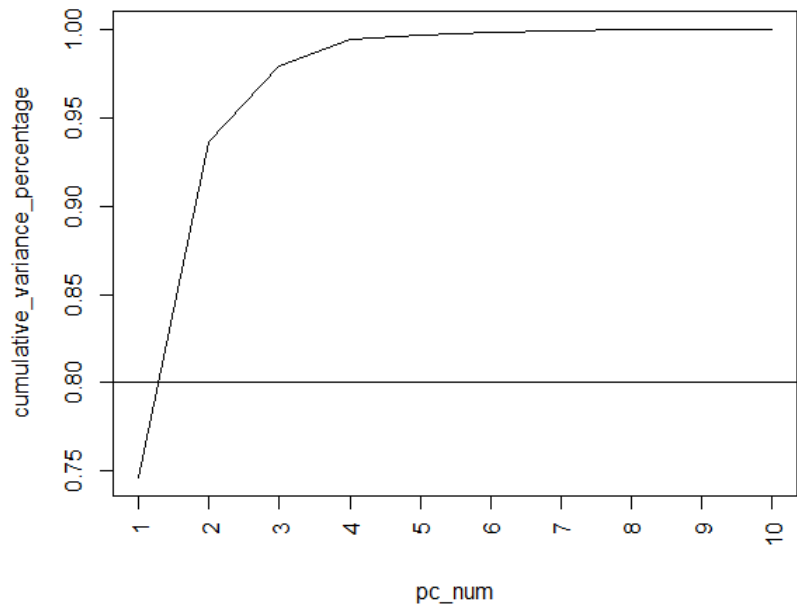
| 2019 P100w

	intercept	GP	IP	H	BB
100w	-48650679	1186524	34302	-18038	12608
sd	22847427	630829	106520	62342	64772
p-value	0.0621	0.0927	0.755	0.779	0.85

	SO	W	L	WAR	ERA	age
100w	-4831	-912051	-14938	1350358	2057095	394514
sd	22724	321260	237051	597903	2252002	230225
p-value	0.836	0.0194	0.951	0.0503	0.385	0.121

n		r	adj. r	p-value
20		0.707	0.38	0.13

| 2019 P100w



| 2019 P1000w

	intercept	GP	IP	H	BB
1000w	37402869	-7181230	762302	-148812	193149
sd	40653545	2017196	282196	127691	179379
p-value	0.379	0.00518	0.0223	0.271	0.307

	SO	W	L	WAR	ERA	age
1000w	-115372	406661	-836432	2977671	14300136	1417386
sd	67888	619401	1254881	2325732	5321984	705067
p-value	0.12	0.526	0.52	0.229	0.0228	0.0721

n		r	adj. r	p-value
21		0.745	0.491	0.0526

| 2019 P1000w



WAR	ERA	L	SO	W
+	-	-	+	+

→超級全能型選手

GP	BB	IP	age	SO
-	-	-	+	-

→一局型投手

| 2019 P

	intercept	GP	IP	H	BB
all	-14851917	-1717755	203605	-47922	-82046
sd	23196625	994714	150795	89065	85215
p-value	0.525	0.0906	0.183	0.593	0.34

	SO	W	L	WAR	ERA	age
all	37312	273992	-67467	-1072876	-26209	1657170
sd	37435	454041	479158	1067612	3052874	281909
p-value	0.324	0.549	0.889	0.32	0.993	0.000000384

n		r	adj. r	p-value
59		0.55	0.456	0.0000104

| 2019 P



WAR	ERA	SO	W	L
+	-	+	+	-

→ 超級全能型選手

GP	IP	H	L	BB
-	-	-	-	-

→ 滾地球投手

2017 Batting

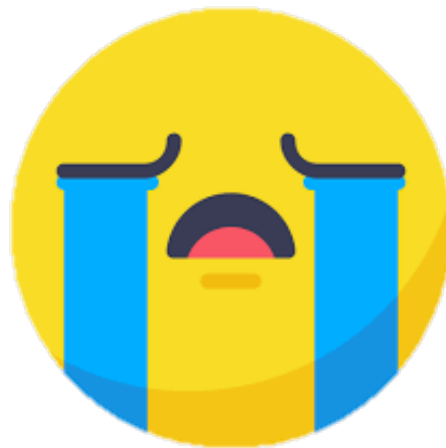
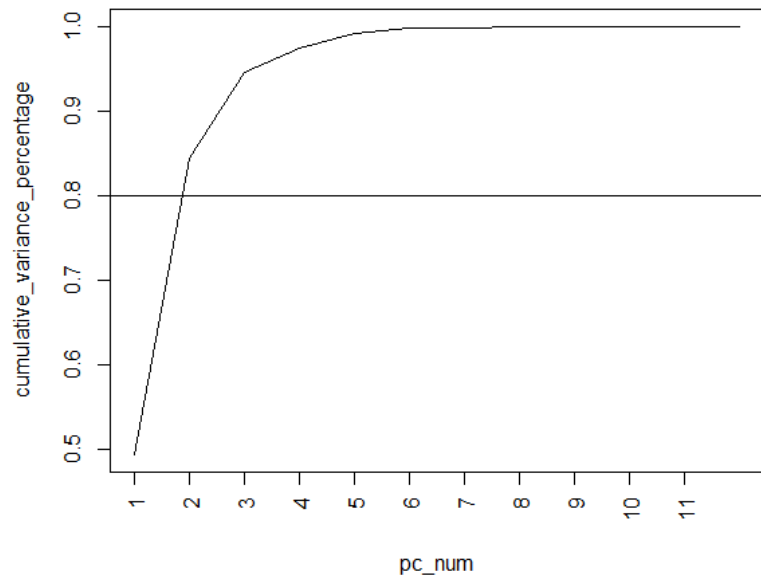
| 2017 B10w

	intercept	AB	R	RBI	SB	CS
10w	431386	327	3700	-164	1342	-3115
sd	681085	804	3665	1923	3712	8890
p-value	0.532	0.688	0.322	0.933	0.721	0.729

	BB	SO	AVG	OBP	SLG	WAR	age
10w	-469	-137	1249528	-1711645	-223419	1197	2647
sd	5098	634	3711641	4471346	809611	17868	10947
p-value	0.927	0.83	0.739	0.705	0.785	0.536	0.811

n		r	adj. r	p-value
39		0.359	0.0632	0.325

| 2017 B10w



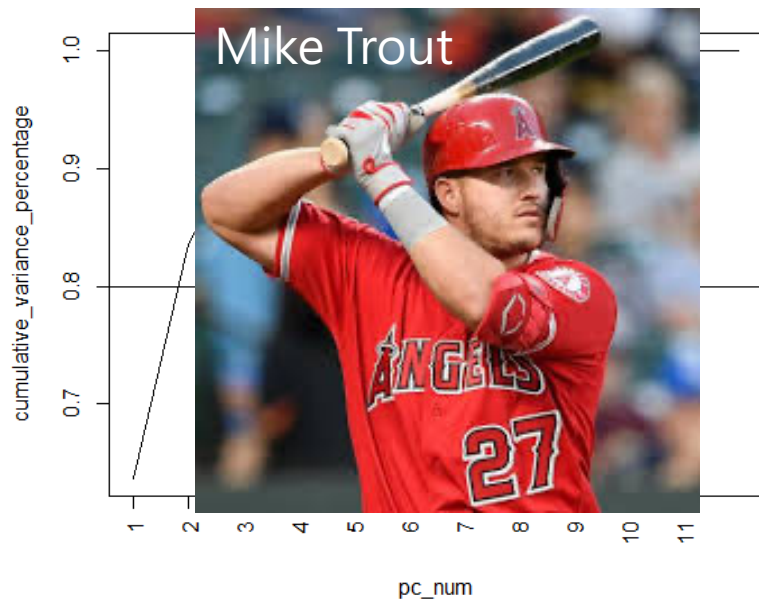
| 2017 B100w

	intercept	AB	R	RBI	SB	CS
100w	-3726487	7723	15221	41449	30056	87305
sd	11765063	14724	42701	27504	41936	155287
p-value	0.753	0.604	0.724	0.142	0.479	0.578

	BB	SO	AVG	OBP	SLG	WAR	age
100w	-67368	-34894	-76981262	45371149	-988975	306149	432400
sd	58394	13909	51891188	54647060	11653124	317369	134247
p-value	0.257	0.0174	0.148	0.113	0.933	0.342	0.00293

n	r	adj. r	p-value
45	0.441	0.232	0.0461

| 2017 B100w



OBP	WAR	SLG	R	AVG
+	+	+	+	+

→超級全能型選手

CS	SB	AB	R	age
-	-	-	-	+

→中庸型普通到爆球員

| 2017 B1000w

	intercept	AB	R	RBI	SB	CS
1000w	-4237779	-13985	-305041	73605	213419	371255
sd	27608489	27554	102718	75702	151928	421268
p-value	0.879	0.615	0.00535	0.338	0.169	0.384

	BB	SO	AVG	OBP	SLG	WAR	age
1000w	186351	46979	14102446	84246314	20405382	-579424	349501
sd	127735	32895	10178860	11863847	29675906	558828	271044
p-val	n		r	adj. r	p-value		0.206
	48		0.416	0.216	0.0461		

| 2017 B1000w



WAR	SLG	R	OBP	AVG
+	+	+	+	+

→超級全能型選手

SB	CS	SO	RBI	AVG
-	-	+	+	-

→重砲型球員

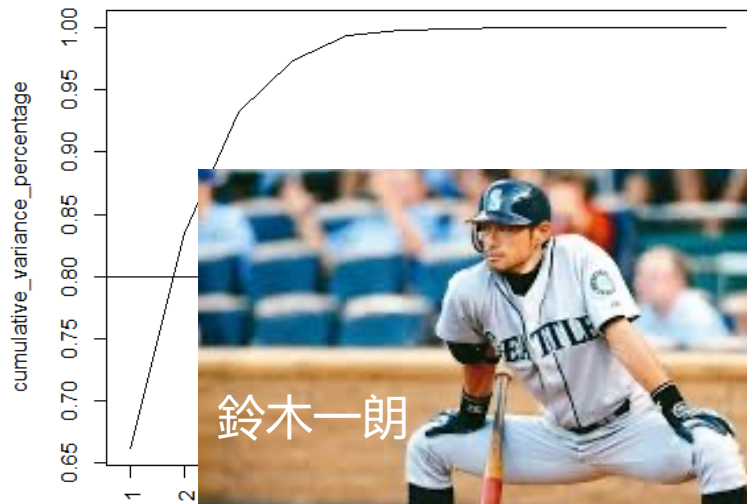
| 2017 B

	intercept	AB	R	RBI	SB	CS
all	-36495722	-3442	-55756	72358	147874	-79784
sd	15227227	18817	67464	43384	75901	230612
p-value	0.0181	0.855	0.41	0.098	0.0537	0.73

	BB	SO	AVG	OBP	SLG	WAR	age
all	34840	-29768	14659319	1373718	7896614	-308980	1347549
sd	91642	18002	75076197	83914889	17778801	385153	134644
p-value	0.704	0.101	0.846	0.987	0.658	0.424	1.77E-17

n		r	adj. r	p-value
132		0.571	0.527	7.37E-17

| 2017 B



WAR	SLG	OBP	R	RBI
+	+	+	+	+

→ 超級全能型選手

SB	CS	RBI	AB	age
+	+	-	+	-

→ 速度型球員

2018Batting

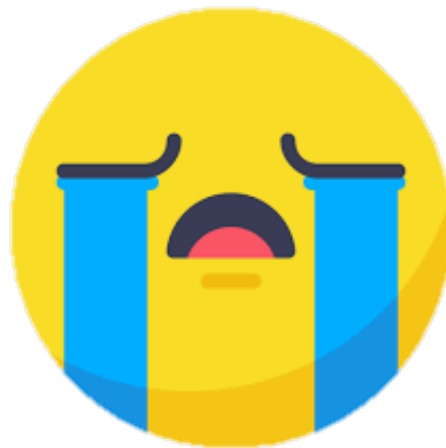
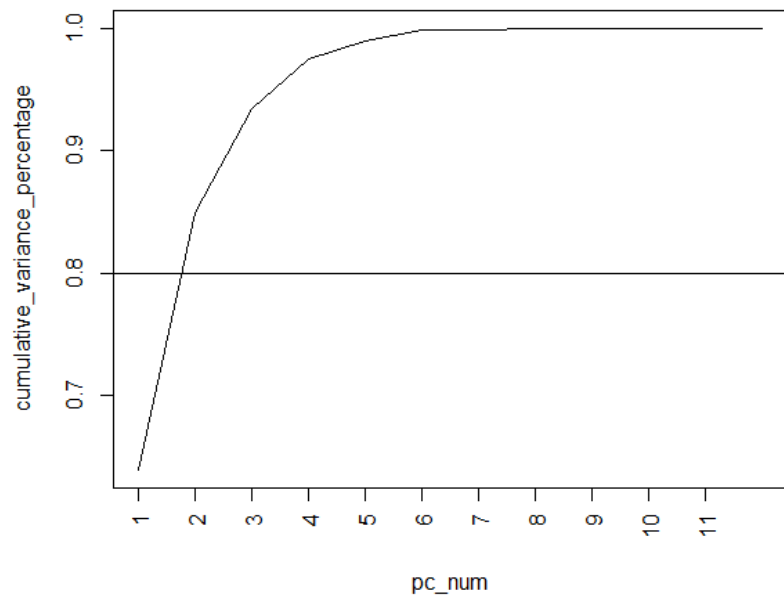
| 2018 B10w

	intercept	AB	R	RBI	SB	CS
10w	817620	-338	483	1288	1903	-5112
sd	296769	460	1625	1314	1726	4934
p-value	0.0155	0.474	0.771	0.344	0.289	0.318

	BB	SO	AVG	OBP	SLG	WAR	age
10w	-92.8	-239	-199711	367410	-247544	-522	-3769
sd	2166	451	1778529	1690383	521366	6354	7608
p-value	0.966	0.605	0.912	0.831	0.642	0.936	0.628

n		r	adj. r	p-value
27		0.368	-0.174	0.747

| 2018 B10w



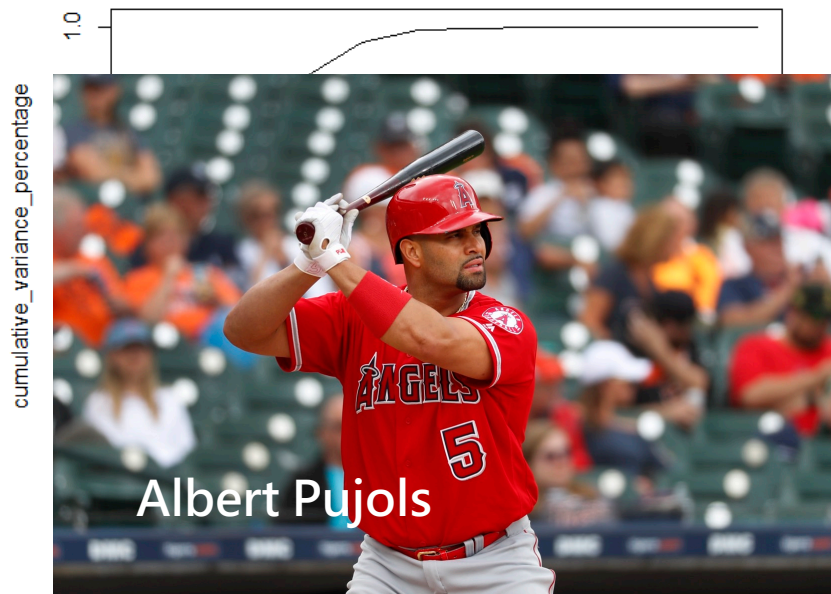
| 2018 B100w

	intercept	AB	R	RBI	SB	CS
100w	10938313	-22929	81163	63369	-32563	-118839
sd	9586779	11883	35198	39615	42104	138186
p-value	0.26	0.0598	0.0257	0.117	0.443	0.394

	BB	SO	AVG	OBP	SLG	WAR	age
100w	34078	16685	52722153	43208819	26292147	393308	144196
sd	71321	12074	63389556	66438003	14318873	296153	114238
p-value	0.635	0.174	0.41	0.519	0.0728	0.191	0.213

n	r	adj. r	p-value
59	0.349	0.179	0.0401

| 2018 B100w



WAR	R	OBP	SLG	RBI
-	-	-	-	-

→ 廢物型(受傷)打者

CS	SB	RBI	SLG	AB
-	-	+	+	-

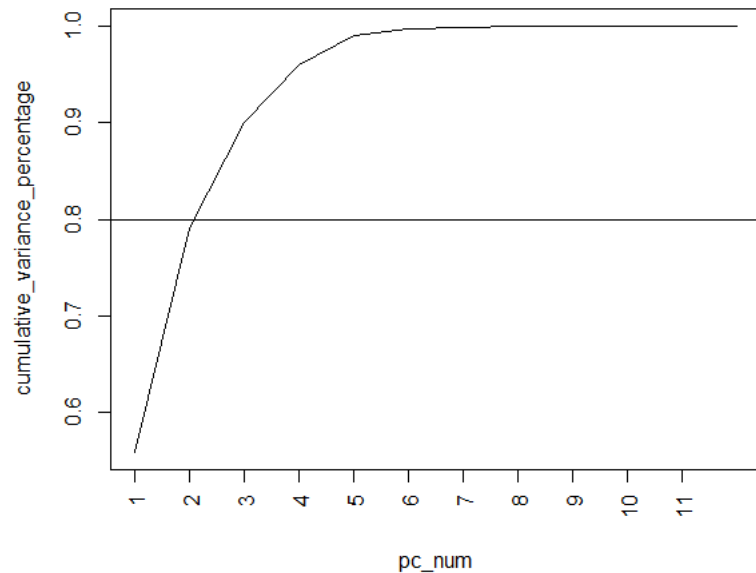
→ 指定打擊型球員

| 2018 B1000w

	intercept	AB	R	RBI	SB	CS
1000w	-7920798	-14375	-5708	-27292	202692	-905840
sd	2078400	26772	71710	70810	141106	380928
p-value	0.705	0.594	0.937	0.702	0.159	0.0223

	BB	SO	AVG	OBP	SLG	WAR	age
1000w	69660	51923	10473502	-	448931	-13051	404705
			1	47629361			
sd	161134	26646	13379789	15007384	31862540	561310	270864
			6	1			
p-val	n		r	adj. r	p-value		0.143
	53		0.431	0.26	0.0141		

| 2018 B1000w



R	WAR	SLG	OBP	AVG
+	+	+	+	+

→超級全能型選手

CS	SB	RBI	SO	BB
-	-	+	+	+

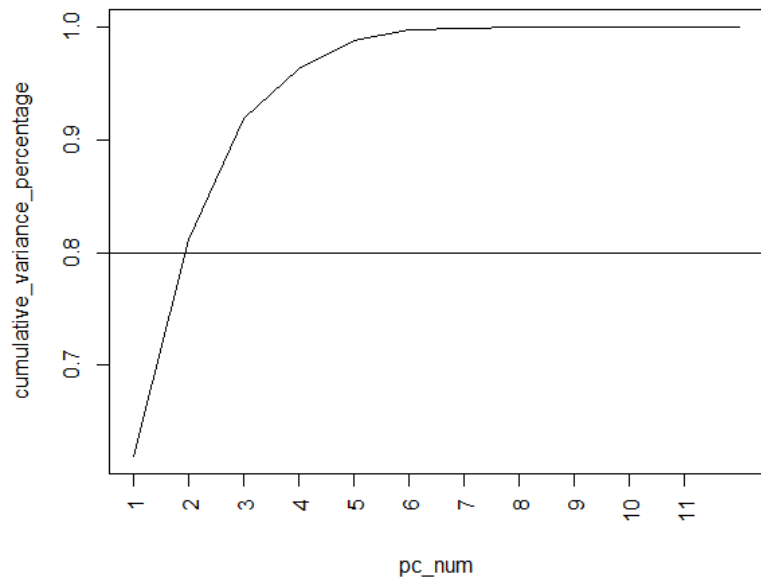
→喜歡等球的球員

| 2018 B

	intercept	AB	R	RBI	SB	CS
all	-28937466	-22643	34442	21826	34433	-86573
sd	15508179	20442	59227	57265	82048	248317
p-value	0.0644	0.27	0.562	0.704	0.675	0.728

	BB	SO	AVG	OBP	SLG	WAR	age
all	176564	18759	12860844 1	13328775 2	1526952 5	314865	1301917
sd	107105	22646	2260000001	270000000	2440908	115270	163829
p-value	n		r	adj. r	p-value		
	139		0.433	0.379	5.26E-11		27E-13

| 2018 B



R	WAR	SLG	OBP	AVG
+	+	+	+	+

→ 超級全能型選手

CS	SB	RBI	SLG	age
-	-	+	+	+

→ 重砲型球員

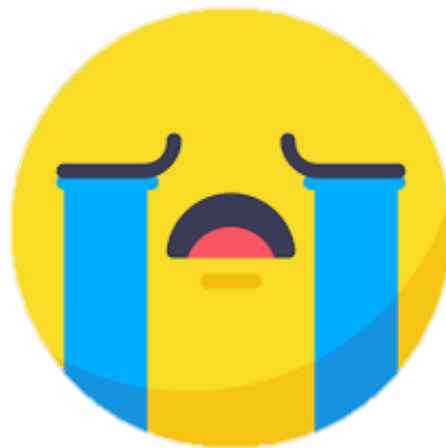
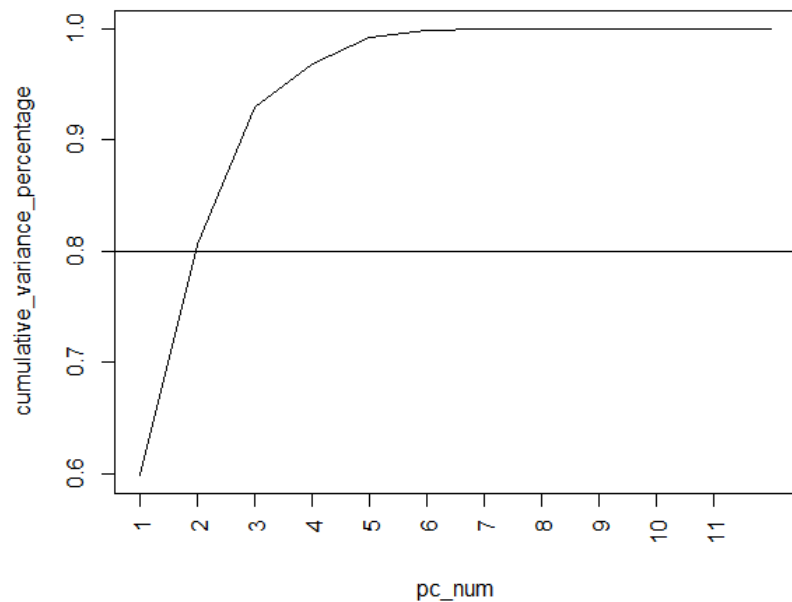
2019Batting

| 2019 B10w

	intercept	AB	R	RBI	SB	CS
10w	459793	68.4	458	-463	-210	911
sd	225901	279	1117	1241	1424	4821
p-value	0.0527	0.808	0.686	0.713	0.884	0.852

	BB	SO	AVG	OBP	SLG	WAR	age
10w	176564	18759	1286084 41	13328775 2	15269525	314865	1301917
sd	107105	20010	9300393	87000000	84400000	415070	163829
p-value	n		r	adj. r	p-value		27E-13
	36		0.154	-0.287	0.969		

| 2019 B10w

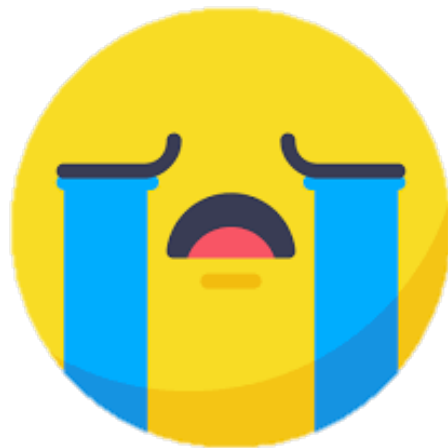
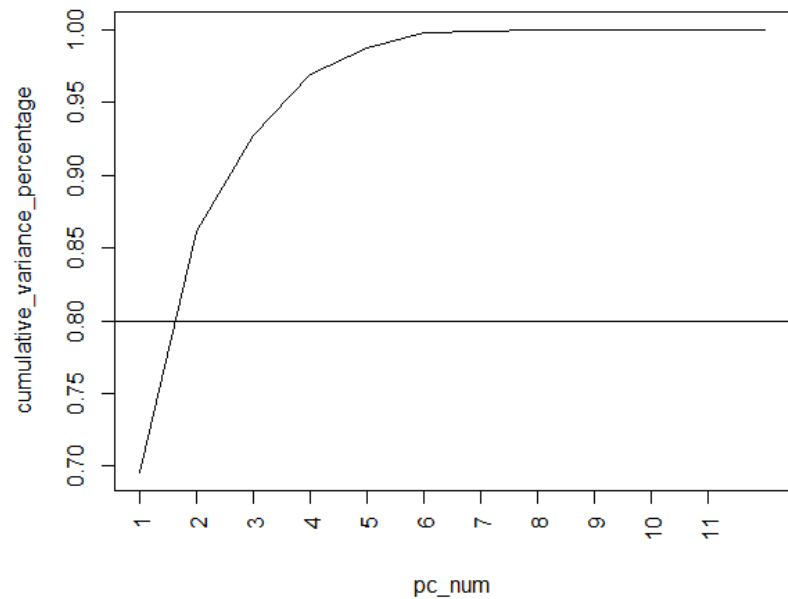


| 2019 B100w

	intercept	AB	R	RBI	SB	CS
100w	-15956469	14849	-20266	10872	7257	172321
sd	11610134	14807	46590	41492	49901	175511
p-value	0.179	0.323	0.667	0.795	0.885	0.334

	BB	SO	AVG	OBP	SLG	WAR	age
100w	-98681	-12103	12269284	11393637	15740545	-80940	260188
sd	105571	14373	74973375	85511633	15328375	342590	145822
p-val	n		r	adj. r	p-value		0.0839
	45		0.327	0.0745	0.269		

| 2019 B100w

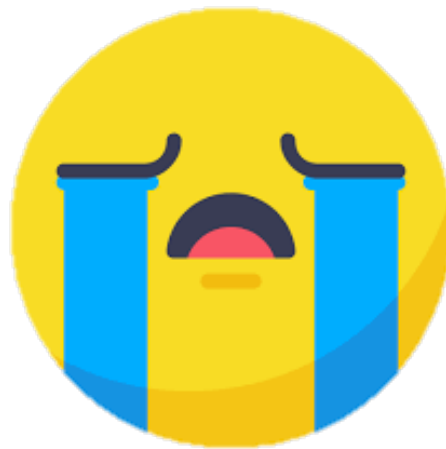
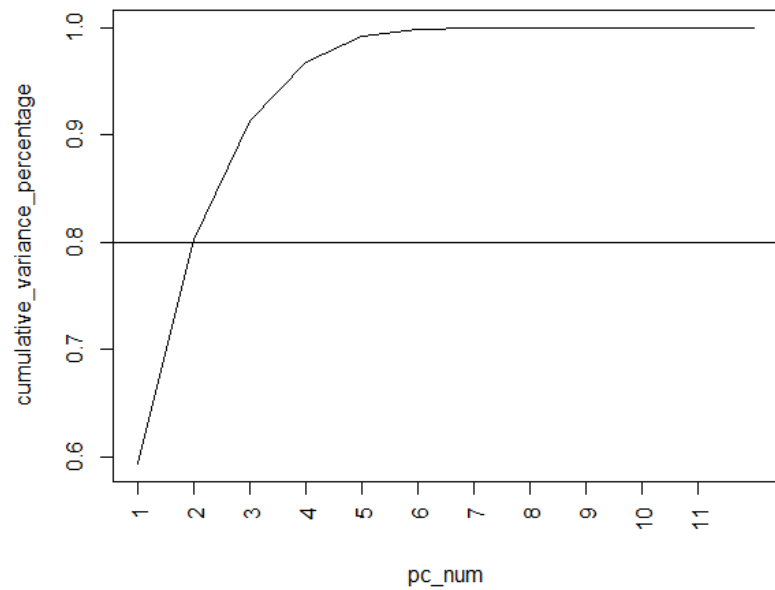


| 2019 B1000w

	intercept	AB	R	RBI	SB	CS
1000w	-39510333	19265	-110228	60516	-13734	339525
sd	27520805	39849	118437	78996	191586	711590
p-value	0.163	0.633	0.36	0.45	0.943	0.637

	BB	SO	AVG	OBP	SLG	WAR	age
1000w	60471	-55470	-14828236	39690034	2478261	-1209610	454072
sd	169885	46967	16465763	17105103	38173967	1012967	362397
p-value	n		r	adj. r	p-value		0.221
	40		0.405	0.141	0.173		

| 2019 B1000w



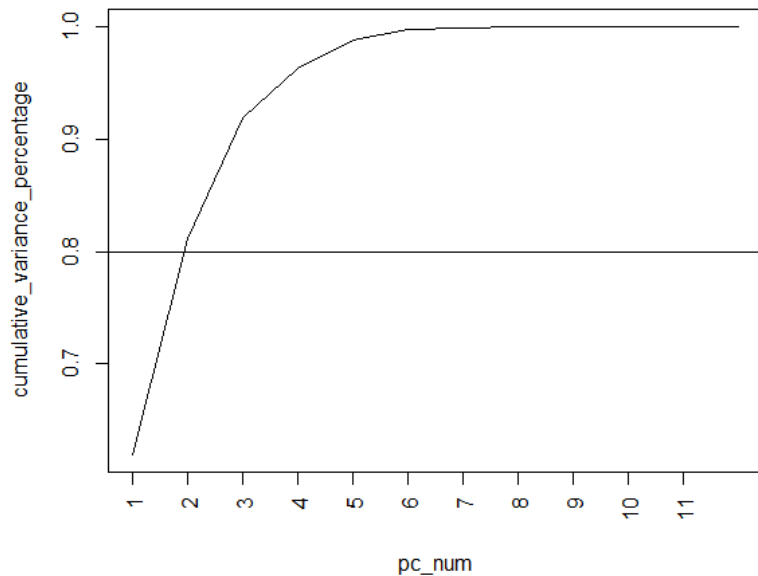
| 2019 B

	intercept	AB	R	RBI	SB	CS
all	-54569962	11661	-3897	44494	5495	36051
sd	14846394	20735	66197	52734	84262	312542
p-value	0.000371	0.575	0.953	0.401	0.948	0.908

	BB	SO	AVG	OBP	SLG	WAR	age
all	98666	-20736	35129070	9068554	3413338	-725953	1346117
sd	100698	23049	85703923	92059160	22264452	486802	157942
p-value	0.329	0.37	0.683	0.922	0.878	0.139	1.03E-13

n		r	adj. r	p-value
121		0.529	0.477	4.79E-13

| 2019 B



R	WAR	SLG	OBP	RBI
+	+	+	+	+

→ 中心打線打者

CS	SB	AB	age	BB
-	-	-	+	+

→ 代打戰術型球員



結論

Conclusion

結論

Conclusion



解釋能力看起來很差，但其實...

我們試過了...

We tried to...

```
> summary(c2019p)
```

```
Call: lm(formula = y ~ ., data = c2019p)
Residuals:
    Min       1Q   -1329341.00
    Median      3Q      1000000.00
    Max      19143701.00
Coefficients:
(Intercept) PC1 PC2
-66926.000  -3509967.000  20590555.000
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 9384000 on 18 degrees of freedom
Multiple R-squared:  0.04909, Adjusted R-squared: -0.05657
F-statistic: 0.4646 on 2 and 18 DF, p-value: 0.6357
```

```
> summary(c2019p_10w)
```

```
> summary(c2019p_100w)
```

```
> summary(c2019p_1000w)
```

```
Call:
lm(formula = y ~ ., data = b2019p_1000w)
```

```
Residuals:
    Min       1Q   Median      3Q      Max
-10457719 -7511668 -1618632  4525521 19143701
```

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	20590555	2047727	10.055	8.2e-09 ***
PC1	27472	35376	0.777	0.447
PC2	55449	97087	0.571	0.575

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 9384000 on 18 degrees of freedom
Multiple R-squared: 0.04909, Adjusted R-squared: -0.05657
F-statistic: 0.4646 on 2 and 18 DF, p-value: 0.6357

結論

Conclusion



結果...
數據解釋能力都不強

結論

Conclusion



我們認為
大聯盟球員薪資與表現關係不大，反而是年紀
與其他無法量化的資料如聲望、名聲、人脈等
關係有關



Q&A