

# PRINCIPAL COMPONENT ANALYSIS

head(AustralianOpen\_Finalists\_allstats)

```
> head(AustralianOpen_Finalists_allstats)
```

	PlayerName	Year	total_matches	winpercentage	MatchID	Round	AvgMinsPerGame
1:	Andre Agassi	2000	7		1 m_2000_A_114	4th Round	3.84
2:	Andre Agassi	2000	7		1 m_2000_A_122	Quarterfinals	3.32
3:	Andre Agassi	2000	7		1 m_2000_A_73	2nd Round	3.44
4:	Andre Agassi	2000	7		1 m_2000_A_124	Semifinals	3.50
5:	Andre Agassi	2000	7		1 m_2000_A_44	1st Round	3.48
6:	Andre Agassi	2000	7		1 m_2000_A_97	3rd Round	3.39

```
> str(AustralianOpen_Finalists_allstats)
```

```
Classes 'data.table' and 'data.frame': 277 obs. of 28 variables:
 $ PlayerName      : chr  "Andre Agassi" "Andre Agassi" "Andre Agassi" "Andre Agassi" ...
 $ Year            : num  2000 2000 2000 2000 2000 2000 ...
 $ total_matches   : int   7 7 7 7 7 7 7 7 7 7 ...
 $ winpercentage   : num   1 1 1 1 1 1 1 1 1 1 ...
 $ MatchID         : chr   "m_2000_A_114" "m_2000_A_122" "m_2000_A_73" "m_2000_A_124" ...
 $ Round           : chr   "4th Round" "Quarterfinals" "2nd Round" "Semifinals" ...
 $ AvgMinsPerGame  : num   3.84 3.32 3.44 3.5 3.48 3.39 3.86 3.81 4 3.75 ...
 $ AvgSecsPerPoint : num   37.9 35.1 37.2 34.5 37.3 37 35 38.3 32.6 33.3 ...
 $ AvgMinsPerSet   : num   41.3 31 31 35 29 31.7 34.8 39.3 68 33.8 ...
 $ Tournament      : chr   "Australian Open" "Australian Open" "Australian Open" "Australi
an Open" ...
 $ TotalMatchMins  : num   165 93 93 175 87 95 139 118 68 135 ...
 $ Points          : num    0 0 0 0 0 0 0 0 0 0 ...
 $ Age             : num   30 30 30 30 30 30 30 31 31 31 ...
 $ Rank            : num    1 1 1 1 1 1 1 6 6 6 ...
 $ Winner          : logi    TRUE TRUE TRUE TRUE TRUE TRUE ...
 $ TotalSets       : num    3 3 3 3 3 3 3 3 1 3 ...
 $ avgOdds         : num    0 0 0 0 0 0 0 0 0 0 ...
 $ maxOdds         : num    0 0 0 0 0 0 0 0 0 0 ...
 $ SP_Percent      : num    0.709 0.574 0.581 0.69 0.551 ...
 $ RP_Percent      : num    0.291 0.426 0.419 0.31 0.449 ...
 $ BP_Win_Percentage : num    0.778 0.5 0 0.889 1 ...
 $ Aces           : num    8 6 8 13 6 8 9 6 8 5 ...
 $ FirstServeReturnsWon : num   11 13 12 19 18 14 23 30 19 33 ...
 $ SecondServeReturnsWon: num   28 27 27 29 22 25 27 18 16 32 ...
 $ FirstServesIn      : num   96 45 50 101 40 35 77 55 40 77 ...
 $ DoubleFaults       : num    4 1 1 3 1 3 5 0 2 2 ...
 $ FirstServePercentage : num    0.691 0.662 0.658 0.682 0.656 ...
 $ avgset_veryears    : num   32.9 32.9 32.9 32.9 32.9 ...
```

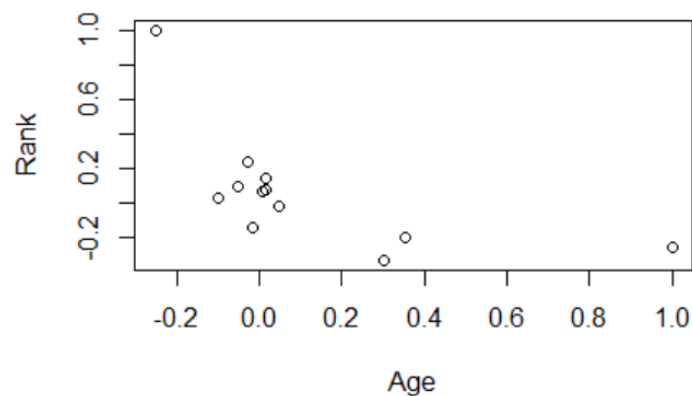
```
> summary(AustralianOpen_Finalists_allstats)
```

PlayerName	Year	total_matches	winpercentage	MatchID
Length:277	Min. :2000	Min. :6.000	Min. :0.8333	Length:277
Class :character	1st Qu.:2005	1st Qu.:7.000	1st Qu.:0.8571	Class :character
Mode :character	Median :2009	Median :7.000	Median :0.8571	Mode :character
	Mean :2009	Mean :6.935	Mean :0.9278	
	3rd Qu.:2014	3rd Qu.:7.000	3rd Qu.:1.0000	
	Max. :2019	Max. :7.000	Max. :1.0000	
Round	AvgMinsPerGame	AvgSecsPerPoint	AvgMinsPerSet	Tournament
Length:277	Min. :2.930	Min. :30.20	Min. :0.00	Length:277
Class :character	1st Qu.:3.860	1st Qu.:37.60	1st Qu.:34.70	Class :character
Mode :character	Median :4.280	Median :40.70	Median :40.60	Mode :character
	Mean :4.361	Mean :41.25	Mean :41.29	
	3rd Qu.:4.700	3rd Qu.:44.30	3rd Qu.:47.30	
	Max. :9.030	Max. :75.00	Max. :93.30	
TotalMatchMins	Points	Age	Rank	Winner
Min. :28.0	Min. :0	Min. :21.0	Min. :1.000	Mode :logical
1st Qu.:104.0	1st Qu.:0	1st Qu.:24.0	1st Qu.:1.000	FALSE:20
Median :135.0	Median :4675	Median :26.0	Median :3.000	TRUE :257
Mean :144.3	Mean :5361	Mean :26.8	Mean :9.289	
3rd Qu.:174.0	3rd Qu.:9595	3rd Qu.:29.0	3rd Qu.:8.000	
Max. :353.0	Max. :16790	Max. :36.0	Max. :86.000	
TotalSets	avgOdds	maxOdds	SP_Percent	RP_Percent
Min. :0.000	Min. :0.0000	Min. :0.0000	Min. :0.4000	Min. :0.1828
1st Qu.:3.000	1st Qu.:0.0000	1st Qu.:0.0000	1st Qu.:0.5556	1st Qu.:0.3644
Median :3.000	Median :0.0000	Median :0.0000	Median :0.5984	Median :0.4016
Mean :2.765	Mean :0.6334	Mean :0.6652	Mean :0.5954	Mean :0.4046
3rd Qu.:3.000	3rd Qu.:1.0700	3rd Qu.:1.1100	3rd Qu.:0.6356	3rd Qu.:0.4444
Max. :3.000	Max. :7.5400	Max. :9.9500	Max. :0.8172	Max. :0.6000

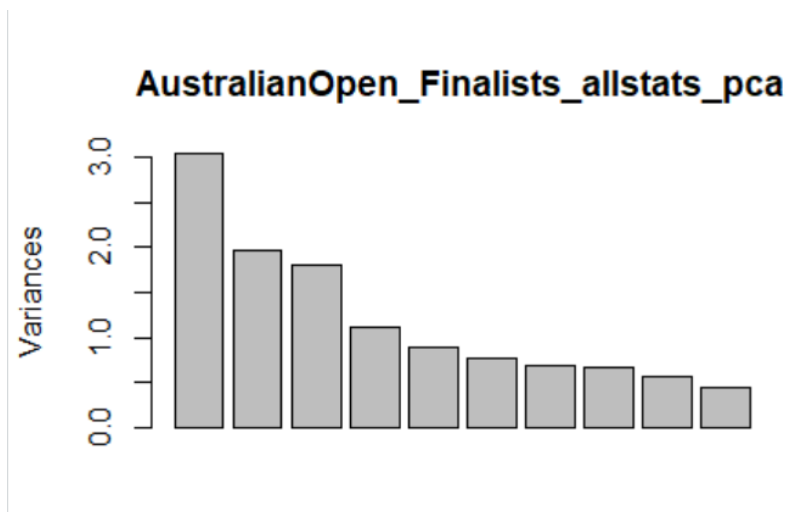
```
> cor(AustralianOpen_Finalists_allstats_Numeric)
```

	Age	Rank	avgOdds	SP_Percent	RP_Percent
Age	1.000000000	-0.25095148	0.35273241	0.01634941	-0.01634941
Rank	-0.250951480	1.00000000	-0.20051576	0.13959147	-0.13959147
avgOdds	0.352732406	-0.20051576	1.00000000	0.12317660	-0.12317660
SP_Percent	0.016349411	0.13959147	0.12317660	1.00000000	-1.00000000
RP_Percent	-0.016349411	-0.13959147	-0.12317660	-1.00000000	1.00000000
BP_Win_Percentage	0.046445661	-0.01874517	0.06214194	0.33361774	-0.33361774
Aces	-0.028322047	0.24189751	0.07063104	0.33096101	-0.33096101
firstServeReturnsWon	0.007560355	0.06350431	0.14914315	-0.19223673	0.19223673
SecondServeReturnsWon	-0.099838420	0.02929340	-0.09410121	-0.12071837	0.12071837
FirstServesIn	0.017875384	0.08019394	0.20328529	0.53140762	-0.53140762
DoubleFaults	-0.050686282	0.09506826	0.08046195	0.21856225	-0.21856225
FirstServePercentage	0.302870829	-0.33129744	0.18773514	-0.05401739	0.05401739

```
plot(cor(AustralianOpen_Finalists_allstats_Numeric))
```



```
AustralianOpen_Finalists_allstats_pca<-prcomp(AustralianOpen_Finalists_allstats_Numeric,scale=TRUE)
plot(AustralianOpen_Finalists_allstats_pca)
```



```
> summary(AustralianOpen_Finalists_allstats_pca)
Importance of components:
      PC1      PC2      PC3      PC4      PC5      PC6      PC7      PC8      PC9
Standard deviation  1.7420  1.4031  1.3450  1.06024  0.94928  0.87265  0.82817  0.81273  0.75323
Proportion of Variance 0.2529 0.1641 0.1507 0.09368 0.07509 0.06346 0.05715 0.05504 0.04728
Cumulative Proportion 0.2529 0.4169 0.5677 0.66136 0.73645 0.79991 0.85707 0.91211 0.95939
      PC10      PC11      PC12
Standard deviation  0.66214 0.22105 8.502e-16
Proportion of Variance 0.03654 0.00407 0.000e+00
Cumulative Proportion 0.99593 1.00000 1.000e+00
```

```
View(AustralianOpen_Finalists_allstats_pca)
```

Name	Type	Value
<ul style="list-style-type: none"> <li>AustralianOpen_Finalists_... list [5] (S3: prcomp)</li> <li>sdev double [12]</li> <li>rotation double [12 x 12]</li> <li>center double [12]</li> <li>scale double [12]</li> <li>x double [277 x 12]</li> </ul>		List of length 5 1.742 1.403 1.345 1.060 0.949 0.873 ... -4.15e-03 1.36e-01 1.18e-01 4.84e-01 -4.84e-01 2.61e-01 4.28e-01 -3.82e-01 ... 26.801 9.289 0.633 0.595 0.405 0.578 ... 3.7184 16.6810 0.9290 0.0615 0.0615 0.3189 ... 2.51e+00 -1.42e+00 -1.52e+00 2.70e+00 -1.50e+00 -1.53e+00 1.59e+00 8.23...

```
eigen_AO_Finalists <- AustralianOpen_Finalists_allstats_pca$sdev^2
> eigen_AO_Finalists
[1] 3.034501e+00 1.968804e+00 1.808901e+00 1.124111e+00 9.011337e-01 7.61513
4e-01
[7] 6.858578e-01 6.605265e-01 5.673569e-01 4.384332e-01 4.886229e-02 7.22779
6e-31
>
> names(eigen_AO_Finalists) <- paste("PC",1:12,sep="")
> eigen_AO_Finalists
      PC1      PC2      PC3      PC4      PC5      PC6
PC7
3.034501e+00 1.968804e+00 1.808901e+00 1.124111e+00 9.011337e-01 7.615134e-01
6.858578e-01
      PC8      PC9      PC10      PC11      PC12
6.605265e-01 5.673569e-01 4.384332e-01 4.886229e-02 7.227796e-31
```

```
> sumlambdas<-sum(eigen_AO_Finalists)
> sumlambdas
[1] 12
```

```
> propvar<-eigen_AO_Finalists/sumlambdas
> propvar
      PC1      PC2      PC3      PC4      PC5      PC6
PC7
2.528751e-01 1.640670e-01 1.507418e-01 9.367588e-02 7.509447e-02 6.345945e-02
5.715482e-02
      PC8      PC9      PC10      PC11      PC12
5.504387e-02 4.727975e-02 3.653610e-02 4.071857e-03 6.023163e-32
```

```
> cumvar_AO_Finalists<-cumsum(propvar)
> cumvar_AO_Finalists
```

	PC1	PC2	PC3	PC4	PC5	PC6	PC7	P
C8	PC9							
0.2528751	0.4169420	0.5676838	0.6613597	0.7364542	0.7999136	0.8570684	0.91211	
23	0.9593920							
	PC10	PC11	PC12					
0.9959281	1.0000000	1.0000000						

```
> matlambdas<-rbind(eigen_AO_Finalists,propvar,cumvar_AO_Finalists)
> rownames(matlambdas)
[1] "eigen_AO_Finalists" "propvar" "cumvar_AO_Finalists"
> round(matlambdas,5)
```

		PC1	PC2	PC3	PC4	PC5	PC6	PC7
PC8	PC9							
eigen_AO_Finalists		3.03450	1.96880	1.80890	1.12411	0.90113	0.76151	0.68586
.66053	0.56736							
propvar		0.25288	0.16407	0.15074	0.09368	0.07509	0.06346	0.05715
.05504	0.04728							
cumvar_AO_Finalists		0.25288	0.41694	0.56768	0.66136	0.73645	0.79991	0.85707
.91211	0.95939							
		PC10	PC11	PC12				
eigen_AO_Finalists		0.43843	0.04886	0				
propvar		0.03654	0.00407	0				
cumvar_AO_Finalists		0.99593	1.00000	1				

```
> summary(AustralianOpen_Finalists_allstats_pca)
Importance of components:
```

		PC1	PC2	PC3	PC4	PC5	PC6	PC7
PC8	PC9							
Standard deviation		1.7420	1.4031	1.3450	1.06024	0.94928	0.87265	0.82817
.81273	0.75323							
Proportion of Variance		0.2529	0.1641	0.1507	0.09368	0.07509	0.06346	0.05715
.05504	0.04728							
Cumulative Proportion		0.2529	0.4169	0.5677	0.66136	0.73645	0.79991	0.85707
.91211	0.95939							
		PC10	PC11	PC12				
Standard deviation		0.66214	0.22105	8.502e-16				
Proportion of Variance		0.03654	0.00407	0.000e+00				
Cumulative Proportion		0.99593	1.00000	1.000e+00				

```
> print(AustralianOpen_Finalists_allstats_pca)
Standard deviations (1, ..., p=12):
[1] 1.741982e+00 1.403141e+00 1.344954e+00 1.060241e+00 9.492806e-01 8.72647
3e-01
[7] 8.281653e-01 8.127278e-01 7.532310e-01 6.621429e-01 2.210482e-01 8.50164
4e-16
```

Rotation (n x k) = (12 x 12):

	PC1	PC2	PC3	PC4	
PC5					
Age	-0.00415178	0.42830942	-0.232554474	0.314609668	-0.04
632629					
Rank	0.13630501	-0.38197446	0.243595669	0.155808021	0.34
813788					
avgOdds	0.11807701	0.34188696	-0.274509489	0.476805302	-0.14
611186					
SP_Percent	0.48391843	0.19453812	0.308779847	-0.007946174	-0.03
292276					
RP_Percent	-0.48391843	-0.19453812	-0.308779847	0.007946174	0.03
292276					
BP_Win_Percentage	0.26061584	0.18226722	-0.006836468	-0.395263686	0.11
221296					
Aces	0.31732681	-0.19283950	-0.016447010	0.370417984	0.37
960882					
firstServeReturnsWon	0.11056995	-0.24004315	-0.506991061	0.241247978	0.26
234179					
SecondServeReturnsWon	0.13556848	-0.30358565	-0.404359859	-0.397499499	-0.08
812446					
FirstServesIn	0.46875952	-0.01812074	-0.326892184	-0.188532278	0.10
380643					
DoubleFaults	0.27786436	-0.21598416	-0.157093786	0.054974387	-0.70
441043					
FirstServePercentage	-0.05423925	0.45923720	-0.261023158	-0.317897990	0.33
598190					
	PC6	PC7	PC8	PC9	
PC10					
Age	0.07970268	-0.63457440	-0.335950103	0.29919590	0.220
54563					
Rank	-0.15206363	-0.05060044	-0.744818085	-0.19909378	-0.097
68241					
avgOdds	-0.10789635	0.22739381	-0.013033622	-0.69122593	-0.043
89392					
SP_Percent	0.14662673	0.10424547	0.006397133	0.07541969	0.157
95541					
RP_Percent	-0.14662673	-0.10424547	-0.006397133	-0.07541969	-0.157
95541					
BP_Win_Percentage	-0.76231012	-0.32625171	0.141283958	-0.14915111	-0.014
80656					
Aces	0.16206350	-0.34295605	0.451779918	0.02147937	-0.479
44497					
firstServeReturnsWon	-0.29723940	0.30625163	0.069620240	0.36171974	0.307
59324					
SecondServeReturnsWon	0.37873653	-0.33614764	-0.030957822	-0.37581689	0.134
08444					
FirstServesIn	0.16173311	0.19139591	-0.109800818	0.03343799	0.152
40337					
DoubleFaults	-0.16974263	0.01768431	-0.179256050	0.25843657	-0.471
11092					
FirstServePercentage	0.14744370	0.23135101	-0.240979790	0.13776595	-0.549
67266					
	PC11	PC12			
Age	-0.035617950	-1.370222e-16			
Rank	0.032917599	7.204847e-18			
avgOdds	0.043408318	8.019690e-17			
SP_Percent	0.261611057	7.071068e-01			
RP_Percent	-0.261611057	7.071068e-01			
BP_Win_Percentage	-0.001685847	8.964077e-17			
Aces	-0.047078812	1.996870e-16			
firstServeReturnsWon	0.365577301	-2.776579e-17			
SecondServeReturnsWon	0.378901466	3.509267e-16			
FirstServesIn	-0.726337635	-4.471402e-16			

DoubleFaults	0.047482294	-9.629723e-17
FirstServePercentage	0.222776913	1.520023e-16

#### AustralianOpen\_Finalists\_allstats\_pca\$rotation

	PC1	PC2	PC3	PC4	
PC5					
Age	-0.00415178	0.42830942	-0.232554474	0.314609668	-0.04
632629					
Rank	0.13630501	-0.38197446	0.243595669	0.155808021	0.34
813788					
avgOdds	0.11807701	0.34188696	-0.274509489	0.476805302	-0.14
611186					
SP_Percent	0.48391843	0.19453812	0.308779847	-0.007946174	-0.03
292276					
RP_Percent	-0.48391843	-0.19453812	-0.308779847	0.007946174	0.03
292276					
BP_Win_Percentage	0.26061584	0.18226722	-0.006836468	-0.395263686	0.11
221296					
Aces	0.31732681	-0.19283950	-0.016447010	0.370417984	0.37
960882					
firstServeReturnsWon	0.11056995	-0.24004315	-0.506991061	0.241247978	0.26
234179					
SecondServeReturnsWon	0.13556848	-0.30358565	-0.404359859	-0.397499499	-0.08
812446					
FirstServesIn	0.46875952	-0.01812074	-0.326892184	-0.188532278	0.10
380643					
DoubleFaults	0.27786436	-0.21598416	-0.157093786	0.054974387	-0.70
441043					
FirstServePercentage	-0.05423925	0.45923720	-0.261023158	-0.317897990	0.33
598190					
	PC6	PC7	PC8	PC9	
PC10					
Age	0.07970268	-0.63457440	-0.335950103	0.29919590	0.220
54563					
Rank	-0.15206363	-0.05060044	-0.744818085	-0.19909378	-0.097
68241					
avgOdds	-0.10789635	0.22739381	-0.013033622	-0.69122593	-0.043
89392					
SP_Percent	0.14662673	0.10424547	0.006397133	0.07541969	0.157
95541					
RP_Percent	-0.14662673	-0.10424547	-0.006397133	-0.07541969	-0.157
95541					
BP_Win_Percentage	-0.76231012	-0.32625171	0.141283958	-0.14915111	-0.014
80656					
Aces	0.16206350	-0.34295605	0.451779918	0.02147937	-0.479
44497					
firstServeReturnsWon	-0.29723940	0.30625163	0.069620240	0.36171974	0.307
59324					
SecondServeReturnsWon	0.37873653	-0.33614764	-0.030957822	-0.37581689	0.134
08444					
FirstServesIn	0.16173311	0.19139591	-0.109800818	0.03343799	0.152
40337					
DoubleFaults	-0.16974263	0.01768431	-0.179256050	0.25843657	-0.471
11092					
FirstServePercentage	0.14744370	0.23135101	-0.240979790	0.13776595	-0.549
67266					
	PC11	PC12			
Age	-0.035617950	-1.370222e-16			
Rank	0.032917599	7.204847e-18			
avgOdds	0.043408318	8.019690e-17			
SP_Percent	0.261611057	7.071068e-01			
RP_Percent	-0.261611057	7.071068e-01			
BP_Win_Percentage	-0.001685847	8.964077e-17			

```

Aces -0.047078812 1.996870e-16
firstServeReturnsWon 0.365577301 -2.776579e-17
SecondServeReturnsWon 0.378901466 3.509267e-16
FirstServesIn -0.726337635 -4.471402e-16
DoubleFaults 0.047482294 -9.629723e-17
FirstServePercentage 0.222776913 1.520023e-16

```

```
#Sample scores stores in AustralianOpen_Finalists_allstats_pca$x
```

```

> head(AustralianOpen_Finalists_allstats_pca$x)
      PC1      PC2      PC3      PC4      PC5      PC6
PC7
[1,]  2.514665  1.5872062  0.67009186 -1.6517068 -0.8693204  1.1465220 -0.549
4237
[2,] -1.421527  0.8228852  0.34733753 -0.8177448 -0.1415148  0.8181356 -1.028
0831
[3,] -1.524914  0.5108870  0.42306493 -0.1243265 -0.2168012  2.1702613 -0.630
2430
[4,]  2.702994  1.1160577 -0.09989699 -1.2755796  0.1607227  0.7739094 -0.739
1820
[5,] -1.503460  0.9591323  0.11138776 -0.9395291  0.2447338 -0.9883880 -1.255
2731
[6,] -1.533669 -0.5137968  0.85399134  0.7820955 -1.5077049  1.4263890 -0.986
5489
      PC8      PC9      PC10      PC11      PC12
[1,] -0.5895241723 0.61394048 -0.02831829 -0.29491498 1.173952e-15
[2,] -0.2525658813 0.01698936 0.13897452 0.13608186 7.844005e-16
[3,] -0.3310518040 0.22489122 0.04211636 -0.05066367 2.824750e-17
[4,]  0.0315090168 0.73644588 0.13172698 -0.26313280 1.111926e-15
[5,]  0.0758887799 0.19662481 0.12504675 0.07637995 1.181607e-15
[6,] -0.0008126966 0.41926563 0.42383211 0.06513463 4.774504e-16

```

```
#Identifying scores by their conversion status
```

```

> AO_type_finalists_pca<-cbind(data.frame(AustralianOpen_Finalists_allstats$w
inner),AustralianOpen_Finalists_allstats_pca$x)
>
> head(AO_type_finalists_pca)
      AustralianOpen_Finalists_allstats.winner      PC1      PC2      PC3
PC4
1      TRUE  2.514665  1.5872062  0.67009186 -
1.6517068
2      TRUE -1.421527  0.8228852  0.34733753 -
0.8177448
3      TRUE -1.524914  0.5108870  0.42306493 -
0.1243265
4      TRUE  2.702994  1.1160577 -0.09989699 -
1.2755796
5      TRUE -1.503460  0.9591323  0.11138776 -
0.9395291
6      TRUE -1.533669 -0.5137968  0.85399134
0.7820955
      PC5      PC6      PC7      PC8      PC9      PC10
PC11
1 -0.8693204  1.1465220 -0.5494237 -0.5895241723 0.61394048 -0.02831829 -0.29
491498
2 -0.1415148  0.8181356 -1.0280831 -0.2525658813 0.01698936 0.13897452 0.13
608186
3 -0.2168012  2.1702613 -0.6302430 -0.3310518040 0.22489122 0.04211636 -0.05
066367
4  0.1607227  0.7739094 -0.7391820  0.0315090168 0.73644588 0.13172698 -0.26
313280

```

```

5 0.2447338 -0.9883880 -1.2552731 0.0758887799 0.19662481 0.12504675 0.07
637995
6 -1.5077049 1.4263890 -0.9865489 -0.0008126966 0.41926563 0.42383211 0.06
513463
      PC12
1 1.173952e-15
2 7.844005e-16
3 2.824750e-17
4 1.111926e-15
5 1.181607e-15
6 4.774504e-16

```

#Means of scores for all PC's classified by winners of Finals

```

> tabmeansPC
winner      PC1      PC2      PC3      PC4      PC5      P
C6      PC7
1 FALSE 1.4964560 0.44209629 0.96920003 0.33131294 -0.8892816 -0.0853491
51 0.63719083
2 TRUE -0.1164557 -0.03440438 -0.07542413 -0.02578311 0.0692048 0.0066419
57 -0.04958683
      PC8      PC9      PC10      PC11      PC12
1 -0.42899660 -0.1914264 0.050570026 -0.22116832 8.466044e-16
2 0.03338495 0.0148970 -0.003935411 0.01721154 5.773858e-16

```

```

> tabmeansPC<-tabmeansPC[rev(order(tabmeansPC$winner)),]
> tabmeansPC
winner      PC1      PC2      PC3      PC4      PC5      P
C6      PC7
2 TRUE -0.1164557 -0.03440438 -0.07542413 -0.02578311 0.0692048 0.0066419
57 -0.04958683
1 FALSE 1.4964560 0.44209629 0.96920003 0.33131294 -0.8892816 -0.0853491
51 0.63719083
      PC8      PC9      PC10      PC11      PC12
2 0.03338495 0.0148970 -0.003935411 0.01721154 5.773858e-16
1 -0.42899660 -0.1914264 0.050570026 -0.22116832 8.466044e-16

```

```

> tabfmeans<-t(tabmeansPC[,-1])
> tabfmeans
      2      1
PC1 -1.164557e-01 1.496456e+00
PC2 -3.440438e-02 4.420963e-01
PC3 -7.542413e-02 9.692000e-01
PC4 -2.578311e-02 3.313129e-01
PC5 6.920480e-02 -8.892816e-01
PC6 6.641957e-03 -8.534915e-02
PC7 -4.958683e-02 6.371908e-01
PC8 3.338495e-02 -4.289966e-01
PC9 1.489700e-02 -1.914264e-01
PC10 -3.935411e-03 5.057003e-02
PC11 1.721154e-02 -2.211683e-01
PC12 5.773858e-16 8.466044e-16

```



```
> colnames(tabfmeans)<-t(as.vector(tabmeansPC[1]))
> tabfmeans
```

	TRUE	FALSE
PC1	-1.164557e-01	1.496456e+00
PC2	-3.440438e-02	4.420963e-01
PC3	-7.542413e-02	9.692000e-01
PC4	-2.578311e-02	3.313129e-01
PC5	6.920480e-02	-8.892816e-01
PC6	6.641957e-03	-8.534915e-02
PC7	-4.958683e-02	6.371908e-01
PC8	3.338495e-02	-4.289966e-01
PC9	1.489700e-02	-1.914264e-01
PC10	-3.935411e-03	5.057003e-02
PC11	1.721154e-02	-2.211683e-01
PC12	5.773858e-16	8.466044e-16

#Standard Deviations of scores for all the PC's Classified by winner Yes/NO

```
> tabsdsPC<-aggregate(AO_type_finalists_pca[,2:13],by=list(winner=AustralianO
pen_Finalists_allstats$winner),sd)
> tabsds<-t(tabsdsPC[,,-1])
> colnames(tabsds)<-t(as.vector(tabsdsPC[1]))
> tabsds
```

	FALSE	TRUE
PC1	1.255267e+00	1.722225e+00
PC2	1.880504e+00	1.357829e+00
PC3	1.924780e+00	1.263392e+00
PC4	1.149186e+00	1.051034e+00
PC5	9.378078e-01	9.163349e-01
PC6	6.748801e-01	8.868987e-01
PC7	4.988461e-01	8.287238e-01
PC8	1.015771e+00	7.874357e-01
PC9	1.078374e+00	7.226948e-01
PC10	6.740626e-01	6.623809e-01
PC11	2.538462e-01	2.092325e-01
PC12	6.048802e-16	7.344560e-16

#t test on all the principal components

```
> t.test(PC1~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalists_
pca)
```

Welch Two Sample t-test

```
data: PC1 by AustralianOpen_Finalists_allstats$winner
t = 5.3667, df = 24.935, p-value = 1.46e-05
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 0.9938503 2.2319731
sample estimates:
mean in group FALSE mean in group TRUE
      1.4964560      -0.1164557
```

significant

```
> t.test(PC2~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalists_pca)
```

Welch Two Sample t-test

```
data: PC2 by AustralianOpen_Finalists_allstats$winner
t = 1.1109, df = 20.571, p-value = 0.2794
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -0.416662  1.369663
sample estimates:
mean in group FALSE mean in group TRUE
 0.44209629      -0.03440438
```

Not significant

```
> t.test(PC3~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalists_pca)
```

Welch Two Sample t-test

```
data: PC3 by AustralianOpen_Finalists_allstats$winner
t = 2.3874, df = 20.294, p-value = 0.0268
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 0.132758 1.956490
sample estimates:
mean in group FALSE mean in group TRUE
 0.96920003      -0.07542413
```

Significant

```
> t.test(PC4~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalists_pca)
```

Welch Two Sample t-test

```
data: PC4 by AustralianOpen_Finalists_allstats$winner
t = 1.3465, df = 21.547, p-value = 0.1921
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -0.1935606  0.9077527
sample estimates:
mean in group FALSE mean in group TRUE
 0.33131294      -0.02578311
```

Not significant

```
> t.test(PC5~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalists_pca)
```

Welch Two Sample t-test

```
data: PC5 by AustralianOpen_Finalists_allstats$winner
t = -4.4099, df = 21.919, p-value = 0.0002233
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -1.4093407 -0.5076321
sample estimates:
mean in group FALSE mean in group TRUE
 -0.8892816      0.0692048
```

Significant

```
> t.test(PC6~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalists_pca)
```

Welch Two Sample t-test

```
data: PC6 by AustralianOpen_Finalists_allstats$winner
t = -0.57234, df = 24.418, p-value = 0.5723
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -0.4234195  0.2394373
sample estimates:
mean in group FALSE mean in group TRUE
 -0.085349151      0.006641957
```

Not Significant

```
> t.test(PC7~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalists_pca)
```

Welch Two Sample t-test

```
data: PC7 by AustralianOpen_Finalists_allstats$winner
t = 5.5862, df = 27.942, p-value = 5.643e-06
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 0.4349194 0.9386359
sample estimates:
mean in group FALSE mean in group TRUE
 0.63719083      -0.04958683
```

Significant

```
> t.test(PC8~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalists_pca)
```

Welch Two Sample t-test

```
data: PC8 by AustralianOpen_Finalists_allstats$winner
t = -1.9897, df = 20.815, p-value = 0.05992
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -0.94591102  0.02114792
sample estimates:
mean in group FALSE mean in group TRUE
 -0.42899660      0.03338495
```

Not Significant

```
> t.test(PC9~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalists_pca)
```

Welch Two Sample t-test

```
data: PC9 by AustralianOpen_Finalists_allstats$winner
t = -0.84107, df = 20.35, p-value = 0.4101
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -0.7174673  0.3048205
sample estimates:
mean in group FALSE mean in group TRUE
 -0.1914264      0.014897
```

Not Significant

```
> t.test(PC10~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalists_pca)
```

Welch Two Sample t-test

```
data: PC10 by AustralianOpen_Finalists_allstats$winner
t = 0.34876, df = 21.954, p-value = 0.7306
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -0.2696509  0.3786617
sample estimates:
mean in group FALSE mean in group TRUE
 0.050570026        -0.003935411
```

Not Significant

```
> t.test(PC11~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalists_pca)
```

Welch Two Sample t-test

```
data: PC11 by AustralianOpen_Finalists_allstats$winner
t = -4.0929, df = 21.058, p-value = 0.000518
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -0.3594824 -0.1172773
sample estimates:
mean in group FALSE mean in group TRUE
 -0.22116832        0.01721154
```

Significant

```
> t.test(PC12~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalists_pca)
```

Welch Two Sample t-test

```
data: PC12 by AustralianOpen_Finalists_allstats$winner
t = 1.8852, df = 23.587, p-value = 0.07178
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -2.578742e-17  5.642246e-16
sample estimates:
mean in group FALSE mean in group TRUE
 8.466044e-16        5.773858e-16
```

Not Significant

```
> var.test(PC1~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalists_pca)
```

F test to compare two variances

```
data: PC1 by AustralianOpen_Finalists_allstats$winner
F = 0.53124, num df = 19, denom df = 256, p-value = 0.1057
alternative hypothesis: true ratio of variances is not equal to 1
```

95 percent confidence interval:  
0.297964 1.150953  
sample estimates:  
ratio of variances  
0.5312421

Not Significant

```
> var.test(PC2~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalist  
s_pca)
```

F test to compare two variances

data: PC2 by AustralianOpen\_Finalists\_allstats\$winner  
F = 1.918, num df = 19, denom df = 256, p-value = 0.02655  
alternative hypothesis: true ratio of variances is not equal to 1  
95 percent confidence interval:  
1.075795 4.155501  
sample estimates:  
ratio of variances  
1.918043

Significant

```
> var.test(PC3~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalist  
s_pca)
```

F test to compare two variances

data: PC3 by AustralianOpen\_Finalists\_allstats\$winner  
F = 2.3211, num df = 19, denom df = 256, p-value = 0.003531  
alternative hypothesis: true ratio of variances is not equal to 1  
95 percent confidence interval:  
1.301838 5.028643  
sample estimates:  
ratio of variances  
2.321056

Significant

```
> var.test(PC4~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalist  
s_pca)
```

F test to compare two variances

data: PC4 by AustralianOpen\_Finalists\_allstats\$winner  
F = 1.1955, num df = 19, denom df = 256, p-value = 0.5225  
alternative hypothesis: true ratio of variances is not equal to 1  
95 percent confidence interval:  
0.6705294 2.5900714  
sample estimates:  
ratio of variances  
1.195492

Not Significant

```
> var.test(PC5~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalist  
s_pca)
```

F test to compare two variances

```
data: PC5 by AustralianOpen_Finalists_allstats$winner
F = 1.0474, num df = 19, denom df = 256, p-value = 0.8142
alternative hypothesis: true ratio of variances is not equal to 1
95 percent confidence interval:
 0.5874765 2.2692607
sample estimates:
ratio of variances
      1.047416
```

Not Significant

```
> var.test(PC6~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalist
s_pca)
```

F test to compare two variances

```
data: PC6 by AustralianOpen_Finalists_allstats$winner
F = 0.57904, num df = 19, denom df = 256, p-value = 0.1609
alternative hypothesis: true ratio of variances is not equal to 1
95 percent confidence interval:
 0.3247704 1.2544991
sample estimates:
ratio of variances
      0.5790356
```

Not Significant

```
> var.test(PC7~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalist
s_pca)
```

F test to compare two variances

```
data: PC7 by AustralianOpen_Finalists_allstats$winner
F = 0.36234, num df = 19, denom df = 256, p-value = 0.01176
alternative hypothesis: true ratio of variances is not equal to 1
95 percent confidence interval:
 0.2032285 0.7850161
sample estimates:
ratio of variances
      0.3623376
```

Significant

```
> var.test(PC8~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalist
s_pca)
```

F test to compare two variances

```
data: PC8 by AustralianOpen_Finalists_allstats$winner
F = 1.664, num df = 19, denom df = 256, p-value = 0.08524
alternative hypothesis: true ratio of variances is not equal to 1
95 percent confidence interval:
 0.9333235 3.6051731
sample estimates:
ratio of variances
      1.664029
```

Not Significant

```
> var.test(PC9~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalis  
s_pca)
```

F test to compare two variances

```
data: PC9 by AustralianOpen_Finalists_allstats$winner  
F = 2.2265, num df = 19, denom df = 256, p-value = 0.005751  
alternative hypothesis: true ratio of variances is not equal to 1  
95 percent confidence interval:  
 1.248821 4.823853  
sample estimates:  
ratio of variances  
      2.226532  
Significant
```

```
> var.test(PC10~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalis  
ts_pca)
```

F test to compare two variances

```
data: PC10 by AustralianOpen_Finalists_allstats$winner  
F = 1.0356, num df = 19, denom df = 256, p-value = 0.8407  
alternative hypothesis: true ratio of variances is not equal to 1  
95 percent confidence interval:  
 0.5808394 2.2436236  
sample estimates:  
ratio of variances  
      1.035583
```

Not Significant

```
> var.test(PC11~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalis  
ts_pca)
```

F test to compare two variances

```
data: PC11 by AustralianOpen_Finalists_allstats$winner  
F = 1.4719, num df = 19, denom df = 256, p-value = 0.1909  
alternative hypothesis: true ratio of variances is not equal to 1  
95 percent confidence interval:  
 0.8255709 3.1889541  
sample estimates:  
ratio of variances  
      1.471916  
Not Significant
```

```
> var.test(PC12~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalis  
ts_pca)
```

F test to compare two variances

```
data: PC12 by AustralianOpen_Finalists_allstats$winner  
F = 0.67828, num df = 19, denom df = 256, p-value = 0.3215  
alternative hypothesis: true ratio of variances is not equal to 1  
95 percent confidence interval:  
 0.3804332 1.4695092  
sample estimates:  
ratio of variances  
      0.6782772
```

Not Significant

```
> (LTPC_1<-leveneTest(PC1~AustralianOpen_Finalists_allstats$winner,data=A0_type_finalists_pca))
Levene's Test for Homogeneity of Variance (center = median)
      Df F value    Pr(>F)
group  1  3.5103 0.06205 .
      275
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Warning message:
In leveneTest.default(y = y, group = group, ...) : group coerced to factor.
> (p_PC1_1sided<-LTPC_1[[3]][1]/2)
[1] 0.03102489
```

```
> (LTPC_1<-leveneTest(PC2~AustralianOpen_Finalists_allstats$winner,data=A0_type_finalists_pca))
Levene's Test for Homogeneity of Variance (center = median)
      Df F value    Pr(>F)
group  1  4.1808 0.04184 *
      275
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Warning message:
In leveneTest.default(y = y, group = group, ...) : group coerced to factor.
> (p_PC2_1sided<-LTPC_1[[3]][1]/2)
[1] 0.02091785
```

```
> (LTPC_1<-leveneTest(PC3~AustralianOpen_Finalists_allstats$winner,data=A0_type_finalists_pca))
Levene's Test for Homogeneity of Variance (center = median)
      Df F value    Pr(>F)
group  1  10.58 0.001286 **
      275
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Warning message:
In leveneTest.default(y = y, group = group, ...) : group coerced to factor.
> (p_PC3_1sided<-LTPC_1[[3]][1]/2)
[1] 0.0006430479
```

```
> (LTPC_1<-leveneTest(PC4~AustralianOpen_Finalists_allstats$winner,data=A0_type_finalists_pca))
Levene's Test for Homogeneity of Variance (center = median)
      Df F value    Pr(>F)
group  1  0.2254 0.6354
      275
Warning message:
In leveneTest.default(y = y, group = group, ...) : group coerced to factor.
> (p_PC4_1sided<-LTPC_1[[3]][1]/2)
[1] 0.317683
```

```
> (LTPC_1<-leveneTest(PC5~AustralianOpen_Finalists_allstats$winner,data=A0_type_finalists_pca))
Levene's Test for Homogeneity of Variance (center = median)
      Df F value    Pr(>F)
group  1  3e-04 0.9864
      275
Warning message:
```



```
In leveneTest.default(y = y, group = group, ...) : group coerced to factor.  
> (p_PC5_1sided<-LTPC_1[[3]][1]/2)  
[1] 0.493195
```

```
> (LTPC_1<-leveneTest(PC6~AustralianOpen_Finalists_allstats$winner,data=AO_ty  
pe_finalists_pca))  
Levene's Test for Homogeneity of Variance (center = median)  
      Df F value Pr(>F)  
group  1  1.3002 0.2552  
      275  
Warning message:  
In leveneTest.default(y = y, group = group, ...) : group coerced to factor.  
> (p_PC6_1sided<-LTPC_1[[3]][1]/2)  
[1] 0.1275801
```

```
> (LTPC_1<-leveneTest(PC7~AustralianOpen_Finalists_allstats$winner,data=AO_ty  
pe_finalists_pca))  
Levene's Test for Homogeneity of Variance (center = median)  
      Df F value  Pr(>F)  
group  1  4.8222 0.02893 *  
      275  
---  
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1  
Warning message:  
In leveneTest.default(y = y, group = group, ...) : group coerced to factor.  
> (p_PC7_1sided<-LTPC_1[[3]][1]/2)  
[1] 0.01446502
```

```
> (LTPC_1<-leveneTest(PC8~AustralianOpen_Finalists_allstats$winner,data=AO_ty  
pe_finalists_pca))  
Levene's Test for Homogeneity of Variance (center = median)  
      Df F value Pr(>F)  
group  1  1.1873 0.2768  
      275  
Warning message:  
In leveneTest.default(y = y, group = group, ...) : group coerced to factor.  
> (p_PC8_1sided<-LTPC_1[[3]][1]/2)  
[1] 0.1384192
```

```
> (LTPC_1<-leveneTest(PC9~AustralianOpen_Finalists_allstats$winner,data=AO_type_finalists  
pe_finalists_pca))  
Levene's Test for Homogeneity of Variance (center = median)  
      Df F value Pr(>F)  
group  1  6.4889 0.0114 *  
      275  
---  
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1  
Warning message:  
In leveneTest.default(y = y, group = group, ...) : group coerced to factor.  
> (p_PC9_1sided<-LTPC_1[[3]][1]/2)  
[1] 0.005699886
```

```
> (LTPC_1<-leveneTest(PC10~AustralianOpen_Finalists_allstats$winner,data=AO_t  
ype_finalists_pca))  
Levene's Test for Homogeneity of Variance (center = median)  
      Df F value Pr(>F)  
group  1  0.1651 0.6848
```

```

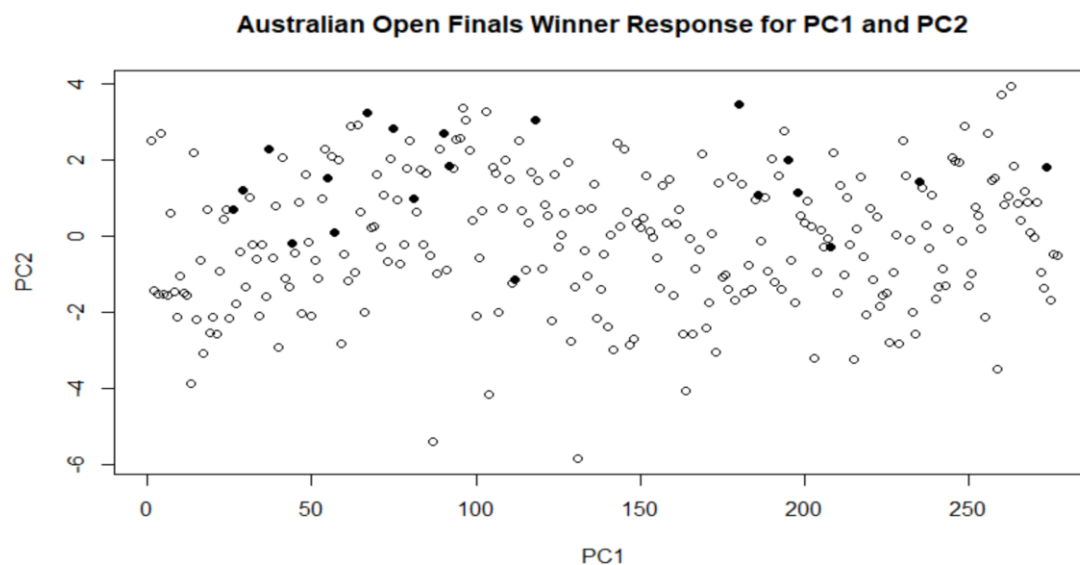
275
Warning message:
In leveneTest.default(y = y, group = group, ...) : group coerced to factor.
> (p_PC10_1sided<-LTPC_1[[3]][1]/2)
[1] 0.3424184

> (LTPC_1<-leveneTest(PC11~AustralianOpen_Finalists_allstats$Winner,data=AO_t
ype_finalists_pca))
Levene's Test for Homogeneity of Variance (center = median)
      Df F value Pr(>F)
group  1  0.5815 0.4464
275
Warning message:
In leveneTest.default(y = y, group = group, ...) : group coerced to factor.
> (p_PC11_1sided<-LTPC_1[[3]][1]/2)
[1] 0.2231903

> (LTPC_1<-leveneTest(PC12~AustralianOpen_Finalists_allstats$Winner,data=AO_t
ype_finalists_pca))
Levene's Test for Homogeneity of Variance (center = median)
      Df F value Pr(>F)
group  1  1.4859 0.2239
275
Warning message:
In leveneTest.default(y = y, group = group, ...) : group coerced to factor.
> (p_PC12_1sided<-LTPC_1[[3]][1]/2)
[1] 0.1119506

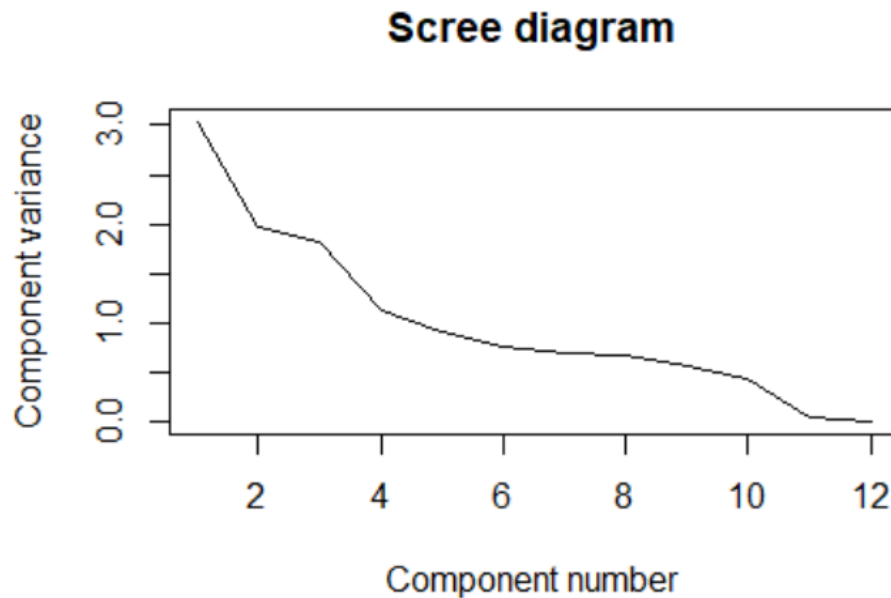
> #Plotting scores for first and second component
> plot(AO_type_finalists_pca$PC1,pch=ifelse(AO_type_finalists_pca$AustralianO
pen_Finalists_allstats.Winner=="TRUE",1,16),xlab = "PC1",ylab = "PC2",main="A
ustralian Open Finals Winner Response for PC1 and PC2")

```



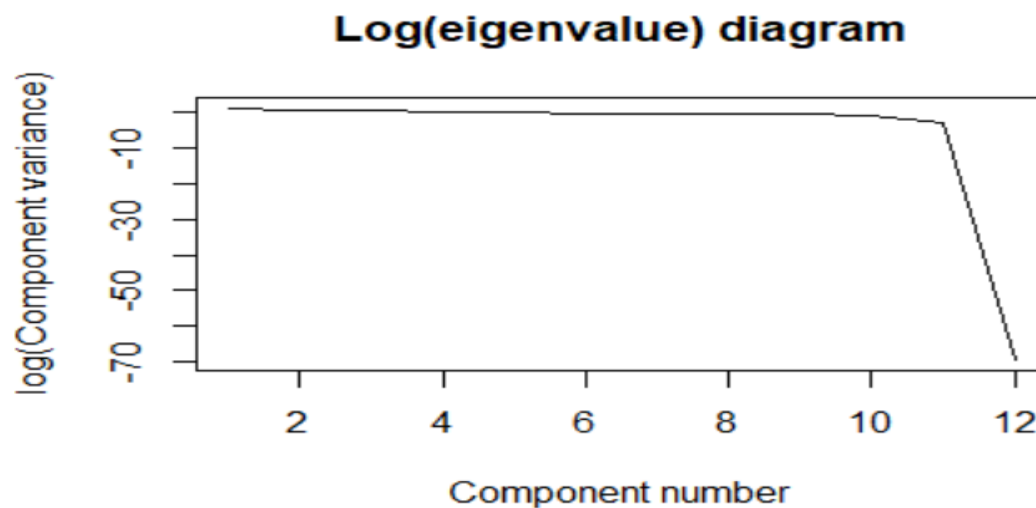
```
> plot(eigen_AO_Finalists, xlab = "Component number", ylab = "Component variance", type = "l", main = "Scree diagram")
```

---



Component number after 11 are discarded

```
plot(log(eigen_AO_Finalists), xlab = "Component number", ylab = "log(Component variance)", type = "l", main = "Log(eigenvalue) diagram")
```



Component 12 is discarded

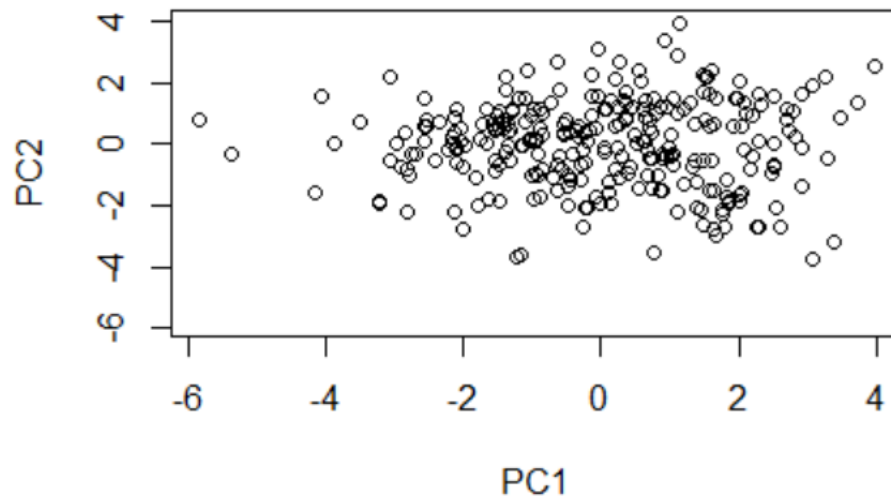
```
> print(summary(AustralianOpen_Finalists_allstats_pca))
```

Importance of components:

	PC1	PC2	PC3	PC4	PC5	PC6	PC7
PC8							
PC9							
Standard deviation	1.7420	1.4031	1.3450	1.06024	0.94928	0.87265	0.82817
.81273	0.75323						
Proportion of Variance	0.2529	0.1641	0.1507	0.09368	0.07509	0.06346	0.05715
.05504	0.04728						
Cumulative Proportion	0.2529	0.4169	0.5677	0.66136	0.73645	0.79991	0.85707
.91211	0.95939						
	PC10	PC11	PC12				
Standard deviation	0.66214	0.22105	8.502e-16				
Proportion of Variance	0.03654	0.00407	0.000e+00				
Cumulative Proportion	0.99593	1.00000	1.000e+00				

```
> diag(cov(AustralianOpen_Finalists_allstats_pca$x))
      PC1      PC2      PC3      PC4      PC5      PC6
PC7 3.034501e+00 1.968804e+00 1.808901e+00 1.124111e+00 9.011337e-01 7.615134e-01
6.858578e-01
      PC8      PC9      PC10      PC11      PC12
PC8 6.605265e-01 5.673569e-01 4.384332e-01 4.886229e-02 5.303971e-31
PC9 5.673569e-01 4.384332e-01 4.886229e-02 5.303971e-31
PC10 4.384332e-01 4.886229e-02 5.303971e-31
PC11 4.886229e-02 5.303971e-31
PC12 5.303971e-31

> xlim <- range(AustralianOpen_Finalists_allstats_pca$x[,1])
> head(AustralianOpen_Finalists_allstats_pca$x[,1])
[1] 2.514665 -1.421527 -1.524914 2.702994 -1.503460 -1.533669
> plot(AustralianOpen_Finalists_allstats_pca$x,xlim=xlim,ylim=ylim)
```



```
> AustralianOpen_Finalists_allstats_pca$rotation[,1]
      Age      Rank      avgOdds
SP_Percent -0.00415178      0.13630501      0.11807701
0.48391843
      RP_Percent      BP_Win_Percentage      Aces      firstServe
ReturnsWon
```

-0.48391843	0.26061584	0.31732681	
0.11056995			
SecondServeReturnsWon	FirstServesIn	DoubleFaults	FirstServe
Percentage			
0.13556848	0.46875952	0.27786436	-
0.05423925			

AustralianOpen\_Finalists\_allstats\_pca\$rotation[,2]

	Age	Rank	avgOdds	
SP_Percent				
0.42830942		-0.38197446	0.34188696	
0.19453812	RP_Percent	BP_Win_Percentage	Aces	firstServe
ReturnsWon				
-0.19453812		0.18226722	-0.19283950	-
0.24004315				
SecondServeReturnsWon		FirstServesIn	DoubleFaults	FirstServe
Percentage				
-0.30358565		-0.01812074	-0.21598416	
0.45923720				

> AustralianOpen\_Finalists\_allstats\_pca\$rotation[,3]

	Age	Rank	avgOdds	
SP_Percent				
-0.232554474		0.243595669	-0.274509489	0
.308779847	RP_Percent	BP_Win_Percentage	Aces	firstServe
ReturnsWon				
-0.308779847		-0.006836468	-0.016447010	-0
.506991061				
SecondServeReturnsWon		FirstServesIn	DoubleFaults	FirstServe
Percentage				
-0.404359859		-0.326892184	-0.157093786	-0
.261023158				

> AustralianOpen\_Finalists\_allstats\_pca\$rotation

	PC1	PC2	PC3	PC4
PC5				
Age	-0.00415178	0.42830942	-0.232554474	0.314609668
632629				-0.04
Rank	0.13630501	-0.38197446	0.243595669	0.155808021
813788				0.34
avgOdds	0.11807701	0.34188696	-0.274509489	0.476805302
611186				-0.14
SP_Percent	0.48391843	0.19453812	0.308779847	-0.007946174
292276				-0.03
RP_Percent	-0.48391843	-0.19453812	-0.308779847	0.007946174
292276				0.03
BP_Win_Percentage	0.26061584	0.18226722	-0.006836468	-0.395263686
221296				0.11
Aces	0.31732681	-0.19283950	-0.016447010	0.370417984
960882				0.37
firstServeReturnsWon	0.11056995	-0.24004315	-0.506991061	0.241247978
234179				0.26
SecondServeReturnsWon	0.13556848	-0.30358565	-0.404359859	-0.397499499
812446				-0.08
FirstServesIn	0.46875952	-0.01812074	-0.326892184	-0.188532278
380643				0.10
DoubleFaults	0.27786436	-0.21598416	-0.157093786	0.054974387
441043				-0.70
FirstServePercentage	-0.05423925	0.45923720	-0.261023158	-0.317897990
598190				0.33

	PC6	PC7	PC8	PC9
PC10				
Age	0.07970268	-0.63457440	-0.335950103	0.29919590
54563				0.220
Rank	-0.15206363	-0.05060044	-0.744818085	-0.19909378
68241				-0.097
avgOdds	-0.10789635	0.22739381	-0.013033622	-0.69122593
89392				-0.043
SP_Percent	0.14662673	0.10424547	0.006397133	0.07541969
95541				0.157
RP_Percent	-0.14662673	-0.10424547	-0.006397133	-0.07541969
95541				-0.157
BP_win_Percentage	-0.76231012	-0.32625171	0.141283958	-0.14915111
80656				-0.014
Aces	0.16206350	-0.34295605	0.451779918	0.02147937
44497				-0.479
firstServeReturnsWon	-0.29723940	0.30625163	0.069620240	0.36171974
59324				0.307
SecondServeReturnsWon	0.37873653	-0.33614764	-0.030957822	-0.37581689
08444				0.134
FirstServesIn	0.16173311	0.19139591	-0.109800818	0.03343799
40337				0.152
DoubleFaults	-0.16974263	0.01768431	-0.179256050	0.25843657
11092				-0.471
FirstServePercentage	0.14744370	0.23135101	-0.240979790	0.13776595
67266				-0.549
	PC11	PC12		
Age	-0.035617950	-1.370222e-16		
Rank	0.032917599	7.204847e-18		
avgOdds	0.043408318	8.019690e-17		
SP_Percent	0.261611057	7.071068e-01		
RP_Percent	-0.261611057	7.071068e-01		
BP_win_Percentage	-0.001685847	8.964077e-17		
Aces	-0.047078812	1.996870e-16		
firstServeReturnsWon	0.365577301	-2.776579e-17		
SecondServeReturnsWon	0.378901466	3.509267e-16		
FirstServesIn	-0.726337635	-4.471402e-16		
DoubleFaults	0.047482294	-9.629723e-17		
FirstServePercentage	0.222776913	1.520023e-16		

**Inference : We are discarding the PC12 component based on scree plot and Eigen plot**