Name of the dataset: "NFL combine physical testing"

1. Treatment and analysis

The dataset was initially cleaned by removing non-college players, ensuring the consistency and reliability of the sample. The cleaned data focused exclusively on college players. To address missing values, an "Attendance" variable was created to track the number of completed tests (ranging from 0 to 6) for each player. From this, a "Completion Percentage" was calculated to quantify the proportion of available test results relative to the full testing.

To standardise comparisons across players and test types, Z-scores were computed for each physical performance measure (e.g., Bench Press, 40-Yard Dash, Vertical Jump, Broad Jump, Shuttle, and Cone Drill). These Z-scores were then aggregated into a "Total Z-score," providing an overall performance index for each college player.

Additionally, to simplify analysis and enhance understanding, the numerous positions (POS) were collapsed into three broader categories: Offence, Defense, and Special Teams. This classification facilitated group-level comparisons and offered deeper insights into positional differences in physical performance. Performance levels were categorised as Outstanding, Above Average, Below Average, and Needs Improvement (with a total Z-score of less than -4).

2. Interpretation of data

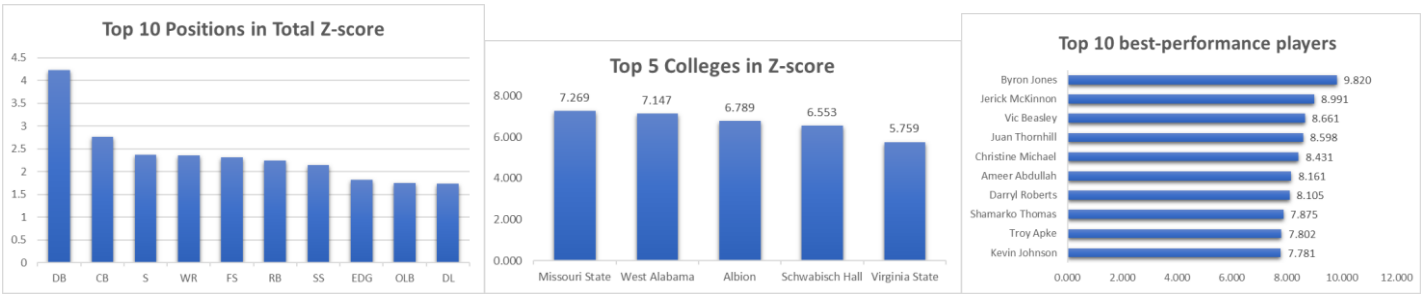


Figure 1: The performance of Top 10 Position, Top 5 Colleges, Top 10 Best-performance players in Z-score

Test	Entire (N=4998)	Offense (N=2322)	Defense (N=2519)	Special (N=167)
40 Yard (s)	4.780±0.004	4.826±0.028	4.711±0.022	4.933±0.020
Bench Press Reps (225 lbs)	19.879±0.102	20.960±0.693	19.535±0.548	16.600±1.135
Vert Leap (in)	32.640±0.063	32.928±0.330	33.926±0.318	30.522±0.452
Broad Jump (in)	115.117±0.151	115.012±0.682	118.299±0.684	113.118±1.136
20 Yard Shuttle	4.441±0.004	4.487±0.021	4.429±0.027	4.454±0.041
3 Cone agility (s)	7.273±0.006	7.319±0.034	7.220±0.027	7.338±0.064

Figur2: Baseline in 6 tests

Test	Entire (N=4998)	Entire_SD (N=4998)	Offense (N=2322)	Offense_SD (N=2322)	Deffense (N=2509)	Deffense_SD (N=2509)	Special (N=167)	Special_SD (N=167)
40 Yard (s)	4.780 ± 0.004	0.004	4.826 ± 0.028	0.028	4.711 ± 0.022	0.022	4.933 ± 0.020	0.020
Bench Press Reps (225 lbs)	19.879 ± 0.102	0.102	20.961 ± 0.693	0.693	19.535 ± 0.548	0.548	16.600 ± 1.135	1.135
Vert Leap (in)	32.640 ± 0.063	0.063	32.928 ± 0.330	0.330	33.926 ± 0.318	0.318	30.524 ± 0.452	0.452
Broad Jump (in)	115.117 ± 0.151	0.151	115.012 ± 0.682	0.682	118.299 ± 0.685	0.685	113.118 ± 1.136	1.136
20 Yard Shuttle	4.441 ± 0.004	0.004	4.487 ± 0.021	0.021	4.429 ± 0.027	0.027	4.454 ± 0.041	0.041
3 Cone agility (s)	7.273 ± 0.006	0.006	7.320 ± 0.034	0.034	7.220 ± 0.027	0.027	7.338 ± 0.064	0.064

Figure 3: Baseline in 6 tests (with conditional formatting)

	Height (in)	Weight (lbs)	40 Yard (s)	Bench Press reps (225 lbs)	Vert Leap (in)	Broad Jump (in)	20 Yard Shuttle	Cone agility (s)
Height (in)	1							
Weight (lbs)	0.74568557	1						
40 Yard (s)	0.56347584	0.88236988	1					
Bench Press reps (225 lbs	0.32337565	0.580868	0.43164245	1				
Vert Leap (in)	-0.3984986	-0.67669402	-0.7624922	-0.316958246	1			
Broad Jump (in)	-0.2840358	-0.65587658	-0.791576	-0.293135101	0.844933235	1		
20 Yard Shuttle	0.44469491	0.72630815	0.75905785	0.357570838	-0.6659128	-0.673227024	1	
3 Cone agility (s)	0.43009584	0.76694791	0.79524539	0.42701527	-0.66203203	-0.700993781	0.858476637	1

Figure 3: Correlation matrix for each record (height, weights and six physical tests

3. Visualization and presentation

In conclusion, the analysis reveals that the year with the highest representation of colleges was 2015 within the

NFL's combine testing 10-year dataset. The average test attendance percentage reached 86%, with 313 colleges and a total of 5001 players participating. To notice that, Missouri State achieved the best performance, while the best performing player was Byron Jones from 2015.

The descriptive statistics show clear differences between units. Defensive players are the fastest in the 40-yard dash, which was 4.711s, and the best at jumping tests with the highest vertical leap, which was 33.926 inches, and the broad jump, which was 118.299 inches. The offence leads in bench press strength with 20.961 reps compared to defence, which was 19.535 and special teams, which was 16.600, while Special teams' players are slowest overall with 4.933s in 40-yard dash, indicating they focus on specialised skills rather than pure athleticism.

The correlation matrix reveals important relationships for coaches. Height and weight correlate strongly, with a correlation of 0.746, and the bigger players tend to be slower. Jumping ability shows negative correlations with size, meaning smaller players jump higher. Agility tests correlate strongly with each other, with 0.858 for the shuttle and cone, and both correlate with 40-yard speed, to show that speed and agility are related abilities. This data helps coaches understand that different units need different physical profiles - defence needs speed and agility, offence needs size and strength.

Moreover, the value of R^2 derived from the graph in the performance of different POS by year can be applied to ascertain trends across various positions, as indicated in the analysis of their performance over time, the range would be from 0 to 1. When the R^2 is closer to 1, it suggests that the model for a specific position fits the data quite well, as it implies a polynomial relationship, as indicated by the trendline selected in Excel.

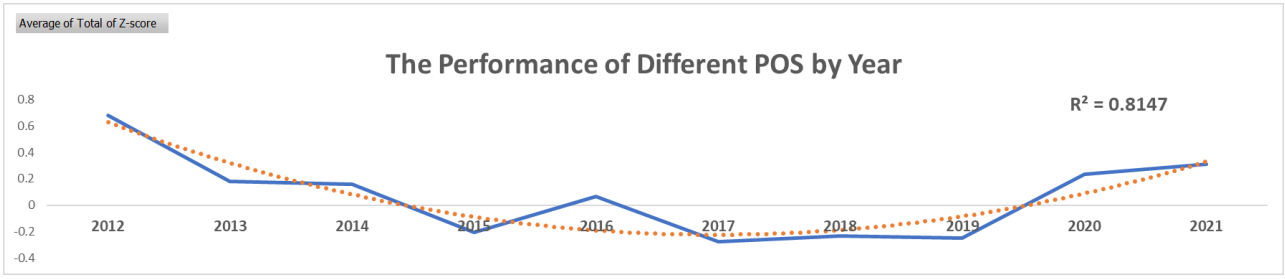
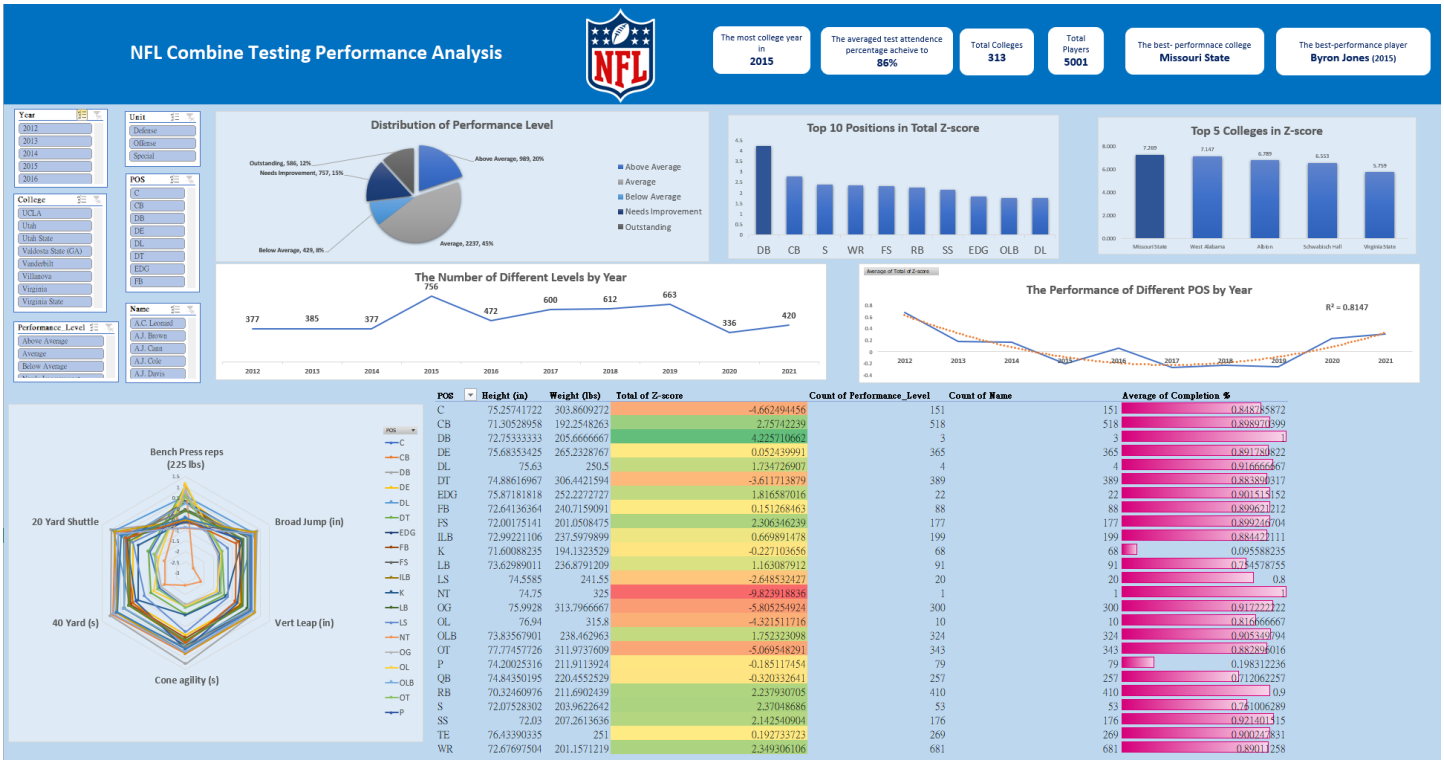


Figure 4. R^2 values would appear in The Performance of Different POS by Year



POS	Height (in)	Weight (lbs)	Total of Z-score	Count of Performance_Level	Count of Name	Average of Completion %
C	75.25741722	303.8609272	-4.662494456	151	151	0.848785872
CB	71.30528958	192.2548263	2.75742239	518	518	0.898970399
DB	72.75333333	205.6666667	4.225710662	3	3	1
DE	75.68353425	265.2328767	0.052439991	365	365	0.891780822
DL	75.63	250.5	1.734726907	4	4	0.916666667
DT	74.88616967	306.4421594	-3.611713879	389	389	0.883890317
EDG	75.87181818	252.2272727	1.816587016	22	22	0.901515152
FB	72.64136364	240.7159091	0.151268463	88	88	0.899621212
FS	72.00175141	201.0508475	2.306346239	177	177	0.899246704
ILB	72.99221106	237.5979899	0.669891478	199	199	0.884422111
K	71.60088235	194.1323529	-0.227103656	68	68	0.095588235
LB	73.62989011	236.8791209	1.163087912	91	91	0.754578755
LS	74.5585	241.55	-2.648532427	20	20	0.8
NT	74.75	325	-9.823918836	1	1	1
OG	75.9928	313.7966667	-5.805254924	300	300	0.917222222
OL	76.94	315.8	-4.321511716	10	10	0.816666667
OLB	73.83567901	238.462963	1.752323098	324	324	0.905349794
OT	77.77457726	311.9737609	-5.069548291	343	343	0.882896016
P	74.20025316	211.9113924	-0.185117454	79	79	0.198312236
QB	74.84350195	220.4552529	-0.320332641	257	257	0.771062257
RB	70.32460976	211.6902439	2.237930705	410	410	0.9
S	72.07528302	203.9622642	2.37048686	53	53	0.761006289
SS	72.03	207.2613636	2.142540904	176	176	0.921401515
TE	76.43390335	251	0.192733723	269	269	0.900247831
WR	72.67697504	201.1571219	2.349306106	681	681	0.890117258

Figure 5. Dashboard of NFL Combine Testing Performance Analysis