Analysis Report

This report is structured as follow.

Contents

Descriptive Statistics

Firstly, descriptive statistics were generated for the data.

The next table presents the mean number of execution on training and matchdays between different categories (training methods and activities).

		Execution on Training	Execution on Matchday
		Mean	Mean
Opposed	Non-Opposed	224.250	25.938
	Opposed	158.125	30.469
Activity	Defending 1v1	325.500	71.750
	Defending the Penalty Box	66.000	6.625
	Finishing from crosses	149.000	1.875
	Finishing inside Penalty Box	34.500	4.625
	Keeping Possession under pressure	139.500	24.250
	Playing Forwards	551.000	64.875
	Shooting from outside the Box	108.500	17.000
	Using Skills to beat players 1v1	155.500	34.625

The comparison of number of training moves on matchdays across weeks for both training methods

This section presents the results of a comparison of number of matchday plays for both training methods and overall training activities. A paired-samples t-test is appropriate in this case, as two sets of observations coming from the same entities are compared (Pallant, 2010).

The results of the T-test showed no significant differences ($p < 0.05$) between any pair of weeks, including week 1 and week 4, on the number of matchday plays for both training methods together. The table below shoes the results of the T-tests along with the mean scores and standard deviations.

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean	t	p
Pair 1	Week 1 Matchday	27.250	16	26.532	6.633	0.229	0.822
	Week 2 Matchday	26.938	16	27.908	6.977		
Pair 2	Week 2 Matchday	26.938	16	27.908	6.977	-1.218	0.242
	Week 3 Matchday	28.875	16	27.305	6.826		
Pair 3	Week 3 Matchday	28.875	16	27.305	6.826	-0.492	0.630
	Week 4 Matchday	29.750	16	28.260	7.065		
Pair 4	Week 1 Matchday	27.250	16	26.532	6.633	-0.714	0.486
	Week 3 Matchday	28.875	16	27.305	6.826		
Pair 5	Week 1 Matchday	27.250	16	26.532	6.633	-0.686	0.503
	Week 4 Matchday	29.750	16	28.260	7.065		

The comparison of number of training moves on matchdays across weeks for the Opposed method

The same analysis of the section above was replicated for both training methods, separately. This section shows the results for Opposed only.

The results of the T-test showed significant differences ($p < 0.05$) between Week 3 and Week 4, $t(8) = -2.919$, $p = 0.022$, Week 1 and Week 4, $t(8) = -3.506$, $p = 0.010$ and Week 1 and Week 3, $t(8) = -2.530$, $p = 0.039$, but not between Week 1 and Week 2. The mean scores reveal that between those weeks mentioned above, the number of plays is increasing from Week 1, 3 and 4.

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean	t	p
Pair 1	Week 1 Matchday	24.500	8	26.484	9.364	-1.557	0.164
	Week 2 Matchday	27.500	8	30.780	10.882		
Pair 2	Week 2 Matchday	27.500	8	30.780	10.882	-1.752	0.123
	Week 3 Matchday	32.250	8	29.649	10.483		
Pair 3	Week 3 Matchday	32.250	8	29.649	10.483	-2.919	0.022
	Week 4 Matchday	37.625	8	31.924	11.287		
Pair 4	Week 1 Matchday	24.500	8	26.484	9.364	-2.530	0.039
	Week 3 Matchday	32.250	8	29.649	10.483		
Pair 5	Week 1 Matchday	24.500	8	26.484	9.364	-3.506	0.010
	Week 4 Matchday	37.625	8	31.924	11.287		

The comparison of number of training moves on matchdays across weeks for the Non-Opposed method

The same analysis was replicated for Non-Opposed. Interestingly, the mean number of plays actually decrease as weeks pass by, unlike what was observed for the Opposed. Statistical significance was found between Week 1 and Week 2 (differently from Non-Opposed), $t(8) = 3.449$, $p = 0.011$, Week 1 and Week 3, $t(8) = 3.100$, $p = 0.017$, and Week 1 and Week 4, $t(8) = 2.493$, $p = 0.041$.

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean	t	p
Pair 1	Week 1 Matchday	30.000	8	28.102	9.936	3.449	0.011
	Week 2 Matchday	26.375	8	26.848	9.492		
Pair 2	Week 2 Matchday	26.375	8	26.848	9.492	0.789	0.456
	Week 3 Matchday	25.500	8	26.317	9.304		
Pair 3	Week 3 Matchday	25.500	8	26.317	9.304	1.737	0.126
	Week 4 Matchday	21.875	8	23.461	8.295		
Pair 4	Week 1 Matchday	30.000	8	28.102	9.936	3.100	0.017
	Week 3 Matchday	25.500	8	26.317	9.304		
Pair 5	Week 1 Matchday	30.000	8	28.102	9.936	2.493	0.041
	Week 4 Matchday	21.875	8	23.461	8.295		

The comparison of Matchday plays between Opposed and Non-Opposed Training Methods

An Independent Samples T-test was executed here, since the Opposed and Non-Opposed groups were formed by different individuals. These tests are appropriate when comparing the scores of a continuous variable between two different groups (Hair et al., 2014).

A Levene's test (Levene, 1961) was conducted to examine homogeneity of variances. The test showed that variances are homogeneous between groups with respect to number of training moves and matchday plays ($p > .05$). Thus this assumption was not violated.

The results of the T-test showed no significant differences for between both methods in terms of number of plays on matchdays, $t(32) = -0.672$, $p = 0.504$. That is, the difference on the mean scores cannot be considered statistically significant according to the data.

Group Statistics

Opposed		N	Mean	Std. Deviation	Std. Error Mean	t	p
Execution on Matchday	Non-Opposed	32	25.938	25.107	4.438	-0.672	0.504
	Opposed	32	30.469	28.748	5.082		

The comparison of Training plays between Opposed and Non-Opposed Training Methods

For the number of training moves, the result was also non-significant, even though the mean number of moves is numerically different between non-opposed (224.25) and opposed (158.12). The reduced number of observations (only 8 per training method) might be the reason for the lack of statistical significance.

Group Statistics

Opposed		N	Mean	Std. Deviation	Std. Error Mean	t	p
Training	Non-Opposed	8	224.250	193.961	68.575	0.767	0.456
	Opposed	8	158.125	147.937	52.304		

The effect of training methods on the number of matchday plays

Lastly, this report presents the results of a regression model, testing the effect of training method on the number of matchday plays overall. To control for the effect that different weeks and different types of plays may have on the number of matchday plays, these variables were dummy-coded and included as predictors in the model (dummy-variable approach for panel data). The number of moves performed during training was also inserted as a control variable, so that only the pure effect of the training method can be evaluated. The model itself was significant, $F(63) = 48.342$, $p < 0.001$, $R^2 = 0.900$. Next table shows the regression results.

While the t-statistics is not directly interpretable (same as the F-statistic), the p-value represents the results of the significance test of the variable. Values below 0.05 represent statistical significance of the predictor. That is, the variable significantly influences the

outcome variable. The beta coefficient refers to the absolute change in the outcome variable that happens for a one-unit change on the independent variable. So, negative beta coefficients indicate an inverse relationship between the variables, whereas positive values represent the opposite.

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	p	95,0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	-3.179	4.321		-0.736	0.465	-11.853	5.495
Opposed	9.019	3.073	0.169	2.935	0.005	2.850	15.187
Defending 1v1	47.377	10.659	0.588	4.445	0.000	25.978	68.776
Playing Forwards	25.199	17.866	0.313	1.410	0.164	-10.668	61.065
Shooting from outside the Box	7.353	4.920	0.091	1.495	0.141	-2.523	17.230
Defending the Penalty Box Keeping	-0.138	4.375	-0.002	-0.031	0.975	-8.921	8.645
Possession under pressure	12.499	5.520	0.155	2.265	0.028	1.418	23.581
Finishing from crosses	-10.520	5.729	-0.131	-1.836	0.072	-22.022	0.981
Using Skills to beat players 1v1	21.789	5.878	0.270	3.707	0.001	9.988	33.589
Week 2	-0.313	3.002	-0.005	-0.104	0.917	-6.339	5.714
Week 3	1.625	3.002	0.026	0.541	0.591	-4.401	7.651
Week 4	2.500	3.002	0.041	0.833	0.409	-3.526	8.526
Execution on Training	0.068	0.034	0.419	2.020	0.049	0.000	0.135

a. Dependent Variable: Execution on Matchday

The coefficients show that the opposed training method has a significant positive effect on the number of matchday plays ($\beta = 9.019$, $p = 0.005$). The beta coefficient reveals that when the opposed method is employed for a given training activity, it is expected that players make an additional 9 moves on matchdays, compared to the non-opposed method.
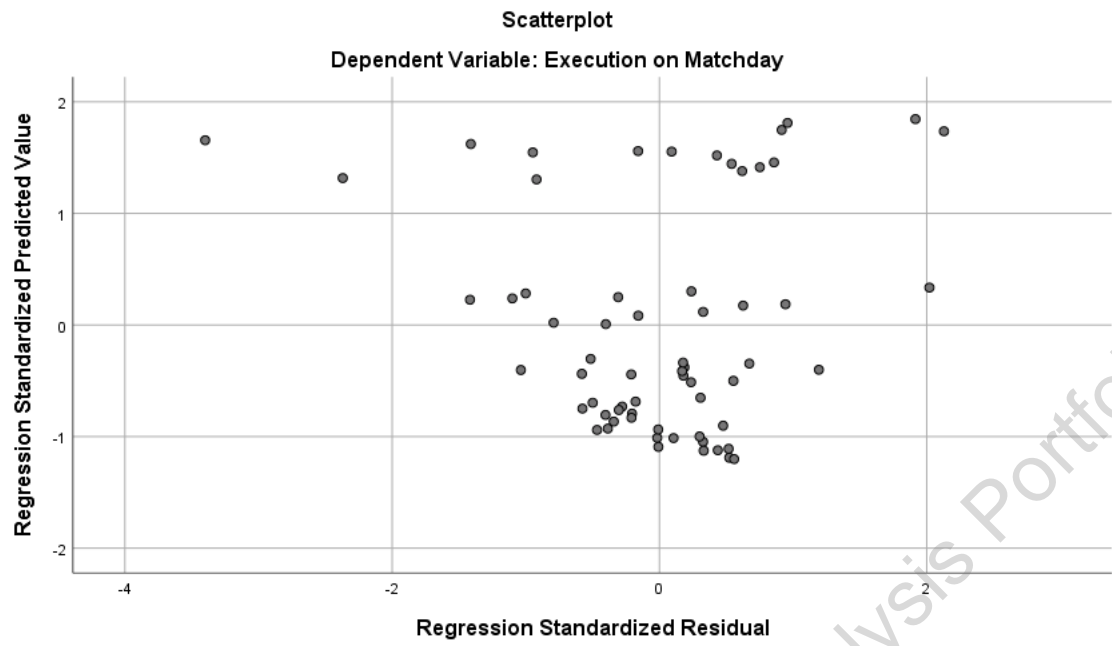
Normality, linearity and homoscedasticity of residuals (errors).

Lastly, violations of the assumptions of normality, linearity and homoscedasticity of residuals (errors) were examined for the regression model. The next figure shows a P-P plot, which is used to assess the normality of residuals. The observations should follow a diagonal pattern to suggest normality of residuals (Tabachnick and Fidell, 2014).

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: Execution on Matchday
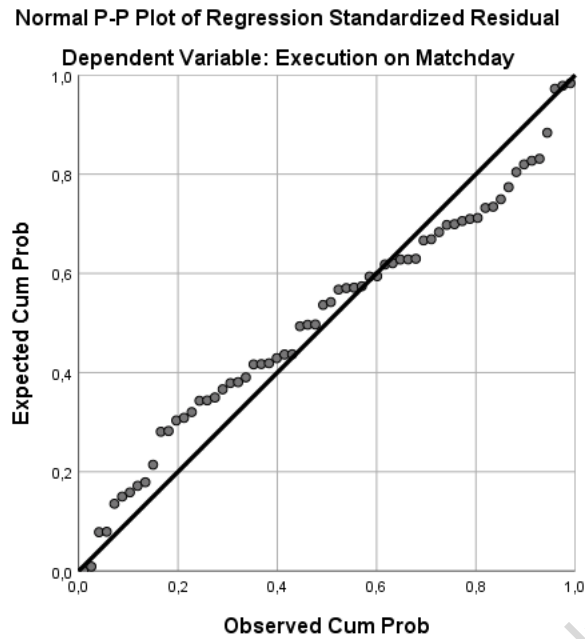
The graph suggests that no substantial violations of normality are present.

The next figure shows a scatterplot of standardized residuals and standardized predicted values of the dependent variable. If points are well distributed along the X and Y axes, this would suggest homoscedasticity and linearity. Nonlinearity is indicated when most of the residuals are above the zero line on the plot at some predicted values and below the zero line at other predicted values. Lack of homoscedasticity is indicated if values are more dispersed for a given predicted values than at other values (Tabachnick and Fidell, 2014).

Scatterplot
Dependent Variable: Execution on Matchday

References