

Analysis Report

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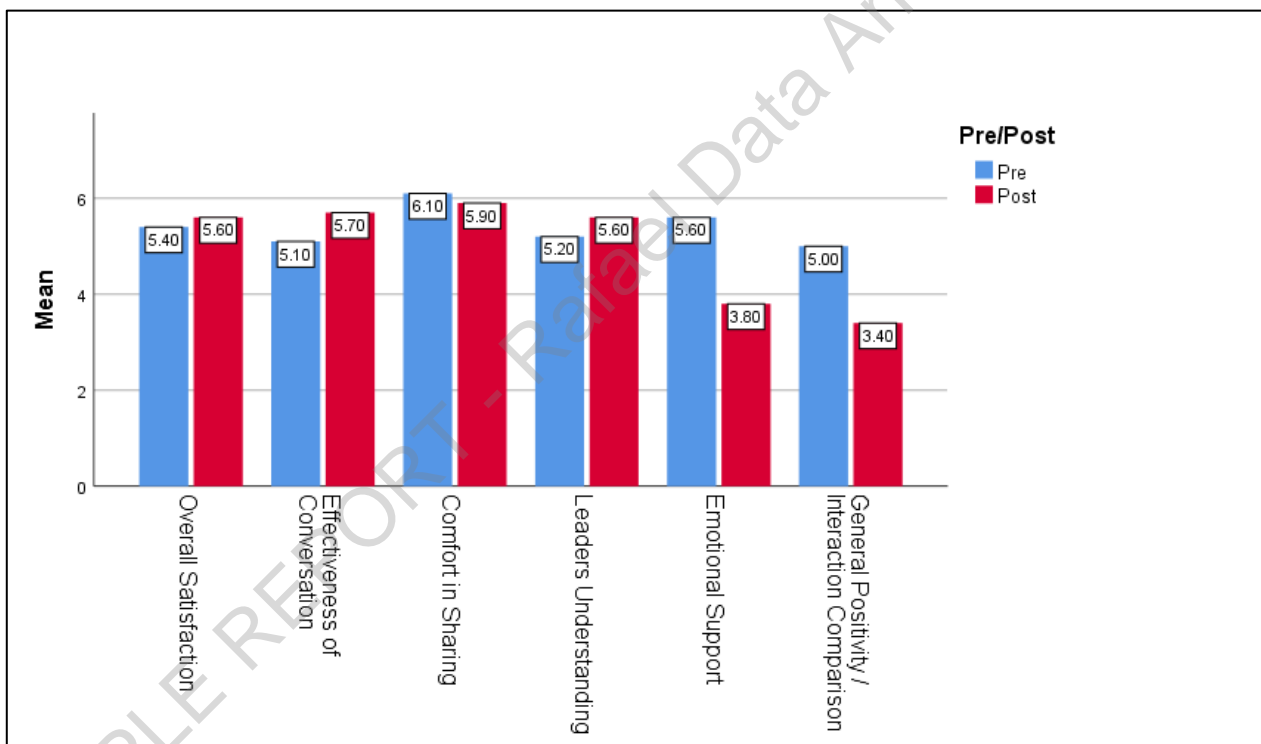
SAMPLE REPORT - Rafael Data Analysis Portfolio

Descriptive Statistics

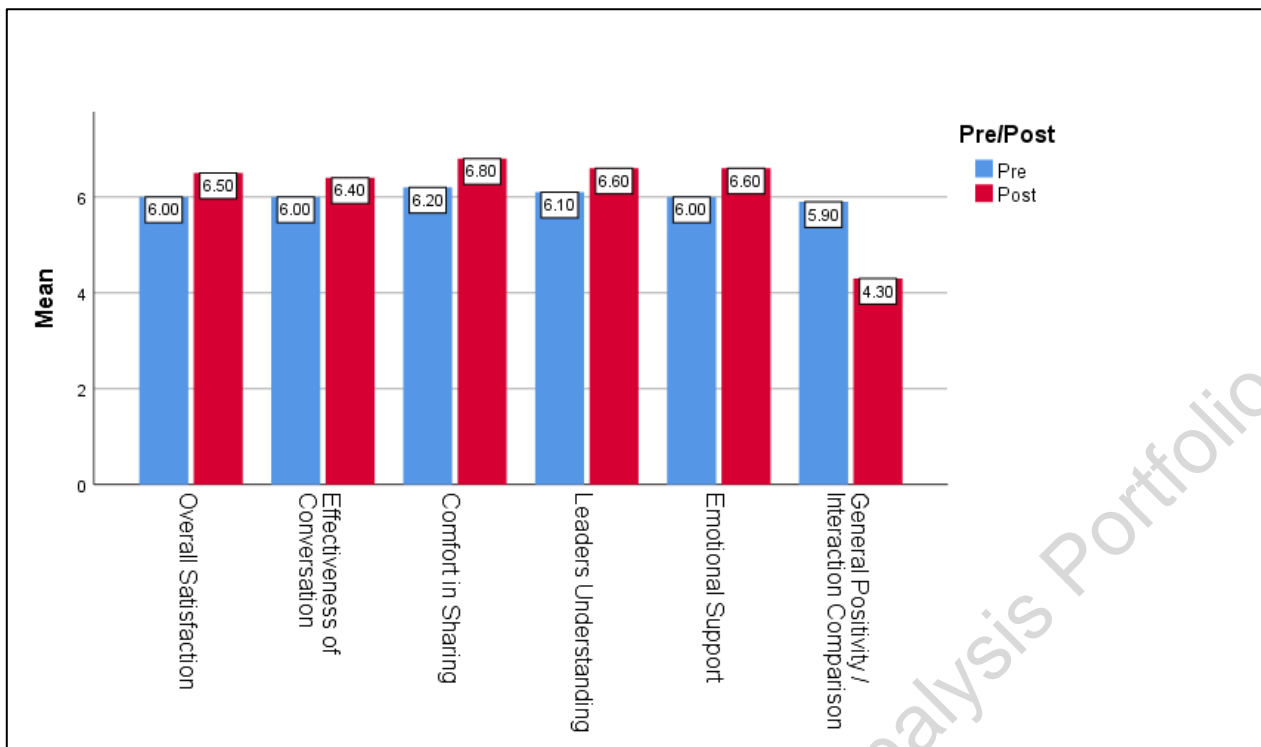
The report starts with descriptive statistics for the variables of interest. The means and standard deviations are shown in the table below.

	Group							
	Chatbot				Human			
	Pre/Post				Pre/Post			
	Pre		Post		Pre		Post	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Overall Satisfaction	5.400	1.506	5.600	.699	6.000	.667	6.500	.527
Effectiveness of Conversation	5.100	1.595	5.700	.823	6.000	.667	6.400	.516
Comfort in Sharing	6.100	1.663	5.900	.876	6.200	.422	6.800	.422
Leaders Understanding	5.200	1.476	5.600	.699	6.100	.316	6.600	.516
Emotional Support	5.600	2.011	3.800	1.549	6.000	.943	6.600	.516
General Positivity / Interaction Comparison	5.000	1.886	3.400	2.011	5.900	.876	4.300	1.767

To facilitate the visualization of the differences, bar graphs were produced and are shown below. The graph below shows the mean scores for the Chatbot group.



The graph below shows the same scores, but for the group subject to the Human interaction.



Between-Subjects Repeated Measures ANOVA

The analysis examined both between-subjects and within-subjects effects using various dependent variables related to the satisfaction and effectiveness of leadership interactions.

There were two groups of equal size, with 10 participants in each group. Group 1 interacted with a chatbot and Group 2 interacted with a human. The homogeneity of variances was first assessed using Levene's Test of Equality of Error Variances. Results indicate that the assumption of homogeneity was violated for several measures, notably the Overall Satisfaction_Pre ($p=0.047$), Effectiveness of Conversation_Pre ($p=0.012$), Comfort in Sharing_Pre ($p=0.010$), Leaders Understanding_Pre ($p=0.002$), and for Emotional Support_Post ($p<0.001$). However, considering equal group sizes, the ANOVA test remains somewhat robust against the violation of this assumption. The table below shows the details of the Levene's tests.

Levene's Test of Equality of Error Variances^a

	Levene Statistic	df1	df2	Sig.
Overall Satisfaction_Pre	4.549	1	18	0.047
Overall Satisfaction_Post	0.256	1	18	0.619
Effectiveness of Conversation_Pre	7.817	1	18	0.012
Effectiveness of Conversation_Post	0.750	1	18	0.398
Comfort in Sharing_Pre	8.284	1	18	0.010
Comfort in Sharing_Post	1.194	1	18	0.289
Leaders Understanding_Pre	12.863	1	18	0.002
Leaders Understanding_Post	1.446	1	18	0.245
Emotional Support_Pre	3.804	1	18	0.067
Emotional Support_Post	36.344	1	18	0.000
General Positivity / Interaction Comparison_Pre	3.929	1	18	0.063
General Positivity / Interaction Comparison_Post	0.671	1	18	0.424

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Group

Within Subjects Design: PrePost

The next table shows the results for the between-subjects effects (Group differences). The between-subjects effects were significant for the Group factor across multiple measures. Specifically, significant group differences were observed in Overall Satisfaction ($p=0.010$, $\eta^2=0.315$), Effectiveness of Conversation ($p=0.038$, $\eta^2=0.218$), Leaders Understanding ($p=0.002$, $\eta^2=0.432$), Emotional Support ($p<0.001$, $\eta^2=0.502$), and General Positivity/Interaction Comparison ($p=0.035$, $\eta^2=0.224$). The Comfort in Sharing variable approached significance but did not reach the 5% significance level ($p=0.069$, $\eta^2=0.172$). By examining the descriptive table provided earlier, it is clear that the mean scores for Group 2 are higher, so it can be concluded that this group shows higher scores in those variables compared to Group 1.

Tests of Between-Subjects Effects

Transformed Variable: Average

Source	Measure	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	OverallSatisfaction	1380.625	1	1380.625	2028.673	.000	.991
	EffectivenessConversation	1345.600	1	1345.600	1053.078	.000	.983
	ComfortSharing	1562.500	1	1562.500	2343.750	.000	.992
	LeadersUnderstanding	1380.625	1	1380.625	2097.152	.000	.991
	EmotionalSupport	1210.000	1	1210.000	857.480	.000	.979
	GeneralPositivityInteractionComparison	864.900	1	864.900	556.007	.000	.969
Group	OverallSatisfaction	5.625	1	5.625	8.265	.010	.315
	EffectivenessConversation	6.400	1	6.400	5.009	.038	.218
	ComfortSharing	2.500	1	2.500	3.750	.069	.172
	LeadersUnderstanding	9.025	1	9.025	13.709	.002	.432
	EmotionalSupport	25.600	1	25.600	18.142	.000	.502
	GeneralPositivityInteractionComparison	8.100	1	8.100	5.207	.035	.224
Error	OverallSatisfaction	12.250	18	.681			
	EffectivenessConversation	23.000	18	1.278			
	ComfortSharing	12.000	18	.667			
	LeadersUnderstanding	11.850	18	.658			
	EmotionalSupport	25.400	18	1.411			
	GeneralPositivityInteractionComparison	28.000	18	1.556			

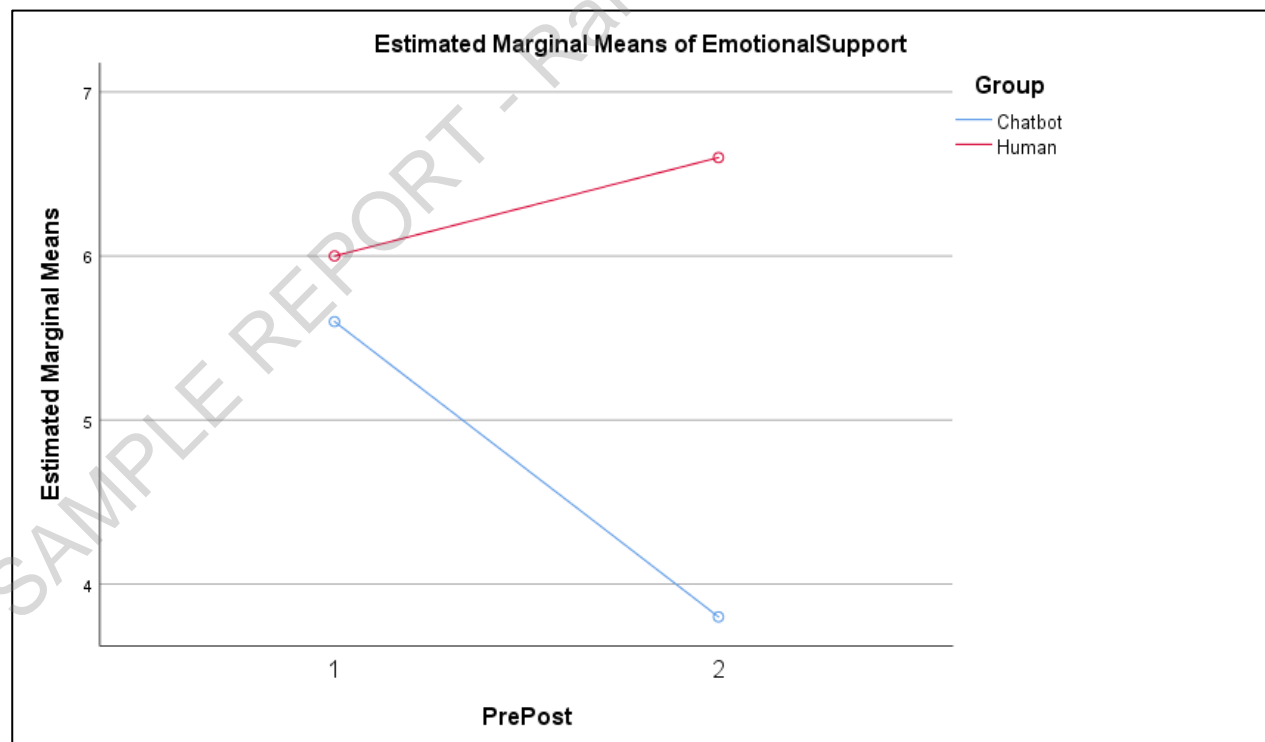
The within-subjects effects focused on differences between the pre and post measurements (Table below). Of the measures assessed, only the General Positivity/Interaction Comparison showed a significant change between pre and post ($p=0.024$, $\eta^2=0.253$). The Effectiveness of Conversation variable also showed a trend, nearing significance, but still not within the 5% significance level ($p=0.073$, $\eta^2=0.168$). The results obtained for the General Positivity/Interaction Comparison variable warrant a critical examination. It is crucial to highlight that the survey questions for this variable were phrased substantially differently between the pre and post assessments. Such variations in phrasing can introduce a methodological inconsistency, which may inadvertently impact respondents' understanding and interpretation of the questions. Consequently, this discrepancy may have affected their responses, thus casting doubt on the validity of the observed changes over time for this specific measure.

The interaction effects of time (pre-post) with group were examined to determine if changes over time differed between groups (PrePost * Group line in the table). Notably, there was a significant interaction for the Emotional Support variable ($p=0.024$, $\eta^2=0.251$), suggesting that the two groups experienced different patterns of change in this measure over time (Pre and Post). Other measures did not demonstrate significant interactions.

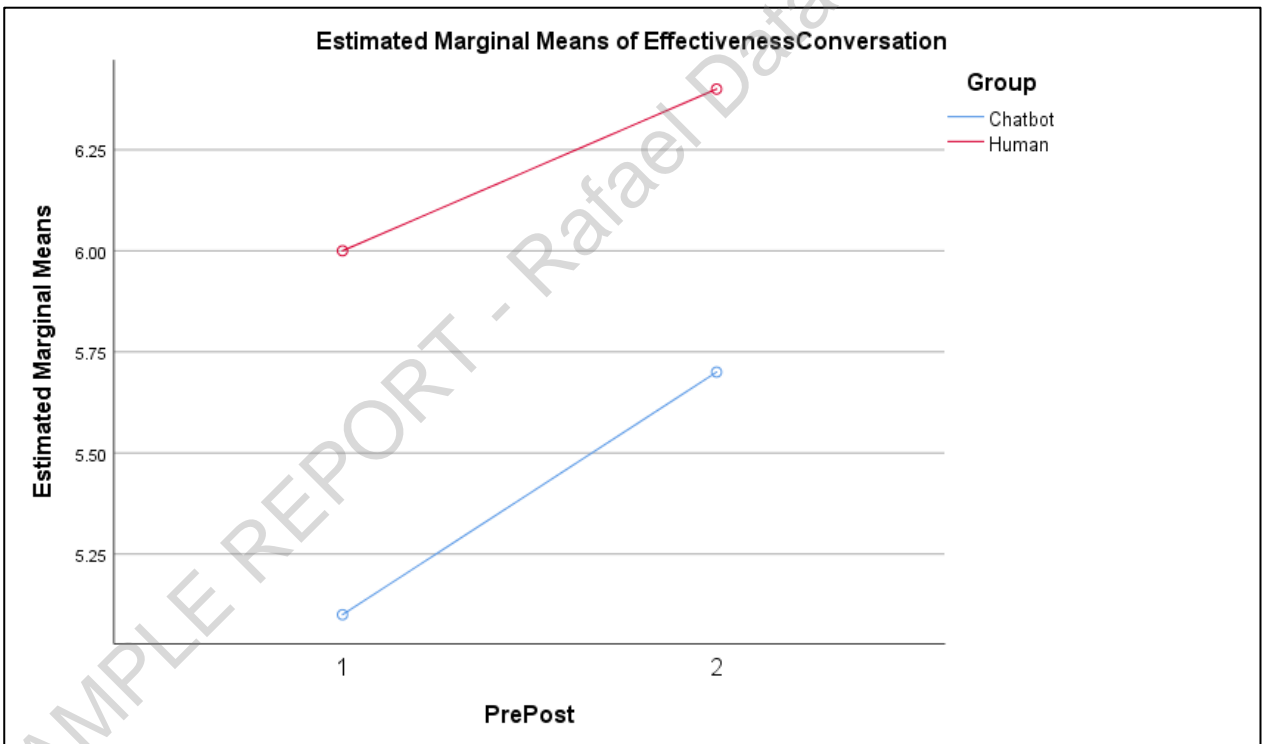
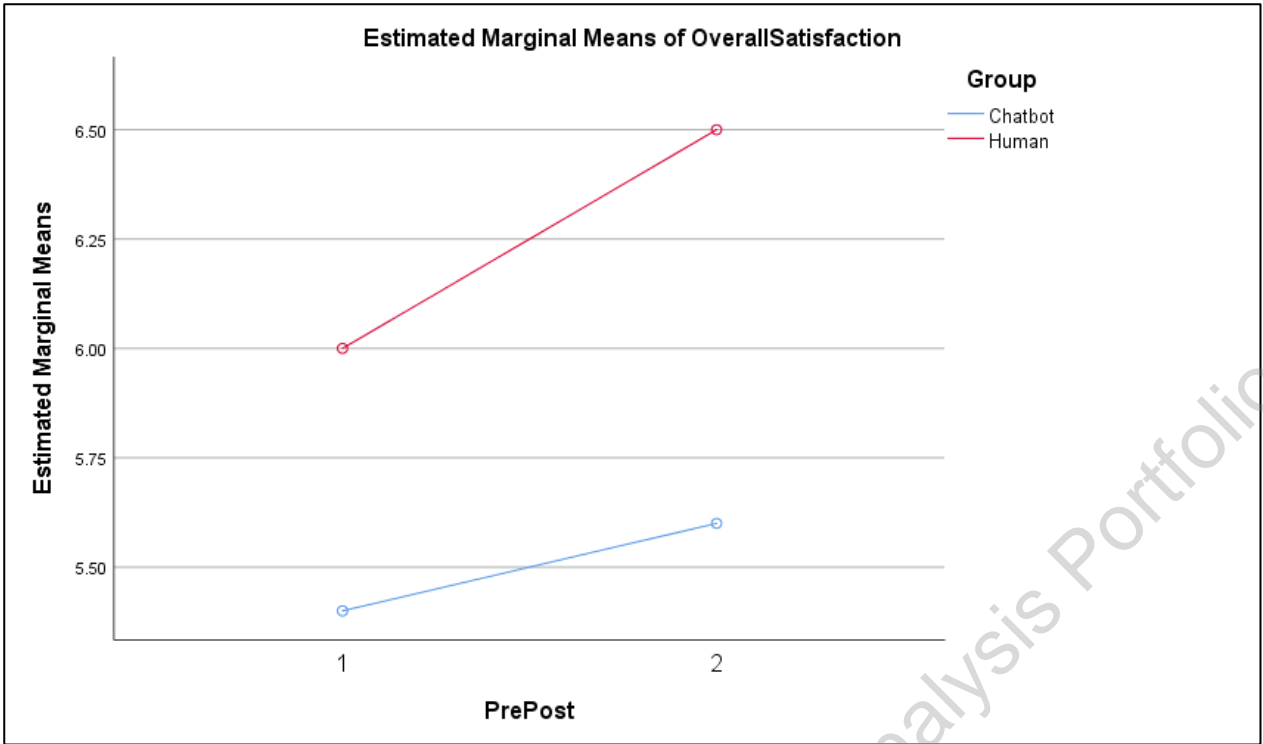
Tests of Within-Subjects Effects

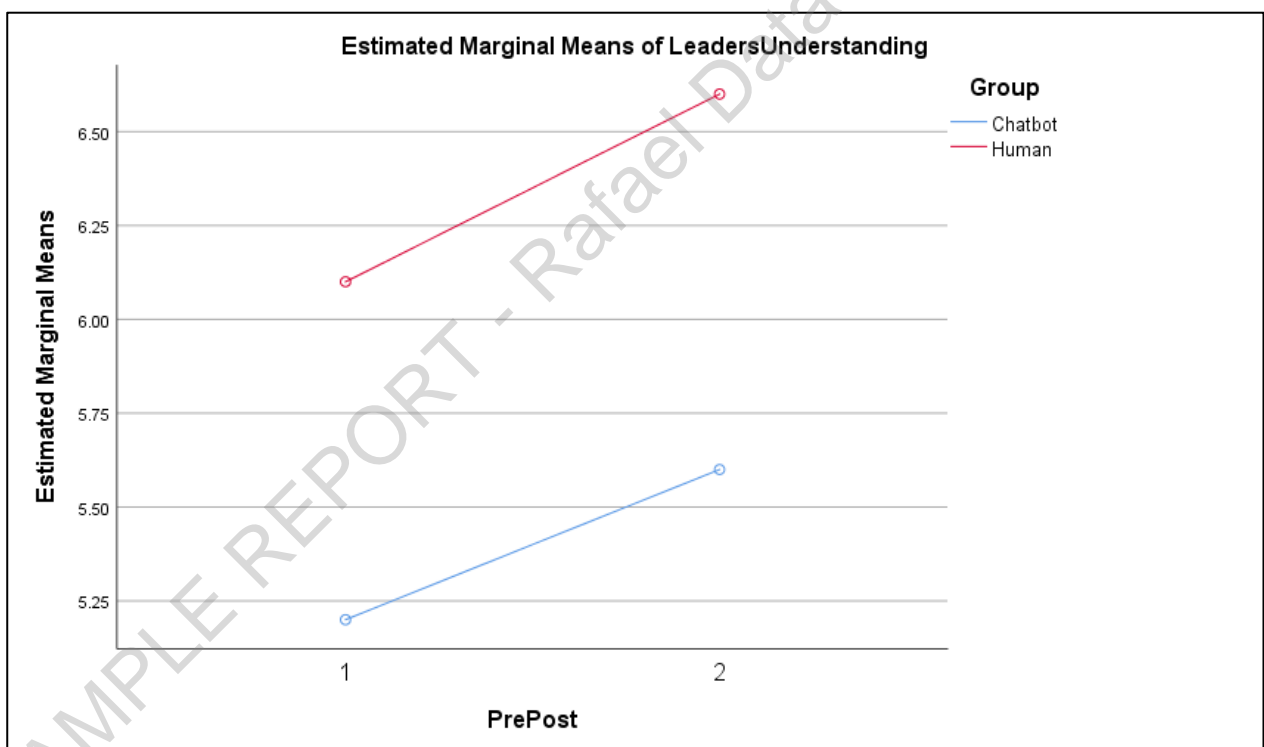
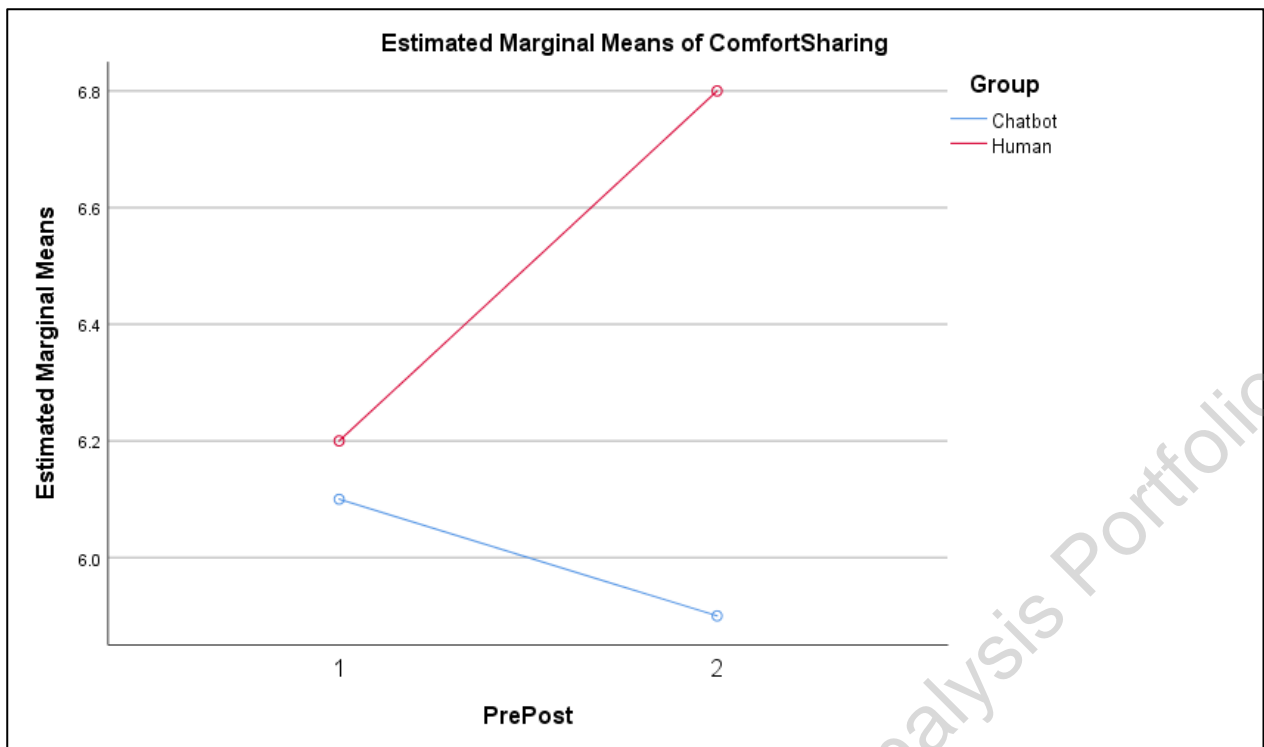
Source	Measure	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
PrePost	OverallSatisfaction	1.225	1	1.225	1.157	.296	.060
	EffectivenessConversation	2.500	1	2.500	3.629	.073	.168
	ComfortSharing	.400	1	.400	.313	.583	.017
	LeadersUnderstanding	2.025	1	2.025	2.359	.142	.116
	EmotionalSupport	3.600	1	3.600	1.507	.235	.077
	GeneralPositivityInteractionComparison	25.600	1	25.600	6.111	.024	.253
PrePost * Group	OverallSatisfaction	.225	1	.225	.213	.650	.012
	EffectivenessConversation	.100	1	.100	.145	.708	.008
	ComfortSharing	1.600	1	1.600	1.252	.278	.065
	LeadersUnderstanding	.025	1	.025	.029	.866	.002
	EmotionalSupport	14.400	1	14.400	6.028	.024	.251
	GeneralPositivityInteractionComparison	.000	1	.000	.000	1.000	.000
Error(PrePost)	OverallSatisfaction	19.050	18	1.058			
	EffectivenessConversation	12.400	18	.689			
	ComfortSharing	23.000	18	1.278			
	LeadersUnderstanding	15.450	18	.858			
	EmotionalSupport	43.000	18	2.389			
	GeneralPositivityInteractionComparison	75.400	18	4.189			

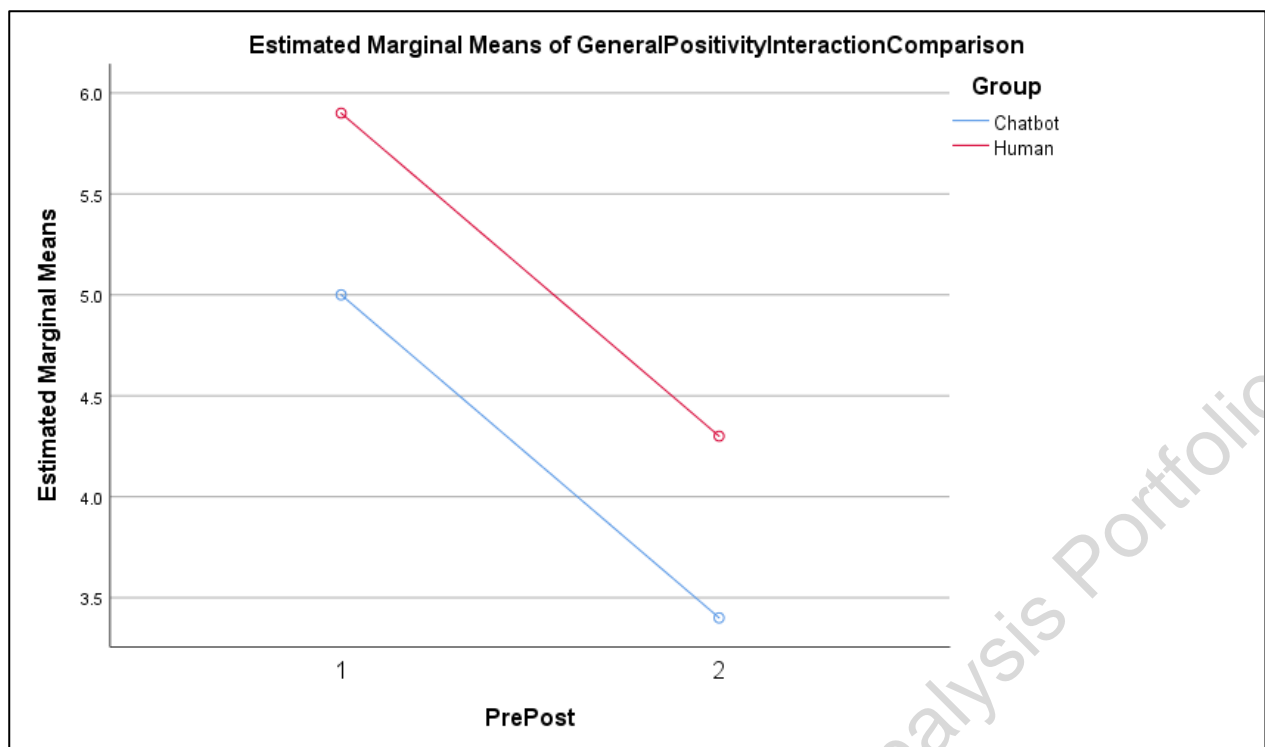
The graph below helps understanding the interaction for the Emotional Support variable. It is clear that while scores decrease from pre to post for the Chatbot group, they increase for the Human group, which indicates that the pre vs post change is different for these groups.



The following graphs show the changes on the other variables.







In summary, these results provide evidence of both significant group differences in multiple aspects of leadership interactions and notable changes over time in at least one measure. Moreover, the interaction effect for Emotional Support indicates differing trajectories of change between the groups, emphasizing the importance of considering both group and time factors in understanding participants' experiences and perceptions. Further exploration and potential interventions may be informed by these findings, with a particular emphasis on the variables that showed both between-group differences and changes over time.