

THE EFFECT OF EMOTIONS ON PEOPLE'S INTERACTION EXPERIENCE TOWARD EMPATHETIC CHATBOTS

Introduction

In this study we try to understand people's interaction experience with chatbots, and how an empathetic chatbot 'effect varies from a non-empathetic one. The following report shows analysis of participants initial emotion and if emotion changes after interaction with the bot. Distributions of age, gender, level of education and race were also included.

Data Description

We use a crowdsourcing platform, Prolific, to launch the survey. The participants are asked to share recent life experience, interact with one of the bots and respond to a few survey questions.

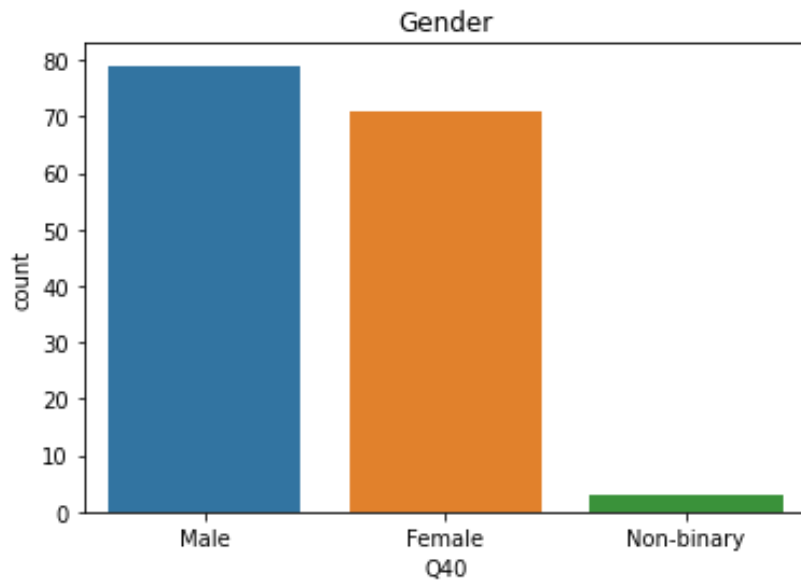
Initially 180 participants have completed the study on Prolific but during the pilot study we observed the participant responses and made changes to the bot stories to improve the quality of data for analysis, the participants who did not finish the interaction with the bot were also excluded. Finally, we chose to go ahead with 148 participants.

	Empathetic	Non-empathetic	Total
Positive	21	28	49
Negative	28	21	49
Neutral	24	26	50
Total	73	75	148

In Q12 participants rated their emotion for the first time after sharing their recent experience (positive, negative, neutral) as a manipulation check i.e., before bot interaction. Q17, participants rate their emotion after bot interactions.

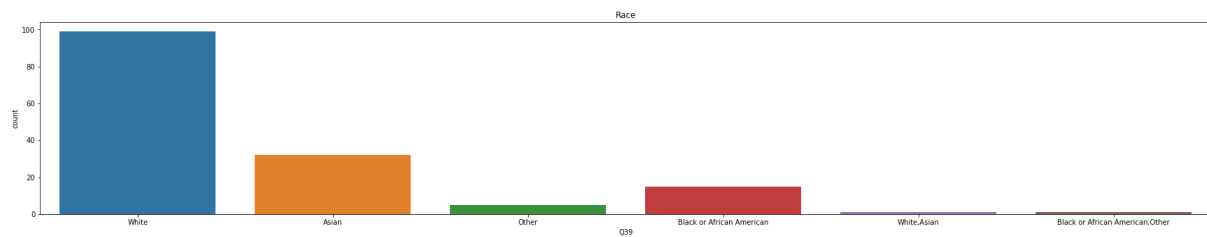
Q14 represents people who interacted with empathetic bot and Q16 represents people who interacted with non-empathetic bot.

Distribution of Gender



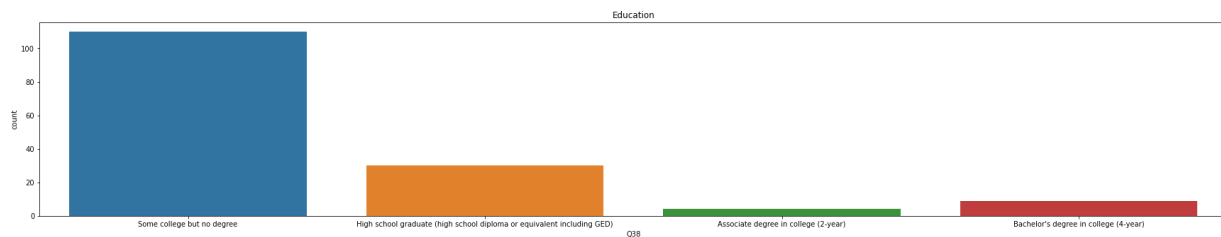
51.6% of the total participants are male, 46.4% are female and 1.9% are non-binary.

Distribution of Race



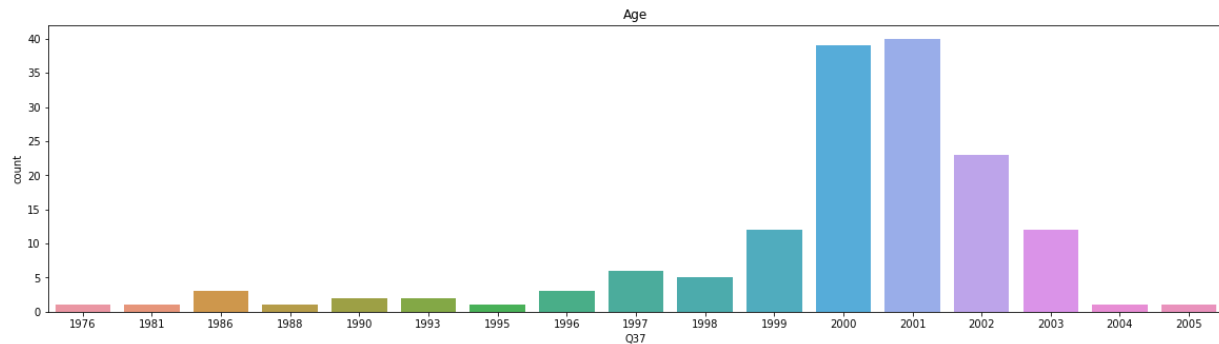
In the race distribution we can observe that the majority (64.7%) are white, 20.9% Asian and 9.8% are black.

Distribution of Education



Most of the participants (71.8%) are in Some college but have no degree, 19.6% are high school graduates, 5.8% of them are pursuing bachelors.

Distribution of Birth Year



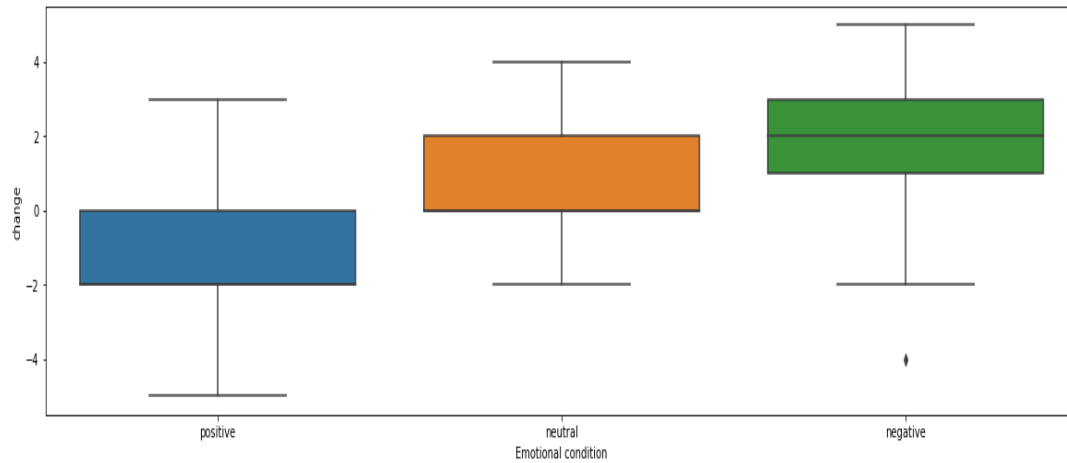
Majority of the participants were born in 2001, 2000 (26.1% and 25.4% respectively) and 2002 (15%), So we can conclude that most of them are around 21 years old.

ANALYSIS

(A) Independent Variables

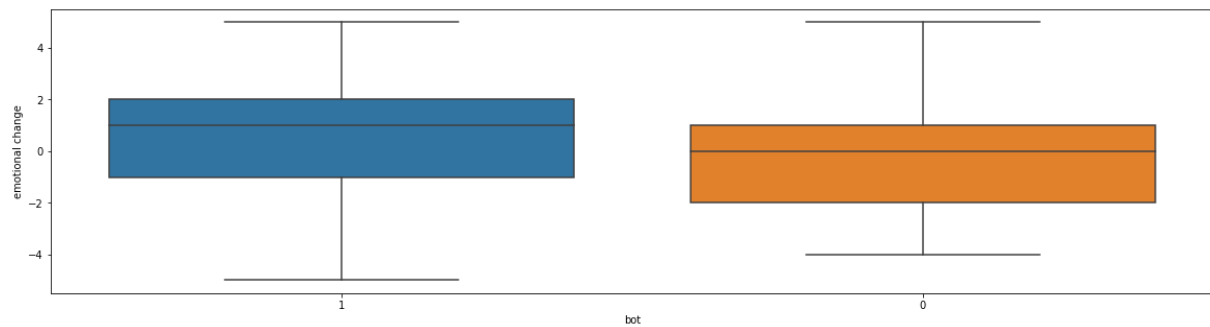
Mean and Standard Deviation of each group for Emotional change

	affect_man1	Mean	StandardDeviation
0	Negative	-1.34694	1.54853
1	Neutral	1.71429	1.77951
2	Positive	0.56	1.38741



Mean and Standard Deviation of bots for Emotional change

	bot	Mean	StandardDeviation
0	NE	-0.0821918	1.97029
1	E	0.7	2.11325



Mean and Standard Deviation of each group interacting with bots after emotional manipulation

	affect_manipulation	bot	Mean	StandardDeviation
0	Negative	NE	0.461538	1.27219
1	Negative	E	0.777778	1.71718
2	Neutral	NE	1.10526	2.18314

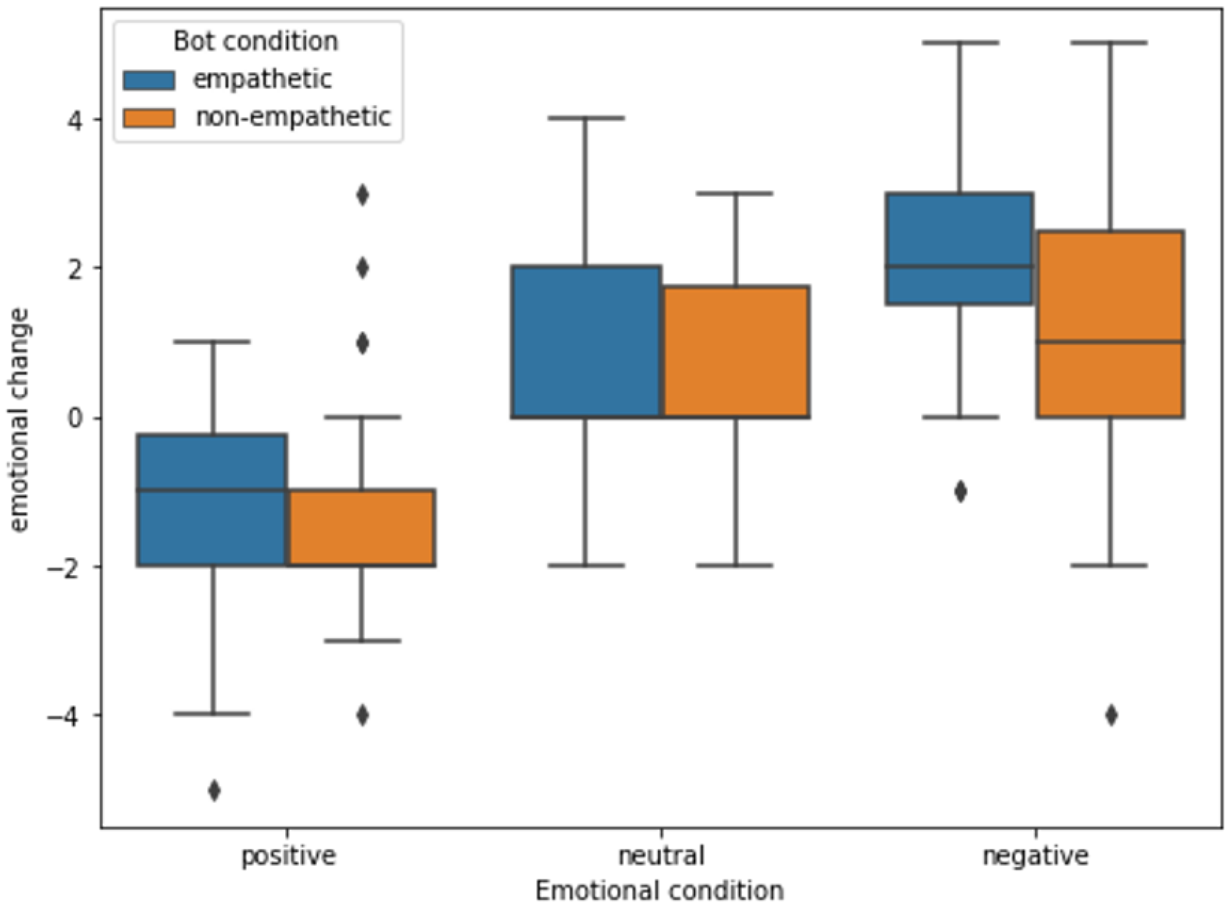
3	Neutral	E	2.16129	1.39276
4	Positive	NE	-1.39286	1.61794
5	Positive	E	-1.45455	1.53459

ANOVA

	coef	std err	t	P> t 	[0.0 25	0.97 5]
Intercept	-1.5647	0.407	-3.843	0.000	-2.370	-0.760
affect_man	0.9359	0.188	4.985	0.000	0.565	1.307
bot	-0.2030	0.407	-0.498	0.619	-1.008	0.602
affect_man:bot	-0.0266	0.188	-0.142	0.888	-0.398	0.344

LINEAR REGRESSION

	coef	std err	t	P> t 	[0.0 25	0.97 5]
Intercept	-1.5647	0.407	-3.843	0.000	-2.370	-0.760
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Conclusion: Affect manipulation has a significant impact on emotional change.

Summary Statistics of Metrics

(B) Dependent Variables

Question No. of Metric	Name of Metric	Cronbach's Alpha
Q18	Emotional Acknowledgement	0.94
Q19	Trust on Chatbot	0.79
Q20	Perceived Effort	0.92
Q21	Liking	0.93
Q22	Perspective Taking	0.93
Q23	Empathy	0.93

Q26, Q27	Trust	0.84
Q28	Enjoyment	0.95
Q30, Q31	Chatbot Usefulness	0.87

1.Emotional Acknowledgement

	affect_man	bot	Mean	StandardDeviation
0	Negative	NE	1.48077	1.06987
1	Negative	E	3.11111	0.936271
2	Neutral	NE	0.960526	0.698526
3	Neutral	E	3.1371	0.952713
4	Positive	NE	1.42857	0.71316
5	Positive	E	3.15909	0.995662

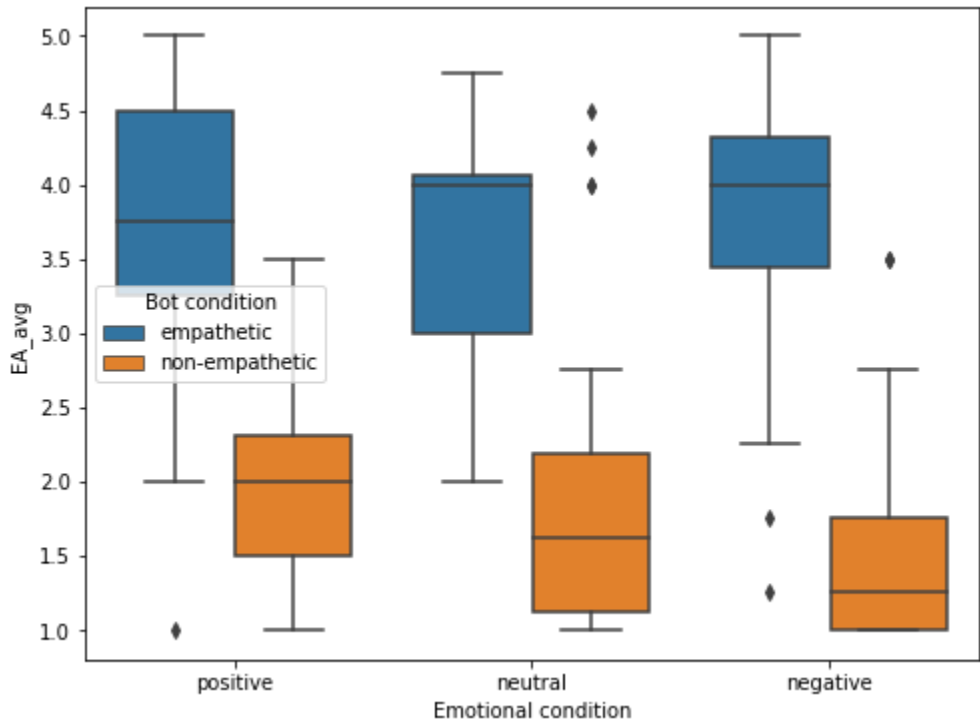
ANOVA

	coef	std err	t	P> t	[0.025	0.975]
Intercept	5.5254	0.638	8.659	0.000	4.264	6.787
affect_man	0.0082	0.293	0.028	0.978	-0.570	0.587
bot	-1.8643	0.391	-4.768	0.000	-2.637	-1.091
affect_man:bot	0.0068	0.180	0.038	0.970	-0.349	0.363

LINEAR REGRESSION

	coef	std err	t	P> t	[0.025	0.975]
Intercept	5.5254	0.638	8.659	0.000	4.264	6.787

affect_manit	0.0082	0.293	0.028	0.978	-0.570	0.587
bot	-1.8643	0.391	-4.768	0.000	-2.637	-1.091
affect_manit:bot	0.0068	0.180	0.038	0.970	-0.349	0.363



Conclusion: Bot has a significant impact on emotional acknowledgement.

2.Trust on Chatbot

	affect_manit	bot	Mean	StandardDeviation
0	Negative	NE	2.88462	0.964963
1	Negative	E	3.32407	0.932364
2	Neutral	NE	2.47368	0.749513
3	Neutral	E	3.41129	0.96079
4	Positive	NE	3.02679	0.78274

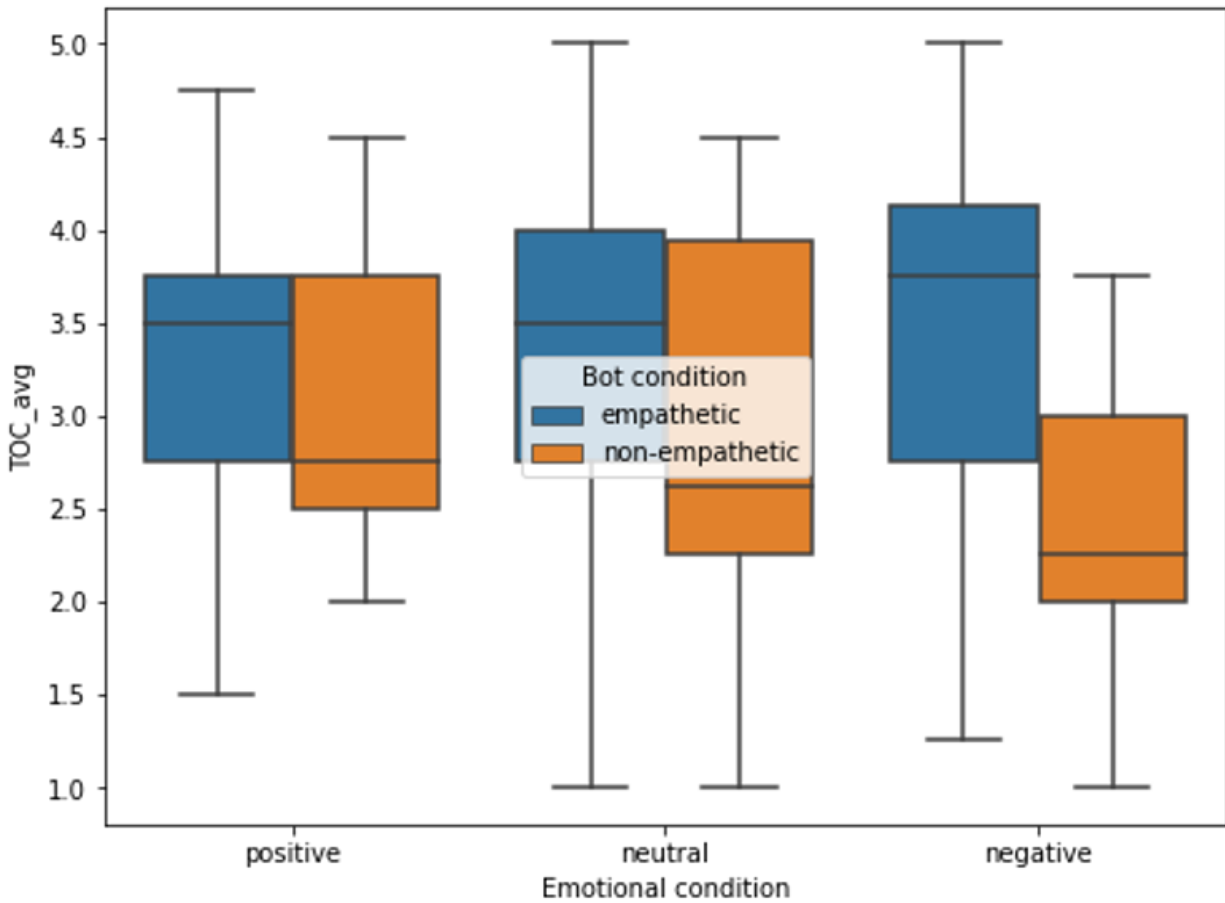
	5		Positive		E		3.28409		0.877277	
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ANOVA

	coef	std err	t	P> t	[0.02 5	0.97 5]
Intercept	3.9014	0.64 2	6.078	0.000	2.633	5.17 0
affect_man	0.0140	0.29 4	0.048	0.962	-0.56 8	0.59 6
bot	-0.488 3	0.39 3	-1.24 2	0.216	-1.26 6	0.28 9
affect_man:bot	-0.028 5	0.18 1	-0.15 7	0.875	-0.38 7	0.33 0

LINEAR REGRESSION

	coef	std err	t	P> t	[0.02 5	0.97 5]
Intercept	3.9014	0.64 2	6.078	0.000	2.633	5.17 0
affect_man	0.0140	0.29 4	0.048	0.962	-0.56 8	0.59 6
bot	-0.488 3	0.39 3	-1.24 2	0.216	-1.26 6	0.28 9
affect_man:bot	-0.028 5	0.18 1	-0.15 7	0.875	-0.38 7	0.33 0



Conclusion: Affect manipulation and bot does not have significant impact on trust on chatbot.

3.Effort

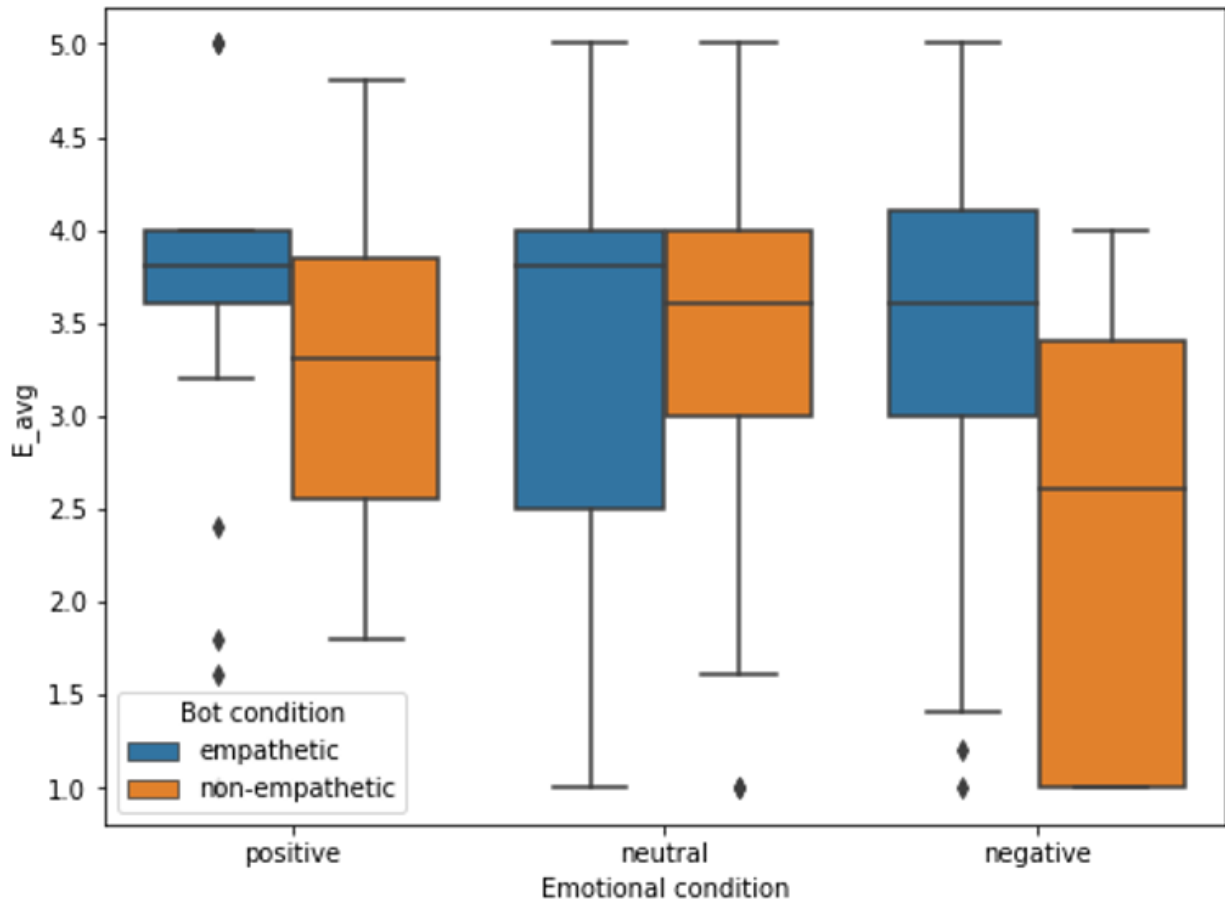
	affect_manipulation	bot	Mean	StandardDeviation
0	Negative	NE	3.27692	0.981553
1	Negative	E	3.34815	1.06206
2	Neutral	NE	2.38947	1.14207
3	Neutral	E	3.43226	1.06845
4	Positive	NE	3.22857	0.880596
5	Positive	E	3.51818	0.988812

ANOVA

	coef	std err	t	P> t	[0.02 5	0.97 5]
Intercept	4.3153	0.74 6	5.784	0.000	2.840	5.79 0
affect_mani	-0.210 5	0.34 2	-0.61 5	0.540	-0.88 7	0.46 6
bot	-0.683 1	0.45 7	-1.49 4	0.137	-1.58 7	0.22 0
affect_mani:bo t	0.1262	0.21 1	0.599	0.550	-0.29 0	0.54 3

LINEAR REGRESSION

	coef	std err	t	P> t	[0.02 5	0.97 5]
Intercept	4.3153	0.74 6	5.784	0.000	2.840	5.79 0
affect_mani	-0.210 5	0.34 2	-0.61 5	0.540	-0.88 7	0.46 6
bot	-0.683 1	0.45 7	-1.49 4	0.137	-1.58 7	0.22 0
affect_mani:bo t	0.1262	0.21 1	0.599	0.550	-0.29 0	0.54 3



Conclusion: Affect manipulation and bot does not have significant impact on effort.

4.Liking

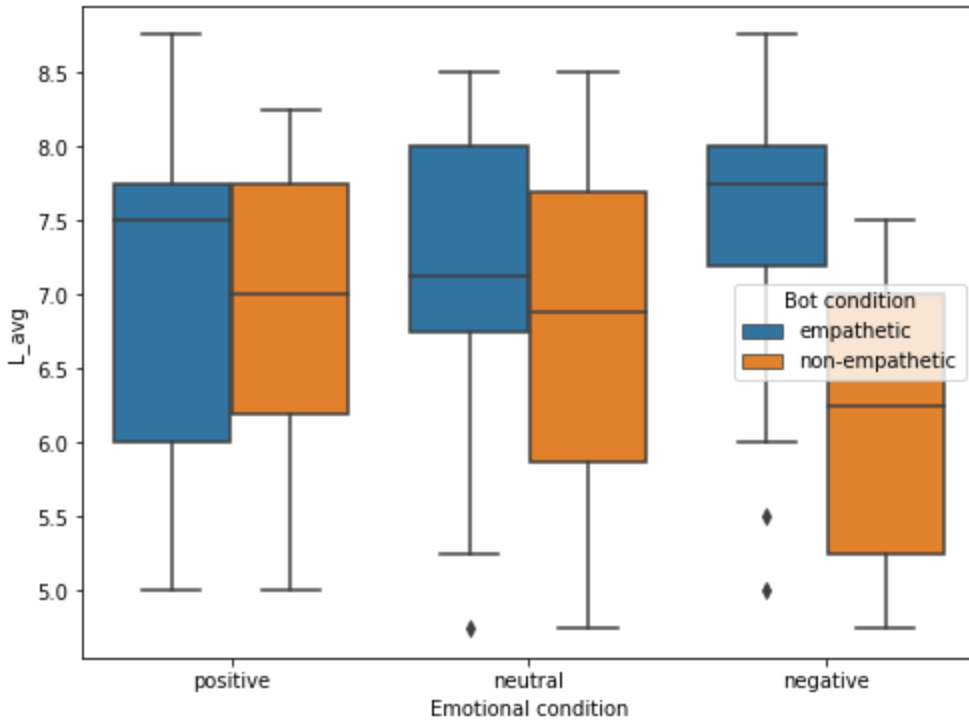
	affect_manipulation	bot	Mean	StandardDeviation
0	Negative	NE	2.875	1.0253
1	Negative	E	3.12037	1.0524
2	Neutral	NE	2.23684	0.944552
3	Neutral	E	3.25	1.10114
4	Positive	NE	2.85714	1.04622
5	Positive	E	3.02273	1.12045

ANOVA

	coef	std err	t	P> t	[0.02 5	0.97 5]
Intercept	3.7541	0.756	4.963	0.000	2.259	5.249
affect_mani	0.1434	0.347	0.413	0.680	-0.542	0.829
bot	-0.4067	0.463	-0.878	0.382	-1.323	0.509
affect_mani:bot	-0.0854	0.214	-0.400	0.690	-0.508	0.337

linear regression

	coef	std err	t	P> t	[0.02 5	0.97 5]
Intercept	3.7541	0.756	4.963	0.000	2.259	5.249
affect_mani	0.1434	0.347	0.413	0.680	-0.542	0.829
bot	-0.4067	0.463	-0.878	0.382	-1.323	0.509
affect_mani:bot	-0.0854	0.214	-0.400	0.690	-0.508	0.337



Conclusion: Affect manipulation and bot does not have significant impact on Liking.

5.Perspective Taking

	affect_manipulation	bot	Mean	StandardDeviation
0	Negative	NE	2.11538	1.23986
1	Negative	E	2.06173	1.00442
2	Neutral	NE	1.40351	0.766417
3	Neutral	E	1.94624	0.992926
4	Positive	NE	1.91667	0.849231
5	Positive	E	2.33333	1.24297

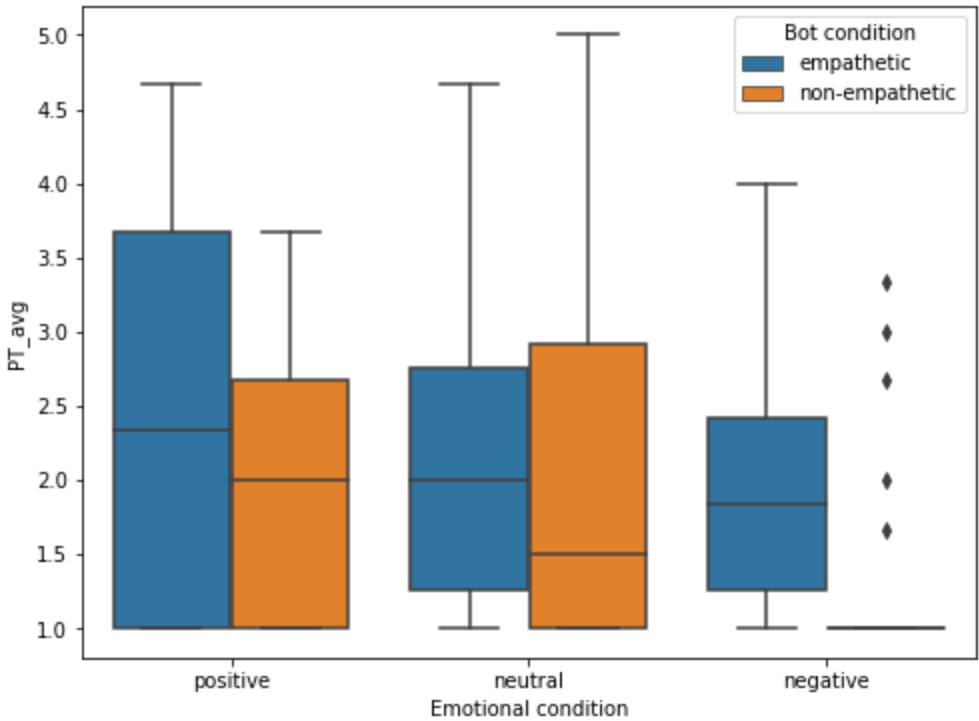
ANOVA

	coef	std err	t	P> t	[0.025	0.975]
Intercept	3.0407	0.752	4.046	0.000	1.555	4.526

affect_man	-0.254 8	0.34 5	-0.73 9	0.461	-0.93 6	0.42 7
bot	-0.671 9	0.46 0	-1.45 9	0.147	-1.58 2	0.23 8
affect_man:bot	0.1547	0.21 2	0.729	0.467	-0.26 5	0.57 4

linear regression

	coef	std err	t	P> t 	[0.02 5	0.97 5]
Intercept	3.0407	0.75 2	4.046	0.000	1.555	4.52 6
affect_man	-0.254 8	0.34 5	-0.73 9	0.461	-0.93 6	0.42 7
bot	-0.671 9	0.46 0	-1.45 9	0.147	-1.58 2	0.23 8
affect_man:bot	0.1547	0.21 2	0.729	0.467	-0.26 5	0.57 4



Conclusion: Affect manipulation and bot does not have significant impact on Perspective taking.

6. Empathy

	affect_manipulation	bot	Mean	StandardDeviation
0	Negative	NE	2.5	1.18603
1	Negative	E	3.81481	0.863967
2	Neutral	NE	1.96491	0.922254
3	Neutral	E	3.88172	0.832437
4	Positive	NE	2.2619	0.986982
5	Positive	E	3.5	1.15355

ANOVA

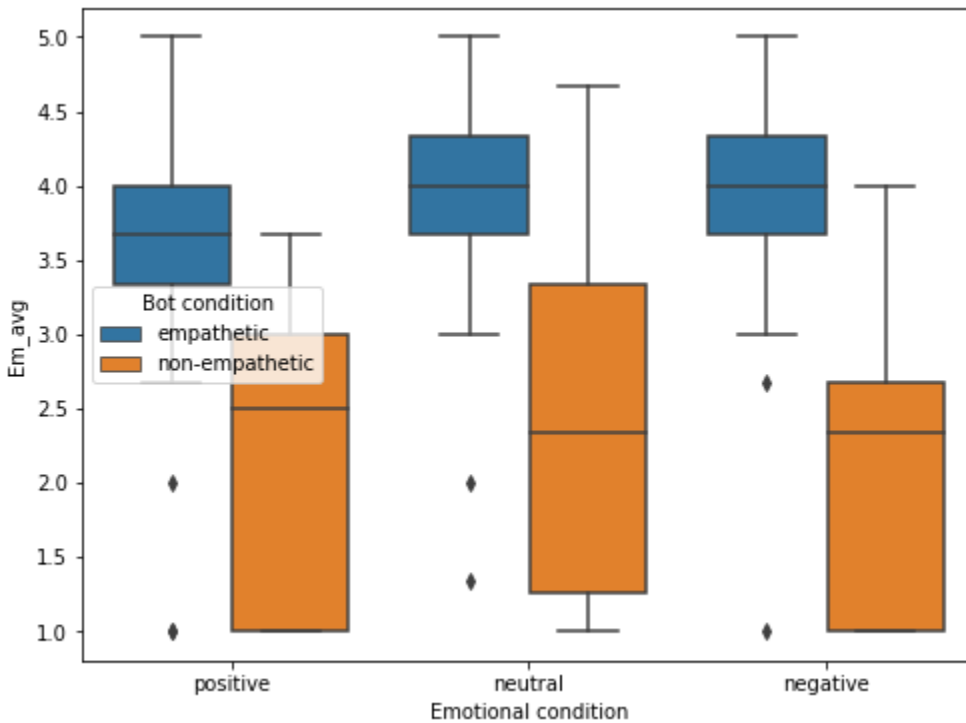
	coef	std err	t	P> t	[0.025	0.975]
Intercept						
affect_manipulation						

bot

affect_manibot
t

LINEAR REGRESSION

	coef	std err	t	P> t	[0.025 5	0.975]
Intercept	4.8585	0.716	6.785	0.000	3.443	6.274
affect_manibot	0.2265	0.328	0.689	0.492	-0.423	0.876
bot	-1.3848	0.439	-3.157	0.002	-2.252	-0.518
affect_manibot	-0.0648	0.202	-0.320	0.749	-0.465	0.335



Conclusion - Bot has a significant impact on empathy.

7.Trust

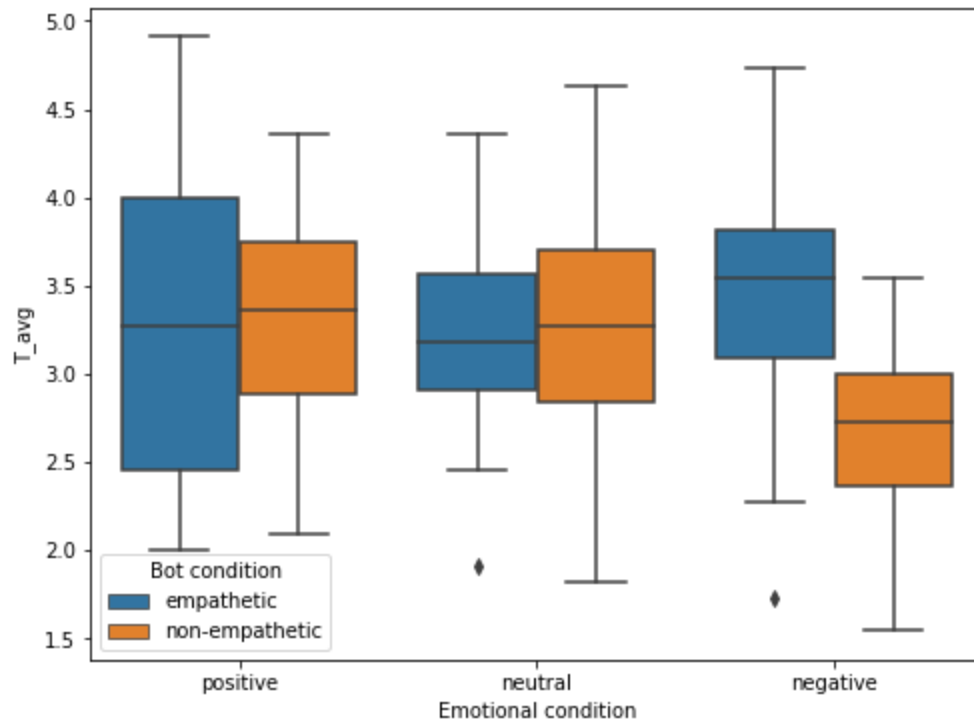
	affect_man	bot	Mean	StandardDeviation
0	Negative	NE	3	0.661079
1	Negative	E	2.95623	0.584484
2	Neutral	NE	2.49282	0.50372
3	Neutral	E	3.03226	0.754253
4	Positive	NE	3.00974	0.61724
5	Positive	E	3.10744	0.830184

ANOVA

	coef	std err	t	P> t	[0.02 5	0.975]
Intercept	3.7966	0.493	7.697	0.000	2.822	4.772
affect_man	-0.0983	0.226	-0.435	0.664	-0.546	0.349
bot	-0.3245	0.302	-1.074	0.285	-0.922	0.273
affect_man:bot	0.0385	0.139	0.276	0.783	-0.237	0.314

LINEAR REGRESSION

	coef	std err	t	P> t	[0.02 5	0.975]
Intercept	3.7966	0.493	7.697	0.000	2.822	4.772
affect_man	-0.0983	0.226	-0.435	0.664	-0.546	0.349
bot	-0.3245	0.302	-1.074	0.285	-0.922	0.273
affect_man:bot	0.0385	0.139	0.276	0.783	-0.237	0.314



Conclusion: Affect manipulation and bot does not have significant impact on Trust.

8.Enjoyment

	affect_mani	bot	Mean	StandardDeviation
0	Negative	NE	2.87179	1.36325
1	Negative	E	3.03704	1.2921
2	Neutral	NE	2.10526	1.02471
3	Neutral	E	3.11828	1.23092
4	Positive	NE	2.7381	1.27772
5	Positive	E	3.04545	1.29016

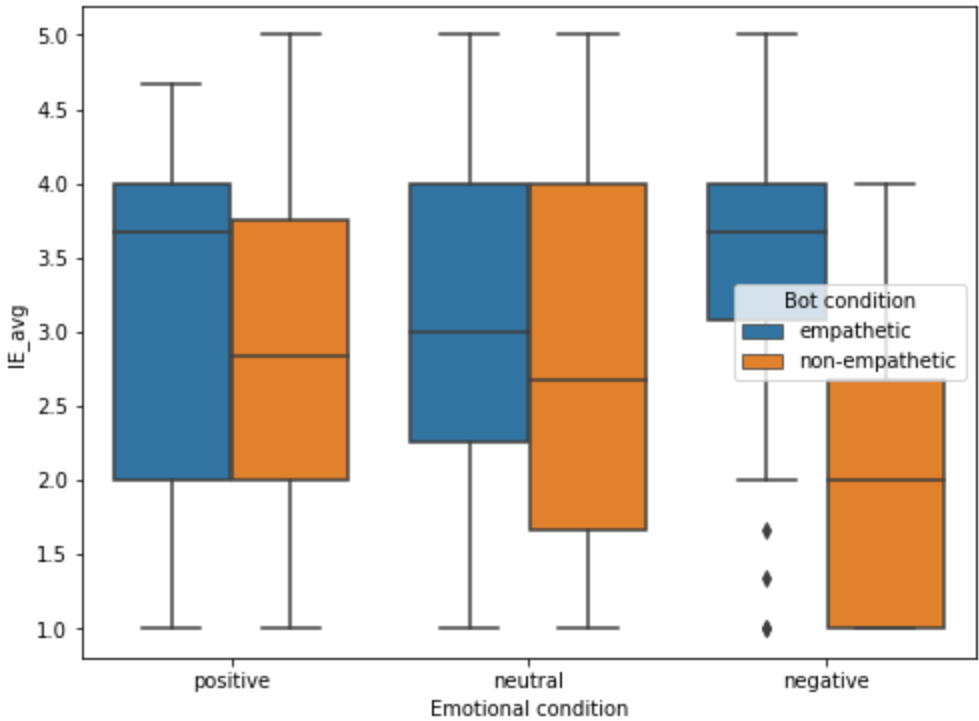
ANOVA

	coef	std err	t	P> t	[0.02 5	0.975]
Intercept	3.6740	0.905	4.059	0.00 0	1.885	5.463

affect_man	0.0295	0.415	0.071	0.943	-0.791	0.850
bot	-0.5937	0.554	-1.071	0.286	-1.690	0.502
affect_man:bot	0.0050	0.256	0.019	0.985	-0.500	0.510

LINEAR REGRESSION

	coef	std err	t	P> t 	[0.025	0.975]
Intercept	3.6740	0.905	4.059	0.000	1.885	5.463
affect_man	0.0295	0.415	0.071	0.943	-0.791	0.850
bot	-0.5937	0.554	-1.071	0.286	-1.690	0.502
affect_man:bot	0.0050	0.256	0.019	0.985	-0.500	0.510



Conclusion: Affect manipulation and bot does not have significant impact on enjoyment.

9.Chatbot Usefulness

	affect_manipulation	bot	Mean	StandardDeviation
0	Negative	NE	2.98077	0.974482
1	Negative	E	2.98148	0.91443
2	Neutral	NE	2.36842	0.983787
3	Neutral	E	3.01613	0.935271
4	Positive	NE	2.83929	1.03685
5	Positive	E	3.09091	0.908116

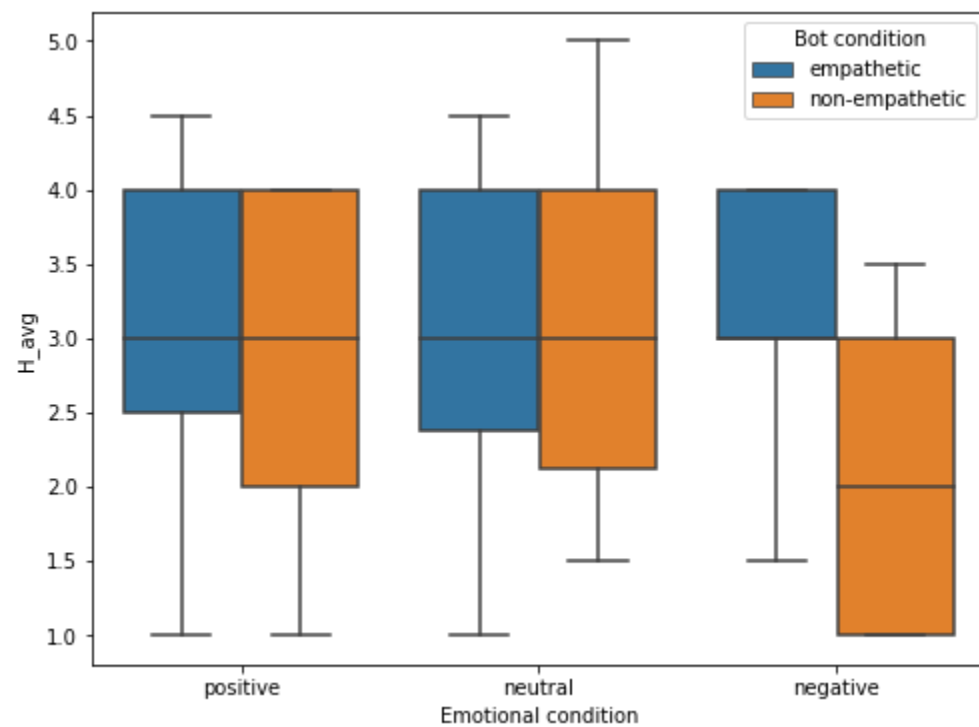
ANOVA

	coef	std err	t	P> t	[0.025	0.975]
Intercept	3.6337	0.681	5.338	0.000	2.288	4.979

affect_mani	-0.075 2	0.31 2	-0.24 1	0.810	-0.69 2	0.54 2
bot	-0.531 9	0.41 7	-1.27 5	0.204	-1.35 6	0.29 2
affect_mani:bot	0.0790	0.19 2	0.411	0.682	-0.30 1	0.45 9

LINEAR REGRESSION

	coef	std err	t	P> t 	[0.02 5	0.97 5]
Intercept	3.6337	0.68 1	5.338	0.000	2.288	4.97 9
affect_mani	-0.075 2	0.31 2	-0.24 1	0.810	-0.69 2	0.54 2
bot	-0.531 9	0.41 7	-1.27 5	0.204	-1.35 6	0.29 2
affect_mani:bot	0.0790	0.19 2	0.411	0.682	-0.30 1	0.45 9



Conclusion: Affect manipulation and bot does not have a significant impact on perceived chatbot usefulness.

(C) Control Variables

Question number of Metric	Metric Name	Cronbach's Alpha
Q24	Expectancy Violation	0.70
Q25	Violation Valence	0.86
Q29	Chatbot Knowledge	0.09
Q32, Q33, Q34	Anthropomorphism	0.81

Note - Q24_1 was excluded from the calculation to improve the result of cronbach alpha for Expectancy Violation.

1.Expectancy Violation

	affect_manipulation	bot	Mean	StandardDeviation
0	Negative	NE	1.4	0.706541
1	Negative	E	1.71852	0.642733
2	Neutral	NE	1.73684	1.0996
3	Neutral	E	1.60645	0.641839
4	Positive	NE	1.62857	0.707032
5	Positive	E	1.82727	0.901418

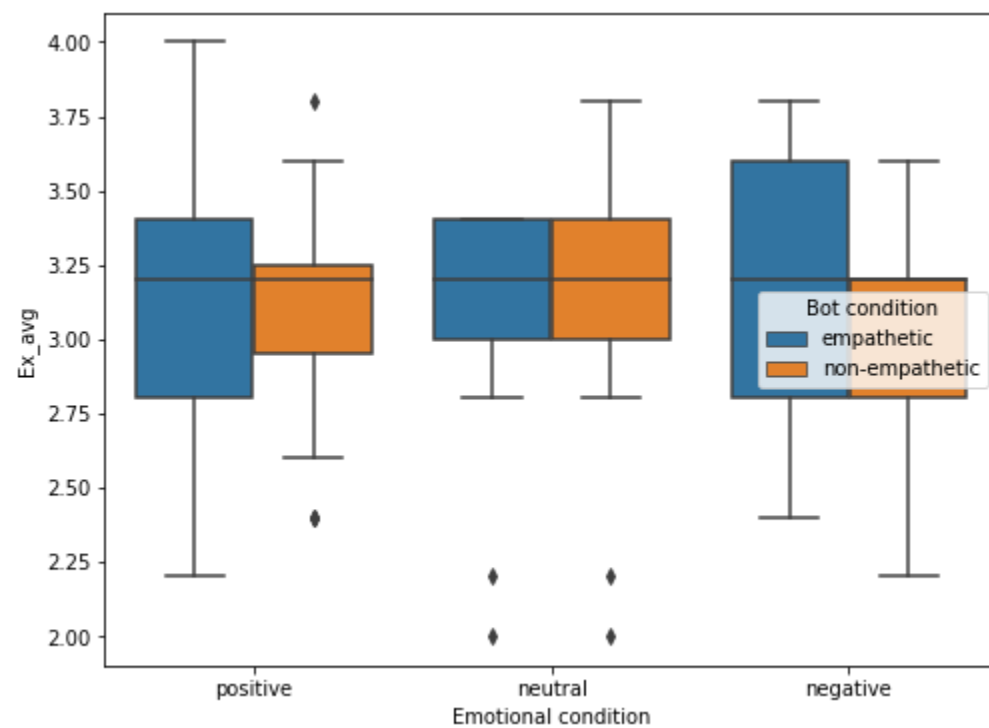
ANOVA

	coef	std err	t	P> t	[0.025	0.975]
Intercept	3.2452	0.275	11.818	0.000	2.702	3.788

affect_man	-0.039 1	0.126	-0.310	0.75 7	-0.28 8	0.210
bot	-0.098 9	0.168	-0.588	0.55 8	-0.43 1	0.234
affect_man:bot	0.0305	0.078	0.393	0.69 5	-0.12 3	0.184

LINEAR REGRESSION

	coef	std err	t	P> t	[0.02 5	0.975]
Intercept	3.2452	0.275	11.81 8	0.00 0	2.702	3.788
affect_man	-0.039 1	0.126	-0.310	0.75 7	-0.28 8	0.210
bot	-0.098 9	0.168	-0.588	0.55 8	-0.43 1	0.234
affect_man:bot	0.0305	0.078	0.393	0.69 5	-0.12 3	0.184



Conclusion: Affect manipulation and bot does not have significant impact on Expectancy Violation.

2.Violation Valence

	affect_manipulation	bot	Mean	StandardDeviation
0	Negative	NE	3.21538	0.859624
1	Negative	E	3.36296	0.805819
2	Neutral	NE	2.68421	0.952927
3	Neutral	E	3.47742	0.841708
4	Positive	NE	3.25	0.86517
5	Positive	E	3.33636	0.798538

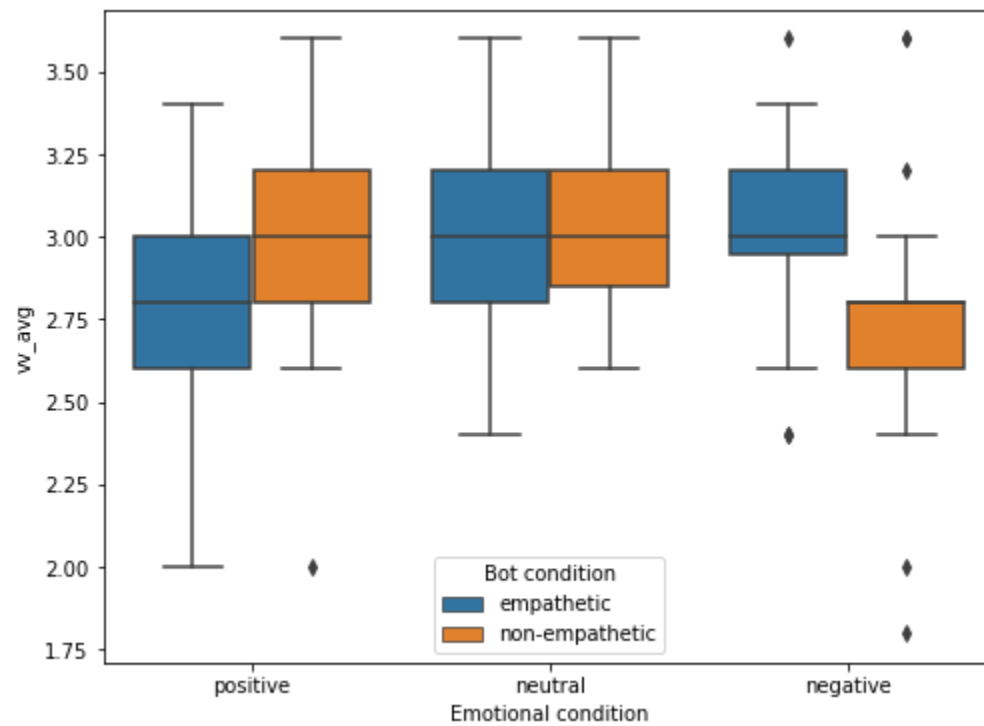
ANOVA

	coef	std err	t	P> t	[0.025	0.975]
Intercept	2.7579	0.234	11.779	0.000	2.295	3.221
affect_manipulation	0.1138	0.107	1.060	0.291	-0.098	0.326
bot	0.0499	0.143	0.348	0.729	-0.234	0.333
affect_manipulation:bot	-0.0397	0.066	-0.601	0.549	-0.170	0.091

LINEAR REGRESSION

	coef	std err	t	P> t	[0.025	0.975]
Intercept	2.7579	0.234	11.779	0.000	2.295	3.221
affect_manipulation	0.1138	0.107	1.060	0.291	-0.098	0.326

bot	0.0499	0.143	0.348	0.729	-0.234	0.333
affect_manipulation	-0.0397	0.066	-0.601	0.549	-0.170	0.091



Conclusion: Affect manipulation and bot does not have significant impact on Violation Valence.

3.Chatbot Knowledge

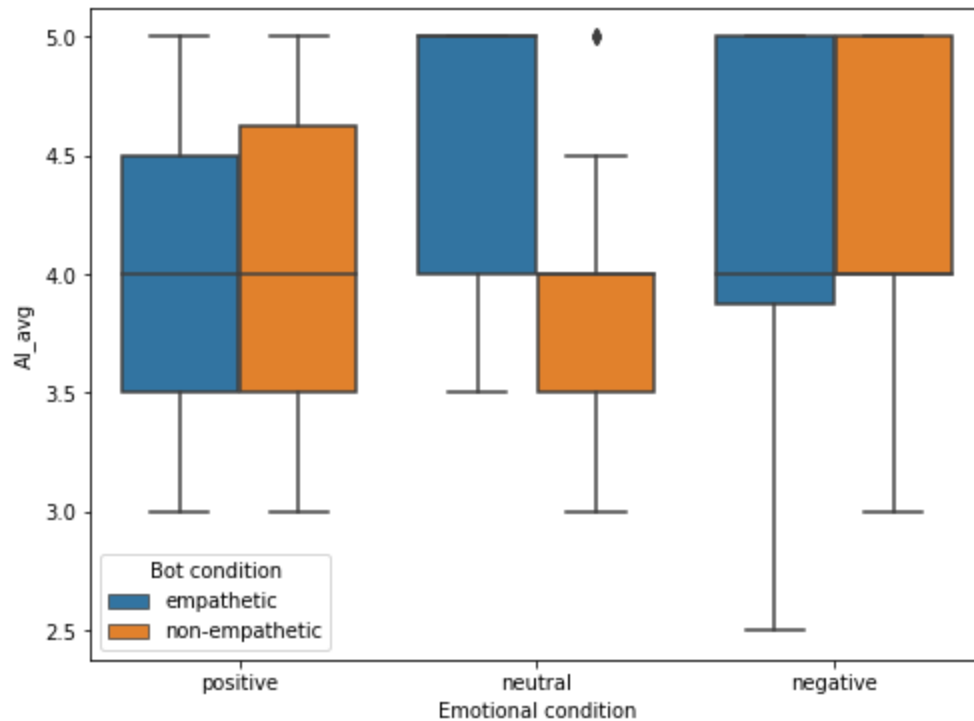
	affect_manipulation	bot	Mean	StandardDeviation
0	Negative	NE	3.90385	0.583425
1	Negative	E	4.51852	0.596165
2	Neutral	NE	4.21053	0.673213
3	Neutral	E	4.25806	0.728823
4	Positive	NE	4.08929	0.720771
5	Positive	E	4.11364	0.596255

ANOVA

	coef	std err	t	P> t	[0.02 5	0.975]
Intercept	3.4431	0.473	7.278	0.00 0	2.508	4.378
affect_man	0.5488	0.217	2.528	0.01 3	0.120	0.978
bot	0.4068	0.290	1.404	0.16 3	-0.16 6	0.980
affect_man:bot	-0.324 2	0.134	-2.42 6	0.01 6	-0.58 8	-0.06 0

LINEAR REGRESSION

	coef	std err	t	P> t	[0.02 5	0.975]
Intercept	3.4431	0.473	7.278	0.00 0	2.508	4.378
affect_man	0.5488	0.217	2.528	0.01 3	0.120	0.978
bot	0.4068	0.290	1.404	0.16 3	-0.16 6	0.980
affect_man:bot	-0.324 2	0.134	-2.42 6	0.01 6	-0.58 8	-0.06 0



Conclusion: Affect manipulation:bot and affect manipulation has a significant impact on Chatbot Knowledge.

4.Anthropomorphism

	affect_manip	bot	Mean	StandardDeviation
0	Negative	NE	3.27885	1.33759
1	Negative	E	3.2338	1.07103
2	Neutral	NE	3.51645	1.40881
3	Neutral	E	3.07056	0.981169
4	Positive	NE	3.68973	1.28386
5	Positive	E	3.00852	0.878034

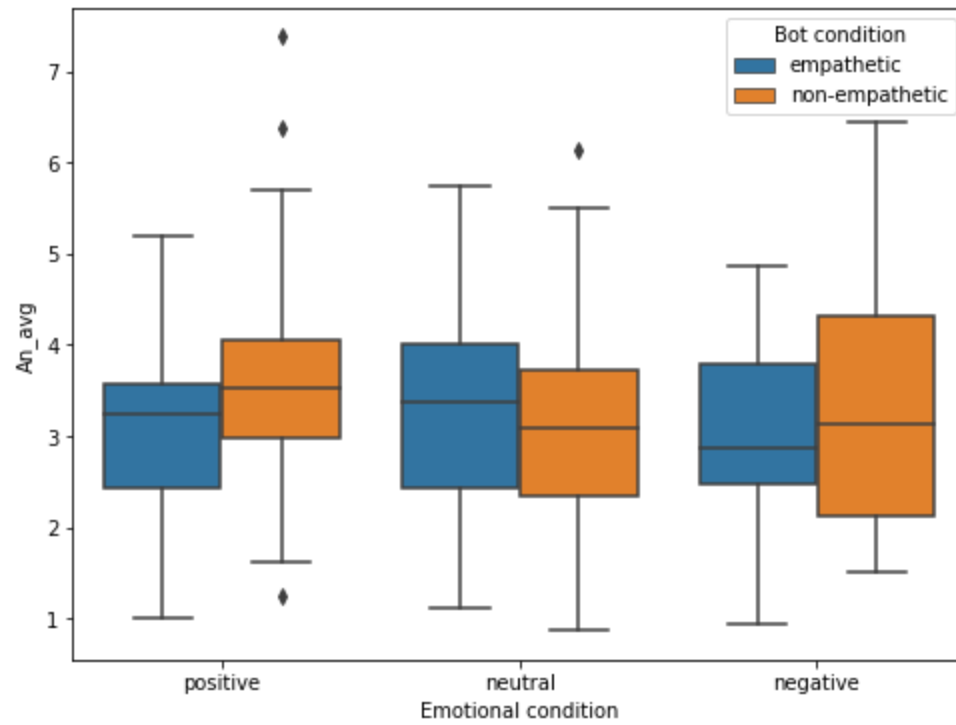
ANOVA

coef	std err	t	P> t	[0.025	0.975]
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Intercept	1.8991	0.80 8	2.350	0.020	0.302	3.49 6
affect_man	0.4911	0.37 1	1.325	0.187	-0.24 2	1.22 4
bot	1.0368	0.49 5	2.094	0.038	0.058	2.01 5
affect_man:bot	-0.391	0.22 8	-1.71 6	0.088	-0.84 3	0.05 9

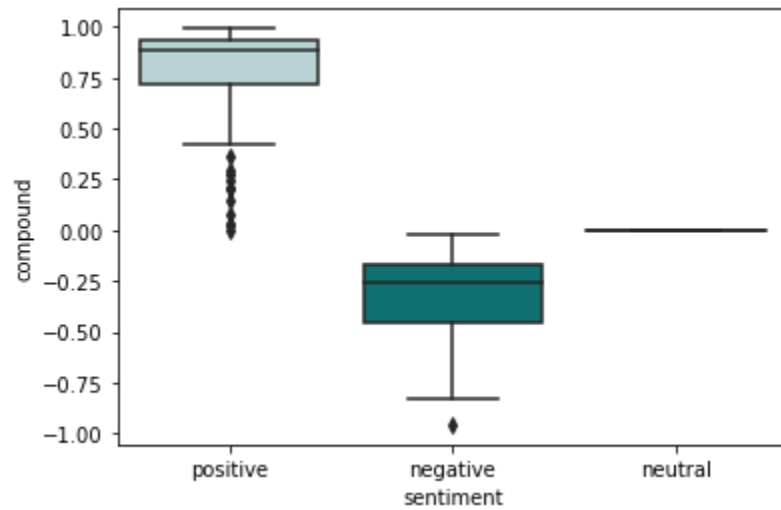
LINEAR REGRESSION

	coef	std err	t	P> t 	[0.02 5	0.97 5]
Intercept	1.8991	0.80 8	2.350	0.020	0.302	3.49 6
affect_man	0.4911	0.37 1	1.325	0.187	-0.24 2	1.22 4
bot	1.0368	0.49 5	2.094	0.038	0.058	2.01 5
affect_man:bot	-0.391	0.22 8	-1.71 6	0.088	-0.84 3	0.05 9

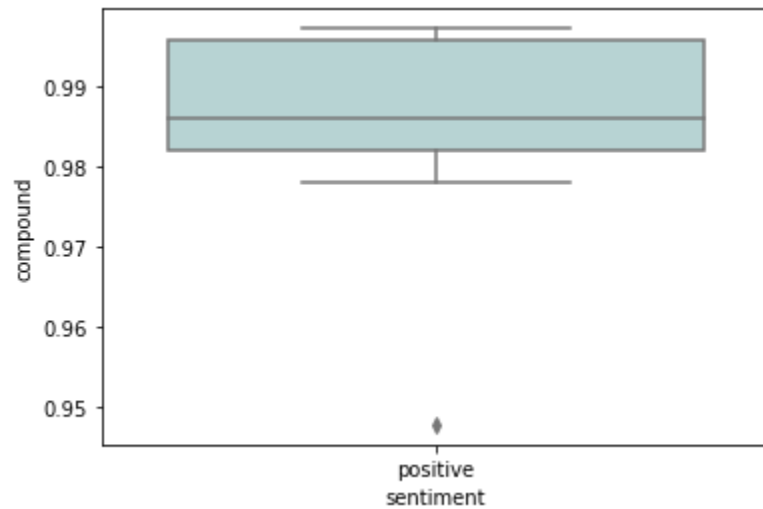


Conclusion: Bot has significant impact on anthropomorphism.

Sentiment Analysis on Bot Transcripts

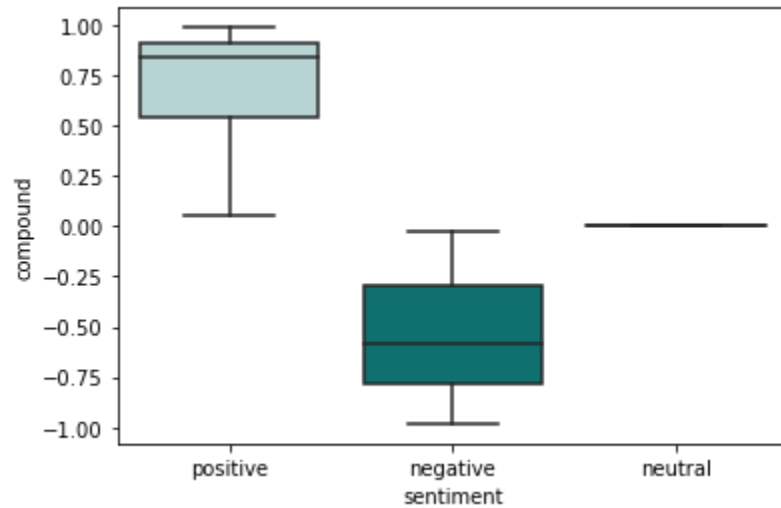


The above figure depicts the sentiment analysis of participant responses.



The above figure shows that BOT responses are positive.

Sentiment analysis of task descriptions



The above figure depicts the sentiment analysis of task descriptions.

Participant Word Count

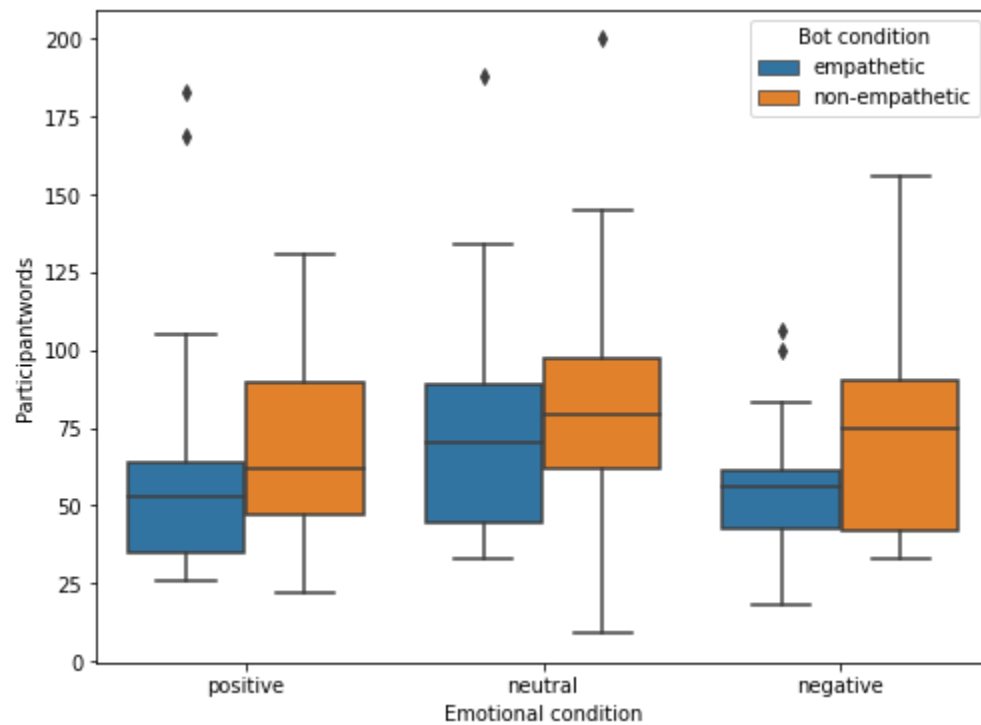
ANOVA

	coef	std err	t	P> t	[0.025	0.975]
Intercept	57.0463	7.569	7.537	0.000	42.086	72.007
affect_manit	6.0906	3.489	1.745	0.083	-0.807	12.988
bot	4.3497	7.569	0.575	0.566	-10.611	19.310
affect_manit:bot	0.4453	3.489	0.128	0.899	-6.452	7.343

LINEAR REGRESSION

coef	std err	t	P> t	[0.025	0.975]
------	------------	---	------	--------	--------

Intercept	57.046 3	7.569	7.53 7	0.00 0	42.086	72.00 7
affect_manipulation	6.0906	3.489	1.74 5	0.08 3	-0.807	12.98 8
bot	4.3497	7.569	0.57 5	0.56 6	-10.61 1	19.31 0
affect_manipulation:bot	0.4453	3.489	0.12 8	0.89 9	-6.452	7.343



Conclusion - Affect manipulation has no significant impact on the number of words used by participants.

Overall Word Count

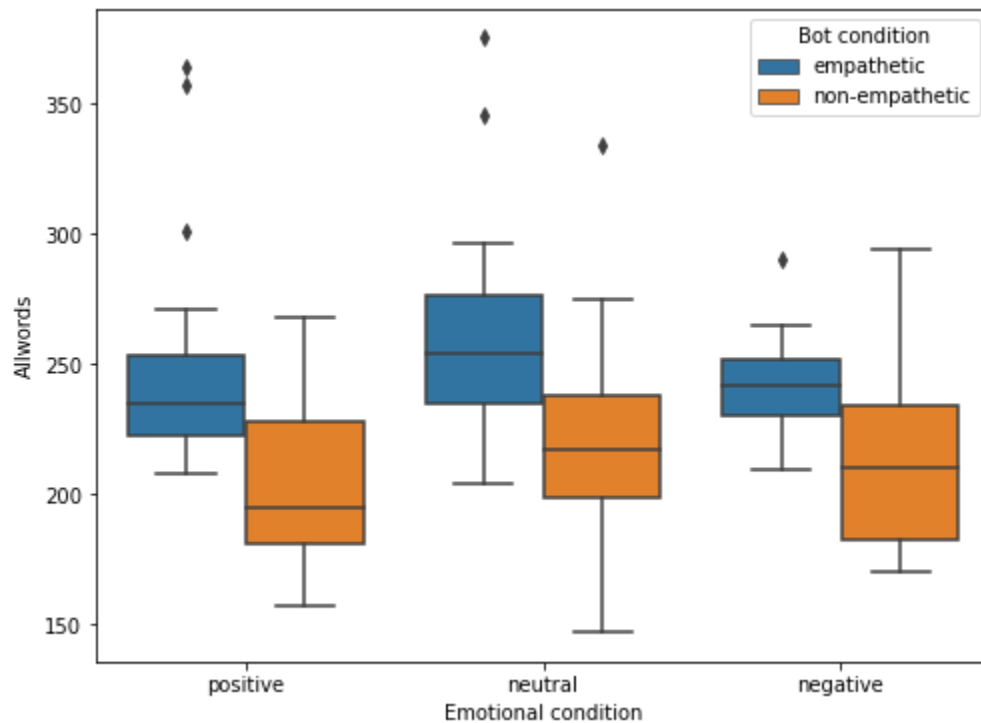
ANOVA

	coef	std err	t	P> t	[0.025	0.975]
Intercept	217.657 9	7.729	28.16 0	0.00 0	202.38 0	232.93 5

affect_man	6.1289	3.563	1.720	0.088	-0.915	13.172
bot	-19.5680	7.729	-2.532	0.012	-34.845	-4.291
affect_man:bot	0.5147	3.563	0.144	0.885	-6.529	7.558

LINEAR REGRESSION

	coef	std err	t	P> t 	[0.025	0.975]
Intercept	217.6579	7.729	28.160	0.000	202.380	232.935
affect_man	6.1289	3.563	1.720	0.088	-0.915	13.172
bot	-19.5680	7.729	-2.532	0.012	-34.845	-4.291
affect_man:bot	0.5147	3.563	0.144	0.885	-6.529	7.558

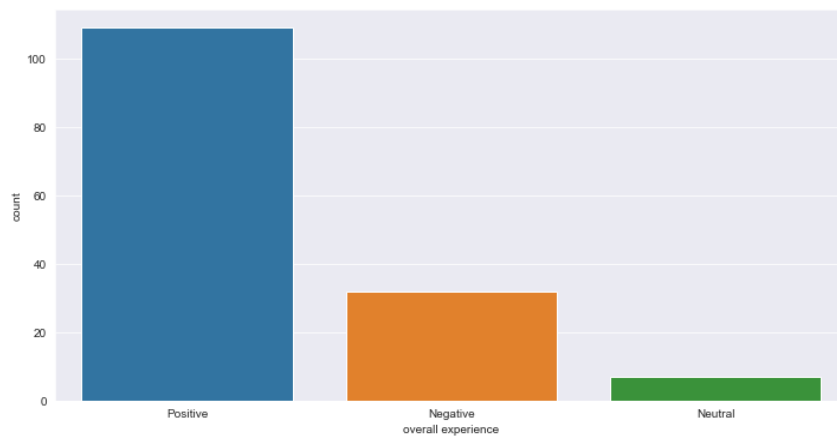


Conclusion - Bot has significant impact on the overall word count.

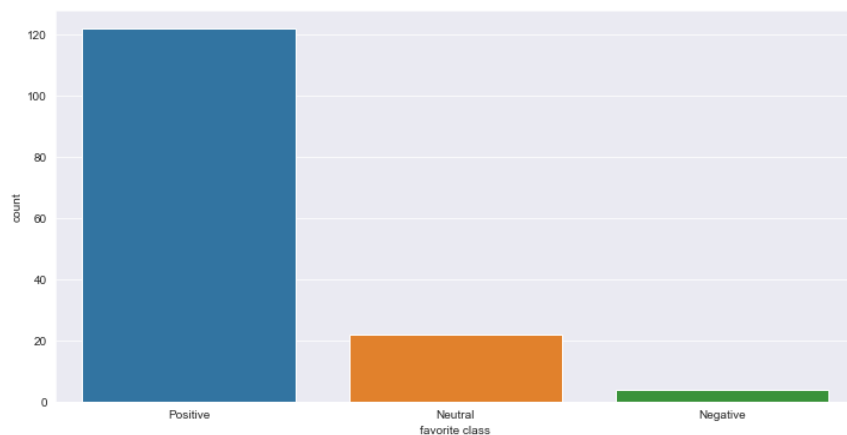
The BOT transcripts were split into the following,

- introduction (How would you like me to address you? Nice to meet you. What is your prolific ID? This is important for approving your work. What program are you in? What year are you? Which courses are you currently taking at school?)
- overall experience (How is your experience at school so far?)
- favorite class (Which of the current courses do you like the best, if you have to pick one?)
- least favorite class (Please tell me why. Okay. Thank you for sharing. Which course is your least favorite?)

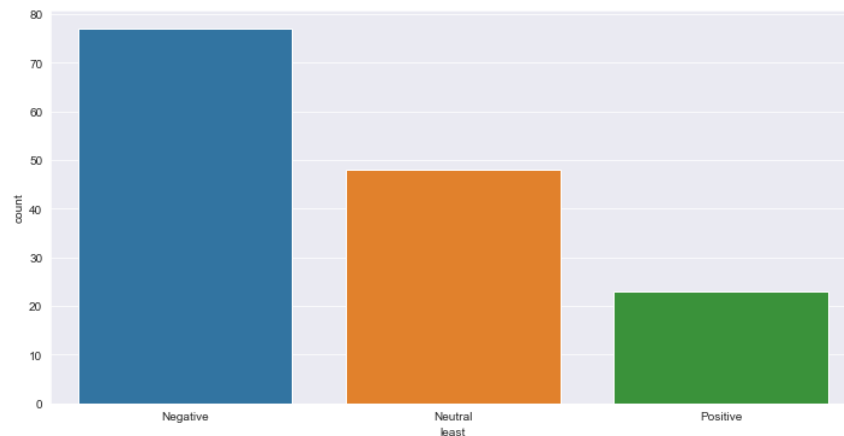
Sentiment analysis was performed on each column and following results were obtained.



As shown in the above figure the overall school experience of participants is positive.



As shown in the figure above, favorite class Sentiment analysis is positive.



As shown in the above figure, least favorite class sentiment analysis is negative.

ANOVA after adding course - (*variable name* ~ affect_man1 + bot_x + course + affect_man1:bot_x)

Emotional Acknowledgement:

	coef	std err	t	P> t	[0.02 5	0.975]
Intercept	5.3941	0.683	7.893	0.000	4.043	6.745
affect_man1	0.0179	0.294	0.061	0.952	-0.563	0.599
bot_x	-1.8441	0.394	-4.685	0.000	-2.622	-1.066
course	0.1207	0.221	0.546	0.586	-0.316	0.558
affect_man1:bot_x	-0.0010	0.181	-0.006	0.996	-0.359	0.357

Conclusion - Bot has significant impact on Emotional Acknowledgement.

Trust on Chatbot:

	coef	std err	t	P> t	[0.02 5	0.97 5]
Intercept	3.4917	0.68 1	5.125	0.000	2.145	4.83 8
affect_manip	0.0442	0.29 3	0.151	0.880	-0.53 5	0.62 3
bot_x	-0.425 5	0.39 2	-1.08 4	0.280	-1.20 1	0.35 0
course	0.3767	0.22 0	1.709	0.090	-0.05 9	0.81 2
affect_manip:bot_x	-0.053 0	0.18 1	-0.29 4	0.770	-0.41 0	0.30 4

Conclusion - course has significant impact on Trust on chatbot.

Perceived Effort:

	coef	std err	t	P> t	[0.02 5	0.97 5]
Intercept	3.8591	0.79 2	4.870	0.000	2.293	5.42 6
affect_manip	-0.176 9	0.34 1	-0.51 9	0.605	-0.85 1	0.49 7
bot_x	-0.613 2	0.45 6	-1.34 3	0.181	-1.51 6	0.28 9
course	0.4195	0.25 6	1.636	0.104	-0.08 7	0.92 6
affect_manip:bot_x	0.0989	0.21 0	0.470	0.639	-0.31 7	0.51 4

Conclusion: Affect manipulation and bot does not have significant impact on effort.

Liking:

coef	std err	t	P> t	[0.02 5	0.97 5]
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Intercept	1.8218	0.417	4.368	0.000	0.997	2.646
affect_manip	0.1825	0.179	1.017	0.311	-0.172	0.537
bot_x	0.1237	0.240	0.515	0.607	-0.351	0.599
course	0.3940	0.135	2.920	0.004	0.127	0.661
affect_manip:bot_x	-0.1163	0.111	-1.051	0.295	-0.335	0.102

Conclusion - course has significant impact on Liking.

Perspective Taking:

	coef	std err	t	P> t 	[0.025	0.975]
Intercept	2.4902	0.795	3.132	0.002	0.919	4.062
affect_manip	-0.2142	0.342	-0.626	0.532	-0.890	0.462
bot_x	-0.5876	0.458	-1.283	0.202	-1.493	0.318
course	0.5061	0.257	1.968	0.051	-0.002	1.015
affect_manip:bot_x	0.1217	0.211	0.577	0.565	-0.295	0.539

Conclusion: Affect manipulation and bot does not have significant impact on Perspective taking.

Empathy:

	coef	std err	t	P> t 	[0.025	0.975]
Intercept	4.5247	0.763	5.926	0.000	3.016	6.034
affect_manip	0.2511	0.328	0.764	0.446	-0.398	0.900

bot_x	-1.3337	0.440	-3.033	0.003	-2.203	-0.464
course	0.3069	0.247	1.243	0.216	-0.181	0.795
affect_mani:bot_x	-0.0848	0.203	-0.419	0.676	-0.485	0.316

Conclusion - Bot and course have significant impact on empathy.

Trust:

	coef	std err	t	P> t	[0.025	0.975]
Intercept	3.4719	0.523	6.637	0.000	2.438	4.506
affect_mani	-0.0744	0.225	-0.331	0.741	-0.519	0.370
bot_x	-0.2747	0.301	-0.912	0.363	-0.870	0.321
course	0.2986	0.169	1.764	0.080	-0.036	0.633
affect_mani:bot_x	0.0190	0.139	0.137	0.891	-0.255	0.293

Conclusion - course has significant impact on Trust.

Enjoyment:

	coef	std err	t	P> t	[0.025	0.975]
Intercept	3.0982	0.961	3.225	0.002	1.200	4.997
affect_mani	0.0719	0.413	0.174	0.862	-0.745	0.889
bot_x	-0.5055	0.553	-0.914	0.362	-1.599	0.588
course	0.5295	0.311	1.704	0.091	-0.085	1.144
affect_mani:bot_x	-0.0295	0.255	-0.116	0.908	-0.533	0.474

Conclusion - course has significant impact on Enjoyment.

Chatbot Usefulness:

	coef	std err	t	P> t	[0.025	0.975]
Intercept	2.9543	0.712	4.151	0.000	1.548	4.361
affect_manip	-0.0251	0.306	-0.082	0.935	-0.630	0.580
bot_x	-0.4278	0.410	-1.044	0.298	-1.238	0.383
course	0.6246	0.230	2.713	0.007	0.170	1.080
affect_manip:bot_x	0.0383	0.189	0.203	0.840	-0.335	0.411

Conclusion - course has significant impact on Chatbot Usefulness.

Expectancy Violation:

	coef	std err	t	P> t	[0.025	0.975]
Intercept	3.0085	0.289	10.411	0.000	2.437	3.580
affect_manip	-0.0217	0.124	-0.174	0.862	-0.267	0.224
bot_x	-0.0626	0.166	-0.376	0.707	-0.392	0.266
course	0.2177	0.093	2.329	0.021	0.033	0.402
affect_manip:bot_x	0.0163	0.077	0.213	0.832	-0.135	0.168

Conclusion - course has significant impact on Expectancy Violation.

Violation Valence:

	coef	std err	t	P> t	[0.02 5	0.975]
Intercept	3.3719	0.647	5.211	0.00 0	2.093	4.651
affect_manip	0.2006	0.278	0.721	0.47 2	-0.35 0	0.751
bot_x	-0.114 4	0.373	-0.30 7	0.75 9	-0.85 1	0.622
course	0.5415	0.209	2.587	0.01 1	0.128	0.955
affect_manip:bot_x	-0.142 8	0.172	-0.83 2	0.40 7	-0.48 2	0.196

Conclusion - course has significant impact on Violation Valence.

Chatbot Knowledge:

	coef	std err	t	P> t	[0.02 5	0.975]
Intercept	3.7391	0.50 2	7.444	0.000	2.746	4.732
affect_manip	0.5270	0.21 6	2.439	0.016	0.100	0.954
bot_x	0.3615	0.28 9	1.249	0.214	-0.21 0	0.933
course	-0.272 2	0.16 2	-1.67 5	0.096	-0.59 3	0.049
affect_manip:bot_x	-0.306 5	0.13 3	-2.30 1	0.023	-0.57 0	-0.04 3

Conclusion - Affect manipulation:bot and affect manipulation, course have significant impact on Violation Valence.

Anthropomorphism:

	coef	std err	t	P> t	[0.02 5	0.97 5]
Intercept	1.5329	0.86 2	1.779	0.077	-0.17 1	3.23 7

affect_mani	0.5180	0.37 1	1.397	0.165	-0.21 5	1.25 1
bot_x	1.0929	0.49 6	2.201	0.029	0.112	2.07 4
course	0.3367	0.27 9	1.207	0.229	-0.21 4	0.88 8
affect_mani:bot_x	-0.413 6	0.22 9	-1.80 9	0.073	-0.86 6	0.03 8

Conclusion: Bot has significant impact on anthropomorphism.