Cairo University

Faculty of Economics and Political Science

English Section

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CATEGORICAL DATA ANALYSIS PROJECT

"Factors Influencing Political Interest and Participation in Brazil"

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I. Introduction:

Political engagement and interest play pivotal roles in shaping the democratic landscape of any society. Understanding the factors that influence individuals' interest in politics is crucial for fostering informed citizenship and maintaining a vibrant democratic discourse. This report delves into an in-depth analysis of the factors influencing political interest and participation among citizens in Brazil. By employing statistical methodologies, including binary logistic regression, ordinal logistic regression, and multinomial logistic regression, we aim to reveal the complex interplay of various socio-demographic and attitudinal variables on individuals' political engagement.

Brazil, with its diverse population and dynamic political landscape, serves as an interesting case study to explore the multifaceted nature of political interest. The research explores the relationships between political interest and variables such as education, media consumption, social media usage, perceptions of democracy, satisfaction levels, and national pride. The study adopts a comprehensive approach, combining quantitative analyses and statistical modeling to uncover patterns and insights that contribute to a well understanding of the factors that drive political interest in Brazil.

As we navigate through the findings of the statistical models, we will interpret significant relationships, explore the goodness of fit of the models, and discuss the predictive power of the models. By doing so, we aim to provide valuable insights for policymakers, researchers, and anyone interested in fostering civic engagement and political awareness in Brazil. Through this research, aiming to contribute to the broader discourse on political behavior and civic participation, offering empirical evidence that can inform initiatives aimed at strengthening democratic values and citizen involvement.

II. Variables Under Study:

❖ Response Variable:

1. **Interest in Politics (Q199):**
    - Type: Ordinal
    - Categories: Not at all interested, Not very interested, Somewhat interested, Very interested.

❖ Explanatory Variables:

1. **TV News Usage (Q202):**
    - Type: Ordinal
    - Categories: Never, Monthly, Weekly, Daily.
2. **Social Media Usage (Q207):**
    - Type: Ordinal
    - Categories: Never, Monthly, Weekly, Daily.
3. **Discussion with Friends or Colleagues (Q208):**
    - Type: Ordinal
    - Categories: Never, Monthly, Weekly, Daily.
4. **Perception of Democracy (Q251):**
    - Type: Ordinal
    - Categories: Low Democracy, Medium Democracy, High Democracy.
5. **Satisfaction with Political System (Q252):**
    - Type: Ordinal
    - Categories: Low Satisfaction, Medium Satisfaction, High Satisfaction.
6. **National Pride (Q254):**
    - Type: Ordinal
    - Categories: Not at all Proud, Not Very Proud, Quite Proud, Very Proud.
7. **Educational Level (Q275):**
    - Type: Ordinal
    - Categories: Lower, Middle, Higher.

III. Modeling:

1. Binary Logistic Regression Model:

In this section, a binary logistic regression model is used to estimate the relationships between the dichotomous response variable "Interest in Politics" and 7 explanatory variables. It models the logit of the probability that the Brazilian citizen is interested in politics, p, as a linear function of the explanatory variables.

Since the response variable understudy is an ordinal variable of 4 categories (Not at all interested, Not very interested, Somewhat interested, Very interested).

Therefore, the categories were merged together in order to transform it into a binary variable in order to be able to model it using binary logistic regression. The variables were transformed as following:

- The categories (Not at all interested and Not very interested) were merged under the code 0 to represent "**Not Interested in Politics**".
- The categories (Somewhat interested and Very interested) were merged together under the code 1 to represent "**Interest in Politics**".

a. Fitted Model:

After doing a backward stepwise regression. Here is the final model that have been reached after four iterations to achieve the maximum likelihood estimates of the parameters.

Interest in Politics	Odds Ratio	Std. Err.	z	P>z	[95% Conf.	Interval]
Education						
Middle	1.723692	0.2216109	4.23	**0**	1.339747	2.217668
Higher	3.313686	0.5604919	7.08	**0**	2.378675	4.61623
TV News						
Daily	1.853974	0.421466	2.72	**0.007**	1.187405	2.894731
Weekly	1.525108	0.3991576	1.61	0.107	0.913105	2.547303
Monthly	1.674243	0.4802274	1.8	0.072	0.9542586	2.937452
Social Media Usage						
Daily	1.622699	0.2279057	3.45	**0.001**	1.232219	2.136918
Weekly	1.731701	0.40808	2.33	**0.02**	1.091151	2.748279
Monthly	1.699085	0.4136909	2.18	**0.029**	1.054303	2.738195
Talk with Friends						
Daily	2.691428	0.5780734	4.61	**0**	1.766684	4.100214
Weekly	3.188177	0.7326467	5.05	**0**	2.032055	5.002067
Monthly	2.137953	0.5295239	3.07	**0.002**	1.315752	3.473937
_cons	0.0761252	0.0218663	-8.97	0	0.0433539	0.1336684

Table 1: Binary Logistic Model Coefficients and their Significance

$$Ln\left(\frac{\Pi(xj)}{1-\Pi(xj)}\right)=$$

$$0.0761252 + 1.723692D1 + 3.313686D2 + 1.853974\,D3 + 1.525108D4 + 1.674243D5 + 1.622699D6 + 1.731701D7 + 1.699085D8 + 2.691428D9 + 3.188177D10 + 2.137953D11$$

D_1	D_2	D_3	D_4	D_5	D_6	D_7	D_8	D_9	D_{10}	D_{11}
Middle Education	Higher Education	Daily TVnews	Weekly TVnews	Monthly TVnews	Daily Social	Weekly Social	Monthly Social	Daily Talk	Weekly Talk	Monthly Talk

Table 2: Dummy Variables Reference

b. Checking the Model Significance:

Logistic regression			
	Number of obs	=	1,528
	LR chi2(11)	=	163.87
	Prob > chi2	=	**0**
	Pseudo R2	=	0.0792
	Log likelihood	=	-952.85411

Table 3: Binary Logistic Model Significance

- From Table (3): the p-value associated with the chi-square test is very close to 0 (almost zero).
- Therefore, this suggests that the model, with all its predictors, is statistically significant.
- Hence, the fitted model is better than the intercept-only model.

c. Interpretation of the Parameters Estimates:

1. Education:
   - Middle Education:

- $e^{\beta 1} = 1.72369$: The estimated odds of being interested in politics for a Brazilian citizen with middle educational level is 72.369% higher than that of a Brazilian citizen with lower educational level, holding other variables constant.

   - Higher Education:

- $e^{\beta 2} = 3.313686$: The estimated odds of being interested in politics for a Brazilian citizen with higher educational level is 3.31 times more likely to be interested in politics compared that of a Brazilian citizen with lower educational level, holding other variables constant.

2. TV News Usage:
   - Daily TV News Usage:

- $e^{\beta 3} = 1.853974$: The estimated odds of being interested in politics for a Brazilian citizen who watches the TV news daily is 85.3974% higher than that of a Brazilian citizen who never watches TV news, holding other variables constant.

3. Social Media Usage:
    - Daily Social Media Usage:

- $e^{\beta 6} = 1.622699$: The estimated odds of being interested in politics for a Brazilian citizen who use the social media daily is 62.2699% higher than that of a Brazilian citizen who never uses social media, holding other variables constant.

    - Weekly Social Media Usage:

- $e^{\beta 7} = 1.731701$: The estimated odds of being interested in politics for a Brazilian citizen who use the social media weekly is 73.17% higher than that of a Brazilian citizen who never uses social media, holding other variables constant.

    - Monthly Social Media Usage:

- $e^{\beta 8} = 1.699085$: The estimated odds of being interested in politics for a Brazilian citizen who use the social media daily is 69.9085% higher than that of a Brazilian citizen who never uses social media, holding other variables constant.

4. Talk With Friends:
    - Daily Talk with Friends:

- $e^{\beta 9} = 2.691428$: The estimated odds of being interested in politics for a Brazilian citizen who make daily discussions about politics with his colleagues or friends is 2.691428 times more likely to be interested in politics compared to that of a Brazilian citizen who never discuss in politics with his friends, holding other variables constant.

    - Weekly Talk with Friends:

- $e^{\beta 10} = 3.188177$: The estimated odds of being interested in politics for a Brazilian citizen who make weekly discussions about politics with his colleagues or friends is 3.188177 times more likely to be interested in politics compared to that of a Brazilian citizen who never discuss in politics with his friends, holding other variables constant.

    - Monthly Talk with Friends:

- $e^{\beta 11} = 2.137953$: The estimated odds of being interested in politics for a Brazilian citizen who make monthly discussions about politics with his colleagues or friends is 2.137953 times more likely to be interested in politics compared to that of a Brazilian citizen who never discuss in politics with his friends, holding other variables constant.

d. Model Goodness of Fit:

Logistic model for Interest in politics, goodness-of-fit test		
Number of observations	=	1528
Number of covariate patterns	=	137
Pearson chi2(125)	=	125.92
Prob > chi2	=	**0.46**

Table 4: Binary Logistic Regression Goodness of fit

- A p-value greater than 0.05 suggests that there is no significant lack of fit in the model. In other words, **the model fits the data well**.
- The goodness-of-fit test suggests that the logistic regression model does not exhibit a significant lack of fit based on the Pearson chi-square test.
- This is a positive result, indicating that the model fits the data reasonably well.

e. Checking Multicollinearity:

- The assumption of no multicollinearity should be checked. Multicollinearity refers to the situation where two or more explanatory variables are highly correlated which might lead to unstable and unreliable estimates of the regression coefficients and can make it difficult to interpret the individual effects of the explanatory variables.
- The assumption is checked using the Variance Inflation Factor (VIF). Generally, VIF values below 5 are considered acceptable, and values above 10 may indicate a cause for concern regarding multicollinearity.
- As we can see from Table (5): The VIF values for all the variables are within an acceptable range, **indicating that multicollinearity is not a severe issue in your model.**
- **No Multicollinearity in the model**

Variable	VIF
_IEducation_2	1.35
_IEducation_3	1.33
_ITVnews_2	3.18
_ITVnews_3	2.52
_ITVnews_4	1.97
_ISocialmed_2	1.61
_ISocialmed_3	1.18
_ISocialmed_4	1.19
_ITalkwithf_2	2.83
_ITalkwithf_3	2.21
_ITalkwithf_4	1.86

Table 5: VIF for Variable Levels

f. Predictive Power of the Model:

1) Determining the Optimal Cut-off Point:

- Figure (1): is a plot fitting Sensitivity and Specificity against the Cut-off point.
- From The graph we found that the optimal cut-off point is 0.42.

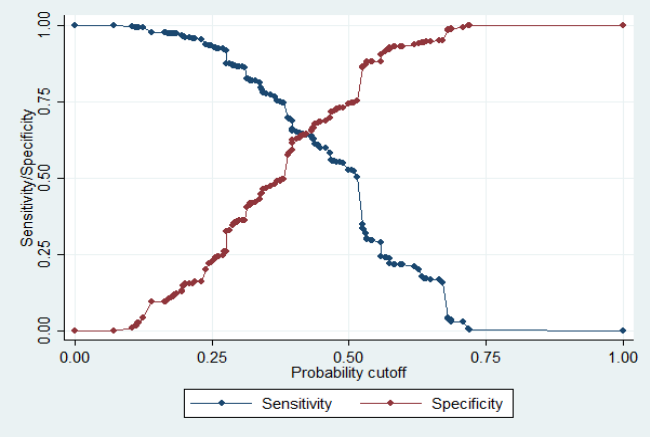

Figure 1: Sensitivity and Specificity Vs Cut-off Points

2) Classification Table:

TRUE			
Classified	D	~D	Total
	403	324	727
	225	576	801
Total	628	900	1528

Table 7: Classification Table for Interest in Politics

Sensitivity	Pr(+ D)	64.17%
Specificity	Pr(-~D)	64.00%
Correctly Classified		64.07%

Table 6: Sensitivity and Specificity

From Tables (6) and (7):

- Sensitivity, also known as the true positive rate, represents the percentage of truly interested cases correctly classified by the model.
- Thus, the model correctly classifies 64.17% of the individuals who are genuinely interested in politics.
- While, specificity measures the true negative rate, representing the percentage of individuals not interested who were correctly classified by the model as not interested.
- Here, the model correctly classifies 64% of cases that are genuinely not interested in politics.
- Furthermore, the model correctly classified 64.07% of all instances.
- Since all the Sensitivity, Specificity, and overall correct classification are all greater than 60%, therefore the model has good predictive power, making accurate predictions for a significant proportion of cases.

3) Area Under the Curve (AUC) and ROC Curve:

- Figure (): is the ROC Curve with Area under the curve = 0.6876
- The ROC Curve visually represents the trade-off between sensitivity and specificity at different cut-off points.
- The Area Under the Curve (AUC) quantifies the overall performance of the model.
- An AUC of 0.6876 is greater than 0.5, indicates reasonably good discrimination. Hence, **the model has a good predictive power.**

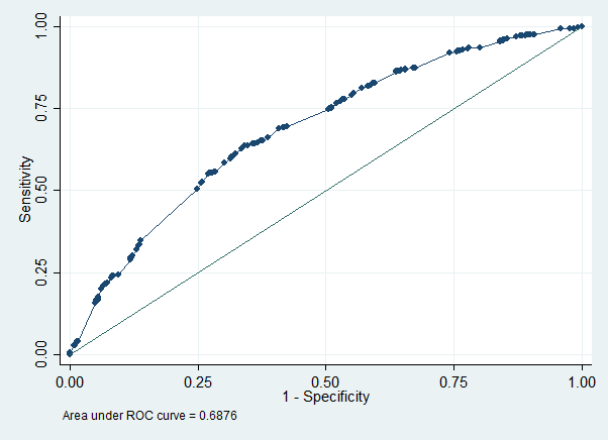

Figure 2: ROC Curve associated with the Area Under the Curve

- Thus, the model can distinguish between interested and not interested individuals with reasonably good level of accuracy.

2. Ordinal Logistic Regression Modeling:

- Before fitting the ordinal logistic regression model, we need to make sure that the assumption of the proportional odds assumption is satisfied which means that the coefficients are equal across the categories.

Approximate likelihood-ratio test of proportionality of odds across response categories:		
chi2(48)	=	73.7
Prob > chi2	=	0.01

Table 8: Significance for Ordinal Logistic Regression Model

- With a p-value of 0.01, the test is statistically significant.
- The significance indicates that there is enough evidence to say that **the proportional odds assumption does not hold.**
- Which implies that the relationship between the predictors and the ordinal response variable may vary across different categories.
- Since the proportional odds assumption is violated, therefore it is crucial to consider alternative modeling approaches.
- We will proceed the analysis with the multinomial logistic regression.

3. Multinomial Logistic Regression Modeling:

Interest in Politics	RRR	Std. Err.	z	P>z	[95% Conf.	Interval]
Not_at_all_interested	(base outcome)					
Not_very_Interested						
Satisfaction						
Medium Satisfaction	1.645593	0.31	2.69	**0.007**	1.144106	2.366891
High Satisfaction	0.8720136	0.3	-0.4	0.689	0.4455949	1.7065
Democracy						
Medium Democracy	1.381109	0.22	2.02	**0.043**	1.010295	1.888025
High Democracy	1.072352	0.27	0.28	0.783	0.6521204	1.763385
Education						
Middle	1.149113	0.3	0.53	0.598	0.6849949	1.927695
Higher	1.083256	0.54	0.16	0.873	0.4060617	2.889814
TVnews						
Daily	1.279372	0.35	0.91	0.361	0.7541154	2.170479
Weekly	1.074745	0.34	0.23	0.819	0.5791456	1.994449
Monthly	1.253461	0.44	0.65	0.516	0.6342647	2.477143
Socialmedia						
Daily	0.9049274	0.22	-0.42	0.677	0.5658207	1.447267
Weekly	0.8510888	0.45	-0.31	0.759	0.3032639	2.388521
Monthly	1.891277	0.92	1.31	0.189	0.7312358	4.891619
Nationalpride						
Not very proud	1.389422	0.37	1.22	0.222	0.8199199	2.354492
Quite proud	1.57581	0.41	1.75	**0.08**	0.9475545	2.620617
Very proud	1.104374	0.31	0.36	0.72	0.6414387	1.901416
Talkwithfriends						
Daily	2.801044	0.68	4.25	**0**	1.742826	4.501795
Weekly	2.794413	0.75	3.84	**0**	1.654396	4.719998
Monthly	2.625734	0.73	3.48	**0.001**	1.523574	4.5252

edu_level_2_soc_level_2	1.287371	0.45	0.72	0.47	0.6491432	2.553093
edu_level_2_soc_level_3	1.077768	0.76	0.11	0.915	0.2719012	4.272083
edu_level_2_soc_level_4	0.8222238	0.53	-0.3	0.763	0.2298694	2.941026
edu_level_3_soc_level_2	2.382721	1.41	1.47	0.142	0.7483801	7.586198
edu_level_3_soc_level_3	2.995129	3.38	0.97	0.33	0.3289622	27.26999
edu_level_3_soc_level_4	0.7714237	0.94	-0.21	0.831	0.0710307	8.377988
_cons	0.1057484	0.04	-5.84	0	0.0497407	0.2248204
Somewhat_interested						
Satisfaction						
Medium Satisfaction	1.598572	0.29	2.57	**0.01**	1.117938	2.285845
High Satisfaction	1.172373	0.36	0.51	0.608	0.6384515	2.152801
Democracy						
Medium Democracy	0.9063491	0.14	-0.64	0.522	0.6706173	1.224944
High Democracy	1.018194	0.24	0.08	0.94	0.6372727	1.626806
Education						
Middle	1.711965	0.45	2.04	**0.042**	1.020196	2.872807
Higher	1.19773	0.63	0.34	0.732	0.4262681	3.365385
TVnews						
Daily	2.791787	0.84	3.42	**0.001**	1.550861	5.025642
Weekly	2.258302	0.76	2.42	**0.015**	1.168566	4.364263
Monthly	2.540219	0.93	2.54	**0.011**	1.238488	5.210154
Socialmedia						
Daily	1.329171	0.32	1.17	0.241	0.82588	2.139169
Weekly	1.112078	0.59	0.2	0.841	0.3950821	3.130277
Monthly	2.591026	1.27	1.95	0.051	0.9946683	6.749399
Nationalpride						
Not very proud	1.524681	0.39	1.65	0.099	0.9237637	2.516501
Quite proud	1.574561	0.39	1.82	0.068	0.9663417	2.565597
Very proud	1.260448	0.33	0.87	0.382	0.7501114	2.11799
Talkwithfriends						
Daily	3.080004	0.76	4.56	**0**	1.899424	4.994368
Weekly	4.079557	1.09	5.27	**0**	2.419386	6.878928
Monthly	2.879474	0.82	3.73	**0**	1.651129	5.021638

edu_level_2_soc_level_2	1.265307	0.43	0.69	0.492	0.6462941	2.477202
edu_level_2_soc_level_3	1.617687	1.07	0.73	0.467	0.4429275	5.908217
edu_level_2_soc_level_4	0.8670209	0.55	-0.22	0.823	0.249156	3.017086
edu_level_3_soc_level_2	4.387592	2.64	2.46	**0.014**	1.352007	14.2388
edu_level_3_soc_level_3	4.03045	4.5	1.25	0.211	0.4526958	35.88398
edu_level_3_soc_level_4	2.110641	2.33	0.68	0.498	0.2433234	18.30817
_cons	0.0368277	0.02	-7.92	0	0.0162688	0.0833672
Very_interested						
Satisfaction						
Medium Satisfaction	1.810127	0.45	2.4	**0.017**	1.113842	2.941674
High Satisfaction	1.663843	0.66	1.28	0.201	0.7625722	3.630309
Democracy						
Medium Democracy	0.7597002	0.16	-1.3	0.194	0.501615	1.150572
High Democracy	0.65372	0.23	-1.2	0.232	0.3257905	1.311732
Education						
Middle	1.688362	0.75	1.18	0.237	0.7081977	4.025099
Higher	5.372515	2.94	3.08	**0.002**	1.840502	15.68264
TVnews						
Daily	1.301145	0.43	0.79	0.431	0.6758353	2.505015
Weekly	0.7669626	0.32	-0.64	0.52	0.3418582	1.720689
Monthly	1.058903	0.5	0.12	0.903	0.4209961	2.663388
Socialmedia						
Daily	1.477703	0.56	1.03	0.303	0.703238	3.105073
Weekly	3.187314	1.91	1.94	0.053	0.9859111	10.30414
Monthly	2.017219	1.67	0.85	0.398	0.3963321	10.26708
Nationalpride						
Not very proud	0.7032526	0.22	-1.1	0.269	0.3764935	1.313606
Quite proud	0.7056753	0.22	-1.12	0.261	0.3840441	1.296668
Very proud	1.038457	0.33	0.12	0.906	0.5536703	1.947718
Talkwithfriends						
Daily	5.406803	2.29	3.98	**0**	2.353917	12.41909

Weekly	5.135475	2.32	3.62	**0**	2.118515	12.44887
Monthly	2.344591	1.2	1.66	0.096	0.8592534	6.397539
edu_level_2_soc_level_2	1.537393	0.83	0.79	0.428	0.5303885	4.456315
edu_level_2_soc_level_3	0.5864914	0.5	-0.63	0.531	0.1103171	3.118031
edu_level_2_soc_level_4	0.4303064	0.51	-0.72	0.474	0.0427691	4.329382
edu_level_3_soc_level_2	1.836849	1.2	0.93	0.354	0.5081347	6.640001
edu_level_3_soc_level_3	1.043587	1.22	0.04	0.971	0.1058618	10.2877
edu_level_3_soc_level_4	1.468876	1.95	0.29	0.773	0.1083365	19.9157
_cons	0.0280431	0.02	-6.24	0	0.009134	0.0860975

Table 9: Multinomial Logistic Regression Model Coefficients and their Significance

a. Interpretations for the Significant Parameters:

From Table (9):

1. Not Very Interested:
   - Medium Satisfaction:

- $e^{\beta} = \mathbf{1.645593}$: The estimated relative risk of being not very interested in politics between Brazilian citizens who have medium satisfaction with the political system compared to those who have low satisfaction with the political system is 64.5593% higher than the corresponding relative risk of a Brazilian citizen being not at all interested, holding other variables constant.

   - Medium Democracy:

- $e^{\beta} = \mathbf{1.381109}$: The estimated relative risk of being not very interested in politics between Brazilian citizens who have medium perception of democracy compared to those who have low perception of democracy is 38.1109% higher than the corresponding relative risk of a Brazilian citizen being not at all interested, holding other variables constant.

   - Quite Proud:

- $e^{\beta} = \mathbf{1.57581}$: The estimated relative risk of being not very interested in politics between Brazilian citizens who are feeling quite proud of their country compared to those who are not feeling proud at all is 57.581% higher than the corresponding relative risk of a Brazilian citizen being not at all interested, holding other variables constant.

- Daily Talk with Friends:

- $e^{\beta} = 2.801044$: The estimated relative risk of being not very interested in politics between Brazilian citizens who make daily discussions with friends about politics compared to those who never make discussions with friends about politics is about 2.8 times greater than the corresponding relative risk of a Brazilian citizen being not at all interested, holding other variables constant.

- Weekly Talk with Friends:

- $e^{\beta} = 2.794413$: The estimated relative risk of being not very interested in politics between Brazilian citizens who make weekly discussions with friends about politics compared to those who never make discussions with friends about politics is about 2.79 times greater than the corresponding relative risk of a Brazilian citizen being not at all interested, holding other variables constant.

- Monthly Talk with Friends:

- $e^{\beta} = 2.625734$: The estimated relative risk of being not very interested in politics between Brazilian citizens who make monthly discussions with friends about politics compared to those who never make discussions with friends about politics is about 2.62 times greater than the corresponding relative risk of a Brazilian citizen being not at all interested, holding other variables constant.

2. Somewhat Interested:

- Medium Satisfaction:

- $e^{\beta} = 1.598572$: The estimated relative risk of being somewhat interested in politics between Brazilian citizens who have medium satisfaction with the political system compared to those who have low satisfaction with the political system is 59.8572% higher than the corresponding relative risk of a Brazilian citizen being not at all interested, holding other variables constant.

- Middle Education:

- $e^{\beta} = 1.711965$: The estimated relative risk of being somewhat interested in politics between Brazilian citizens who have middle educational level compared to those who have lower educational level is about 71.2% higher than the corresponding relative risk of a Brazilian citizen being not at all interested, holding other variables constant.

- Daily TV News Usage:

- $e^{\beta} = \mathbf{2.791787}$: The estimated relative risk of being somewhat interested in politics between Brazilian citizens who watches the TV news daily compared to those who never watches TV news is about 2.79 times greater than the corresponding relative risk of a Brazilian citizen being not at all interested, holding other variables constant.

- Weekly TV News Usage:

- $e^{\beta} = \mathbf{2.258302}$: The estimated relative risk of being somewhat interested in politics between Brazilian citizens who watches the TV news weekly compared to those who never watches TV news is about 2.25 times greater than the corresponding relative risk of a Brazilian citizen being not at all interested, holding other variables constant.

- Monthly TV News Usage:

- $e^{\beta} = \mathbf{2.540219}$: The estimated relative risk of being somewhat interested in politics between Brazilian citizens who watches the TV news monthly compared to those who never watches TV news is about 2.54 times greater than the corresponding relative risk of a Brazilian citizen being not at all interested, holding other variables constant.

- Daily Talk with Friends:

- $e^{\beta} = \mathbf{3.080004}$: The estimated relative risk of being somewhat interested in politics between Brazilian citizens who make daily discussions with friends about politics compared to those who never make discussions with friends about politics is about 3 times greater than the corresponding relative risk of a Brazilian citizen being not at all interested, holding other variables constant.

- Weekly Talk with Friends:

- $e^{\beta} = \mathbf{4.079557}$: The estimated relative risk of being somewhat interested in politics between Brazilian citizens who make weekly discussions with friends about politics compared to those who never make discussions with friends about politics is about 4 times greater than the corresponding relative risk of a Brazilian citizen being not at all interested, holding other variables constant.

The interaction term between the higher educational level and weekly social media usage is also significant.

- Monthly Talk with Friends:

- $e^{\beta} = 2.879474$: The estimated relative risk of being somewhat interested in politics between Brazilian citizens who make monthly discussions with friends about politics compared to those who never make discussions with friends about politics is about 2.88 times greater than the corresponding relative risk of a Brazilian citizen being not at all interested, holding other variables constant.

3. Very Interested:

- Medium Satisfaction:

- $e^{\beta} = 1.810127$: The estimated relative risk of being very interested in politics between Brazilian citizens who have medium satisfaction with the political system compared to those who have low satisfaction with the political system is about 81% higher than the corresponding relative risk of a Brazilian citizen being not at all interested, holding other variables constant.

- Higher Education:

- $e^{\beta} = 5.372515$: The estimated relative risk of being very interested in politics between Brazilian citizens who have higher educational levels compared to those who have lower educational levels is about **5.37 times** greater than the corresponding relative risk of a Brazilian citizen being not at all interested, holding other variables constant.

- Daily Talk with Friends:

- $e^{\beta} = 5.406803$: The estimated relative risk of being very interested in politics between Brazilian citizens who make daily discussions with friends about politics compared to those who never make discussions with friends about politics is about **5.4 times** greater than the corresponding relative risk of a Brazilian citizen being not at all interested, holding other variables constant.

- Weekly Talk with Friends:

- $e^{\beta} = 5.135475$: The estimated relative risk of being very interested in politics between Brazilian citizens who make weekly discussions with friends about politics compared to those who never make discussions with friends about politics is about **5.13 times** greater than the corresponding relative risk of a Brazilian citizen being not at all interested, holding other variables constant.

b. Goodness of Fit of the Model:

Goodness-of-fit test for a multinomial logistic regression		
Dependent variable: Interest in Politics		
number of observations	=	1528
number of outcome values	=	4
base outcome value	=	1
number of groups	=	10
chi-squared statistic	=	24.468
degrees of freedom	=	24
Prob > chi-squared	=	0.435

Table 10: Multinomial Logistic Regression Goodness of fit

- From Table (10), with a p-value of 0.435 which is greater than 0.05, there is insufficient evidence to reject the null hypothesis.
- This indicates that **the model fits the data well**, and there is no evidence of lack of fit.

IV. Conclusion:

This comprehensive exploration of factors influencing political interest and participation in Brazil has provided valuable insights into the dynamics of civic engagement within the nation. Through the utilization of various statistical models, including binary logistic regression and multinomial logistic regression, we have dissected the complex interplay of socio-demographic and attitudinal variables that contribute to citizens' political involvement.

While education levels and media consumption exhibit strong positive correlations with political interest, the influence of social media and interpersonal communication, as represented by talk with friends, also plays a pivotal role. The perceived level of democracy and satisfaction with the political system, however, yielded varied results across different levels of political interest.

Moreover, the binary logistic regression model, which categorized political interest into "Interested" and "Not Interested," unveiled the predictive power of certain key variables. **Daily talk with friends, higher education, and daily social media usage emerged as significant predictors of interest in politics**, providing actionable insights for those seeking to enhance political engagement.

The multinomial logistic regression model further expanded the understanding by considering the nature of the political interest categories. Notably, the model revealed nuanced relationships, highlighting the intricate balance between various factors across different levels of political interest.

In conclusion, this academic report helps for understanding the factors shaping political interest and participation in Brazil. By unraveling the complexities of citizen engagement, we contribute to the ongoing dialogue on democracy and civic involvement, providing empirical evidence that can inform initiatives to foster a more politically aware and active society.