Trust in my Fake News, Scepticism about yours: Experimental Evidence on how Ideological Congruence and Echo Chambers alter Beliefs in Fake News

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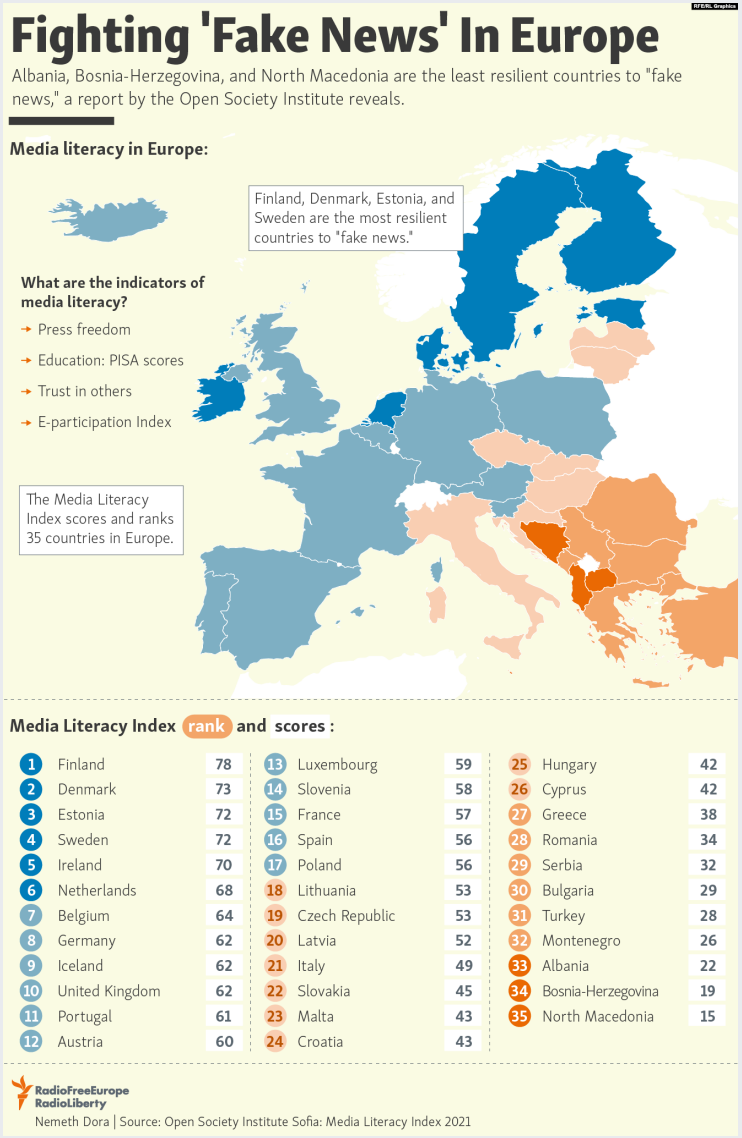

Growing evidence suggests the existence of fake news is problematic (Sunstein, 2014; Lazer et.al, 2018), polarizing (Spohr, 2019; Osmundsen et. al., 2021) and erodes democracy (Lance & Livingston, 2018). Partisanship increase from this years and Eco chambers participants and digital activist promotes it.

Are echo chambers and group polarization causing problems in processing information to participate in discussion in the public space?

This leads us to analyze how people and their partisanship interpret the information circulating in social media.

First theories conducting this research

- More political homophilia, more reinforcement in the group's opinions.
- in Homophilic networks: "At the same time, political homophily may also insulate individuals from exposure to false or offensive information" (2)
- Homophily makes you "lose perspective" of politically opposing information.

But …

But fake news evidence said the opposite (although ambiguously)

- First research we visited was that it was more cognitive laziness than ideological biases.
- Using a simple but robust method, they measure the level of belief in fake news by modulating the response times and self-reflection capacity of the classification.
- Other studies have shown other attributes such as not believing in science as relevant factors for believing in fake news.

Contents lists available at ScienceDirect

Cognition

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Original Articles

Lazy, not biased: Susceptibility to partisan fake news is better explained by lack of reasoning than by motivated reasoning

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Review

The Psychology of Fake News

Gordon Pennycook [1, 2], David G. Rand [3, 4, 5]

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So...

Using the methodologies to the second group we try to test the first group hypothesis

Main Question

How partisanship affects when we have to distinguishing fake news from real news?

How does membership in echo chambers and digital citizenship affect this phenomenon?

Concept of Echo chambers and Digital Citizenship

- Friendship and resource network made up of like-minded people. Includes political homophily, social identity and confirmation bias (Boutyline et.al, 2017; Wollebæk et. al, 2019). Often produces by algorythms (Pariser, 2011)

- Type of political participation in digital platforms. includes technological skills, valuation of collective action in digital media and participation in them (Choi, M, 2016; Choi et.al, 2018; Chadwick, 2013; Castells, 2009).

¿What do we know about the relationship between echo chambers and misinformation?

- **Information bias**: Endemic consumption of information that is politically similar to one's own thinking and the distancing, rejection or impossibility of consuming information of different political thinking. (Currarini & Mengel, 2016; Halbestam & Knight, 2016)
- **Spread of Misinformation**: Those who belong to echo chambers spread information faster, generate rumors and reach audiences that do not directly access those rumors (Choi et. al. 2020)

Hypothesis, we expect:

Following the political homophily effects (Wollebaek et.al, 2019; Boutyline & Willer, 2017; Ackland & Shorish, 2014)

1) respondents will be less likely to accurately categorize fake and real news when asked to review news headlines with taking points associated with parties that oppose their political self-placement.

According to the same literature:

1.a) no differences in accuracy across respondents with high and low levels of echo chamber membership

Based on civic engament in social media literature (Gil de Zuñiga et.al, 2011, 2012; Castells, 2001,2009)

1.b) respondents with higher levels of digital citizenship will be more likely to accurately categorize fake and real news than citizen with low levels of digital citizenship

Methods

Sample

Online Survey Experiment (n= 690) with CESS Santiago de Chile's poll.

Randomization

Block randomization with Eco Chamber membership and levels of digital citizenship (both binaries)

Experimental survey

Socio-demographic characterization: Age range, gender, income, educational level, political ideology ("Left wing", "Right wing", "Center", "without ideology") + Fake news experiment

Analysis

Differences between averages by treatment, *Kruskall-Walis* and *Wilcoxon test*. And Regression models (balanced and unbalanced) with *Maximun Likehood* estimation

Experimental task

- Every participant received 7 headlines and we ask to evaluate if they're true or false

> *We will show you below 7 different headlines that are circulating in Social Media, some of which are true and others false. You will have to indicate if they are true or false.*
>
> *(At the end of this survey you will be shown your results).*
>
> *How do you classify them?*

- if they're correct, them scoring 1. if there's incorrect, them scores zero.
- Maximun score is 7 and minimum is zero.

Validation process

- Two pre-test to evaluate the headline's relevance and difficulty

Eco Chamber membership Scale

- Using a recent validated scale* about reinforcement opinion in social media
- 7 items with 1 to 10 range por each item (total Range: 7 to 70)
- Low Eco Chamber Membership: 7 to 39
- High Eco Chamber Membership: 40 to 70

[*] Kaakinen, M., Sirola, A., Savolainen, I., & Oksanen, A. (2020). Shared identity and shared information in social media: Development and validation of the identity bubble reinforcement scale. Media Psychology, 23(1).

Digital Citizenship scale

- Using a Scale development by Choi* and reduced since 34 items to 14.
- Each item are with a 7 point scale (1 to 7). Total range: 14 to 98
- Low levels of digital citizenship: 14 to 62
- High levels of Digital citizenship: 63 to 98

[*] Choi, M., Glassman, M., & Cristol, D. (2017). What it means to be a citizen in the internet age: Development of a reliable and valid digital citizenship scale. Computers & Education, 107, 100-112.

Creating treatments

¿How to define treatments?

Using self political positions questions

T1 (Like-Minded)	T2 (Opposite)	T3 (Control)
The set of headlines in line with their ideology is delivered (left, right, center and without ideology)	If the person self-identifies as a leftist, he/she is given a set of right-wing headlines. If the person self-identifies as right-wing, he/she is given the left-wing headline set If the person self-identifies as centrist or non-ideological, he/she is randomized to a mixture of the left and right sets.	Random selection of 7 headlines from each ideology (4 falses and 3 true)

Where do news headlines come from?

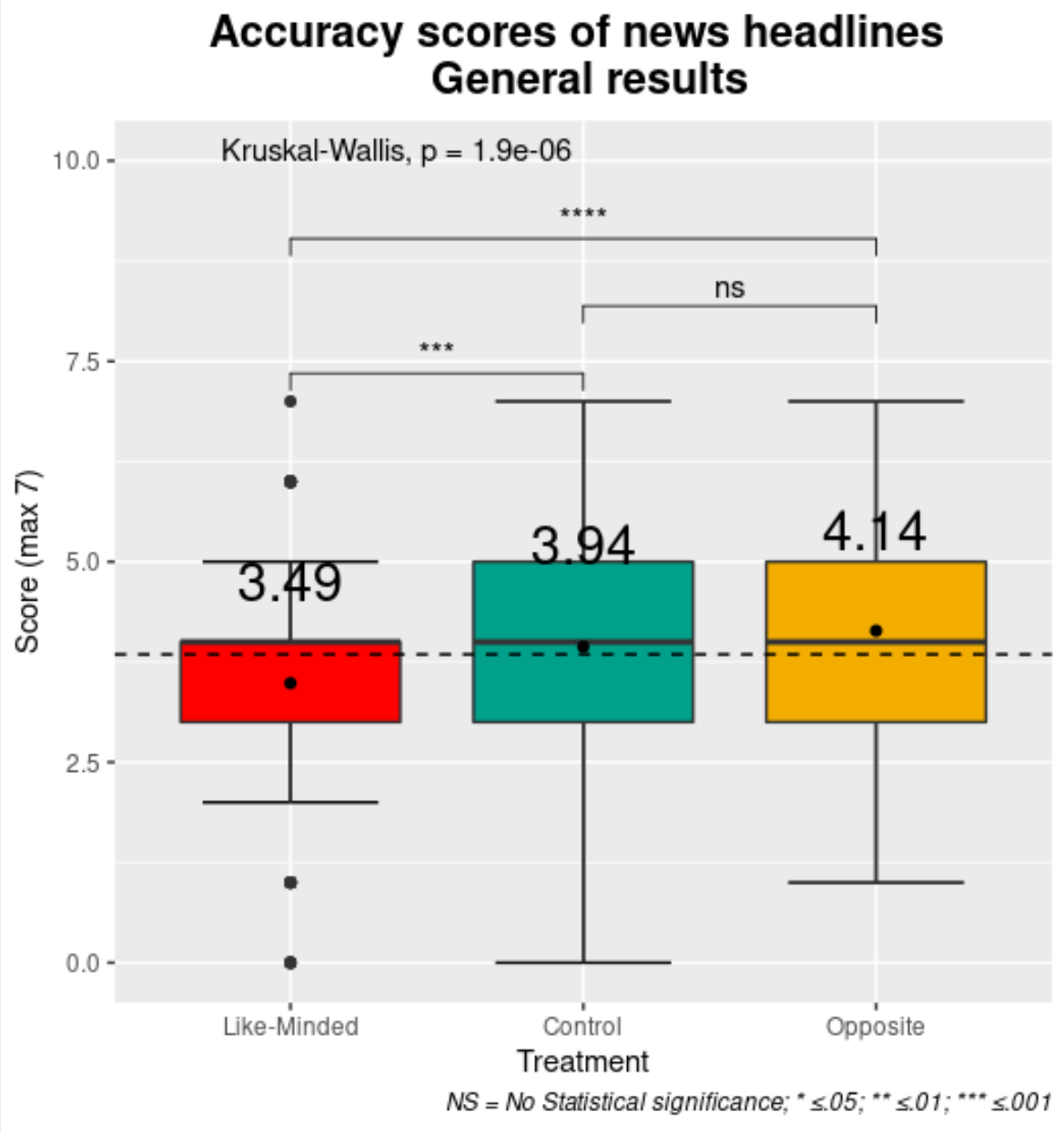
We selected news headlines that were disseminated through social media and checked by independent fact-checking agencies, such as fast Check and "decodificador".

Headlines examples

Set of news headlines related to ideologies

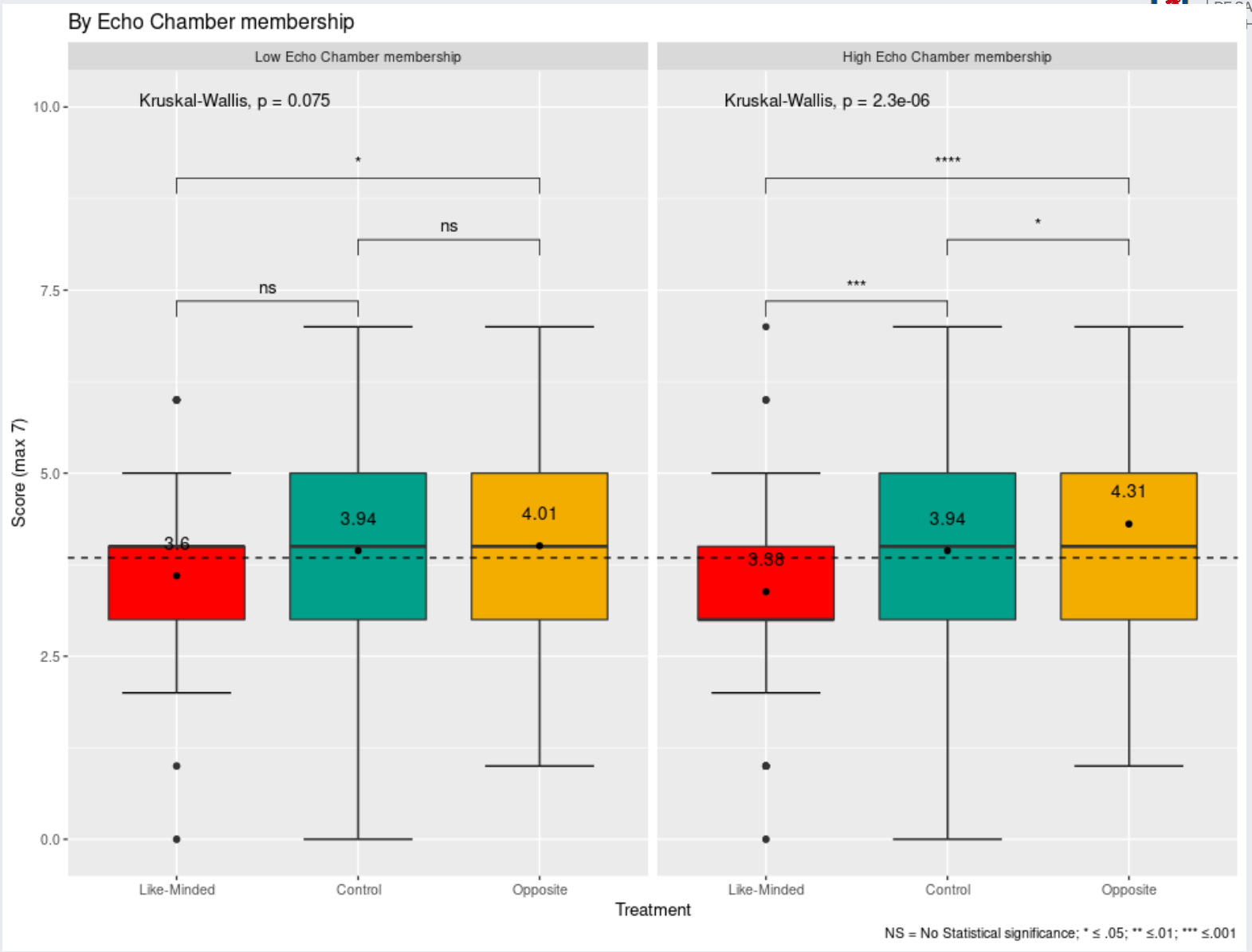
Left wing related	Right wing related	Center related	Without ideology related
"Comptroller's Office authorizes controls in domiciles without authorization of the dwellers, for sanitary purposes". (Real)	"Comptroller's Office authorizes controls in domiciles without authorization of the dwellers, for sanitary purposes". (Real)	"Comptroller's Office authorizes controls in domiciles without authorization of the dwellers, for sanitary purposes". (Real)	"Comptroller's Office authorizes controls in domiciles without authorization of the dwellers, for sanitary purposes". (Real)
"'Vamos Chilenos': Almost no senior citizens will receive the benefits of the campaign led by Don Francisco [famous TV personality]." (False)	"Massive changes of address were part of electoral fraud in the election of Jorge Sharp in Valparaíso municipal election, 2016." (False)	"New law project allowing euthanasia does not contemplate that the patient may repent." (False)	"'Vamos Chilenos': Almost no senior citizens will receive the benefits of the campaign led by Don Francisco [famous TV personality]." (False)
"The patent to test Covid-19 was filed in 2015." (False)	"The patent to test Covid-19 was filed in 2015." (False)	"The patent to test Covid-19 was filed in 2015." (False)	"The patent to test Covid-19 was filed in 2015." (False)
"Sebastián Piñera owns AFP Habitat [Private mortgages company]" (False)	"Today destroying a city bus is free and there is no penalty." (False)	"Sebastián Piñera owns AFP Habitat." (False)	"Sebastián Piñera owns AFP Habitat." (False)
"Constanza Hube: "There is no problem if a forestry company burning down a National Park, economic freedom is sacred above all else"" (False)	"INDH human rights observers arrested for carrying Molotov cocktails on 'the day of the young activist' ". (False)	It's official: the State of China now controls the monopoly of the electricity supply of 57% of Chileans". (Real)	"Congressmen who performed remote work spent more than $165 million in transportation." (Real)
"Women fall back more than ten years in their participation in the labor market." (Real)	"Former Navy Commander, Edmundo Gonzalez: "If they let us act, we will put an end to terrorism in 72 hours". (Real)	Pepe Mujica: "Chile would be one of the best countries to live in and a world economic power if its citizens would unite and remove the politicians who have robbed them for years". (False)	Pepe Mujica: "Chile would be one of the best countries to live in and a world economic power if its citizens would unite and remove the politicians who have robbed them for years". (False)
"Michelle Bachelet's government built ditches in Colchane". (Real)	"Military officer who led caravan of drug traffickers arrested". (Real)	"Former Navy Commander, Edmundo Gonzalez: "If they let us act, we will put an end to terrorism in 72 hours". (Real)	"Michelle Bachelet's government built ditches in Colchane". (Real)

Results


Accuracy scores of news headlines
General results
Kruskal-Wallis, p = 1.9e-06
****
ns
***
10.0
7.5
5.0
2.5
0.0
Score (max 7)
3.49
3.94
4.14
Like-Minded
Control
Opposite
Treatment
NS = No Statistical significance; * ≤.05; ** ≤.01; *** ≤.001

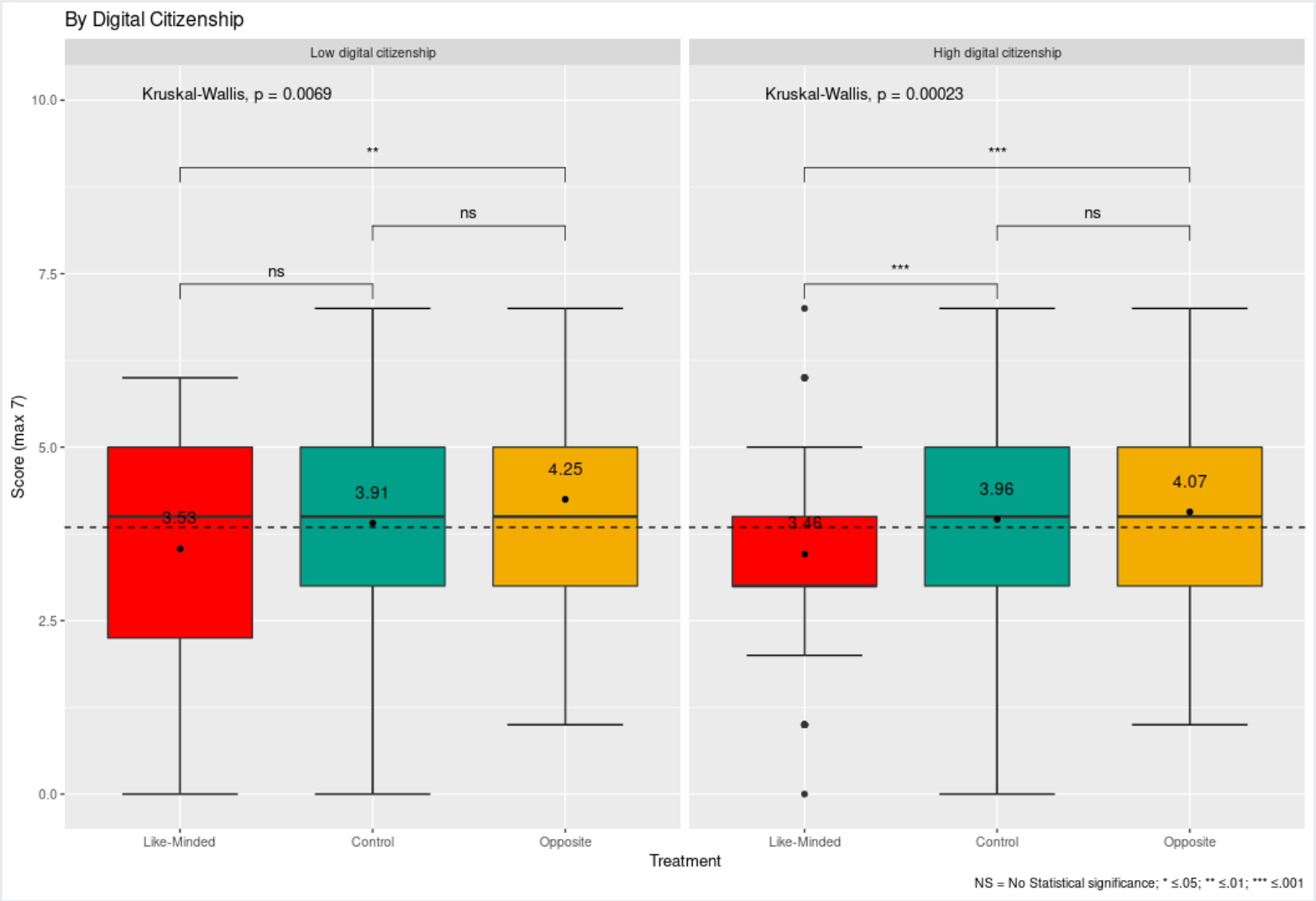
Success score distinguishing fake news from real news

	Dependent variable:	
	Success score	
	normal	*OLS*
	(1)	(2)
T1 Like-minded	-0.462***	-0.462***
	(0.122)	(0.122)
T2 Opposite	0.193	0.193
	(0.125)	(0.125)
High Eco Chamber	0.021	0.021
	(0.106)	(0.106)
High Digital Citizenship	-0.048	-0.048
	(0.110)	(0.110)
Female	-0.225*	-0.225*
	(0.102)	(0.102)
30 to 40 years	-0.300*	-0.300*
	(0.136)	(0.136)
41 to 65 years	-0.711***	-0.711***
	(0.137)	(0.137)
66+ years	-0.390*	-0.390*
	(0.153)	(0.153)
Constant	4.438***	4.438***
	(0.154)	(0.154)
Observations	690	690
R^2		0.083
Adjusted R^2		0.072
Log Likelihood	-1,162.891	
Akaike Inf. Crit.	2,343.782	
Residual Std. Error		1.312 (df = 681)
F Statistic		7.715*** (df = 8; 681)
Significance levels		*p<0.05; **p<0.01; ***p<0.001
		Base variables: Control Group, 18 to 29 years, Lowest Income


By Echo Chamber membership
Low Echo Chamber membership
High Echo Chamber membership
Kruskal-Wallis, p = 0.075
Kruskal-Wallis, p = 2.3e-06
Score (max 7)
10.0
7.5
5.0
2.5
0.0
*
ns
ns
****
*
***
3.6
3.94
4.01
3.98
3.94
4.31
Like-Minded
Control
Opposite
Like-Minded
Control
Opposite
Treatment
NS = No Statistical significance; * ≤ .05; ** ≤.01; *** ≤.001

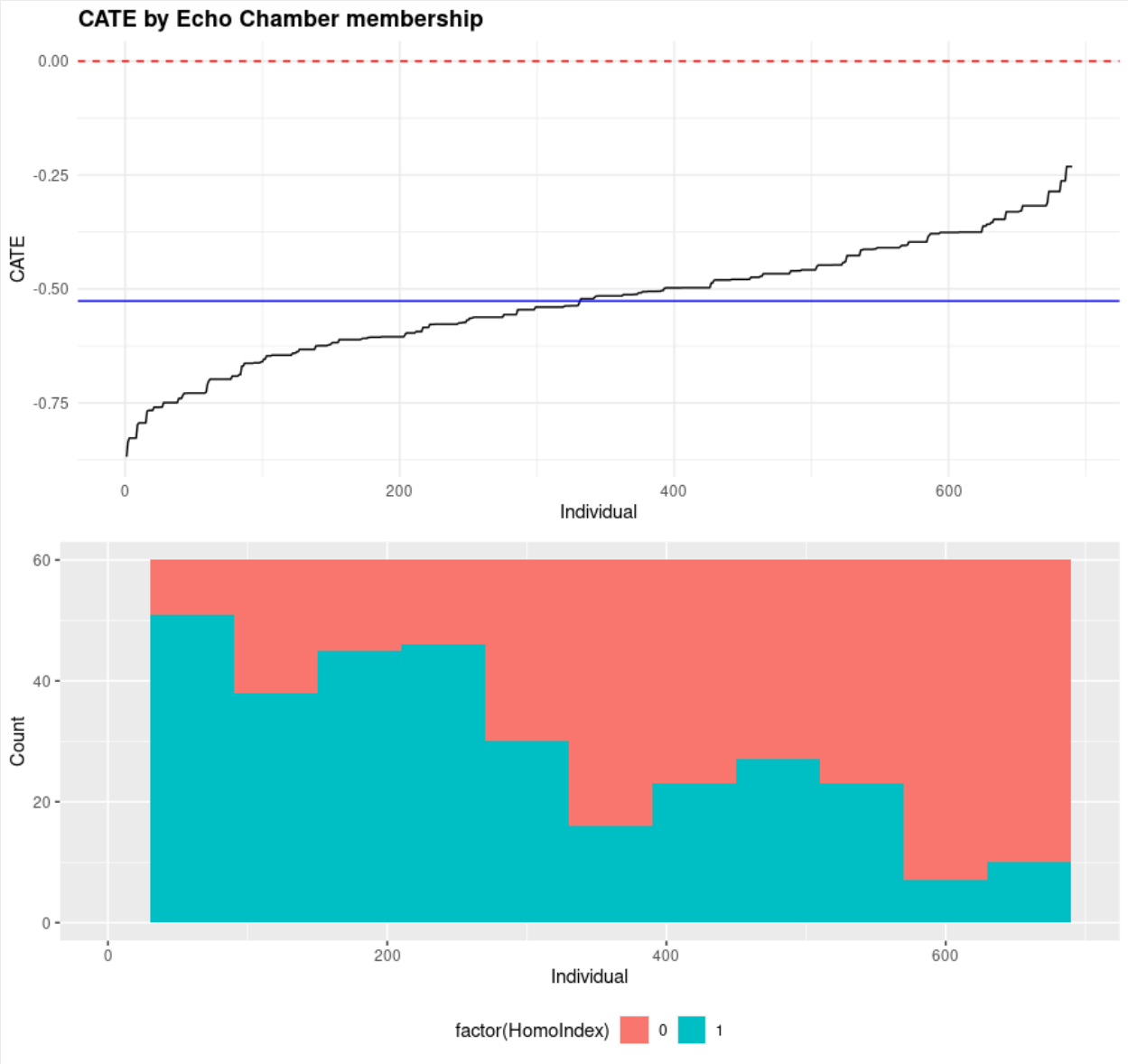
Success score distinguishing fake news from real news

	Dependent variable:	
	Success score	
	normal	*OLS*
	(1)	(2)
T1 Like-minded	-0.470***	-0.470***
	(0.122)	(0.122)
T2 Opposite	0.177	0.177
	(0.125)	(0.125)
High Eco Chamber	-0.001	-0.001
	(0.100)	(0.100)
Female	-0.160	-0.160
	(0.103)	(0.103)
30 to 40 years	-0.363**	-0.363**
	(0.138)	(0.138)
41 to 65 years	-0.794***	-0.794***
	(0.139)	(0.139)
66+ years	-0.451**	-0.451**
	(0.155)	(0.155)
Low income	0.262	0.262
	(0.228)	(0.228)
Low - Mid Income	0.260	0.260
	(0.213)	(0.213)
Mid-High Income	0.523*	0.523*
	(0.218)	(0.218)
Highest Income	0.774**	0.774**
	(0.286)	(0.286)
Constant	4.082***	4.082***
	(0.234)	(0.234)
Observations	690	690
R^2		0.099
Adjusted R^2		0.085
Log Likelihood	-1,156.760	
Akaike Inf. Crit.	2,337.520	
Residual Std. Error		1.303 (df = 678)
F Statistic		6.791*** (df = 11; 678)
Significance levels		*p<0.05; **p<0.01; ***p<0.001
		Base variables: Control Group, 18 to 29 years, lowest income

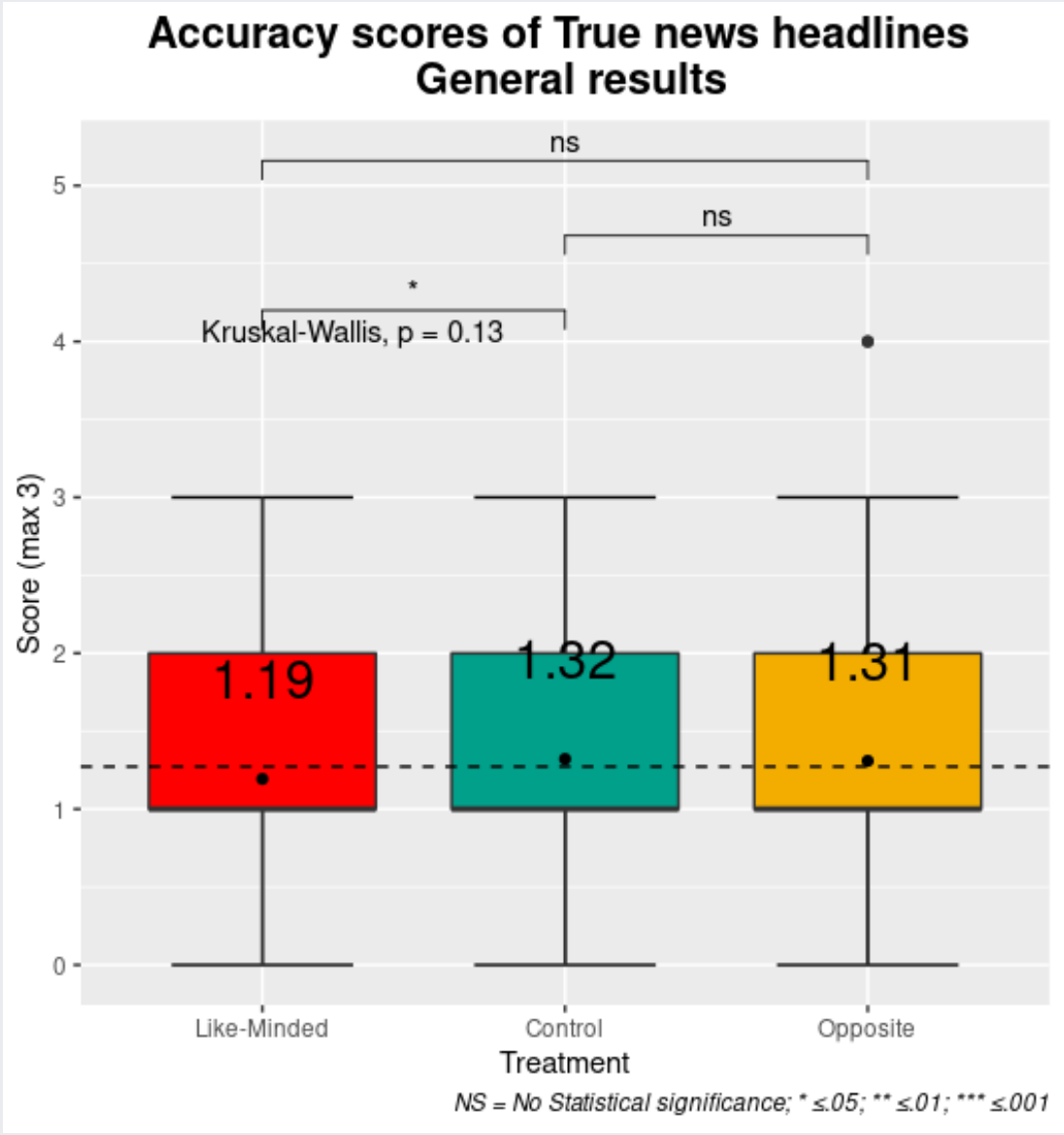

By Digital Citizenship
Low digital citizenship
High digital citizenship
Kruskal-Wallis, p = 0.0069
Kruskal-Wallis, p = 0.00023
Score (max 7)
10.0
7.5
5.0
2.5
0.0
**
ns
ns
***
***
ns
3.53
3.91
4.25
3.46
3.96
4.07
Like-Minded
Control
Opposite
Like-Minded
Control
Opposite
Treatment
NS = No Statistical significance; * ≤.05; ** ≤.01; *** ≤.001

Success score distinguishing fake news from real news

	Dependent variable:	
	Success score	
	normal	*OLS*
	(1)	(2)
T1 Like-minded	-0.471***	-0.471***
	(0.122)	(0.122)
T2 Opposite	0.174	0.174
	(0.125)	(0.125)
High Digital Citizenship	-0.049	-0.049
	(0.104)	(0.104)
Female	-0.157	-0.157
	(0.103)	(0.103)
30 to 40 years	-0.361**	-0.361**
	(0.137)	(0.137)
41 to 65 years	-0.792***	-0.792***
	(0.139)	(0.139)
66+ years	-0.451**	-0.451**
	(0.154)	(0.154)
Low income	0.264	0.264
	(0.227)	(0.227)
Low - Mid Income	0.263	0.263
	(0.213)	(0.213)
Mid-High Income	0.526*	0.526*
	(0.218)	(0.218)
Highest Income	0.778**	0.778**
	(0.286)	(0.286)
Constant	4.109***	4.109***
	(0.236)	(0.236)
Observations	690	690
R^2		0.100
Adjusted R^2		0.085
Log Likelihood	-1,156.646	
Akaike Inf. Crit.	2,337.291	
Residual Std. Error		1.303 (df = 678)
F Statistic		6.814*** (df = 11; 678)
Significance levels		*p<0.05; **p<0.01; ***p<0.001
		Base variables: Control Group, Low citizenship, 18 to 29 years, lowest income

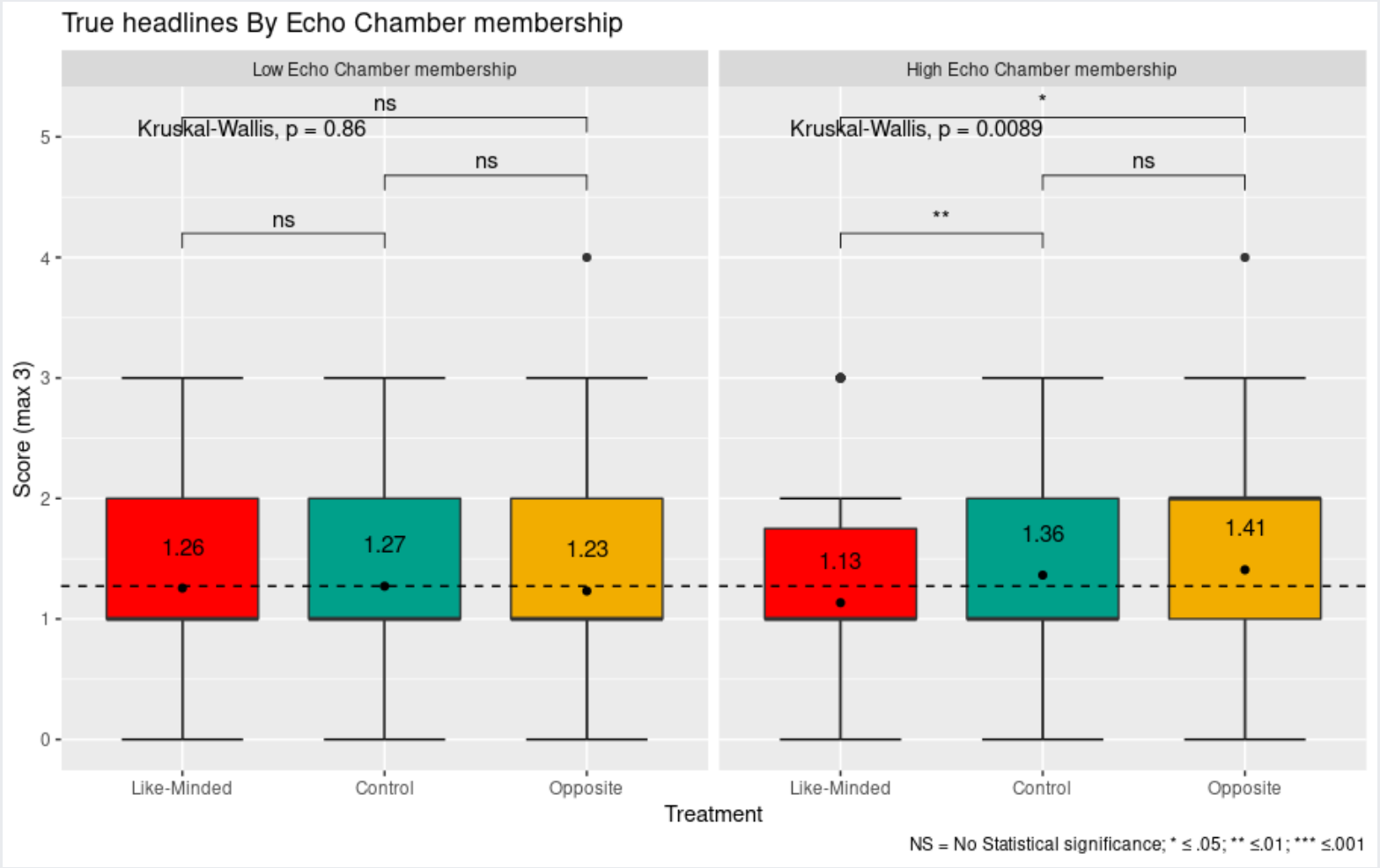

CATE by Echo Chamber membership
0.00
-0.25
-0.50
-0.75
CATE
0
200
400
600
Individual
60
40
20
0
Count
0
200
400
600
Individual
factor(HomoIndex)
0
1

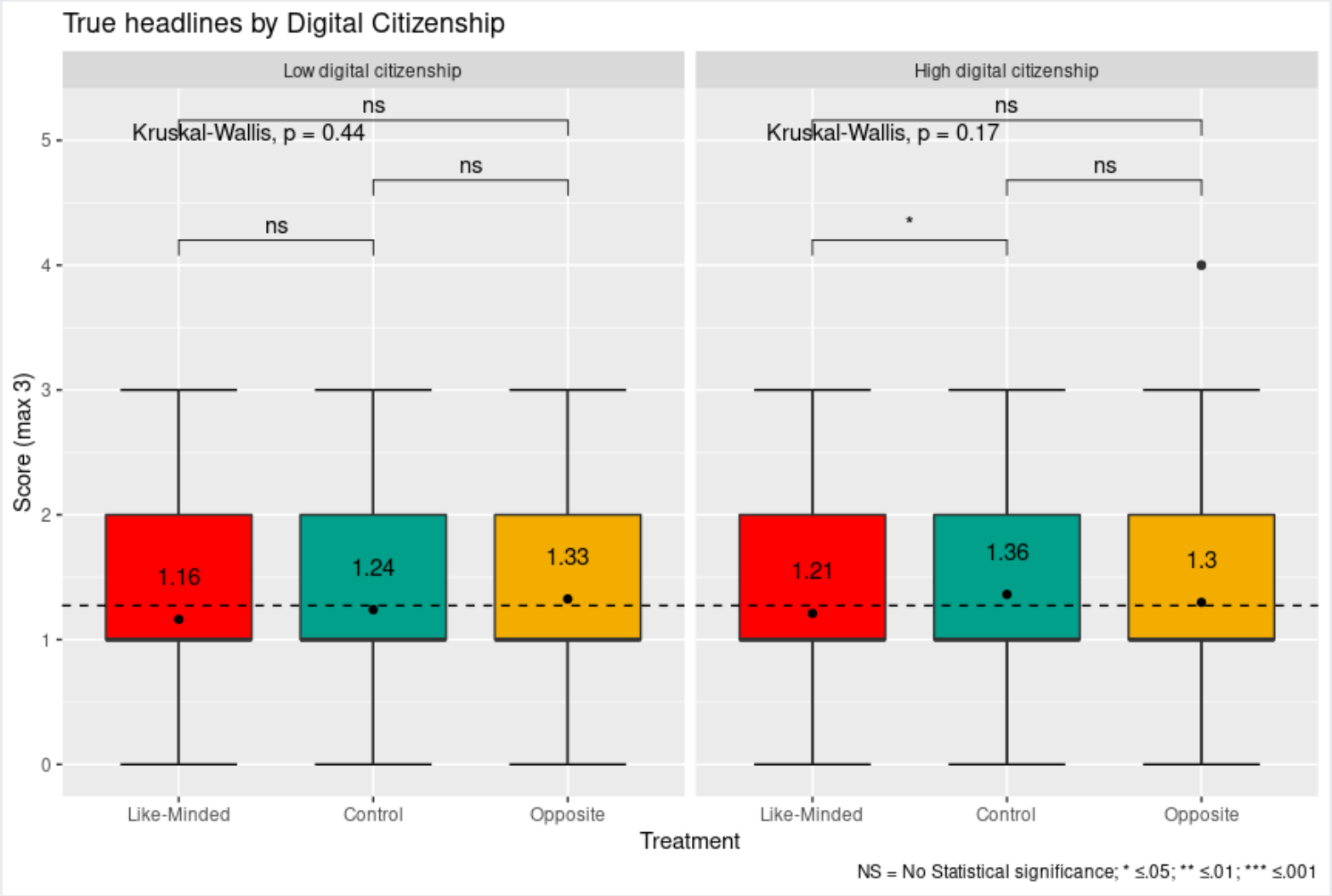
There's any difference distinguishing true or false headlines?

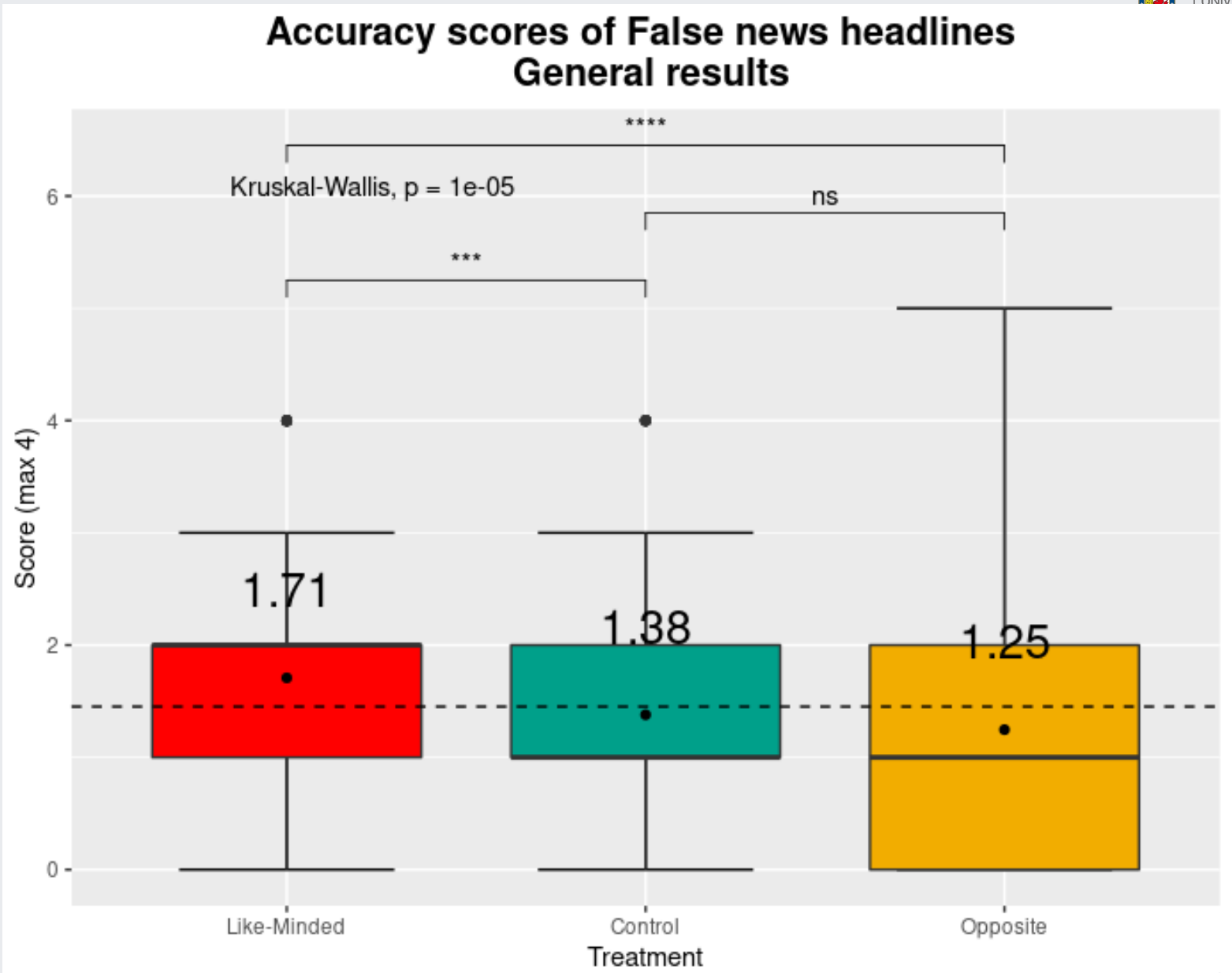

Accuracy scores of True news headlines
General results
ns
ns
*
Kruskal-Wallis, p = 0.13
5
4
3
2
1
0
Score (max 3)
1.19
1.32
1.31
Like-Minded
Control
Opposite
Treatment
NS = No Statistical significance; * ≤.05; ** ≤.01; *** ≤.001

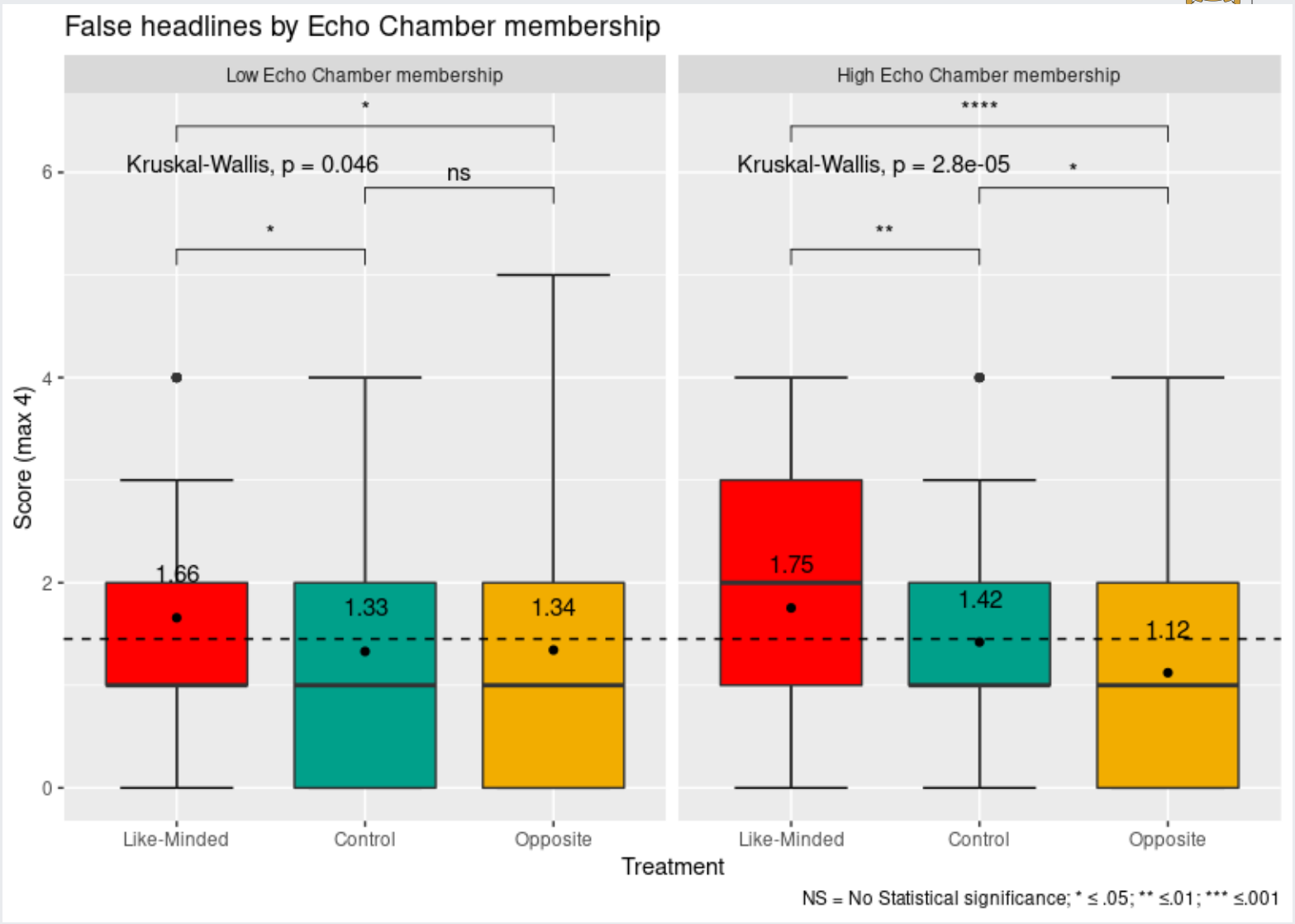
Success score distinguishing True headlines

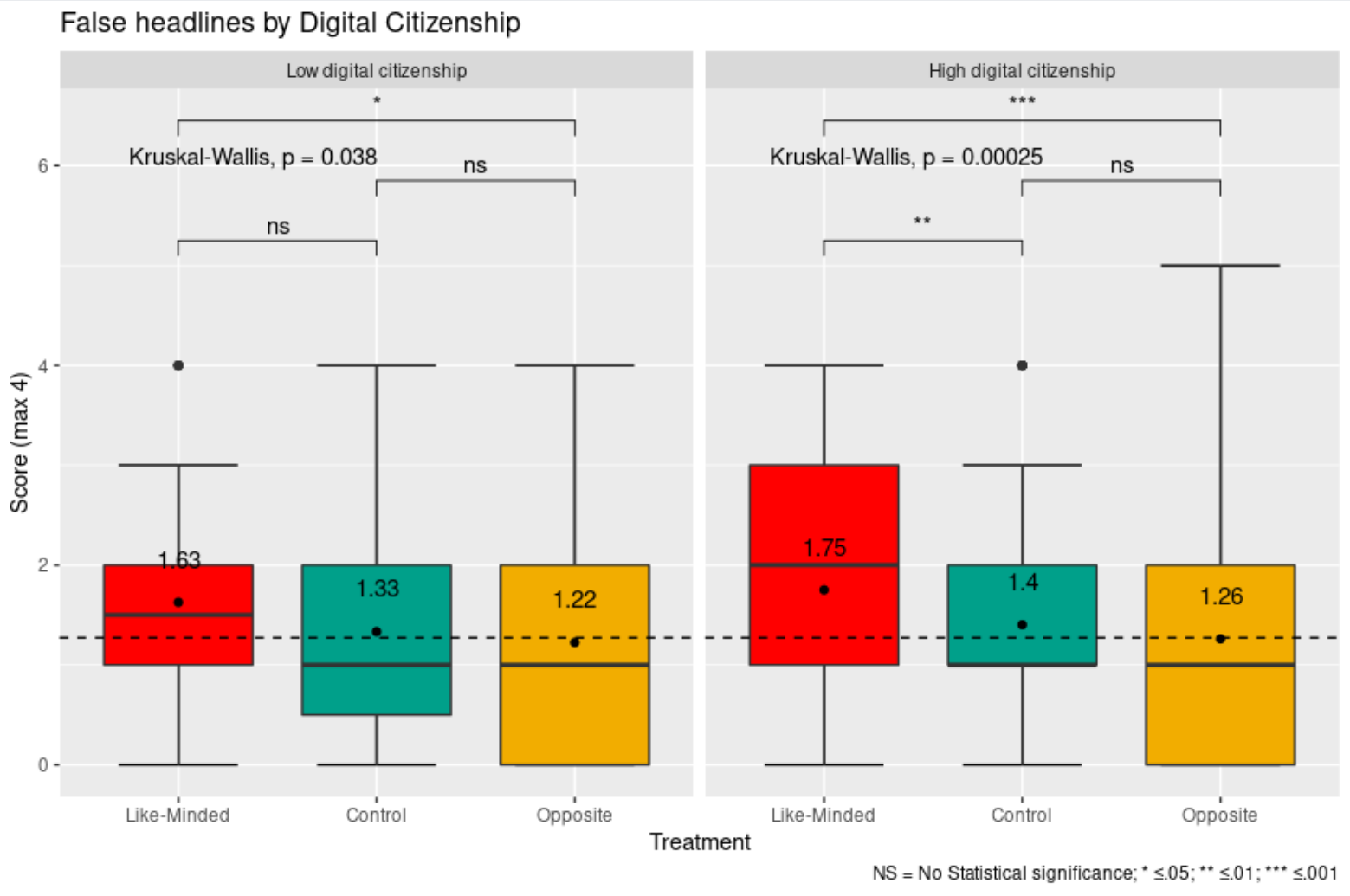
	Dependent variable:	
	Success score	
	normal	*OLS*
	(1)	(2)
T1 Like-minded	-0.127	-0.127
	(0.076)	(0.076)
T2 Opposite	-0.010	-0.010
	(0.078)	(0.078)
High Eco Chamber	0.003	0.003
	(0.066)	(0.066)
High Digital Citizenship	0.055	0.055
	(0.068)	(0.068)
Female	-0.019	-0.019
	(0.065)	(0.065)
30 to 40 years	-0.264**	-0.264**
	(0.086)	(0.086)
41 to 65 years	-0.470***	-0.470***
	(0.087)	(0.087)
66+ years	-0.380***	-0.380***
	(0.097)	(0.097)
Low income	-0.028	-0.028
	(0.142)	(0.142)
Low - Mid Income	0.026	0.026
	(0.133)	(0.133)
Mid-High Income	0.106	0.106
	(0.136)	(0.136)
Highest Income	0.031	0.031
	(0.179)	(0.179)
Constant	1.523***	1.523***
	(0.149)	(0.149)
Observations	690	690
R^2		0.052
Adjusted R^2		0.035
Log Likelihood	-831.348	
Akaike Inf. Crit.	1,688.696	
Residual Std. Error		0.814 (df = 677)
F Statistic		3.071*** (df = 12; 677)
Significance levels		*p<0.05; **p<0.01; ***p<0.001
		Base variables: Control Group, 18 to 29 years, Lowest Income


True headlines By Echo Chamber membership
Low Echo Chamber membership
High Echo Chamber membership
Kruskal-Wallis, p = 0.86
Kruskal-Wallis, p = 0.0089
ns
ns
ns
*
**
ns
Score (max 3)
0
1
2
3
4
5
1.26
1.27
1.23
1.13
1.36
1.41
Like-Minded
Control
Opposite
Like-Minded
Control
Opposite
Treatment
NS = No Statistical significance; * ≤ .05; ** ≤.01; *** ≤.001


True headlines by Digital Citizenship
Low digital citizenship
High digital citizenship
Kruskal-Wallis, p = 0.44
Kruskal-Wallis, p = 0.17
ns
ns
ns
ns
ns
*
Score (max 3)
0
1
2
3
4
5
1.16
1.24
1.33
1.21
1.36
1.3
Like-Minded
Control
Opposite
Like-Minded
Control
Opposite
Treatment
NS = No Statistical significance; * ≤.05; ** ≤.01; *** ≤.001


Accuracy scores of False news headlines
General results
****
Kruskal-Wallis, p = 1e-05
ns
***
6
4
2
0
Score (max 4)
1.71
1.38
1.25
Like-Minded
Control
Opposite
Treatment
NS = No Statistical significance; * ≤.05; ** ≤.01; *** ≤.001


False headlines by Echo Chamber membership
Low Echo Chamber membership
High Echo Chamber membership
Kruskal-Wallis, p = 0.046
Kruskal-Wallis, p = 2.8e-05
ns
*
**
****
Score (max 4)
0
2
4
6
1.66
1.33
1.34
1.75
1.42
1.12
Like-Minded
Control
Opposite
Treatment
NS = No Statistical significance; * ≤ .05; ** ≤.01; *** ≤.001


False headlines by Digital Citizenship
Low digital citizenship
High digital citizenship
Kruskal-Wallis, p = 0.038
Kruskal-Wallis, p = 0.00025
*
***
ns
ns
ns
**
Score (max 4)
6
4
2
0
1.63
1.33
1.22
1.75
1.4
1.26
Like-Minded
Control
Opposite
Like-Minded
Control
Opposite
Treatment
NS = No Statistical significance; * ≤.05; ** ≤.01; *** ≤.001

Success score distinguishing false headlines

	Dependent variable:	
	Success score	
	normal	*OLS*
	(1)	(2)
T1 Like-minded	0.345***	0.345***
	(0.100)	(0.100)
T2 Opposite	-0.106	-0.106
	(0.102)	(0.102)
High Digital Citizenship	0.065	0.065
	(0.085)	(0.085)
Female	0.125	0.125
	(0.084)	(0.084)
30 to 40 years	0.145	0.145
	(0.112)	(0.112)
41 to 65 years	0.367**	0.367**
	(0.114)	(0.114)
66+ years	0.056	0.056
	(0.126)	(0.126)
Low income	-0.303	-0.303
	(0.186)	(0.186)
Low - Mid Income	-0.265	-0.265
	(0.174)	(0.174)
Mid-High Income	-0.449*	-0.449*
	(0.178)	(0.178)
Highest Income	-0.757**	-0.757**
	(0.234)	(0.234)
Constant	1.447***	1.447***
	(0.193)	(0.193)
Observations	690	690
R^2		0.071
Adjusted R^2		0.056
Log Likelihood	-1,018.080	
Akaike Inf. Crit.	2,060.159	
Residual Std. Error		1.066 (df = 678)
F Statistic		4.685*** (df = 11; 678)
Significance levels		*p<0.05; **p<0.01; ***p<0.001
		Base variables: Control Group, Low citizenship, 18 to 29 years, lowest income

Results summary

- People are more likely to misclassify news headlines when it is related to their political ideology
- Contrary to our hypothesis, people have a better performance classifying news headlines of opposite political thought to their own.
- Eco chambers membership increases this difference in performance.
- These results refute our initial hypotheses

but..

- People are better able to distinguish false headlines when they are related to their own ideology compared to the opposite group.
- Echo Chambers membership increases these effect on false headlines. Digital Citizen Ship increases just the accuracy classifying falses headlines in like-minded group.

Discussion

- We find Evidence to intra-group biased new's consumption, supporting by others studies (eg: Osmundsen et.al, 2021; Pereira et.al, 2021)
- ***Motivated skepticism*** (Taber & Lodge, 2006). Motivated skepticism is a concept used to describe the process by which people pay more attention to and are better informed about content that is opposed to their thinking, so as to be able to debate more fiercely with them.
- Researchers who had not considered this concept come to the same finding (eg. Allen et.al, 2021; Pennycook & Rand, 2019), and so do we.
- This invites us to look at political polarization from another angle: Is it a question of misunderstanding the other, or overestimating our own position?

¡Thank You!

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This slide has created with **xaringan** and **XaringanThemer**

Appendix

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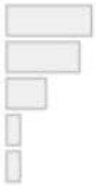
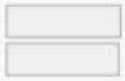
No	Variable	Stats / Values	Freqs (% of Valid)	Graph	Valid	Missing
1	AgeRecod [character]	1. +66 años 2. 18 a 29 años 3. 30 a 40 años 4. 41 a 65 años	129 (18.6%) 187 (26.9%) 190 (27.4%) 188 (27.1%)		694 (100.0%)	0 (0.0%)
2	EducRec [character]	1. Básica 2. Media 3. Postgrado 4. Sin Estudios 5. Superior	3 (0.4%) 174 (25.1%) 97 (14.0%) 3 (0.4%) 417 (60.1%)		694 (100.0%)	0 (0.0%)
3	IncomeRecod [character]	1. Ente $448.001 y $1.000.00 2. Entre $1.000.001 - $3.000 3. Entre $224.001 - $448.000 4. Más de $3.000.000 5. Menos de $224.000	262 (37.8%) 224 (32.3%) 122 (17.6%) 41 (5.9%) 45 (6.5%)		694 (100.0%)	0 (0.0%)
4	GenRecod [character]	1. Femenino 2. Masculino 3. Otro	388 (55.9%) 298 (42.9%) 8 (1.2%)		694 (100.0%)	0 (0.0%)
5	Ideología [character]	1. centro 2. Derecha 3. Izquierda 4. Ninguno	69 (9.9%) 55 (7.9%) 279 (40.2%) 291 (41.9%)		694 (100.0%)	0 (0.0%)
6	HomoIndex [numeric]	Min : 0 Mean : 0.5 Max : 1	0 : 348 (50.1%) 1 : 346 (49.9%)		694 (100.0%)	0 (0.0%)
7	DigitIndex [numeric]	Min : 0 Mean : 0.6 Max : 1	0 : 251 (36.2%) 1 : 443 (63.8%)		694 (100.0%)	0 (0.0%)

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