The Psychology of Online Political Hostility – How Aggressiveness of People Effects Their Online and Offline Comment Towards Political Incidents*

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In contemporary society, the widespread influence of the internet and electronic technology has made the online world an indispensable part of daily human life. However, amidst this digitalization, a significant challenge has emerged: the proliferation of hostile online discussion environments. This paper aims to replicate and analyze data from existing studies investigating the statistical disparities in individual behavior during online and offline political discussions. Additionally, it employs secondary research to explore how individuals' levels of aggressiveness correlate with the observed differences in online and offline political discourse. Our findings indicate that there is no substantial variance in hostility levels between online and offline political discussions, irrespective of an individual's level of aggression.

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*Code and data are available at: https://github.com/kqlqkqlqF/The-Psychology-of-Online-Political-Hostility.git. This paper is replicated from paper the Psychology of Online Political Hostility – A Comprehensive, Cross-National Test of the Mismatch Hypothesis, available at : https://doi.org/10.1017/S0003055421000885.

1 Introduction [1]

Since as early as 2000, there has been a desire for people to engage in political discussions anonymously through social media platforms (Lincoln 2001). With the rapid expansion and development of the internet, it has become extremely common for individuals to connect to it using electronic devices. By 2024, the registered user base of the leading social media platform, Instagram, had reached an astounding 2.5 billion (Shewale 2024). This staggering number serves as compelling evidence for the global shift into the internet era. However, along with the globalization of the internet, a series of problems arising from online interactions have become increasingly apparent, with one of the most notable being the toxic atmosphere prevalent in online discussions. Nowadays, online discussions are rife with users launching vicious attacks against each other, and according to a survey conducted in the United States, politics is one of the most contentious topics that easily sparks heated debates (Maeve 2017). Furthermore, apart from the chaos caused by personal attacks among individual users, online trolling has also become a tool for manipulating public opinion. For instance, researchers have found that during elections, social media users engage in partisan attacks that completely overshadow substantive issues, leading to a wave of partisan confrontation (Rossella Rega and Stanziano 2023). Today, online political hostility has been identified as a " key question for achieving impact on online harassment" (Nathan 2019).

Scholars have begun to analyze the reasons behind people's more hostile behavior in online communication and the psychological factors behind it. Some analysts suggest that when individuals communicate without facing someone directly, but rather in an anonymous or difficult-to-trace environment, even those who are usually friendly may find it challenging to control their emotions, especially on controversial topics (Baek and Carpini 2012). The lack of regulators and accountability mechanisms in online discussions seems to be one of the reasons for this hostility. Additionally, the flat structure of social media allows people from different social backgrounds to participate in discussions on the same political issues. Therefore, compared to offline communication, online communication is more likely to result

[1] Rstudio (R Core Team 2022) was used for producing the code and this paper. A series of R packages were used: (Kassambara 2023), (Xie 2023), (Zhu 2021), (Firke 2023), (Daróczi et al. 2017), (Pedersen 2022), (Wickham 2021) and (Wickham et al. 2019).

in disagreements over political discourse, and individuals with conflicting views are more likely to encounter each other (Brundidge 2010). In general, the characteristics of the internet and social media amplify people's emotions and increase the likelihood of political disagreements occurring.

The article "The Psychology of Online Political Hostility: A Comprehensive, Cross-National Test of the Mismatch Hypothesis" analyzes the differences in people's behavior in online and offline political discussions and draws some conclusions. They collected data through online surveys in the United States and Denmark from 2018 to 2021, totaling approximately 4800 responses, and conducted a series of analyses. They found that people perceive differences between online and offline political discussions but do not necessarily believe that online political discussions are more hostile than offline ones. Furthermore, in self-assessments, people believe that they exhibit similar levels of aggression in online and offline environments and do not perceive offline political discussions to be more peaceful than online ones (Alexander and Petersen 2021). We noticed that their survey questionnaire, in addition to investigating online and offline discussions on political topics, also asked respondents to assess their own personalities, such as "I consider myself a calm person" or "I am an aggressive person." Therefore, we decided to replicate this article and conduct secondary research based on the data they collected.

Based on the psychological viewpoints mentioned earlier and the survey results of Bor Alexander and Michael Bang Petersen, we have made an assumption: individuals with more aggressive personalities are more likely to exhibit different behaviors in online and offline political discussions, because in the unregulated world of the internet, they are more likely to display aggression beyond offline discussions. Our study primarily focuses on two aspects: (1) comparing political discussions in online and offline environments and (2) evaluating differences in the level of aggression among individuals. In summary, our article will first discuss the data sources and analysis methods used in the original paper. Then, we will conduct secondary analysis on the data from the original paper to discuss whether our hypothesis, "individuals with more aggressive personalities are more likely to exhibit different behaviors in online and offline political discussions," holds true.

2 Data

2.1 Source

The paper used for replication is from the "American Political Science Review," which analyzed and compared the level of aggressiveness in people's online and offline political discussions, using surveys as a means of data collection (Alexander and Petersen 2021). Our replication aims to address a new question stemming from the original paper: whether individuals with more aggressive personalities exhibit greater differences in behavior between online and offline political discussions.

2.2 Methodology

This paper will replicate the survey data originally collected for the study by Bor Alexander and Michael Bang Petersen. They selected the United States and Denmark as the source of the original data, considering them to be two countries with stark differences in many aspects, thus likely to produce more credible original data (Alexander and Petersen 2021). The United States was characterized as a high-polarization, high-conflict, low-trust, and low-participation country, while Denmark was described as a low-polarization, low-conflict, high-trust, and high-participation country (Nelson Michelle R. 2002). Surveys were disseminated across multiple public platforms to collect feedback from users of different platforms, aiming to obtain the most authentic responses, as some social platforms may censor highly aggressive political discourse.

2.3 Features

As mentioned before, the researchers constructed a questionnaire to assess the hostile and aggression level. To reduce errors, many questions in the survey were time-bound within the past thirty days to prevent significant distortion of subjects' memories over time, which could affect the experimental results. Additionally, to better capture the intensity of emotions, questions were structured not as simple yes-or-no queries but rather required subjects to select a numerical value within a range that best corresponded to their situation. For instance, for the question "I have trouble controlling my temper," participants could choose any number within the range of 1 to 7, with higher numbers indicating a greater alignment with the description provided in the question.Using this method, the researchers collected over 4,200 responses, gathered in the United States in 2018, 2019, and 2021, as well as in Denmark in 2019. Given that our paper primarily focuses on (1) comparing political discussions in online and offline environments and (2) evaluating differences in the level of aggression among individuals, we needed to collect data on hostile_online, hostile_offline, and aggression from the original dataset. However, the data collected in the United States in 2019 did not include information related to aggression. As a result, we did not utilize this portion of the data in our analysis, opting instead to use the remaining dataset. Similarly, we also removed data with "NA" in any of the three content to minimize the error.

In the source dataset, the values for hostile_online, hostile_offline, and aggression are calculated as the averages of numerical responses given by participants to a series of questionnaire questions. For example, if a participant responds to 12 questions related to aggression with 1, 2, 3, 4, 5, 6, 7, 1, 1, 1, 1, and 1, their aggression value would be calculated as (0 + 1 + 2 + 3 + 4 + 5 + 6 + 0 + 0 + 0 + 0 + 0) / 12 = 1.75. The reason for subtracting one from each answer before calculation is because the response range is between 1 and 7, but for more precise results, we shift the range to 0-6 for calculation purposes. The calculation process for hostile_online and hostile_offline follows the same steps.

3 Result

First, we integrated all the data together, retaining only the values of hostile_online, hostile_offline, and aggression for each dataset. To understand how aggression affects an individual's behavior in online and offline political discussions, we calculated the difference between hostile_online and hostile_offline for each dataset. Since the dataset was consisted with over 3200 entries, we display a preview of the first ten rows in (Figure 1). We have constructed (Figure 2), (Figure 3) and (Figure 4) using these data.

NO.	hostile_offline	hostile_online	aggression	online_offline
1	0.056	0.0	0.083	-0.056
2	0.000	0.0	0.056	0.000
3	0.333	0.3	0.792	-0.033
4	0.889	0.9	0.847	0.011
5	0.000	0.0	0.125	0.000
6	0.000	0.0	0.181	0.000
7	0.000	0.0	0.278	0.000
8	0.056	0.0	0.319	-0.056
9	0.056	0.0	0.597	-0.056
10	0.000	0.0	0.403	0.000

Figure 1: Summary of Agression and Hostile Behavior Measures in Offline and Online Political Discussions.

The relationship between the level of aggression and the hostile level during offline political communication was demonstrated in (Figure 2). The scatter plot reveals an interesting trend: despite some scattered points, there appears to be a slight upward trend, indicating a weak positive correlation. Additionally, we've incorporated a best-fit line to underscore this observed trend. This trend suggests that as individuals' aggression levels increase, their hostility in offline political discussions also tends to rise. Notably, the majority of data points cluster in the lower aggression and hostility regions, implying that most participants perceive themselves as having moderate temperaments and exhibit less hostility during offline political exchanges.

The relationship between the level of aggression and the hostile level during online political communication was demonstrated in (Figure 3). Similar with (Figure 2), the scatter plot reveals a upward trend, indicating a weak positive correlation. This trend suggests that as individuals' aggression levels increase, their hostility in online political discussions also tends to rise.

Interestingly, we find that quite a few people perceive themselves are very aggressive, where their aggressive level is between 0.75 and 1.0. However, they only gain 0.0 to 0.25 hostile level

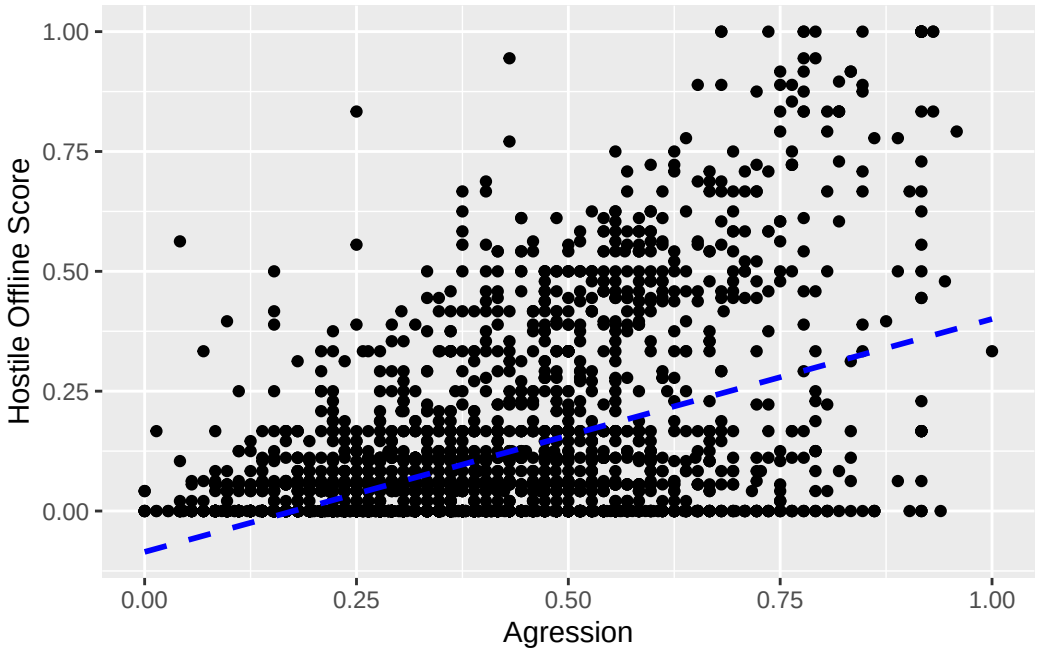

Figure 2: Scatter Plot of Agression versus Hostile Offline Scores

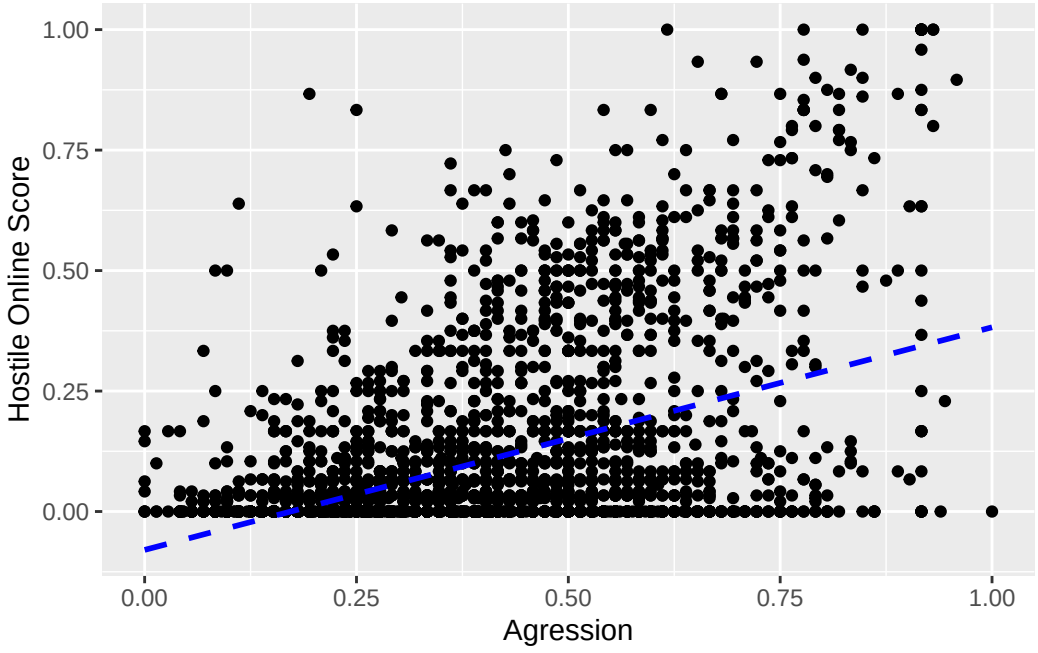

Figure 3: Scatter Plot of Agression versus Hostile Online Scores

for either online or offline discussions. At the same time, there's only 3 people rate themselves as low aggressive level (0.0 - 0.25) but retain high hostile online or offline scores (0.75 - 1.0).

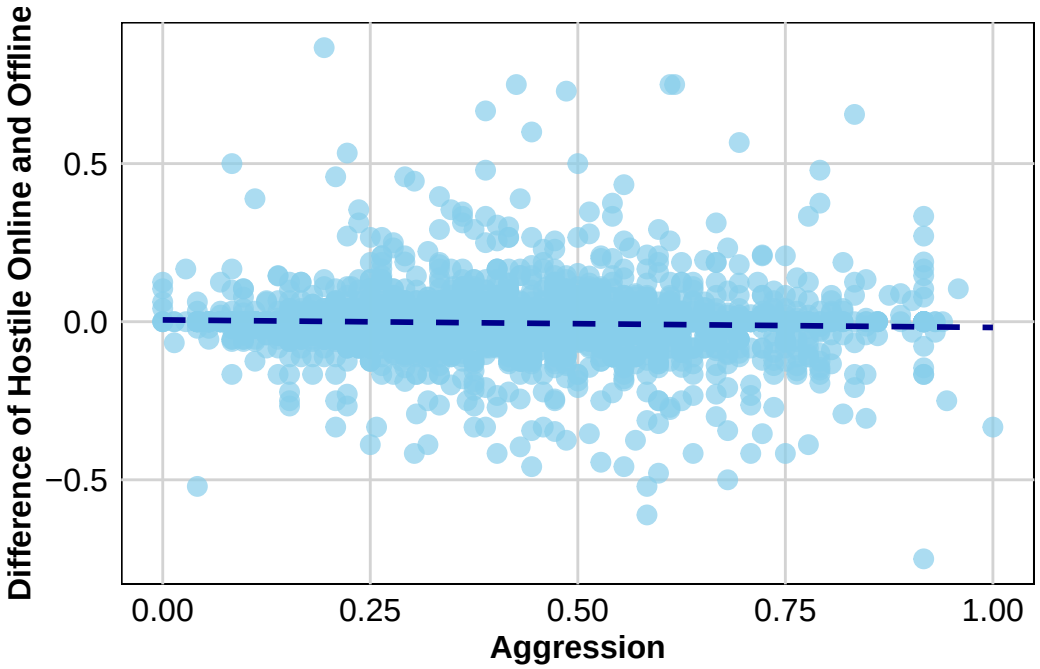

Figure 4: Scatter Plot of Agression versus Hostile Online Scores Minus Hostile Offline Scores

The relationship between level of aggression and the difference between online and offline hostile scores was demonstrated in (Figure 4). The calculation of differences involves subtracting the offline hostile score from the online hostile score. Consequently, if the offline hostile score exceeds the online score, the difference becomes negative. In (Figure 4), we observe a balanced distribution of points around the y-axis, with values clustering near the y=0 horizontal line. This indicates that most participants perceive a similar level of hostility in their online and offline political discussions. The addition of the best-fit line further emphasizes this point, since it aligns closely with the y=0 line. Overall, regardless of their aggression levels, participants tend to perceive a similar level of hostility in both online and offline political exchanges.

In addition to examining the relationship between aggression levels and the degree of hostility in online and offline discussions, we conducted t-tests to assess the differences in hostility between online and offline political exchanges. This aimed to determine whether there were statistically significant differences in the hostility levels between online and offline political discussions. For a comprehensive analysis, we performed t-tests separately for (1) the overall data on online and offline hostility, (2) data collected exclusively in the United States, (3) data collected solely in Denmark, (4) online hostility in US data compared to Danish data, and (5) offline hostility in US data compared to Danish data. The results of these t-tests are presented in (Figure 5).

Nation	P_Value	T_Value	DF
Total on_off	4.563320e-01	-0.7449	6475.980
US on_off	7.083189e-01	-0.3741	4567.993
DK on_off	3.851272e-01	-0.8687	1905.902
USDK on	5.168918e-10	6.2440	2055.133
USDK off	2.356589e-08	5.6053	2072.120

Figure 5: Summery of T-Test result

In (Figure 5), we observe that the p-values for online and offline hostility levels, whether in the overall dataset or in the individual datasets from the United States and Denmark, far exceed 0.05. This suggests that there is no significant difference in hostility levels between online and offline political discussions. This finding is consistent with the conclusion drawn in the original paper (Alexander and Petersen 2021). However, in the t-tests comparing online/offline hostility levels between the United States and Denmark, we note that the p-values are less than 0.05. This indicates a significant difference in the level of political discussion hostility between the United States and Denmark, both in online and offline settings.

Category	Mean
US-ON	0.1079431
US-OFF	0.1100596
DK-ON	0.0663406
DK-OFF	0.0728657

Figure 6: Summery of Mean Hostile Score for US and DK

In (Figure 6), we present the average hostility levels of political discussions, both online and offline, in Denmark and the United States. It is evident that regardless of whether the discussions are conducted online or offline, the level of political discussion hostility is higher in the United States compared to Denmark. Combining these findings with those presented in Table 2, we can conclude that there is a significant difference in the hostility levels of political discussions between the United States and Denmark, with the United States exhibiting higher hostility levels in both online and offline discussions.

In (Figure 7), the negativity of online (dark gray) and offline (light gray) discussions were demonstrated. Although there's no statistically significant difference between hostile levels in online and offline political discussions, we can still see that in both countries, offline discussions have low negativity compared with online discussions. Similarly, there are more online discussions with a higher negativity. As a result, we can still conclude there's a general trend of people being more hostile in online political discussions, although the statistical test doesn't support this idea.

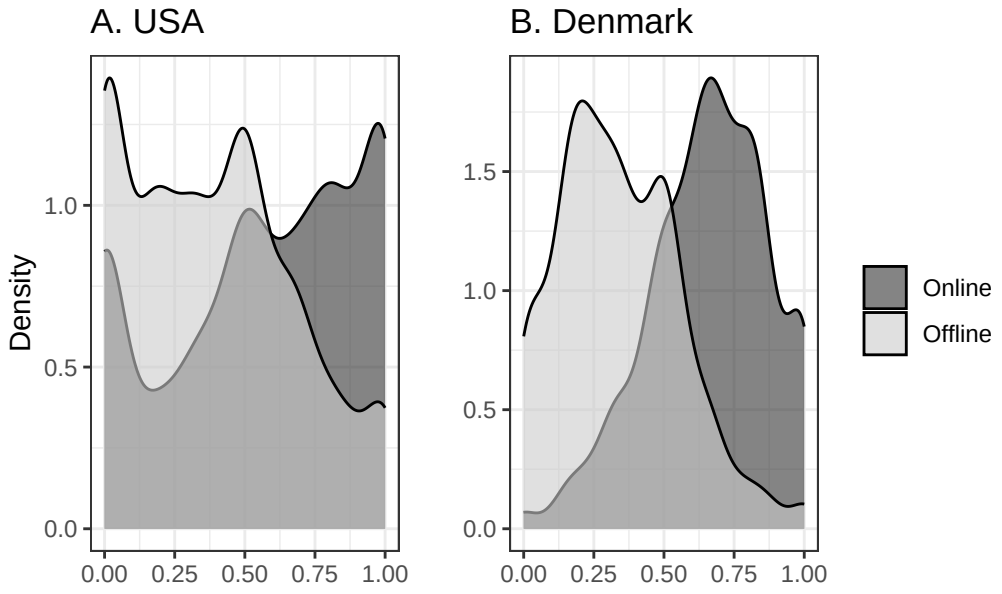

Figure 7: Distribution of Perceived Negativity of Online and Offline Discussions in the United States and Denmark

4 Discussion

In the original study, the authors delved into the influence of status-driven risk-taking behavior on hostility, both online and offline, uncovering a positive correlation. Building upon this groundwork, our aim was to shed further light on the role of aggressiveness while emphasizing the intricate relationship between individual traits and political hostility across different communication mediums. Leveraging insights from pertinent psychological literature, we posited that there exists a positive correlation between an individual's level of aggressiveness and the intensity of hostility exhibited in their online and offline political exchanges.

However, contrary to our initial hypothesis, our empirical findings did not reveal a significant correlation between aggressiveness and the disparities in hostility observed across online and offline environments. This unexpected result challenges the conventional belief that heightened aggressiveness would lead to a discernible escalation in the severity of political conflicts, particularly in the context of online interactions characterized by increased anonymity and diminished accountability.

Furthermore, our study yielded a conclusion consistent with the original paper, indicating that the perceived severity of political conflicts online does not necessarily surpass that of offline discussions. Additionally, individuals with aggressive tendencies did not demonstrate

a statistically significant difference in their perception of hostility on these digital platforms compared to non-aggressive participants.

In summary, our replication study contributes to the growing understanding of the dynamics between individual aggressiveness and political hostility, highlighting their influence on discussions across both online and offline arenas. Importantly, it underscores the nuanced nature of these relationships, suggesting that even among more aggressive internet users, the impact of aggressiveness on the divergence in hostility between online and offline environments may not be statistically significant. This nuanced perspective challenges the notion that digital platforms inherently exacerbate political confrontations, emphasizing instead the pivotal role of inherent individual traits in shaping the discourse tone, irrespective of the communication medium.

4.1 Limitation

Firstly, as mentioned earlier, the data used in this study comes from the original data of Bor Alexander and Michael Bang Petersen's research. Although they collected over 4800 survey results from the United States and Denmark, the data from Denmark amounted to only about one thousand, while the data from the United States overwhelmingly dominated with around 3800 responses. Despite the data from the United States being used extensively, the imbalance in sample sizes between the two countries may lead to errors in the overall data results. This is because the United States was characterized as a high-polarization, high-conflict, low-trust, and low-participation country, while Denmark was described as a low-polarization, low-conflict, high-trust, and high-participation country (Nelson Michelle R. 2002), and researchers believed that these opposite characteristics could make the results representative of a wider range of applications. In fact, we also verified this point in the results, in online and offline political discussions, the hostility level of the American sample was significantly higher than that of the Danish sample. Therefore, the unequal sample sizes of the United States and Denmark may bias the research results towards the political discussion environment in the United States.

Secondly, the data collection method, which is questionnaire, may also affect the accuracy of the survey results. Firstly, as a form of survey that allows respondents to fill in voluntarily, the questionnaire can only collect subjective answers from respondents, without objective evaluation. For example, in the question "Are you an even-tempered person," the respondent may actually have a quick temper, but subjectively believes that they are a calm person, and the questionnaire can only yield "even-tempered" as a result. Although there's one question asking for comments from the others – "My friends say that I'm somewhat argumentative.", this is not enough to reflect other people's objective views. Secondly, although the survey was posted on various websites, not limited to a single social media platform, data was not collected both in online and offline environment, which could introduce sampling bias. Moreover, when respondents see the survey information online and voluntarily participate in the survey, individuals who are more relevant to the survey information and those with specific personalities may be more inclined to participate in the survey, rather than closing the webpage. (Imagine

someone who afraid of inconvenience seeing a survey, they are more likely to ignore it than participate in filling it out.) Therefore, when online surveys are sent to people we don't know, and when only some people choose to take part spontaneously, the survey results might not be very reliable (Andrade 2020).

4.2 Next step

In future research, we can make the following improvements in data collection to increase the reliability of the results: Firstly, in addition to the United States and Denmark, we can involve other countries with different political characteristics in the survey and maintain a similar sample size for each country. Secondly, apart from distributing surveys online, we can also distribute the same questionnaire offline to collect data from both online and offline environments simultaneously. Thirdly, we can try to include more questions that collect objective data and compare others' evaluations of the respondents with the respondents' self-evaluations. If there is a significant difference, we may consider excluding the data.

Furthermore, in this study, we found that the level of aggression does not affect the hostility exhibited by individuals in online and offline political discussions. Therefore, we will explore other factors that may contribute to the difference in hostility between online and offline discussions. Additionally, since we obtained the same results as the original paper, that is there is no significant difference in hostility between online and offline political discussions, we can also investigate the interesting question: if there is no difference in hostility between online and offline discussions, why do people generally perceive online discussions as more hostile? This will be an important direction for our future research.

5 Appendix

The full questionnaire:

Online hostility battery

Now please think about the past 30 days, specifically. How often did the following happen to you in political discussions that occur on the Internet, including social media and comments sections?

1. I post or share political content or comments, which get flagged or deleted for violating the site's guidelines.
2. I get banned or blocked from a website for posting or sharing political content or comments, which violate the site's guidelines.

3. I post or share political content or comments, which I later regretted or felt ashamed of.
4. I post or share political content or comments, which could be taken as offensive or aggressive.
5. I post or share political content or comments, which could be taken as a threat or harassment.
6. [In S2 & S3] I had a difficult time tempering my emotions.

Please think about the past 30 days, specifically. How often did the following happen to you in text-based political discussions that occur on the Internet, such as on social media or in comments sections?

1. I made fun of my political opponents.
2. I cursed a lot in a political discussion.
3. I made a comment in a political discussion that others may find hurtful.
4. In a conversation with like-minded people, we made insensitive remarks about our opponents
5. I participated in a political discussion that was aggressive, uncivil or hostile.
6. In the heat of a political discussion, I got out of control.
7. I humiliated or bullied others for their political views or actions.
8. I threatened or harassed my political opponents.

Offline hostility battery

Now please think about the past 30 days, specifically. How often do the following happen to you in political discussions that occur face-to-face? 1. I make political comments, which I later regret or feel ashamed of. 2. I make political comments, which could be taken as offensive or aggressive. 3. I make political comments, which could be taken as a threat or harassment. 4. [In S2 & S3] I had a difficult time tempering my emotions.

Please think about the past 30 days, specifically. How often did the following happen to you in political discussions that occur in a conversation, where you could hear and see the other person?

1. I made fun of my political opponents.
2. I cursed a lot in a political discussion.
3. I made a comment in a political discussion that others may find hurtful.
4. In a conversation with like-minded people, we made insensitive remarks about our opponents
5. I participated in a political discussion that was aggressive, uncivil or hostile.
6. In the heat of a political discussion, I got out of control.
7. I humiliated or bullied others for their political views or actions.
8. I threatened or harassed my political opponents.

Talking about politics

[Offline] How often do you talk about politics or public affairs face-to-face, with the following? [Online] How often do you talk about politics or public affairs on the Internet, with the following? 1. Family and friends 2. Co-workers and acquaintances 3. Strangers 4. People who agree with me 5. People who disagree with me

Perception batteries

[Offline] How often do you experience the following in face-to-face political discussions? [Online] How often do you experience the following in political discussions that occur on the Internet?

1. My discussion partner does not allow me to drop the discussion, even though I would like to
2. I ruminate over the content of a discussion after it is over
3. I spend a lot of energy during a discussion to ruminate over the arguments that are being made or that I should make
4. People involve me in a discussion that I do not feel like having
5. I continue a discussion even though I do not enjoy it
6. A discussion is quickly over
7. When we cannot agree, we just switch to talking about something else
8. When my discussion partner says something that might be offensive, he or she apologizes

Witnessing hostility

[Offline] How often do the following happen to you in political discussions that occur face-to-face? [Online] How often do the following happen to you in political discussions that occur on the Internet?

1. I am offended or insulted by someone.
2. I witness that someone I know is offended or insulted by someone.

3. I witness that someone I do not know is offended or insulted by someone.

Difficulties in Emotion Regulation Scale

How much do you disagree or agree with the following statements?

1. When I'm upset, I feel ashamed at myself for feeling that way.
2. When I'm upset, I become angry with myself for feeling that way.
3. When I'm upset, I have difficulty focusing on other things.
4. When I'm upset, I have difficulty getting work done.
5. When I'm upset I lose control over my behaviors.
6. I experience my emotions as overwhelming and out of control.
7. I pay attention to how I feel.
8. When I am upset, I take time to figure out what I'm really feeling.
9. When I'm upset, I believe there is nothing I can do to make myself feel better.
10. When I'm upset, I believe that wallowing in it is all I can do.
11. I have difficulty making sense out of my feelings.
12. I have no idea how I am feeling.

Status Driven Risk Taking Scale

How much do you disagree or agree with the following statements?

1. I would rather live as an average person in a safe place than live as a rich and powerful person in a dangerous place.
2. I would enjoy being a famous and powerful person, even if it meant a high risk of assassination.
3. If the pay was really high, I would be willing to work with extremely explosive materials.
4. I would risk my life for a good chance of finding a huge amount of buried treasure.
5. If I could become rich and famous by winning a major competition, I would put my life on the line to win it.
6. I would like to live in a country where people who take huge risks have the chance to gain superior social status.
7. No matter how good the pay of perks; I would not want to be a spy who takes very dangerous assignments.
8. I would rather live a secure life as an ordinary person than risk everything to be at the top.
9. For a very high-status job, I would be willing to live in a place that had an extremely high crime rate.
10. I would take a very high-status job even if I had to live in a place where there are many deadly diseases.
11. I would volunteer for a risky medical experiment if it paid me enough to retire early.
12. Being an organized crime boss would be far too dangerous for me.
13. To become a billionaire, I would be willing to trade 10 years from my life expectancy.
14. I would not go to a warzone even if the business opportunities were extremely profitable.

Trait aggression

How much do you disagree or agree with the following statements?

1. I have trouble controlling my temper.
2. I am an even-tempered person.
3. Sometimes I fly off the handle for no good reason.
4. Given enough provocation, I may hit another person.
5. There are people who pushed me so far that we came to blows.
6. If I have to resort to violence to protect my rights, I will.
7. I tell my friends openly when I disagree with them.
8. When people annoy me, I may tell them what I think of them.
9. My friends say that I'm somewhat argumentative.
10. Other people always seem to get the breaks.
11. I sometimes feel that people are laughing at me behind my back.
12. When people are especially nice, I wonder what they want.

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