Research Article

Exploring Denial Strategies against Climate Change across Agents and Media Platforms

Isyaku Hassan [1]
 0000-0002-8260-2894

Rabiu Muazu Musa [2*]
 0000-0001-5332-1770

Mohd Nazri Latiff Azmi [1]
 0000-0002-4712-5332

Mohamad Razali Abdullah [3]
 0000-0002-7608-2458

Adekunle Daoud Balogun [4]
 0000-0003-4992-993X

[1] Faculty of Languages and Communication, Universiti Sultan Zainal Abidin, MALAYSIA
[2] Centre for Fundamental and Continuing Education, Universiti Malaysia Terengganu, MALAYSIA
[3] East Coast Environmental Research Institute, Universiti Sultan Zainal Abidin, MALAYSIA
[4] Faculty of Law and International Relations, Universiti Sultan Zainal Abidin, MALAYSIA
* Corresponding author: rabiu.muazu@umt.edu.my

ARTICLE INFO	ABSTRACT
	Climate change represents a highly detrimental issue with long-term undesirable consequences on global humanity. Whilst concerted efforts are being made to curtail the effects of climate change, disinformation continues to be a significant obstacle to meaningful actions. Therefore, via content analysis, this study aims to explore the strategies employed by agents to deny the scientific evidence of climate change across media platforms. The data were gathered from a sample of two Malaysian online newspapers: *The Star* and *New Straits Times*. A total of 124 articles on climate change disinformation were gathered from the digital archives of the selected newspapers between August 2015 and October 2021 using "disinformation" and "climate change" as keywords. The data were analyzed using descriptive statistics and the Chi-square test. The findings revealed that politicians, organizations, and anonymous agencies use more strategies to deny climate change compared with other agents such as academics, business tycoons, and celebrities. Additionally, social media, broadcast media, and online news represent the most frequently used platforms to deny climate change. These outcomes suggest the critical role of politics in sabotaging the efforts against climate change disinformation. This study could provide governments and activists with useful information to help mitigate disinformation against climate change. **Keywords:** agents, climate change, denial strategies, disinformation, media effects

INTRODUCTION

As a highly detrimental issue, climate change has long-term undesirable consequences on global humanity (Loy et al., 2020; Strudwicke & Grant, 2020). While efforts are being made to mitigate the effects of climate change, "there have been countless incidents of human lives being at stake" due to climate change disinformation (Shu et al., 2020, p. 3). According to Lopez and Share (2020), one of the most dangerous kinds

of disinformation "being repeated in commercial media, social media, and now government-sponsored media is the denial of human-caused climate change" (p. 8). Unlike misinformation (unconscious falsehood), disinformation refers to false or misleading information spread deliberately to mislead or deceive (Bontcheva et al., 2020; Shu et al., 2020; Strudwicke & Grant, 2020).

As the climate change debate has been politicized (Pogson, 2021; Van der Linden et al., 2017), disinformation is a significant obstacle to taking meaningful and collective actions against the effect of climate change (Strudwicke & Grant, 2020). The processing of information becomes more challenging in this post-digital era (Cheng & Gonzalez-Ramirez, 2021). This phenomenon has created the prospect for communication researchers to advance research on media disinformation (Green et al., 2021). In essence, "research in the domain of disinformation detection and related fields has gained momentum, and different aspects of the problem are being approached by researchers from different perspectives" (Shu et al., 2020; p. 1). Policymakers have also reflected on climate change as they debate its scientific and non-scientific sources of information, activism, and deniability (Green et al., 2021).

Additionally, different strategies are employed by agents to convey disinformation across various media platforms (Bontcheva et al., 2020). As people depend on media for information (Azmi et al., 2015; Taylor & Johnston, 2020), exploring the various strategies used by agents to convey climate change disinformation becomes crucial. In Malaysia, a few studies focused on how the media, particularly newspapers, report the issue of climate change in terms of trends and coverage (Azmi et al., 2015). However, as digital media platforms continue to grow, understanding how agents of climate change disinformation use different media outlets becomes necessary. Therefore, via a content analysis of selected Malaysian online newspapers, this study aims to explore the various strategies and media platforms used by agents to convey climate change disinformation. The analysis was guided by the central hypothetical viewpoint of the sociotechnical model of media effects. As described by Marwick (2018), this model can be used to understand how disinformation spreads.

Malaysia's *The Star* and *New Straits Times* were considered in this study. It is worth noticing that our purpose was to collect data about climate change disinformation from the chosen newspapers. This is because newspapers are recognized as a strong source of data used by researchers to support decision-making for various purposes (Hassan et al., 2020a). Also, online newspaper content has been considered as a practical means through which information about climate change can be accessed as newspapers tend to cover various local and global issues of climate change (Azmi et al., 2015). It was envisaged that the findings of this study could provide relevant authorities, including climate change activists, with useful information to help mitigate disinformation about global climate change.

MEDIA, AGENTS AND DENIAL STRATEGIES OF CLIMATE CHANGE

Whilst different strategies are employed by agents to convey disinformation, research has demonstrated how people's perceptions of climate change are influenced by how the issue of climate change is presented, usually via different platforms (Bontcheva et al., 2020; Carvalho & Burgess, 2005; Cheng & Gonzalez-Ramirez, 2021; Schafer, 2012). For instance, Cheng and Gonzalez-Ramirez (2021) used a survey method to investigate students' trust in traditional media outlets as sources of information about climate change. The findings indicated that students are doubtful about the consistency of climate change information obtained from media outlets, including *The Washington Post*, *Fox News*, *Breitbart*, and *CNN*. This doubt regarding climate change news might occur as a result of excess disinformation, the use of cognitive heuristics, and the lack of digital literacy.

Additionally, various events occurring around the globe influence the trends and coverage of global climate change news (Azmi et al., 2015), and at times, confirmation bias within the socio-political environment (Cheng & Gonzalez-Ramirez, 2021). A study conducted by Taylor and Johnston (2020) revealed that people's views about climate change are shaped by the media, including traditional news outlets such as television and newspapers as well as online media platforms and social media. However, in public discourse, disinformation is more intimately linked to social networks and digital platforms than other forms of communication channels (Kuo & Marwick, 2021). According to Cheng and Gonzalez-Ramirez (2021), advances in communication technology have caused mistrust in different news media outlets generally.

Moreover, climate change denialism is deep-rooted in public views, which represents the most common issue connected with climate change disinformation (Strudwicke & Grant, 2020). This phenomenon continues to occur because disinformation campaigns by individuals, and even organizations, have promoted the idea of climate skepticism. Besides, climate change denials become difficult to address once they have been integrated into individuals' worldviews due to certain cognitive psychological processes. However, as pointed out by Strudwicke and Grant (2020), "climate activism is becoming increasingly common worldwide and is often emotionally charged stemming from narratives of negative effects and fear for the future" (p. 3).

As people depend on media to understand information on various phenomena such as environmental issues (Azmi et al., 2015; Taylor & Johnston, 2020), analyzing how various agents convey climate change disinformation using different media outlets is crucial. Also, as pointed out by Cummings and Kong (2019), the ability to quickly identify despicable agents can help to restrain the spread of disinformation. These agents of disinformation are of diverse backgrounds (Ong & Cabanes, 2018). As such, this study explores the agents' identities, strategies, and the various media platforms they use to convey climate change disinformation. As mentioned by Green et al. (2021), identifying the sources can help to mitigate climate change disinformation.

Theoretical Viewpoint

To identify the characteristics of agents and the means through which they convey climate change disinformation, we adopt the sociotechnical model of media effects as described by Marwick (2018). This model, among other suppositions, examines "actors to understand group identity and media" (Marwick, 2018, p. 488). Various elements, such as information sources, media, content, and context collectively generate communication effects. While media effect theories such as framing and agenda-setting emphasize how news construction or media coverage influence people's opinions about particular issues (McCombs & Shaw, 1972; Iyengar et al., 2004), the sociotechnical model of media effects considers the role of individual agents in constructing and spreading media messages (Marwick, 2018). Based on this central theoretical viewpoint, we argue that agents tend to spread climate change disinformation using various strategies across different media platforms. This investigation is performed using content analysis (Hsieh & Shannon, 2005) as explained in the following sections.

METHODOLOGY

This study employed a quantitative content analysis method to investigate climate change disinformation across agents and media platforms. The content analysis approach was chosen due to its strength in generating a variety of data from media content. This approach also involves text-based media content and allows for quantitative analysis (Hsieh & Shannon, 2005; Oleinik, 2011). Additionally, content analysis is a reliable method based on evidence, as opposed to other techniques such as discourse analysis (Weaver, 2007). The content analysis summarizes texts and other media content through both emerging themes and existing categories to test or generate a theory (Cohen et al., 2002).

Data Collection

The data were gathered from two major English newspapers in Malaysia: *The Star* and *New Straits Times*. Although these newspapers are national dailies, they tend to report climate change issues both nationally and globally (Azmi et al, 2015). Thus, a variety of data about climate change disinformation could be accessed via the selected newspapers. Also, the chosen newspapers exist on digital platforms, which enables them to reach a global audience. As such, news articles focusing on climate change disinformation were gathered from the digital archives of the selected media outlets between August 2015 and October 2021. This time represents the current period of climate change debate across the globe. Additionally, the time frame enables us to generate data with manageable scope.

The newspaper articles were gathered using "disinformation" and "climate change" as search keywords. All newspaper articles accessed using this technique were included in the analysis. Likewise, only straight news and feature articles were identified for analysis. Overall, 124 articles focusing on climate change disinformation were gathered. This study considers digital news content because readers can access digital news at any time (Chung, 2008; Hassan & Azmi, 2018). Also, as mentioned earlier, newspapers are seen as a

robust source of data compared with conventional datasets (Hassan et al., 2020b). Although media messages are seen as qualitative data, they can be quantified through content analysis (Hsieh & Shannon, 2005).

Coding Procedure and Reliability Analysis

At the preliminary stage, each newspaper article in the sample was read to determine its relevance based on texts and headlines. The textual content of each article was considered and coded through a hierarchical code scheme. This scheme helps produce a vast amount of data in a few figures (Hassan et al., 2020b). Afterward, an Excel database was created with three categorical variables: agents of disinformation, denial strategies of climate change, and media platforms. The denial strategies of climate change were explored in relation to the various forms of disinformation enumerated by Wardle and Derakhshan (2018):

1. presenting comment as fact;
2. distorting genuine evidence;
3. presenting false evidence;
4. presenting false context;
5. presenting conflicting evidence; and
6. impersonating genuine sources.

For reliability, an inter-coder test was performed by two independent coders. Since two coders were involved in the reliability analysis, the inter-coder agreement was ascertained using Cohen's kappa test as proposed in prior research (Krippendorff, 1980). The outcomes obtained from the inter-coder analysis showed a Cohen's kappa agreement of 1.000 except for denial strategies which revealed 0.96. Cohen's kappa is an established reliability technique for content analysis (Cohen et al., 2007). Besides, the newspaper articles were double-checked to avoid double entry of data. Likewise, the emergent themes were validated to avoid duplication of data. Precisely, we aimed to investigate denial strategies of climate change across agents and media platforms using content analysis. This approach involves subjective decisions, but inter-coder reliability enabled us to attain a logical analysis.

Data Analysis

Chi-square analysis is used in the current study to examine the occurrences of climate change denial strategies with respect to agents and media platforms as reported by the selected media outlets. Essentially, the test is applied to analyze the aforementioned variables based on the incidences of disinformation: Denial strategies vs. agents of disinformation as well as denial strategies vs. media platforms. The Chi-square is employed in the current investigation due to its robustness in the analysis of categorical data. It is worth highlighting that the chi-square test considers counted and classified datasets. As a result, the test will not operate with numeric data that is parametric or continuous. Thus, the data set required to conduct the Chi-square test should be in the form of frequency, i.e., count datasets, rather than percentages, percentiles, or relative frequency (Musa et al., 2021).

FINDINGS

A total of 124 articles on climate change disinformation were analyzed. The first objective of this study was to explore how various agents use different denial strategies to convey climate change disinformation. As mentioned earlier, the denial strategies considered in this study are: presenting comment as fact; distorting genuine evidence; presenting false evidence; presenting false context; presenting conflicting evidence; and impersonating genuine sources. **Table 1** presents the analysis of denial strategies across agents various.

Table 1 tabulates the frequencies of denial strategies employed by different agents of disinformation. It could be observed that various denial strategies are utilized by different agents. Nonetheless, there are statistically significant differences between the agents regarding the frequencies of the denial strategies employed (p<0.002). It could be noticed from the table that politicians (37.90%), anonymous agencies (23.40%), and organizations (19.40%) more frequently apply denial strategies in the quest of sharing disinformation as compared with academics (8.10%) and netizens (6.50%). On the other hand, celebrities and

Table 1. Denial strategies and agents of disinformation

Denial strategy	Agents of disinformation [F (%)]							Total (F)
	P	N	O	A	B	C	AS	
Presenting comments as fact	16 (38.10)	1 (2.40)	10 (23.80)	3 (7.10)	0 (0.00)	1 (2.40)	11 (26.20)	42
Distorting genuine information	5 (33.30)	0 (0.00)	1 (6.70)	0 (0.00)	0 (0.00)	2 (13.30)	7 (46.70)	15
Presenting false evidence	13 (39.40)	4 (12.40)	6 (18.20)	5 (15.20)	0 (0.00)	0 (0.00)	5 (15.20)	33
Presenting false context	2 (25.00)	1 (12.50)	1 (12.50)	0 (0.00)	0 (0.00)	0 (0.00)	4 (50.00)	8
Presenting conflicting evidence	11 (57.90)	0 (0.00)	5 (26.30)	0 (0.00)	2 (10.50)	0 (0.00)	1 (5.30)	19
Impersonating genuine sources	0 (0.00)	2 (28.60)	1 (14.30)	2 (28.60)	1 (14.30)	0 (0.00)	1 (14.30)	7
Overall total (%)	37.90	6.50	19.40	8.10	2.40	2.40	23.40	124

Note. P: Politician; N: Netizen; O: Organization; A: Academic; B: Businessmen; C: Celebrity; & AS: Anonymous
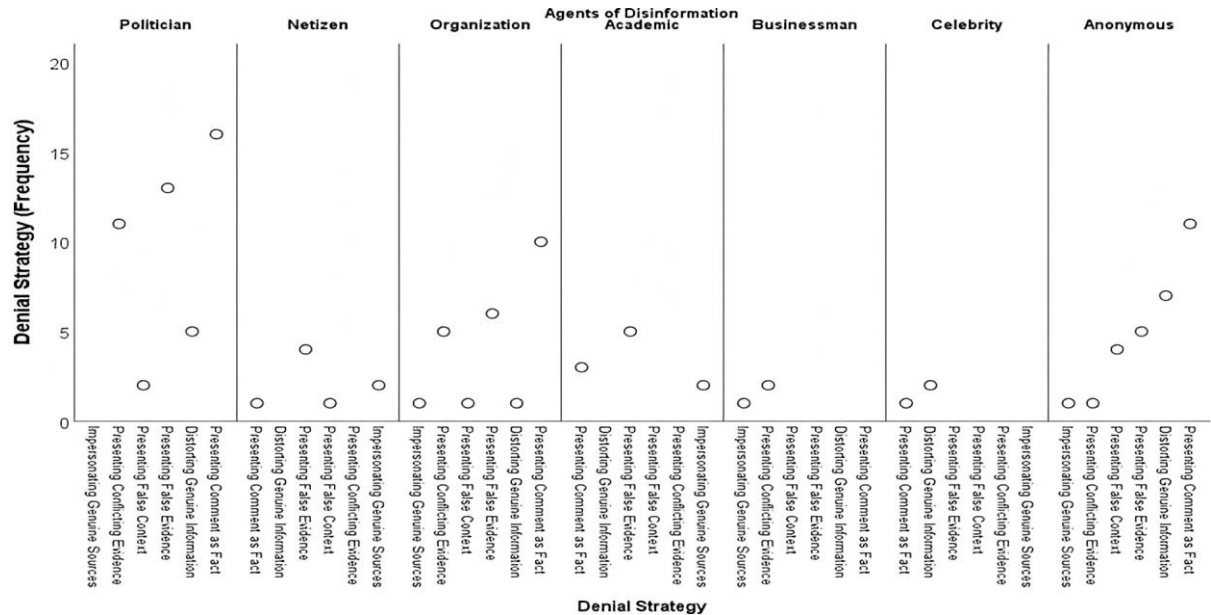

Figure 1. Types and frequency of denial strategies used by various agents of disinformation

businessmen are observed to be less frequently engaging in denial strategies about climate change as both recorded 2.40%. **Figure 1** illustrates the denial strategies used by various agents of disinformation.

As shown in **Figure 1**, certain denial strategies, such as presenting comments as fact, distorting genuine information, presenting false evidence, presenting false context, as well as presenting conflicting evidence are mostly attributed to politicians. Anonymous agencies and organizations are also observed to employ all the denial strategies examined in the study. On the other hand, academics are characterized by presenting comments as facts, presenting false evidence, and impersonating genuine sources as denial strategies. Additionally, netizens appear to present comments as facts, presenting false evidence and context as well as impersonating genuine sources. Businessmen are found to be inclined in employing the presentation of conflicting evidence and impersonating genuine sources whilst celebrities present comments as facts as well as distort genuine information as a means of their denial strategies. The second objective of this study was to explore the denial strategies of climate change across media platforms. This outcome is depicted in **Table 2**.

Table 2 projects the distribution of climate change denial strategies with regards to media platforms. It could be observed that various media platforms are used to convey disinformation about climate change using different strategies. However, there are significant differences in the number of denial strategies conveyed by agents as demonstrated by the Chi-square analysis (p<0.001). It could be seen from the table that social media (54.0%), broadcast media (16.9%), and online news platforms (16.1%) are more likely to be used in conveying several denial strategies as compared with print media (2.4%) and unidentified platforms (10.5%). Print media are the least media platforms utilized in sharing disinformation (2.40%). Additionally, presenting comments as fact (33.9%); presenting false evidence (26.6%); presenting conflicting evidence (15.3%) characterize the most frequently used denial strategies against climate change. Nevertheless, impersonating genuine sources represents the least used denial strategy (5.6%).

Table 2. Denial strategies and media platforms

Denial strategies	Media platforms [F (%)]					Total
	SM	BM	PM	ON	U	
Presenting comments as fact	25 (20.2)	5 (4.0)	0 (0.0)	7 (5.6)	5 (4.0)	42 (33.9)
Distorting genuine information	9 (7.3)	6 (4.8)	0 (0.0)	0 (0.0)	0 (0.0)	15 (12.1)
Presenting false evidence	16 (12.9)	8 (6.5)	0 (0.0)	7 (5.6)	2 (15.4)	33 (26.6)
Presenting false context	3 (4.5)	1 (0.8)	0 (0.0)	4 (3.2)	0 (0.0)	8 (6.5)
Presenting conflicting evidence	9 (7.3)	0 (0.0)	2 (1.6)	2 (1.6)	6 (4.8)	19 (15.3)
Impersonating genuine sources	5 (4.0)	1 (0.8)	1 (0.8)	0 (0.0)	0 (0.0)	7 (5.6)
Total	67 (54.0)	21 (16.9)	3 (2.4)	20 (16.1)	13 (10.5)	124 (100)

Note. $\chi^2(20)=44.851$; p=0.001; SM: Social media; BM: Broadcast media; PM: Print Media; ON: Online news; & U: Unidentified

DISCUSSION

Through content analysis, this study has achieved several outcomes regarding climate change disinformation. First, the findings reported in this study revealed the identities of agents who employ various strategies to deny climate change. According to the findings, politicians, organizations, and anonymous agencies are more likely to deny climate change using different strategies compared with other agents such as academics, business tycoons, and celebrities. This outcome supports previous assertions that politics represents a critical factor in sabotaging the desired efforts to mitigate climate change disinformation (Pogson, 2021; Schafer, 2012). According to Pogson (2021), the issue of climate change denial is largely political, and thus, political action is needed to safeguard efforts toward climate change activism.

Second, this study found that social media, broadcast media, and online news platforms are more likely to be used in conveying several denial strategies as compared with print media and unidentified platforms. As discovered in this study, *Facebook*, *YouTube*, and *Twitter*, are more frequently used, followed by broadcast media such as *BBC Radio*. This outcome also concurs with the fact that social media and digital platforms are more likely to be used by agents of disinformation compared to traditional media outlets (Kuo & Marwick, 2021; Strudwicke & Grant, 2020). This consistency proves the usefulness of online newspapers as a source of data for researchers and scientists. According to Taylor and Johnston (2020), social media tend to support either side (advocates or deniers) of the global debate on climate change. Additionally, Shu et al. (2020) emphasized that the formation, distribution, and consumption of "fabricated content on social media is a growing concern, especially with the ease of access to such sources, and the lack of awareness of the existence of such false information" (p. 1).

Moreover, the findings of this study concur with the assumption of the sociotechnical model that various elements, including information sources and media platforms, collectively generate communication effects (Marwick, 2018). Considering this assumption, individual agents play a critical role in creating and spreading disinformation. As digital media platforms continue to grow, understanding how agents of climate change disinformation use different media outlets becomes necessary. According to the findings of this study, agents are less likely to use print media for climate change disinformation compared with social media platforms, which could be due to the rigorous standards employed by traditional media to validate sources (Strudwicke & Grant, 2020). To mitigate climate change disinformation, sources of disinformation must be taken seriously (Green et al., 2021). In this regard, some studies emphasized the need for education, particularly digital literacy, as a vital means through which society can be protected against the spread of climate change disinformation (Lopez & Share, 2010; Strudwicke & Grant, 2020).

CONCLUSION

This study explored the denial strategies against climate change employed by various agents across different media platforms from the central hypothetical principle of the sociotechnical model of media effects. The study revealed that politicians, organizations, and anonymous agencies use more strategies to deny climate change compared with other agents such as academics, business tycoons, and celebrities. Additionally, social media, broadcast media, and online news platforms are more likely to be used by agents as compared with print media and unidentified platforms. These outcomes concur with the sociotechnical

model of media effects which presumes that various elements such as agents and media, especially social media platforms, collectively communicate media effects.

According to this study, politics plays a critical role in sabotaging the efforts against climate change disinformation. Thus, there is a need for the collective efforts of governments, media practitioners, and activists to curtail the phenomenon of climate change disinformation. This study advances our understanding of how agents of disinformation use various strategies to deny the scientific evidence of climate change across different media platforms. The study also proves the significance of online newspapers as a source of data for researchers and practitioners. However, this study is limited to a content analysis of data gathered from a selected sample of two newspapers. Thus, further research may consider a large sample to provide more generalizable outcomes.

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