A Corpus-Assisted Discourse Analysis Case Study of Public Opinion on Climate Change in Malaysia

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ABSTRACT

Climate change is a global emergency that necessitates urgent action from policymakers and the public. Public opinion plays a crucial role in shaping climate change policy, making it essential to understand how people perceive and respond to the issue. Studies on public opinion on climate change are emerging, but are lacking in examining linguistic aspects. The present study intends to conduct a linguistic analysis of public opinion news to identify public recommendations on climate change issues, by identifying themes in opinion news on climate change. The analysis focused on directive verbs and modal verbs, and examined how the general public linguistically expressed their recommendations. 136 news articles from the New Straits Times Malaysia were analysed using a corpus-assisted discourse analysis approach. The findings revealed that the dominant

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themes are   *government action,* followed by *education and awareness, protecting natural resources, encouraging sustainable lifestyle, transitioning to renewable energy,* and *reducing greenhouse gas emissions.* The public's overwhelming emphasis on *government action*, indicates a strong demand for policy restructuring and enactment to address climate change. While there is increasing awareness and interest in learning about climate change, the study raises concerns about the limited attention given to themes such as *encouraging sustainable living, protecting natural resources, transitioning to renewable energy,* and *reducing greenhouse gas emissions*, suggesting a need for further education and awareness campaigns to bridge these knowledge gaps and promote holistic climate action. The results provide insights into Malaysian public opinion on climate change, which can assist policymakers in developing effective policies and communication strategies.

Keywords: climate change; Malaysian public opinion; corpus-assisted discourse studies; thematic analysis; opinion news

INTRODUCTION

Remarkable economic growth has come at an environmental cost, including climate change, attributed to increased industrialization and excessive consumption, impacting weather patterns globally. This reckless approach has triggered shifts in our global climate, such as industrialization in many countries that has increased the demand for energy and resources (Zhang et al., 2022). The overconsumption of goods and services by the affluent segments of society has also generated enormous amounts of waste and pollution. This phenomenon entails prolonged alterations in the typical weather trends across local, regional, and worldwide scales. Europe recently faced a severe heatwave, such as the recent heat wave in Europe that recorded temperatures above 45°C in parts of Greece, eastern Spain, Sardinia, Sicily and southern Italy, in July 2023 (https://www.bbc.com/news/science-environment-58073295).   Such environmental challenges are driving public awareness and the need for ecological preservation. The adverse environmental conditions also cause health problems and increase the public's awareness of the need for ecological preservation.

Climate change is a prevalent issue on which not only the scientific world is pondering over, rather eco linguists are also trying to add solutions with linguistic assistance (Grimm et al., 2008). Ecolinguistics explores the relationship between language, communication, and the environment. It focuses on how language reflects and influences our understanding of the natural world, ecosystems, and environmental issues (Zhou, 2021).

Climate scientists strive to understand climate change, but comprehending public perspectives is also equally important. Language wields transformative power, shaping our perceptions and even reality itself, as Moeller notes (1998, in Kruger, 2016). Language shapes our thoughts, ideologies, worldviews, and behaviors. Therefore, this far-reaching influence extends to our interactions and environmental actions, positioning language as a potential tool for promoting environmental sustainability and safeguarding ecosystems. This study explores public recommendations on climate change in Malaysia through corpus analysis of opinion-based news articles. This will be achieved through corpus analysis of data obtained from a curated selection of opinion-based news articles. The term "public" refers to collective societal awareness, while "opinion" covers expressed viewpoints and behaviors of evaluative significance (Noelle-Neumann, 1991). Public opinion significantly shapes climate change discourse (Jaspal et al.,

2013), encompassing diverse beliefs, concerns, and suggested actions (Shwom et al., 2015). Understanding this dynamic and multifaceted concept is essential for a comprehensive grasp of responses to climate change. The methodology section will detail the selected news sources for this analysis. This study also adopted a discourse theoretical perspective, which views discourse as language used in social practices. Discourse analysis examines and determines the connections among language, structure and agency, and how they shape social reality and knowledge production.

LITERATURE REVIEW

With climate change is gaining increasing prominence, public exposure to related news has also surged. Photiou et al. (2017) argue that media acts as a "public sphere" in shaping societal understanding, actively influencing public opinion. However, the effectiveness of climate change measures depends on public perspectives (Dahal et al., 2019). Furthermore, public opinion significantly shapes attitudes toward climate change adaptation and mitigation (Cvetković & Grbic, 2021; Dahal et al., 2019; Molina et al., 2021). Therefore, understanding public opinion is vital for policymakers and policy developers as they develop effective strategies to address environmental concerns.

The present study focused on the use of directive and modal verbs in opinion news. Directive verbs in English opinion texts mirror cultural values and discourse practices. Oktavianti (2020) analyzed directive verbs in The Jakarta Post's opinion articles and found a strong correlation between text features and verb selection. Modal verbs, as identified by Biber and Quirk (2012), are linguistic features used to convey different concepts in academic discourse. Oktavianti (2019), on the other hand, discovered that these modal verbs are more commonly employed in news texts than academic discourse.

Multiple studies have investigated public opinion regarding climate change across diverse domains (Pisasrski et al. 2013; Voskaki & Tsermenidis, 2015; Lorencová et al. 2019; Brooks & Ebi et al. 2021; Yu et al. 2021). Brooks and Ebi (2021) examined public reactions to climate change mitigation through warning labels on gas pumps. Findings indicate that these labels activate climate concern norms, encouraging support for sustainable transportation policies. The labels also boost public self-efficacy concerning climate change. Pisasrski and Ashworth (2013) explored public attitudes toward climate-mitigating energy technologies. The citizen round tables approach indicates an increased understanding and interest in climate-mitigating energy technologies, particularly among less informed participants. Yu et al. (2021) assessed public water literacy in Taiwan and found that respondents had good knowledge of water literacy, but limited action on climate-related water resource issues. Earlier studies highlight that while the public has some climate awareness, research on their opinion remains vital. This underlines the need for further research into the public's opinion of climate change.

STATEMENT OF THE PROBLEM

The media and climate campaigns significantly influence public perception of climate change, affecting individual and collective actions. Carvalho (2010) underscores the media's role in shaping societal views, and Hase et al. (2020) describe climate discourse as complex. To develop effective climate mitigation and adaptation strategies, understanding public opinion is crucial (Lorencová et al., 2019; Dahal et al., 2021). Research on public opinion in Serbia, as noted by

Cvetković and Grbic (2021), highlights a lack of studies on the processes and causes of these perceptions. Moreover, current knowledge about public climate solutions opinions remains limited (Schmid & Guinaudeau, 2022) as existing research mainly focuses on problem perception rather than how opinions drive specific climate solutions (Jenkins-Smith et al. 2020; Levi, 2021).

In the Malaysian context, limited research explores media representations of climate change. Nor Jijidiana et al. (2015) and Han et al. (2017) conducted content analysis of climate change news coverage. The former analysed four Malaysian newspapers between 2008 and 2010 and found global climate events influence media coverage. The latter identified six frames in five Malaysian mainstream Chinese newspapers. Other past studies examine climate literacy, focusing on elements like socio-demographics (Wan Nur Syamilah & Nasuha, 2021) and recycling awareness (Chea et al., 2021) among Malaysians.

Zalina Mohd Daud et al. (2015) and Haliza Abdul Rahman (2018) conducted past studies that underscore the public's vital role in addressing climate change in Malaysia. Tasha Erina Taufek et al. (2021; 2022) examined public awareness and news themes in The Sun Daily and Malaysiakini, revealing awareness among the public, but a lack of urgency among Malaysians and decision-makers. Another study (Tasha Erina Taufek et al., 2022) prioritized governance, mitigation, adaptation, contributors, impacts, and threats in news themes. A Monash University survey (2023) confirmed Malaysians' concerns and efforts in changing behaviors, recommending further incentives like home solar panels and composting for climate change solutions.

Past studies underscore the public's role in addressing climate change because the public's contribution has the potential to drive significant change in addressing the increasing challenges and hazardous impact of climate change. Therefore, the present study is timely as it focuses on public recommendations on climate change within the Malaysian context. Language influence on behavior and issue perception makes it crucial for this study, as it delves into how climate change narratives are framed. The words used directly impact issues on climate change.

To reiterate, this study specifically concentrates on directive and modal verbs, as verbs are indicative of mental actions, occurrences, and states of being. The data for the study is derived from opinion news, where "opinion" includes expressed viewpoints, audible expressions, and observable behaviors related to matters of evaluative significance (Noelle-Neumann, 1991). This type of data effectively captures the essence of directive and modal verbs. In English syntactic construction, verbs are salient since there will be no grammatical construction without verbs.

This study addressed the following objectives:

1. To identify themes in public recommendations based on public opinion news on climate change issues by analysing the usage of directive verbs and modal verbs;
2. To examine how the public expressed their recommendation through linguistics resources.

METHODOLOGY

This study adopted a Corpus-Assisted Discourse Studies (CADS) approach, as articulated by Partington (2010), who defines CADS as *"the investigation and comparison of features of particular discourse types, integrating into the analysis, where appropriate, techniques and tools developed within corpus linguistics"* (p. 88). Therefore, CADS involves the amalgamation of corpus linguistics and discourse analysis.

In line with CADS principles, this study employed a mixed-methods approach, incorporating both quantitative and qualitative methodologies. The quantitative facet of the

research hinged on corpus linguistics, specifically employing concordance analysis. By utilising corpus linguistics, we were able to scrutinize a vast collection of machine-readable texts. Conversely, qualitative methods were employed, encompassing thematic and discourse analyses. Thematic analysis was employed to systematically categorise opinion news data based on contextual criteria, while discourse analysis facilitated the comprehension of linguistic expressions within the data. Both of these analytical approaches involved manual procedures, ensuring a comprehensive examination that automated tools alone might not capture.

The integration of quantitative and qualitative methodologies in this study resulted in a multifaceted analysis that merged the computational efficiency of automated tools with the interpretive depth and contextual insight offered by human analysis. This methodological integration also ensured a thorough and robust investigation of public opinion discourse surrounding climate change, ultimately yielding a more nuanced and holistic comprehension of this phenomenon.

THE CORPUS

The data utilised in this study was drawn from a corpus, which is defined as *"a collection of natural texts compiled from written or spoken speech or writings, constructed for specific purposes, and is stored in digital format"* (Imran et al. 2021, p. 67). Being a case study, a corpus was developed specifically from Malaysian opinion news articles on climate change, sourced from the New Straits Times (NST), a prominent Malaysian online newspaper. NST was chosen for this study due to its prominent status as Malaysia's newspaper brand that has the highest readership based on Reuters Institute Digital News Report (Zaharom Nain, 2022). The choice of a newspaper as the data source aligns with the role of newspapers as a primary information source for the public on various topics (Stecula & Merkley, 2019), including climate change.

To identify relevant news articles, a deliberate keyword search was conducted using "climate change Malaysia." This specific choice of keyword aimed to maintain an explicit focused reference for locating pertinent articles. Other search terms, such as "natural disaster" and "global warming," were intentionally excluded to ensure a targeted scope and avoid an excessive number of repetitive news articles. These carefully selected search terms were well-suited to the study's objective of analysing the concept of climate change exclusively within the Malaysian context. This meticulous selection method contributed to a clear and purposeful approach to the data, enhancing the precision and validity of the analysis.

This study examined news articles spanning from 2015 to 2022. The choice of 2015 stems from the adoption of the Paris Agreement by UNFCCC parties at the end of that year, signalling the growing global attention to climate change (United Nations Climate Change, n.d.). The decision to include the year 2022 was influenced by a pivotal event in Malaysia's climate history. Towards the end of 2021, an extraordinary flash flood occurred, affecting multiple states, including Selangor, an area not conventionally prone to such flooding occurrences. (The Star. https://www.thestar.com.my/news/nation/2021/12/30/major-floods-mark-the-end-of-2021).

This study primarily focused on opinion news. Opinion news, as a subset of opinion pieces, inherently carries subjectivity. Thus, it was deemed fitting to use this source for understanding public sentiments on climate change issues. This approach aligns with Brooker and Schafer's (2015) recommendation, which underscores the effectiveness of opinion news in gauging public opinion. Thus, a total of 136 opinion news articles were gathered based on the mentioned parameters. The corpus encompassed 9,099-word types and 109,115-word tokens. A "token"

represents any occurrence of a specific wordform within the text, whereas a "type" refers to a distinct and unique wordform (McEnery & Hardie, 2011, p. 50). The ratio of the total tokens to the total types, known as the "type-token ratio," provides insight into the richness and diversity of vocabulary employed within the text. Detailed information on the sub-corpora is stated in table 1. As demonstrated in table 1, there is an increase on the number of opinion news on climate change since 2019 and the highest number of opinion news articles is in 2021.

TABLE 1. Description of NST's 2015-2022 sub-corpora

Sub-corpora	NST 2015	NST 2016	NST 2017	NST 2018	NST 2019	NST 2020	NST 2021	NST 2022
No. of News Articles	11	5	8	10	25	24	27	26
Types	3,044	1,468	2,403	2,984	4,810	4,809	5,426	4,743
Tokens	8,477	3,147	6,186	7,671	16,761	16,453	19,943	16,829
Type Token Ratios	0.359	0.466	0.388	0.389	0.287	0.292	0.272	0.282

RESEARCH PROCEDURE

During the data collection phase, the news articles underwent conversion into plain text (txt.) format to ensure compatibility with the corpus analysis tool employed in this study, namely *AntConc 4.2.0*. *AntConc* is a freeware, cross-platform, and versatile tool for corpus analysis (Anthony, 2005).
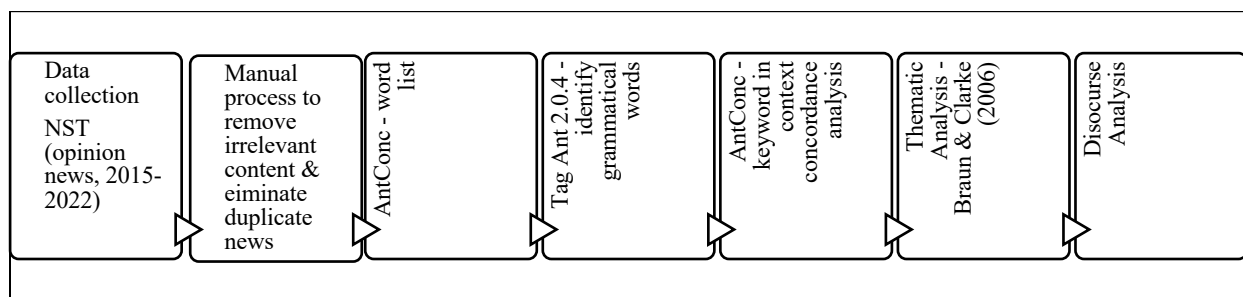
Figure 1 depicts the research procedure.

FIGURE 1. Research Procedure

PRE-PROCESSING DATA PROCEDURE

Subsequently, efforts were made to enhance data relevance. This involved a manual process to remove irrelevant content and eliminate duplicate news articles. It was essential to refine the dataset, as not all articles tagged with the keyword "climate change Malaysia" were centred on this issue. Some articles, despite the keyword association, did not primarily address climate change. Therefore, these articles were deliberately excluded, leaving only those directly addressing climate change. For example, articles in which climate change was mentioned in subordinate clauses, such as those referring to the Ministry of Energy, Science, Technology, Environment, and Climate Change (MESTECC), were not included in the analysis.

Next, the *AntConc* tool's wordlist feature was employed to gather essential information, including type, token counts, and the type-token ratio, aiding in the assessment of the corpus and its sub-corpus sizes. Additionally, the corpus underwent tagging using *TagAnt 2.0.4*, a freely

available tagging tool, to assign part-of-speech (POS) tags to every token within the corpus (Anthony, 2022). POS tags serve to identify the grammatical category of each word, encompassing nouns, verbs, adjectives, and other categories. This aids in ensuring accurate identification of verbs during subsequent analysis. To enhance the quality of the analysis, the wordlist range tool was utilised to filter out function words (commonly known as stop words in corpus linguistics), such as "the," "is," and "are," which carry minimal semantic significance (Raulji & Saini, 2017). This refinement process ensured that only content words were retained for further analysis.

CONCORDANCE ANALYSIS PROCESS

Subsequently, a concordance analysis was conducted in *AntConc* using its KWIC (keyword in context)/concordance feature. This feature provides a visual representation of how a search term is used in context, facilitating a comprehensive understanding of its usage within the target corpus (Anthony, 2005). It is worth highlighting that any concordance entries that did not pertain to climate change-related contexts were excluded from the analysis to enhance the relevance of the findings. To reiterate, the analysis focused on a list of modal verbs and associated modal expressions, as well as certain directive verbs, as the search terms. Modal verbs encompass a range of semantic notions, including possibility, necessity, ability, obligation, permission, and hypothetical scenarios (Collins, 2009). Speech Act theory (Austin, in Napoleon, 2018; Searle, 2000) classifies the functions of language into various speech acts is used in this study for linguistic analysis. In relation to modal verbs and directive verbs, Speech Act Theory provides a framework for understanding how these verbs function in communication. Speech Act Theory helps us understand the different functions of language, and how modal and directive verbs play a crucial role in performing the functions of semantic notions. The study focused on modal verbs and expressions, including "should," "can," "could," "may," "must," "might," "ought to," "need," and "has/have to," (Learn English Team, n.d.; British Council, n.d.; University of Cambridge, n.d.). However, only the following modal verbs appeared within the corpus: "should," "can," "could," "may," "must," "might," "ought to," "need," and "has/have to."

To further explore public recommendations on climate change issues, directive verbs were examined. Verbs like "suggest" and "recommend" were identified and various synonyms were obtained from Thesaurus.com (n.d.). Nevertheless, only six recommendation verbs, including "advocate," "encourage," "urge," "promote," "foster," and "propose," appeared in the corpus, emphasizing their significance in expressing public recommendations on climate change issues.

After completing the concordance analysis, discourse and thematic analyses were conducted concurrently. Thematic analysis precedes discourse analysis to categorize collocations into themes for later discourse analysis. The thematic analysis used an inductive approach, following Braun and Clarke's (2006) Six Phases of Thematic Analysis (Proudfoot, 2023). Braun and Clarke (2006) described thematic analysis as a method for identifying, analysing, and reporting patterns within collected data. It focuses on participants' experiences and meanings, or exploring how events, meanings, and experiences are influenced by societal discourses (Braun & Clarke, 2006). Discourse analysis involved a comprehensive examination of the contextualization of the targeted search terms within the corpus.

To establish coding reliability for the thematic analysis, two experienced qualitative experts from the National University of Malaysia were engaged in the process. Prior to rating, the raters were provided with a rating manual and comprehensive training. Each rater worked independently, exercising their judgment, and applying sub-codes as per the provided guidelines. Cohen's Kappa statistic (k = (po – pe) / (1 – pe)) was utilized as the statistical measure for this assessment. In this

context, 'po' represents the relative observed agreement among raters, while 'pe' denotes the hypothetical probability of chance agreement (Bobbit, 2022). In the initial round, the calculated Kappa was 0.4973, indicating a moderate level of agreement, which was deemed unsatisfactory. To address this, the research team and raters convened to address discrepancies and make necessary adjustments to refine ~~to~~ the rating process, guided by an updated set of instruction. As a result of these revision, a final agreement value of Kappa 0.6660 was achieved, indicating substantial agreement. This improved the level of reliability underscores the robustness of our results. Discourse and thematic analyses provided a nuanced and comprehensive insight into the public's recommendations related to the crucial subject of climate change. Figure 2 shows an overview of Braun and Clarke's Six Phases of Thematic Analysis.
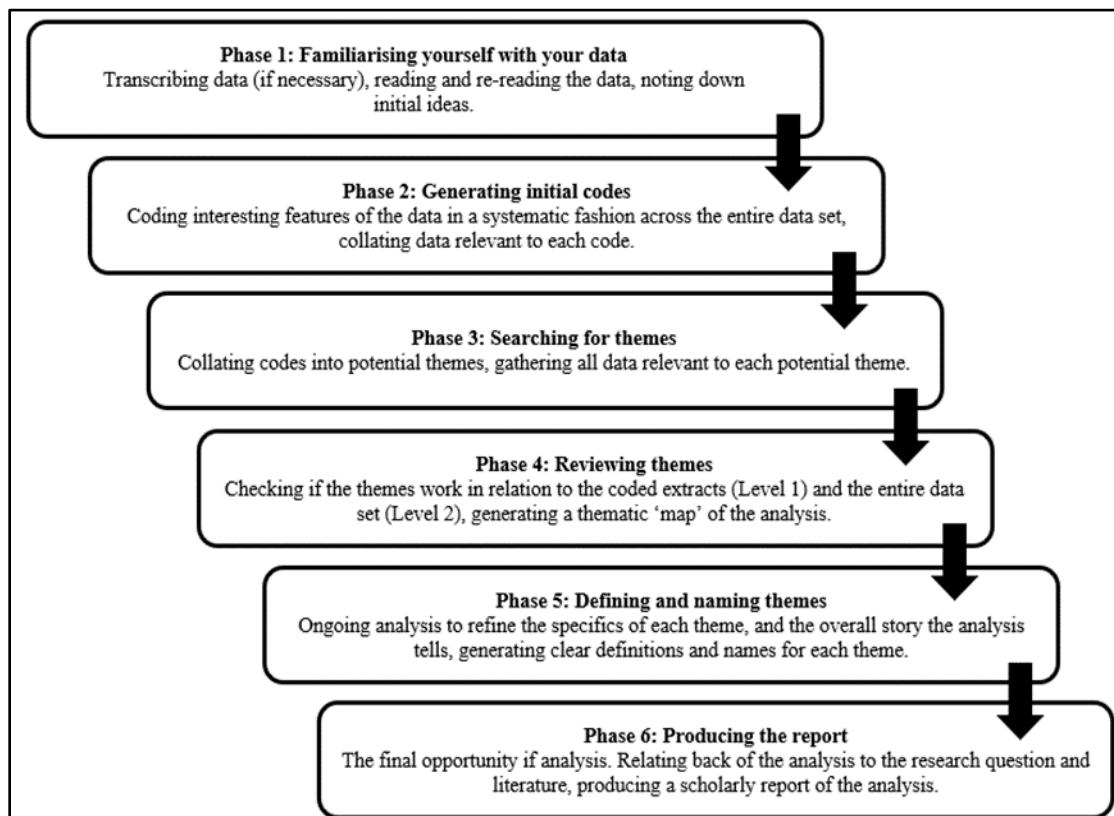

FIGURE 2. Overview of Braun and Clarke's (2006) Six Phases of Thematic Analysis

RESULTS

This section divides the results into two primary sections. The initial part outlines the outcomes of the concordance analysis, showcasing modal and directive verbs discovered within the corpus. Subsequently, the second section details the results of thematic and discourse analyses, illustrating the themes derived from the corpus and providing sample excerpts that constitute the analysed discourse used to generate these themes.

MODAL AND RECOMMENDATION VERBS WITHIN THE CORPUS

Ten modal verbs and six directive verbs were identified, resulting in 165 concordances linked to these verb categories. Concordances refer to instances of the verbs' usage within the corpus. Table 2 provides an overview of these verb occurrences, each with an illustrative example. The most frequently used verbs are mainly modal verbs, specifically "need" with 37 concordances, "must" with 29, and "should" with 28. Five types of directive verbs were used, with "encourage" scoring 9 concordances, followed by "promote" with 4 concordances and "urge" with 3 concordances.

Applying Speech Act theory, these verbs can be seen as performative, meaning they do more than just describe; they perform actions. For instance, modal verbs like "must" and "should" express necessity or obligation, performing the speech act of directive. Similarly, directive verbs such as "encourage", "promote", and "urge" are used to influence the behavior or actions of others. This aligns with Austin's (1962) and Searle's (1969) Speech Act theory, which posits that language can be used to do things and not just to state things.

TABLE 2. An overview of verb concordances in corpus

Type of verb	Verb	Example	No. of concordances
Modal verb	Should	...flood cover should be a matter of great concern to us.	28
	Can	Solar energy can be a game - changer to address this issue...	12
	Could	This could be as simple as consciously considering sustainability...	12
	May	In Malaysia, citizens may take a stand now and come forward...	5
	Must	Those who destroy Mother Earth must be taken to task.	29
	Might	Malaysia might consider nuclear to be a potential source of energy…	2
	Ought to	...ought to be nurtured at the community level.	1
	Need	...all need to be aware that this is not a natural phenomenon.	37
	Has to	...education on sustainable development has to be implemented in school...	8
	Have to	...the environment, ecology and quality of life have to be prioritised...	9
Directive verb	Advocate	...green consumer attitudes advocate efficient use of energy...	2
	Encourage	It is also time to encourage more clean vehicles...	9
	Urge	I urge every member state to position climate change as…	3
	Suggest	I would like to suggest that a round - table dialogue...	2
	Promote	...promote the use of renewable energy…	4
	Foster	We must foster public debate on renewable energy.	2
Total no. of concordances			**165**

THEMES GENERATED FROM THE CONTEXTUALISATION OF MODAL AND RECOMMENDATION VERBS WITHIN THE CORPUS

As previously stated, the thematic coding follows an inductive approach, where the codings have been derived from the data's discoveries. Each thematic code is labelled with the corresponding initial of its theme title (e.g., T1-T2 for sub-themes related to the main theme of *transitioning to renewable energy*). Table 3 provides an overview of the themes and verb concordances identified

within the corpus, while figure 2 presents an overview of the distribution of themes. Table 3 presents the themes, with the most frequent theme placed at the top of the table, followed by the progressively less frequent themes. Six themes, each with several sub themes were identified. The sections that follows present the results of the themes and sub themes based on the thematic coding.

TABLE 3. An overview of themes, sub-themes and concordances in the corpus

| Theme	Code	Code/ Sub-theme Description	No. of Concordance	Total No. of Concordance in Theme
Government action	G1	Policy, regulation and legislative measures	21	67
	G2	Funding and incentives	9	
	G3	Government initiatives	19	
	G4	Climate action plans	18	
Education and awareness	EA1	Environmental education	6	41
	EA2	Climate change and environment awareness	32	
	EA3	Outreach and engagement	3	
Protecting natural resources	P1	Biodiversity conservation	5	18
	P2	Habitat preservation	1	
	P3	Forest and land management	6	
	P4	Water resource management	2	
	P5	Conservation practices	4	
Encouraging sustainable living	E1	Sustainable consumption and production	6	15
	E2	Eco-friendly practices and sustainable lifestyle	4	
	E3	Green living	5	
Transitioning to renewable energy	T1	Renewable energy sources and practices	14	15
	T2	Energy efficiency measures	1	
Reducing greenhouse gas emissions	R1	Carbon footprint reduction	4	9
	R2	Greenhouse gas emissions reduction	5	
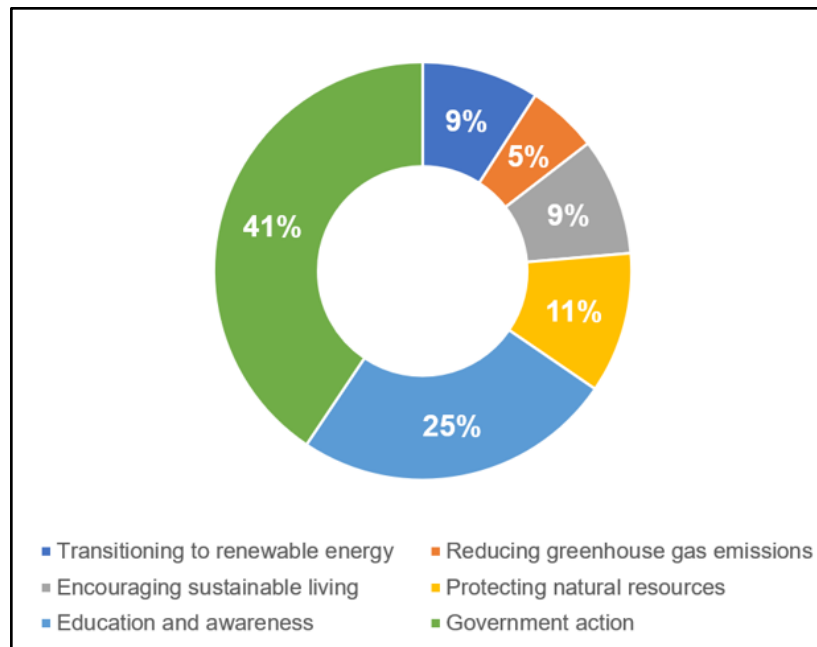
FIGURE 3. Overview of distribution of themes

GOVERNMENT ACTION

Government action emerged as the most frequent, i.e., with a total of 67 concordances. This theme accounted for a substantial 41% of the overall concordances in the study. It encompasses four sub-themes, which are *policy, regulation, and legislative measures* leading with 21 concordances, which clearly emphasised the need for improved role of government policies and regulations in addressing environmental concerns. *Government initiatives* and *climate action plans* contributed 19 and 18 concordances, respectively, highlighting the demand for comprehensive strategies and plans developed by the government to combat environmental challenges. *Funding and incentives* totalled up to nine concordances, indicating the call for financial support mechanisms by the government to encourage sustainability efforts. Below are a few instances of the concordance to exemplify the sub-themes:

> G1 - Policy, regulation and legislative measures: *"...I urge every member state to position climate change as a foreign policy priority."*
> G2 - Funding and incentives: *"Monetary assistance in the form of green bonds, carbon credits and payments for ecosystem services must be firmly articulated…"*
> G3 - Government initiatives: *"Governments need to work closely with the private sector to accelerate the green transition…"*
> G4 - Climate action plans: *"Adaptation measures, very much in the periphery, have been somewhat elusive, and efforts need to be assessed…"*

The next section presents the second most frequent theme which is education and awareness with a total of 41 concordances.

EDUCATION AND AWARENESS

This theme contributed to 25% of the overall concordances. *Climate change and environment awareness* emerged as a primary focus, generating 32 concordances, emphasising the importance of awareness in climate change and the environment. *Environmental education* contributed six concordances, highlighting the demand for environmental education to be implemented, while *outreach and engagement* has three concordances, emphasising the essentiality in public engagement strategies. Provided below are several illustrative excerpts of the sub-themes:

> EA1 - Environmental education: *"The changes in education <u>must</u> be introduced as early as possible to monitor the impact…"*
> EA2 - Climate change and environment awareness: *"The public <u>must</u> be made aware that climate change is inevitable and is already deadly…"*
> EA3 - Outreach and engagement: *"One key issue related to climate change and sustainable development is how average people <u>can</u> be consulted and engaged…"*

The following section presents the results for the third most frequent theme, which is protecting natural resources.

PROTECTING NATURAL RESOURCES

Protecting natural resources with a total of 18 concordances, constituted 11% of the overall concordances. Four sub themes were identified. *Biodiversity conservation* led this theme with five concordances, highlighting the importance of preserving biodiversity which are deteriorating. *Forest and land management* contributed six concordances, indicating a focus on sustainable land-use practices by human. *Conservation practices* added four concordances, emphasising various measures needed for protecting natural resources. *Water resource management* and *habitat preservation* contributed two and a concordance, respectively, reflecting discussions on responsible resource management and habitat protection. Presented below are some sample excerpts showcasing the sub-themes:

> P1 - Biodiversity conservation: *"The highest priority <u>must</u> be given to protect our coastlines as they are facing more rapid challenges…"*
> P2 - Habitat preservation: *"Halting further habitat loss and restoring damaged ecosystems <u>could</u> be done…'*
> P3 - Forest and land management: *"Effective solutions than destruction of forests <u>must</u> be found…"*
> P4 - Water resource management: *"…our climate action efforts <u>need</u> to focus on efficient water management."*
> P5 - Conservation practices: *"We <u>must</u> protect and conserve our resources…"*

This section lacks clear transitions between sections, making it challenging for readers to follow the structure and understand how the themes and sub-themes are related. To improve this, you could use introductory sentences or phrases that signal the transition from one theme to another.

The next theme which is placed fourth based on frequency is encouraging sustainable living with a total of 15 concordances.

ENCOURAGING SUSTAINABLE LIVING

This theme represented 9% of the overall concordances with three sub themes. *Sustainable consumption and production* led with six concordances, emphasising the demand for responsible consumption patterns to maintain sustainability. *Green living* added five concordances, highlighting the demand for holistic approaches to sustainable lifestyles. *Eco-friendly practices and sustainable lifestyle* contributed four concordances, focusing on individual behaviours that promote sustainability. Here are a few instances exemplifying the sub-themes:

> E1 - Sustainable consumption and production: *"…we <u>need</u> to ensure that everyone knows sustainable production is one of our most important…"*
> E2 - Eco-friendly practices and sustainable lifestyle: *"This <u>could</u> be as simple as consciously considering sustainability in our everyday life…"*
> E3 - Green living: *"…farms in buildings and nearer to demand zones <u>must</u> be implemented to mitigate…"*

The next section presents the results of transitioning to renewable energy theme. The total concordances for this theme is 15, accounting for 9% of the overall concordances.

TRANSITIONING TO RENEWABLE ENERGY

Renewable energy sources and practices sub theme garnered the highest number of concordances at 14, reflecting discussions on various renewable energy sources and sustainable practices. *Energy efficiency measures* resulted in one concordance, ~~added a concordance~~, highlighting the importance of energy-efficient technology and practice. Below are several sample of concordances that represented the sub-themes:

> T1 - Renewable energy sources and practices: *"…<u>encourage</u> industrial players to use renewable energy instead of fossil fuels…"*
> T2 - Energy efficiency measures: *"…time to <u>encourage</u> more clean vehicles and commit to energy efficient construction…"*

The final theme is reducing greenhouse gas emissions which follows next.

REDUCING GREENHOUSE GAS EMISSIONS

The theme *reducing greenhouse gas emissions* also received attention in the study, with a total of nine concordances, representing 5% of the overall concordances. *Carbon footprint reduction* contributed four concordances, emphasising measures to decrease individual and collective carbon footprints. *Greenhouse gas emissions reduction* contributed five concordances, reflecting discussions on strategies and approaches to tackle greenhouse gas emissions. Provided below are several illustrative excerpts of the sub-themes:

> R1 - Carbon footprint reduction: *"…for the most part freely emitted carbon. This attitude <u>has</u> to change…"*
> R2 - Greenhouse gas emissions reduction: *"…we <u>need</u> to cut emissions on a global scale to save Malaysia…"*

In summary, the analysis identified six main themes and sub themes that reflect the public's opinion on climate change. Each of these themes is interconnected and plays a significant role in the broader context of climate change and sustainability. The sub-themes within these main themes further elucidate specific aspects of public opinion and concern that demonstrate the multifaceted nature of the public's perspective on climate change and sustainability. In essence, these themes and sub-themes provide a comprehensive overview of the public's opinion on climate change, highlighting their concerns, expectations, and suggestions for action.

DISCUSSION

This research aimed to gain insights into public opinion regarding climate change as reflected in media discourse in order to identify public recommendations on this issue by analyzing opinion news articles. By delving deeper into public recommendations regarding climate change issues, our study aimed to provide a more comprehensive understanding of how climate change can be addressed from the perspective of the public. In the present study, the term "public discourse" refers specifically to public opinion news. The identification of various themes facilitated a discourse analysis, which involved an examination of concordances to discern public opinion on climate change. For example, the most salient theme, "government action", revealed a public sentiment advocating for increased governmental measures to address the challenges and problems associated with climate change.

Our contribution to the field of Malaysian climate studies lies in offering valuable insights into Malaysian public opinion on recommendations for addressing climate change issues from a linguistic standpoint, an area that has remained largely unexplored. Importantly, this research opens up avenues for shaping potential climate change solutions by analysing public recommendations, a dimension that traditional perception-focused studies cannot fully capture.

In terms of news distribution, it is noteworthy that the year 2021 featured the highest volume of opinion news, which may be attributed to significant events such as the major flash flood that impacted Malaysia during that year. This aligns with previous research findings indicating that media coverage of specific issues, like climate change, often correlates with significant events related to the subject matter (Birkland, 1998; Nor Jijidiana et al., 2015). Additionally, research by Kunelius et al. (2017) and Olausson (2009) underscores that media coverage of climate change is influenced by both domestic and global perspectives on causation, impact, and potential solutions.

The findings of this study highlight the public's awareness of climate change. This aligns with results from a 2023 survey conducted by Monash University, which indicates that the majority of Malaysians express alarm and concern regarding climate change (Azliyana Azhari et al., 2023). It also suggests that the public possesses a fundamental knowledge of climate change, a notion reinforced by the research of Yu et al. (2021) and Tasha Erina Taufek et al. (2021). Furthermore, Wan Nur Syamilah and Nasuha (2021) assert that 66% of their Malaysian respondents exhibit a high level of climate change literacy, possibly due to the easy access to information enabled by modern technology. This awareness is not limited to Malaysia, as Voskaki and Tsermenidis (2015) report a similar trend in Greece, where the majority of the public recognises the existence of climate change as a pressing issue.

Moreover, the study indicates that the public is receptive to change and supportive of climate change adaptation efforts. This aligns with findings by Azliyana Azhari et al. (2023), which suggest that the majority of Malaysians are actively making shifts in their purchasing behaviour

and energy-related practices to address climate change. The public expresses support for government efforts to reduce emissions but also advocates for stronger incentives to promote behaviour changes, such as the installation of solar panels and composting.

PUBLIC OPINION OF GOVERNMENT ACTION ON CLIMATE CHANGE

One of the key findings of the current study reveals that the most discussed theme is *government action*, comprising 41% of the discussion. This primarily reflects public calls for the restructuring and enactment of policies, and laws related to climate change. The public perceives existing government climate initiatives as insufficient and demands more robust climate action plans, funding, and incentives. This suggests a public sentiment that views government efforts as inadequate and highlights the public's exasperation towards how climate change is handled by the government (Tasha Erina et. al., 2021), indicating a need for increased governmental involvement. Nevertheless, it is worth noting that new climate policies and laws have been introduced in Malaysia in tandem with the country's pursuance of sustainable development (Maizatun Mustafa et al., 2019), although their propagation to the public may have limitations.

In consideration of the aforementioned, the study reveals that the public tends to view climate change as an issue that necessitates action at a higher level, rather than focusing on individual or community-level actions, such as *encouraging sustainable living* (9%). This perspective necessitates a reconsideration, given that individual and community actions hold significant importance in addressing climate change, extending beyond the involvement of higher-level stakeholders. The public needs to be educated about climate change literacy and ways in which they can be involved in managing climate crisis. Consequently, this can lead to behavioral change according to the Spiral of Silence theory (Noelle-Neumann, 1972).

Furthermore, the findings underscore the public's increasing awareness and interest in learning more about climate change, as indicated by their demand for *education and awareness campaigns,* which is the second most frequent theme at *25%* (refer to table 3*). It is worth noting that Malaysia has pledged to introduce Climate Change Education (CCE) into the curriculum as one of the thrusts in 11th Malaysia Plan (11MYP) 2016-2020, which is already in effect (Berita Harian, n.d.; United Nations Framework Convention on Climate Change, n.d.). However, there is potential for further public engagement through well-propagated campaigns aimed at enhancing climate change awareness, particularly among those outside the school system. This would be advantageous for individuals seeking deeper involvement in climate-related initiatives and could also serve as a means to raise awareness among those who are unfamiliar with climate change. The limited emphasis on themes such as *protecting natural resources* (11%), *transitioning to renewable energy* (9%), and *reducing greenhouse gas emissions* (5%) is a cause for concern (refer to table 3). This suggests that the public may not fully grasp the critical role these aspects play in effectively addressing climate change.

To reiterate, understanding the public's opinion of climate change, particularly their recommendations and desires for addressing the issue, is invaluable in crafting effective responses. This understanding can aid decision-makers in formulating appropriate adaptation and mitigation strategies (Lorencová et al., 2019; Dahal et al., 2021). Notably, research by Zalina Mohd Daud et al. (2015) highlights the pivotal role of the public in responding to climate change in Malaysia. Engaging the public actively in mitigating climate change impacts is emphasized by Haliza Abdul Rahman (2018).

To address the observed underemphasized themes and the public's inclination toward higher-level climate change action, it is essential to foster a shift in mindset. While *government action* remains crucial, *encouraging sustainable living* (9%), *transitioning to renewable energy* (9%), and *reducing greenhouse gas emissions* (5%) should also be promoted as viable pathways to address climate change (refer to table 3). This necessitates a comprehensive approach that combines top-down policy initiatives with grassroots efforts to instil sustainable practices among individuals and communities.

The study's scope on the usage of directive and modal verbs has provided insights into how the public expresses their recommendations through linguistic resources The results demonstrated the value of public opinion that can be considered as a resource in climate change mitigation and adaptation strategies. This aligns with the research objective of examining public opinion on climate change issues, further reinforcing the study's relevance.

ENHANCING PUBLIC AWARENESS AND GOVERNMENT ACTION ABOUT CLIMATE CHANGE

Despite the inclusion of Climate Change Education (CCE) in the curriculum, there is room for further enhancement in terms of public awareness and engagement. Well-propagated campaigns and initiatives outside the school system can complement formal education efforts. These campaigns can target a wide range of demographics, from those already well-versed in climate change issues to those in need of basic awareness. Such endeavours align with global efforts to raise climate change literacy and empower individuals to take action (United Nations Framework Convention on Climate Change, n.d.).

The strong public awareness and support for climate change action should not be underestimated. It offers a platform for meaningful collaboration between the public and decision-makers. Public input can inform the development of more effective policies and initiatives, while governmental incentives can further motivate individuals and businesses to adopt sustainable practices. This symbiotic relationship between public awareness and government action can be harnessed to accelerate progress toward climate change mitigation and adaptation goals.

Lastly, the media, as evident from our analysis, plays a pivotal role in shaping public opinion and awareness of climate change. As such, it is incumbent upon media outlets to continue providing comprehensive coverage of climate change-related issues. By doing so, they can amplify public understanding and engagement on climate change matters. This includes not only reporting on climate change events but also highlighting individual and community-level initiatives that contribute to the broader climate change agenda.

The multifaceted nature of public opinion and recommendations underscores the complexity of climate change discourse and the importance of a holistic approach in addressing this global challenge. The study's findings highlight the need for governmental action, individual and community efforts, climate change education, and media engagement, all of which are crucial components in the fight against climate change.

CONCLUSION

To recapitulate, this research has successfully achieved its objectives in identifying public recommendation based on public opinion news on climate change within media discourse. It effectively identified themes in public recommendations regarding climate change issues by analysing the usage of directive verbs and modal verbs in opinion news articles. Additionally, the study provided valuable insights into the linguistic manifestations of the public in conveying their recommendations on addressing climate change.

The analysis revealed a prominent theme of *government action*, which accounted for 41% of the discussion in the opinion news articles. This theme emphasised the public's strong call for policy and legislative changes, as well as more robust government initiatives and climate action plans. These findings align with previous research, highlighting the significance of government involvement in climate change mitigation and adaptation (Tasha Erina et al., 2021).

The linguistic analysis shed light on the public's awareness of climate change and their support for various initiatives. The findings indicated that the public is relatively well-informed about climate change and is open to making changes in addressing the issue. This includes *transitioning to renewable energy*, *protecting natural resources*, engaging in more climate-related *education and awareness*, *encouraging sustainable living*, and potentially *reducing greenhouse gas emissions*. Furthermore, the three most frequent theme has significant relevance on climate change issues. The theme of government action underscores the public's concern about the role of policy and governmental measures in addressing climate change. Education and awareness, on the other hand, highlight the importance of knowledge dissemination and consciousness-raising in fostering a more sustainable society. Protecting natural resources and encouraging sustainable living emphasize the need for conservation and lifestyle changes at both individual and community levels.

The contributions of this study are significant, as it fills a gap in Malaysian climate studies by providing linguistic insights into public recommendations on climate change issues. It highlights the need for a comprehensive approach that combines governmental actions with grassroots efforts to address climate change effectively. The results can be used to develop a supplementary mitigation guideline to help improve communication on climate change policies and regulations to the public. The supplementary mitigation guideline can assist the government to effectively translate complex climate change information into language that is easily understood by the general public. In doing so, it can foster greater public understanding and engagement with these crucial policies, thereby strengthening the collective response to climate change. Additionally, the research emphasises the role of media in shaping public opinion and recommendations of climate change. Mass media, as noted by Noelle-Neumann (1991), plays a pivotal role in shaping public opinion by serving as an indicator of majority viewpoints, potentially leading individuals to conform or remain silent when their opinions differ (Hayes et al., 2011).

However, there are limitations to this study, including the analysis of opinion news articles from only one Malaysian newspaper which may not fully represent the diversity of public opinions. The relatively short timeframe of analysis from 2015 to 2022 also limits the longitudinal perspective. While this study does have its limitations, the methodology employed by the researchers is noteworthy. They ensured the reliability of the analysis by using an inter-rater approach and validating it with the Cohen's Kappa statistic. This method could be beneficial for future research on this topic. Future research could also expand the scope to include multiple

newspapers and extend the analysis over a more extended period to capture evolving public perceptions.

In conclusion, understanding public opinion and recommendations on climate change is essential for informed decision-making and effective climate change mitigation and adaptation strategies. This research not only provides a valuable foundation for further exploration and action in addressing climate change from the perspective of the Malaysian public but also underscores the crucial role of language studies in the climate change discourse. Language, despite being unable to solve the climate crisis on its own, plays a pivotal role in shaping how people think, plan, argue, act, and prepare for their futures in the context of climate change. It highlights the need not only for improved scientific literacy but also for enhanced overall literacy, emphasising a deeper understanding of how language and communication operate in public life and how they interact with tangible actions in the world.

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