Barriers to Climate Change Communications

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Abstract

This study employed narrative review to discuss three main barriers that constrain a change from climate change-related behaviours to pro-environmental behaviours. After reviewing 100 environmental communication and climate change scientific papers (1990–2022), the study found that conflicting values and social dilemmas, psychological denial, and the absence of emotional engagement are major barriers affecting the smooth dissemination of climate change-related messages. The study aimed to create awareness of how these barriers occur and the best solutions to deal with them. From the results, the mismatch of values between climate message and its audience leads to conflicting values and social dilemmas. Additionally, lack of goal specifications, fear, blaming, and negative criticism also cause psychological denial and the rejection of climate change messages. The study recommends the need for action-directed messages that will identify and resolve specific causes, effects, and outcomes of behaviours causing climate change. Also, the application of strategies such as appropriate frames and goal specifications are recommended.

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Introduction

Climate change is among the world's most pressing challenges. The main cause is generally the persistent emissions of anthropogenic greenhouse gases, principally from the combustion of fossil fuels. It is widely understood that climate change is resulting in increasing floods, drought in waterlogged areas, storms, fires, and the distortion of global ecosystems. The direct opposite of climate change behaviour is pro-environmental behaviour. Importantly, encouraging pro-environmental behaviour is highly necessary to reduce climate change activities while supporting environmental sustainability (Clayton et al., 2004). For the purpose of this study, pro-environmental behaviour is defined as an activity that affects the environment in the best possible way or benefits the environment (Steg & Vlek, 2009).

Subsequent research has revealed that communication is the most effective means of changing unwanted behaviours into desired ones (Moser, 2010; Lorenzoni et al., 2007). This means that adequate information on climate change-related behaviour is vital. However, it is not always about access to enough information on climate change but also an actionable plan (Lorenzoni et al., 2007). Nerlich et al. (2010) agreed that providing just information does not mean they always raise awareness or encourage active engagement. Considering this, this study insists on effective and action-based communication as a core element in handling climate change-related behaviours. On this note, it has focused on the major barriers to influencing a change in climate change-related behaviours in terms of communication. Specifically, it has explored the various common pitfalls associated with the information established in climate change messages, which in a way block their effectiveness in altering behaviours. Quintessentially, it is worth noting that this study aimed to strengthen existing knowledge in the field while producing novel information on the need for better climate change communications.

King et al. (2015) and Rayner and Minns (2015) suggest the need for an increase in knowledge on the rising global temperature (climate change) due to inadequate communication. Additionally, the Intergovernmental Panel on Climate Change (IPCC, 2018) also encourages high-quality knowledge about climate change through effective communication. These accounts reveal that despite the scarcity of climate change messages, the few available ones are somehow incapable of changing behaviours as required. Considering this, the purpose of this study is to explore the barriers that influence an amendment in climate change-related behaviour. Thus, helping in a substantial reduction in emissions as long-termly wished by the international law of the United Nations (UN, 1992b).

Literature Review

Climate Change Communication

Human activities have a significant impact on climate change as argued in the European Environment Agency (EEA, 2005). Attributing climate change to an anthropogenic cause has raised the concern of a change in human behaviour, hence the fundamental reasons for the initiation of the Paris Agreement, which was signed by 195 countries globally. The United Nations agree that the concern for climate change solutions was a core topic during the agreement (UN, 2015a). Sian et al. (2017) review the same agreement and encourage governments to gather and put together relevant strategies and actions through proper communication to ensure the success of the Paris climate deal. Studies including Dupar et al. (2019), IPCC (2018), and Serrat (2017) theorise that it is good for climate change communicators, policymakers, and societies to strengthen the type of information they disseminate. This is because obeying these protocols on climate change, especially with regard to the content of the message, will support global environmental resilience and long-term sustainability (Dupar et al., 2019).

Climate change communication has recently gained traction in society, resulting in a recent boom of messages from all sorts of movies, newsletters, radio broadcasts, and the media, among others (Thompson & Schweizer, 2008). Many theories are inclined towards the concepts of effective climate change communication by exploring the rationale behind why people must be emotionally engaged, why communication goals must be clearly defined, and why people must be engaged in a conversation or two-way communication model (Nerlich et al., 2010). This implies that, dating back many decades, theories have evaluated environmental communication and its effects on society in the quest to reduce carbon emissions. Despite this, the IPCC's special report on climate change and environmental sustainability shows that there is 1.5 °C of global warming, which is higher than pre-industrial levels (IPPC, 2021). This shows that global warming is still increasing despite the growth of information. According to Nye and Rydin (2008), this pertains because governments and decision-makers are unable to devise tools and climate change mitigation procedures to improve understanding of the environment and reduce this societal adversarial. Communication is critical in eliciting a reaction to climate change. Depoux et al. (2017) and other researchers agree that the right communication should achieve three main goals. In particular, it should increase awareness, make people feel involved, and urge them to act (Depoux et al., 2017). Due to the absence of some of this in scientific communication on climate change, it is often critiqued. For example, Stafford-Smith et al. (2011, p. 360) criticise how 'simply science' presents to people the possibility of a 4°C rise in global warming. According to them, the complexity of dealing with the effects of the change is not told but rather a simple projection, which will disempower people. On the other hand, Nerlich et al. (2010) argue that it is the invisibility of climate change that has made it difficult for scientists to educate the public on the right measures to mitigate this change.

Global Warming

Since the beginning of modern record-keeping in 1880, the last eight years have been the warmest, according to the National Aeronautics and Space Administration (NASA, 2022). NASA also estimated the earth to be 1.1 degrees Celsius (1.9 degrees Fahrenheit) warmer in 2021 than it was in the late 1800s, when the Industrial Revolution was in full swing. Moreover, according to NASA and the National Oceanic and Atmospheric Administration (NOAA), earth's average global temperature in 2021 matched 2018 as the 6th warmest year ever recorded implying that, despite the increasing climate change messages, the globe is getting warmer.

The values (-0.50 to 1.00) on the chart stand for the surface temperatures of the globe. It shows the increasing warming from man's actions, specifically from activities causing carbon dioxide emissions and related greenhouse gases (see figure 1). This is an indication of how the globe is warming faster than before. The IPCC (2021) has even concurred by reminding humanity of how the warming is getting more serious, with potential catastrophic outcomes if emissions are not cut down (IPCC, 2018).

Global warming has received a lot of attention in recent years. It is seen as a global threat because the depletion of the ozone layer through the emission of gases (CO_2) results in global warming, leading to rapid melting of glaciers and a rise in sea level that causes floods (NASA, 2022). Hence the reason why climate change cinematic films speak about the melting glaciers in the Arctic and their consequences, including the loss of habitats for polar bears. The melting of ice in polar regions is supposed to be an ecological cycle unit supplying fresh water to about 40% of the world's population during dry seasons (Alley et al., 2007). This makes global warming a threat to humanity because the earth appears to be full of water from a distance; however, only 2.5% of it

is fresh, and the rest is too salted to sustain human life, according to the World Health Organisation (WHO, 2003).

2021 ties 2018 for Sixth Warmest Year on Record

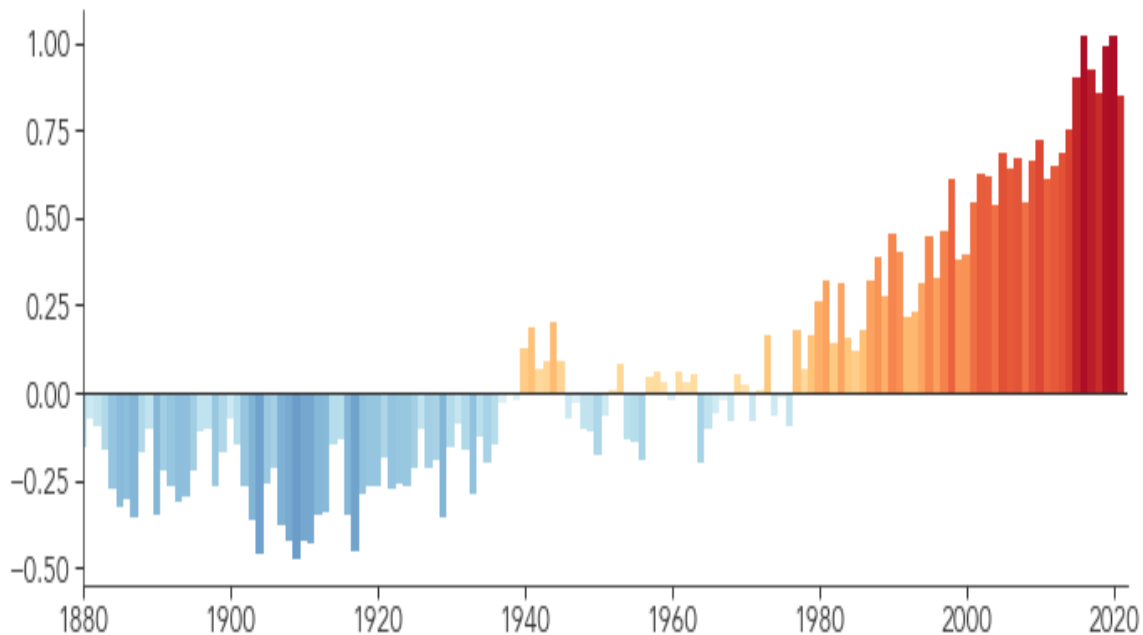Global Temperature Anomaly (°C compared to the 1951-1980 average)

Figure 1: Displays the year 2021 in relation to the previous 140 years.

Source: 2021 Continued Earth's Warming Trend (NASA, 2022)

It is worth mentioning that the current melting glaciers are doing more harm than good. Places such as Bangladesh, the United States of America, Tuvalu, and other places are deeply at risk as a result of climate change causing these floods. The issue of beachfront disappearance on some islands due to the rise in sea level is also outrageous. Likewise, the climate change crisis has led to a point where some places (some countries in the South Pacific) are too vulnerable to the extent that they are making evacuation decisions, as noted by Scientific American (2017).

Energy emissions, energy consumption, the R3 strategy (reduce, reuse, and recycle), renewable energy, green energy, and afforestation are among the mitigation actions to achieve this holistic goal of battling global warming and floods. Rolnick et al. (2022) agree that tackling climate change involves multifaceted activities, including either continuing with existing behaviour and bearing the consequences or adopting mitigation actions such as changes in energy, electricity, emissions, land use, industry, and other consumption patterns that cause climate change and global warming.

Theoretical foundation of the study

Most messages about climate change are declined because of the sceptical frameworks developed by the media. Teso-Alonso and Lozano-Ascencio used a quantitative approach to better understand online climate change communication in Spain. The study, after exploring online communication on climate change in the country, discovered that the main sources were the media, aside from a few other associations and governmental bodies that made this information available to the public. In a rating of the thirty most principal sources of online information on climate change, the Europa Press news agency ranks first in terms of the volume of material produced (Teso-Alonso & Lozano-Ascencio, 2022). This implies that the media is the leading hub in climate change communications.

Forchtner and Lubarda (2022) and Rahmstorf (2004) have provided a clear image of the work and influence of the media in our world of climate change today. Rahmstorf (2004) proposes a typology of scepticism in climate change communications by the media. According to the author, there are three main categories of scepticism with regard to hearing, understanding, believing, and the dissemination of information about climate change. Rahmstorf theorised and summarised these forms into trend sceptics (those who believe there is no global warming), attribution sceptics (those who believe that there is global warming but there is no proof that man is responsible for

it), and impact sceptics (those who also think that global warming does not have negative impacts on man or is harmless to man). The study explained that the sceptics' media reports were because the world's most prominent environmental scientists are sometimes undercover, leading to audience disbelief because of some media works.

Some media types are able to create different impressions on people who rely on them. As listed, the trend sceptic audience formed by this type of media believes that global warming is a fallacy because heat has been a part of man since time immemorial. The attribution sceptics also acknowledge the existence of global warming but do not attribute it to human actions. They understand global warming as a natural phenomenon but do not attribute it to the activities of humanity. The theory states that these audiences even believe that atmospheric CO_2 is a gas produced solely by natural processes, especially in the ocean. In the same sense, the impact sceptic also understands global warming as undamaging and not as bad as cold season (Rahmstorf, 2004). To help refashion these ideologies, Sian et al. (2017) have developed a framework to guide creation and direction at the individual, family, societal, and national levels on proper climate knowledge and actions for a sustainable outcome.
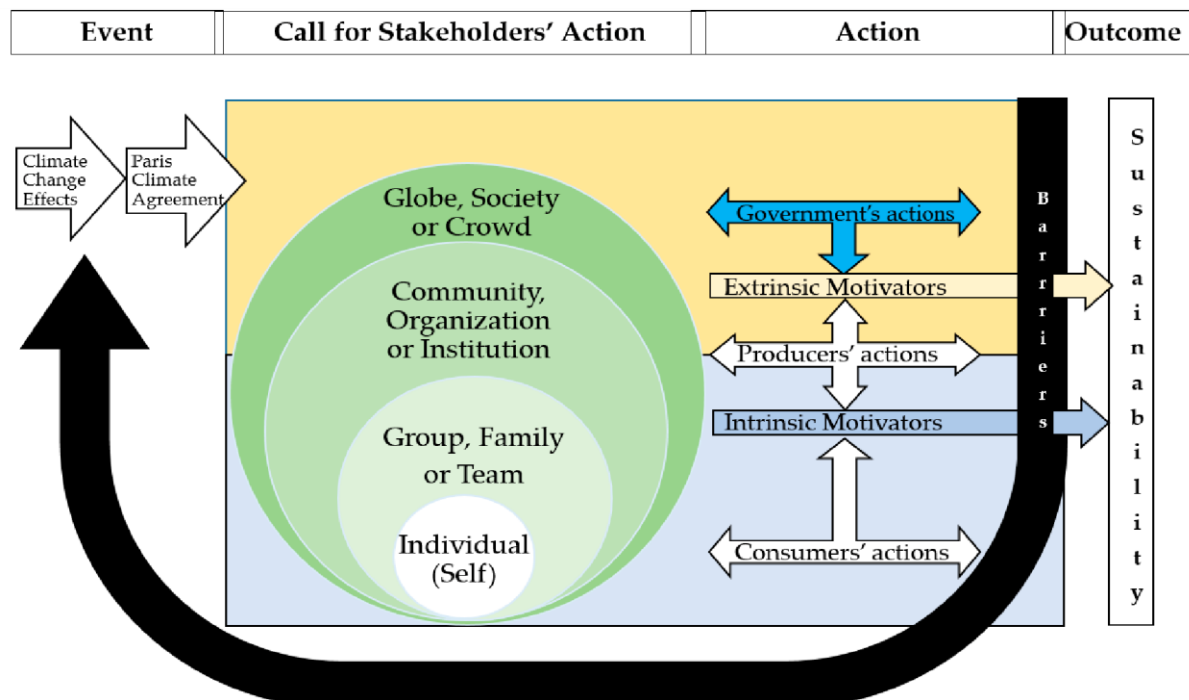
Figure 2: Contextual influence framework.

The conceptual framework of this research focuses on the international evaluation of the diverse climate change plans presently being applied, the measurement of their outcomes, and the current needed actions (see figure 2). According to the framework, stakeholders at various levels, starting from individuals to societal and national levels, will take actions towards climate change if effective communication that focuses on actions is disseminated. Hence, if the heads of state continue to care about the narratives of climate change, there should be a corresponding increase in national awareness, which must result in behavioural change and a sustainable environment.

Methodology

Research Approach

This study focuses on reviewing scientific studies on environmental communication as a result of the ongoing debate on climate change and global warning. The research has mainly focused on

understanding the barriers to environmental communication through a narrative review approach with commentaries. It sought to do this as a result of the pitfall which has made it unclear as to why there are enormous climate change communications yet behaviours causing climate change are the same. The study used secondary data from 100 scientific articles.

Research Data

The study concentrated on data from articles published in journals that are highly ranked from sources such as Scimago and Scopus journal rankings. Initially, the study reviewed 500 papers and then lowered it to 100 most important in terms of the study's aim and objectives. Specifically, scientific articles that have contributed to the debate on environmental communications between the 1990s and 2022 were mostly considered. The study focused on these publications because it was during this time that climate change has generated a lot of controversy in the literature, with many ideas and initiatives coming into play on a national and international level. They were the focus of the study in order to explore why climate change has not declined despite the worldwide emergency being raised at the time, the situation with regard to climate change has not changed. Other secondary data include references made from climate change and global warming reports and conference proceedings by the IPCC, UN, NASA, and COP26. The aim is to trace the trend of climate communications and their impacts on the general public.

The study concentrated mostly on qualitative research papers to better understand the perspectives of the masses because, after evaluating the 500 publications, the research that went in-depth on climate change and global warming was of that kind. Hence, they were mostly featured in this study because they have gone the extra mile to discuss the entire climate change situation and not just a mere numeric representative of data. Subsequently, they were grouped under themes based on the environmental communication debate each fell under. In all, the study generated five

themes; any paper that did not fall under any of these themes identified was eliminated. The themes include, environmental communication, climate change, solutions to climate change, the politics behind the climate, and global warning.

Data Analysis

To quantify and discuss the most appropriate discussions in the reviewed scientific papers based on this study's objective, SPSS statistical tool version 20 was used to generate frequencies and percentages. The discussion was done based on the sources, topics, objectives, methodology, and arguments of these papers to identify why, despite the tons of information, communications on climate change are still not effective as world demands. Subsequently, the various strategies for battling climate change discussed in these documents were reviewed to detect their flaws. By doing this, the study identified climate communication trends, barriers, and their implications. This helped the study to draw conclusions on why, despite the enormous amount of information, communication is still not effective in changing climate change behaviours. Based on this, the main themes were developed.

Based on the study objectives, the study only concentrated on the subjects generated from the discussions, which include environmental communication, climate change, solutions to climate change, the politics behind the climate, and global warning. The focus was to understand the trends in environmental communication and their effectiveness as a result of the increasing interest in saving the globe in terms of current climate change following the recent commentaries of the COP 26 held in Glasgow, Scotland. Taken together, three main concerns were identified as the main themes of the review, which this study considers as barriers to environmental communication. They include conflicting values and social quandaries, the absence of emotional engagement, and

psychological denial. The study has established that these are the obstacles hindering the success of environmental and climate change communications.

Results and Discussions

This section summarises the results of the analysis. It focuses on the various themes identified from the 100 reviewed articles and the other relevant documents on environmental communication and climate change.

To identify the barriers to environmental communication, 90% of scientific papers, 7 global climate change reports, 2 climate change conference proceedings, and others from 1990 to 2022 were reviewed (see Table 1). From these documents, 57% dealt with the debate on environmental communication, while 24% discussed climate change and its impacts. The rest were on global warming and the politics behind climate change, representing a percentage of 9 and 6, respectively (see Table 2). The study considered this because these are the immediate areas on which environmental communication is mostly discussed in those three decades.

Table 1: Source of data used for the study

Secondary Data Sources	Categories	Percentage (%)	Year
Highly ranked journals	Scientific articles	90	1990-2022
Global organisations	Global climate reports	7	1990-2022
International proceedings	Global climate conference	2	1990-2022
Others	Others	1	1990-2022

According to the results, psychological denial is the top barrier that affects the dissemination of environmental communication. This means that the ineffectiveness of a change in climate change behaviour is a result of the rejection of climate change messages. Following this is the absence of emotional engagement. With this, about 28% of similar views accept that climate change messages

are not taking effect because of the wrong emotional engagement they carry. Conflicting values and social quandaries follow with 15%; see figure 3. The results also reveal that people act based on their values; therefore, a climate message that is not in consonance with such values fails to change an undesirable behaviour.

Table 2: Research papers reviewed based on topics

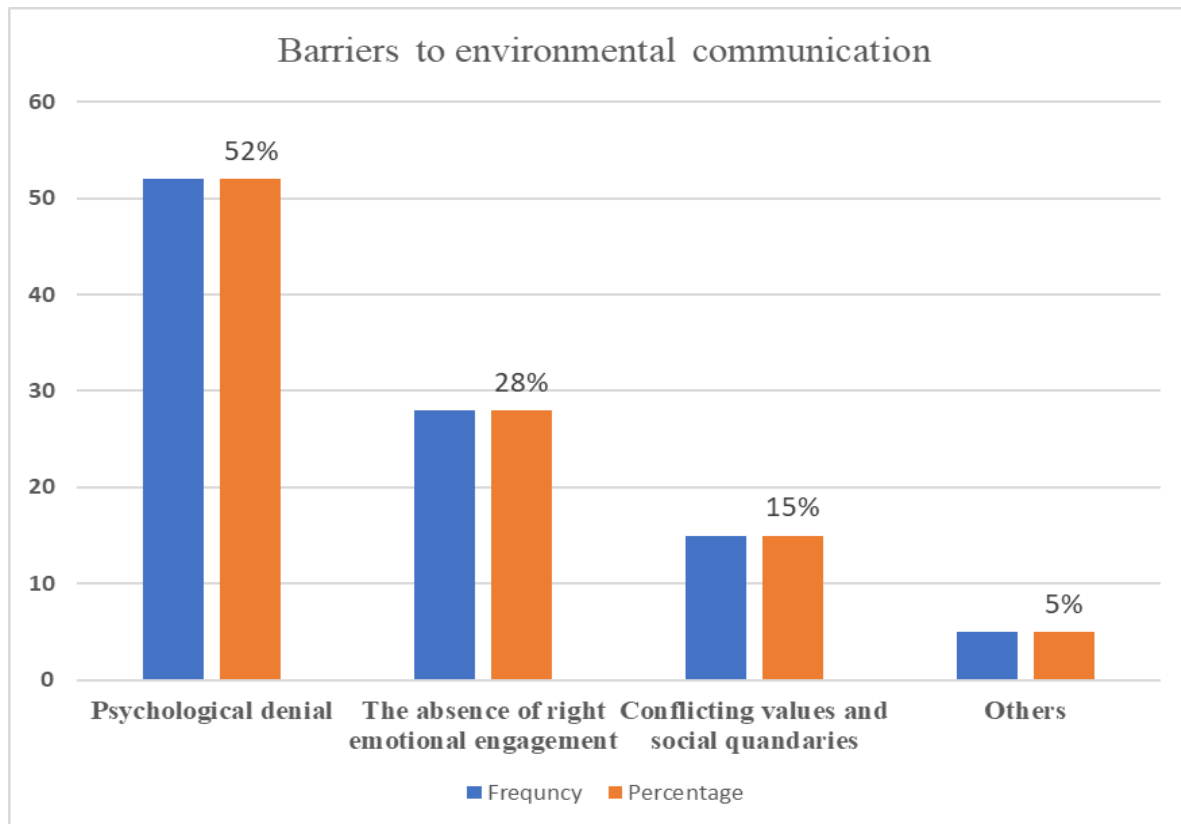| Reviewed research papers based on topics	Year	Frequency	Percentage (%)
Environmental Communication	1990-2022	57	57
Climate Change	1990-2022	24	24
Global warming	1990-2022	9	9
The politics behind climate change	1990-2022	6	6
Solutions to climate change	1990-2022	3	3
Others	1990-2022	1	1
Total	-	100	100%

Figure 3: Barriers to environmental communication and a change in climate change behaviour

Barriers to Influencing a Change in Climate Change Behaviours

Concerns for environmental sustainability have brought about the need for pro-environmental behaviour through several communication strategies and messages. Despite the increase, there are still glitches that affect the manifestation of the recommended actions in these messages. This study calls these hurdles barriers influencing the change in climate change behaviour. Based on the analysis, they are discussed below.

Conflicting values and social quandaries

From the analysis, most of the models supported the idea that a clash between individual values and climate change messages constrains the alteration of behaviours noted to be causing climate change (Ehrlich, 2020) (see figure 3). According to them, when climate messages do not

correspond to the values of the audiences, they lose their efficacy. This is because, naturally, people accept and act upon climate change information that shares the same values as their own (Cieciuch & Schwartz, 2017). Values determine personalities and beliefs, which have a significant impact on people's perceptions, influencing their behaviour towards the environment and anything else (Cieciuch & Schwartz, 2017). Therefore, conflicting values occur in the dissemination process, especially when messages are unable to identify the specific values of a target audience. In other words, when climate change messages are in line with the values of people, they become essential; if they conflict, they are denied.

It is scientifically proven that the human mind associates better with familiar activities that are local, repetitive, and familiar (Payne, 2012). Since most climate change messages appear to be new, non-traditional, and uncommon in their society, it affects the transition from old climate change-related behaviours to pro-environmental behaviours. For instance, the preaching of the adoption of electric cars in developing countries, while important national issues like poverty still exist, is likely to fail. Moreover, the analysis has shown that the less familiarity and misalignment of values between the general public and climate change messages, the less influential they are. Ehrlich (2020) adds to the debate and concludes that a social dilemma as a result of conflicting values and social quandaries occurs when people would benefit from cooperating but do not due to their competing interests. Therefore, social dilemmas also impede climate change interventions by making people unsure whether to act environmentally or continue with their enjoyable behaviours. Analysing these thoughts, the study believes that people give priority to climate change messages that in harmony with their beliefs; therefore, it makes it difficult for a rapid alteration in climate change-related behaviours we seek to change especially with contrary messages (Assiter, 2016).

The absence of the right emotional engagement

The result of the study has also shown that people can better understand and exhibit pro-environmental behaviour through emotional engagement. Most of the debate centres on this and makes reference to how the Scottish government, under the Individual Social Material (ISM) framework, defines emotion as "how people feel about something; thus, people's intentions that result in their future actions" (Scottish Government, 2013, p. 3). The perceptions formed after hearing a climate change message that creates extremely heightened fear have an equal probability of being accepted or ignored. As the results prove, the more a message creates fear, the more likely it will be ignored. Therefore, expressing climate change messages in a more frightening manner seizes the opportunity for the right kind of emotional engagement for people to act pro-environmentally.

The results have also disclosed that governments, corporations, non-governmental organisations (NGOs), and other climate communicators have issues communicating the dangers of climate change (Morgan et al., 2001). Hassol (2008, p. 106) considers this as an obstacle. According to the author, "scientists employ various phrases that indicate something that is very different from the public's understanding." On this note, the continual overuse of discomfort, helplessness, and fearful elements in environmental communication contradicts the purposes of conveying climate change messages. It is worth noting that such information may interrupt people's life decisions by reminding them of approaching deaths, lost relatives, previous tragedies, and the future problems that await them (Nisbet, 2009; Hamilton, 2009). Hence, acceptance and action upon such communication become very low due to the denial of the rest of the vital information in the message. Therefore, the employment of wrong emotional engagement in the form of fear-inclined elements has no option but to wrongly engage the emotions of the public.

Also, from the results, most ideologies on this theme revealed that sometimes people fail to change their behaviour because they perceive themselves as powerless. This is because many climate-change messages push people to feel incapable of combating climate change. They cause common negative emotions such as panic, vulnerability, guilt, and depression and make people see their intended contribution as small and therefore, not capable of making any significant change in the current climate situation (Franks et al., 2018). Barr et al. (2011) add to the debate by proposing that they make people see climate change as a problem that cannot be solved by man. Subsequently, climate change messages lose their motivational value and result in denials since it is common for people to ignore disturbing information (Norgaard, 2012; Hamilton, 2009).

Furthermore, the lack of specific goals in climate change messages has been noted as a barrier to proper environmental communication. As revealed, most are neither direct nor specific enough to convey the precise causes, effects, and outcomes of specific climate change behaviours. The results show that most present scenarios that are far from what is seen daily (Barr et al., 2011). Because of the normalisation of this generalisation and a lack of specific goals, the majority of climate communicators fail to provide a trustworthy method for verifying material before reporting it, especially the media, according to Mourik et al. (2009). Consequently, climate change messages are perceived and treated as fabricated stories, just like any other information on the internet. This makes it difficult for such information to influence behaviour as desired.

Psychological denial

The study has identified that scientific facts in climate change messages provide supporting evidence for the occurrence of climate change. However, the dominance of projections and assumptions creates doubts and denials about them despite their ability to strengthen a change in behaviours causing climate change (Goodwin & Dahlstrom, 2022). Presenting scientific facts

alone in climate messages is not enough; it is also important that they relate to reality because messages without a solution cannot effectively shift behaviour to address global warming (Lorenzoni et al., 2007). Based on this comprehensive account, it is proven that climate change projections are not enough to persuade people to completely change the behaviours they enjoy, even though predictions are important to include in climate change communications for the purposes of planning (Norgaard, 2012).

Psychological denial was also found to occur when climate change messages are geared to blame the audience (see figure 3). As explained by Barr et al. (2011), people disapprove of climate change messages or regard them as false allegations when they blame them. Therefore, as many climate change communications end up accusing the public, their acceptance is tougher. Aside from this, it affects the recommended pro-environmental behaviours that come along with the messages (Gifford, 2011). According to Hamilton (2009), people react by creating a coping strategy to limit the acceptance of such messages. The model developed by Norgaard during the analysis revealed that some Norwegians are unconcerned about the future consequences of climate change despite their awareness of it for similar reasons (Norgaard, 2012). Therefore, climate change messages that blame people do not generally succeed and become ineffective in the changing of behaviours.

Conclusion

Developed countries, such as Britain, the USA, and the Netherlands, among others, are striving hard to reduce their carbon imprints, as seen over the years. Other developing countries in Africa, the Caribbean, and elsewhere even confirmed their commitment to decrease greenhouse gas discharges on global platforms, especially during the United Nations Secretary-Global General's Climate Action Summit (UNCAS). Despite this, the Climate Analytics Annual Report 2019

declares that the international climate arrangements have made minimal effort in their quest to implement the regulations of the Paris Agreement on fighting climate change (Climate Analytics, 2019). It is through this that this study has reviewed relevant studies on the barriers hindering the proper dissemination of climate change messages. Specifically, it has explored the various common pitfalls associated with information established in climate change communications, which in a way block their effectiveness in altering behaviours.

Following a hypercritical narrative review approach, this study has discussed why climate change communications are unable to achieve expected goals. It identified that conflicting values and social dilemmas, the absence of the right kind of emotional engagement, and psychological denial are the main issues that prohibit the manifestation of pro-environmental behaviour. The study further discovered issues like the mismatch of values, indecisiveness, and refusal of people to change behaviours because of the contradiction between their beliefs and those of climate change messages. Additionally, the results show that another reason why climate change communication does not take effect because of fear, a lack of goal specifications, and the engagement of the right emotions. Moreover, it has revealed that psychological denial is also one of the barriers that affect a change in people's actions because of the overconcentration of scientific projections and assumptions.

From the conceptual framework and study's results, this research can conclude that a collaborative decision between governments, communities, organisations, families, groups, teams, and individuals will help minimise climate change. This is because a collaborative approach to climate change will always play a catalysing and regulatory role in facilitating individual's engagement in pro-environmental behaviour. Furthermore, environmental communicators should make

climate messages precise by focusing on a target audience and specific behaviours. This will support the development of a proper message that is concise, clear, and easily remembered.

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