Implicatures in the Tweets of Climate Change Skeptics

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ABSTRACT

The article attempts to provide a speech act analysis of tweets which are posted by climate change skeptics. It argues that their deliberate flouting and violation of Grice's Cooperative Principle show that they substitute overt denial by conversational implicatures which show skepticism. Based on data from 420 tweets which are responses to climate change discussion, the paper demonstrates that tweeters respond with different deceptive tactics by using conversational implicatures. The article attempts to provide a pragmatic analysis of tweets which are posted by climate change opponents. It argues that their deliberate violation of the CP shows that their attitude shifted from overt denial to skepticism.

Keywords: Grice maxims; denial; presupposition; conversational implicature; humor

I. INTRODUCTION

Twitter has been an important social media platform to study conversations on important issues. One of the issues on Twitter which have significant political and socioeconomic implication is climate change. This study might be helpful for future studies on climate change conversations on social media. A state of denial and skepticism emerged from Twitter in the last decade. Hoexter (2016) introduced the concept of "soft climate denial" to refer to a state of mind acknowledging global warming in general while remaining in partial psychological or intellectual denialism about its reality or impact. It is described as implicit denial. To the contrary, hard denial refers to explicit denial of the consensus on global warming's existence. Opponents of climate change adopt a deliberate set of pragmatic and rhetorical strategies. This paper investigates one of these strategies which is implicature. I focus specifically on the analysis of tweets posted by climate change skeptics to show their attitude. The hypothesis is that climate change skeptics utilize conversation implicature to support their stance. Against this background, I set out to achieve better understanding of their violation of Grice's CP with focus on two questions:

1. Do climate change skeptics flout or violate Grice's maxims?
2. What are the strategies used by climate change skeptics to politicize climate change?

For this purpose, I conducted a qualitative content analysis of a sample of their tweets which included 420 tweets from 2012 to 2022. Authentic data are then collected, analyzed, and used to verify the hypothesis.

This study addresses how climate change skeptics on Twitter used not only direct denials but also implicatures as a kind of non-conventional meaning. They manipulated implicature that can be described as more subtle forms of denial.

II. LITERATURE REVIEW

There are many linguistic studies where Twitter was used as a corpus. Argüelles-Álvarez and Muñoz (2012) study the use of use of Spanish and English in the micro-blogging social network Twitter from a contrastive point of view. They found that there are general discourse and organizational features common to the two corpora. Pak and Paroubek (2010) utilized Twitter for sentiment analysis and opinion mining purposes. González (2015) addresses the Twitter translation task, and argues that there is a lack of appropriate corpora that represents the colloquial language used in Twitter. Burghardt (2015) also asserts that Twitter provides vast amounts of user-generated language data. Moreover, Dijkstra (2021) deals with the usability of Twitter as a resource for the study of language change in progress in low-resource languages.

However, there is little literature on implicit meaning and implicature in Twitter. On the other hand, literature on denial distinguishes between negation and denial with a general view of semantics and pragmatics. In terms of speech act theory negation is applied when it is located in the negative morpheme "not". Horn (1985, 1989) distinguishes between an ordinary descriptive negation operator and a so-called metalinguistic negation. The former is the standard logical connective contributing to truth-conditional content, the latter is a non-truth-functional device that accounts for rejection of non-propositional material. The second type comprises objections/ rejections to presuppositional and implicatural information. Horn characterizes this operator as a metalinguistic device which can be used to signal an objection to an utterance. The primary function of a denial is to object to information. Van der Sandt (1991, 2003) argues that there is no inherent connection between the concepts of denial and negation. Instead, he explained the semantic and pragmatic properties of denials in terms of their discourse effects. His theory comprises (1) proposition denials, (2) presupposition denials, and (3) implicature denials. His study aims to give a unified account of standard proposition denials and the marked cases that Horn labeled 'metalinguistic negation'. According to Horn (1985, 1989), denials can be used

to reject utterances on contextual information. A speaker may imply objection to its truth or reject it in virtue of the presuppositions associated, the implicatures invoked or other inferences of a non-truth-conditional nature. Here assertion and denial are concepts of speech act theory and both notions can be explained in terms of their discourse function. The function of a denial is to object to a previous utterance. Notice the difference in the following examples:

Proposition denial: Mary is happy vs. Mary is not happy

Presupposition denial: The king of France is not bald. France does not have a king.

Implicature denial: That wasn't a lady I kissed last night – it was my wife.

The analysis of implicature is based on Grice's notion of conversational implicature (e.g. Adler 1997, Meibauer 2005). Implicatures arise when a speaker intends one thing while saying something different (Grice 1975). Grice's Cooperative Principle and its four maxims of Quantity, Quality, Relevance and Manner specify how interlocutors in a conversation subscribe to and comply with a tacit agreement to be cooperative. The four maxims, which constitute the core of the Cooperative Principle are, as explained by Grice:

- Maxim of Quantity: to be as informative as is required for the current purpose of the conversation, and do not be more informative than is required,

- Maxim of Quality: do not say what you believe to be false, do not say anything for which you lack adequate evidence,

- Maxim of Relevance: make your contribution relevant to the conversation/ context, and

- Maxim of Manner: do not be ambiguous, be brief and orderly.

Flouting is the most frequent type of non-observance of the conversational maxims. It refers to the blatantly or intentionally not observing a particular maxim for the purpose of generating a conversational implicature. According to Grice (1989), flouting a maxim is a particularly silent way of getting an addressee to draw inferences. Grundy (2000: 78)

argues that the speaker wants the hearer to move from the semantically expressed meaning to the level of a further implied meaning. Grice (1975) also classified irony as a case of flouting the Maxim of Quality. Notice the following example in which meaning is conveyed indirectly:

He hit the roof when he heard the news.

Saying something that is obviously false conveys figures of speech such as irony. In the above example, it is unlikely he was tall enough to hit the roof; It is not possible that the speaker was intentionally lying or mistaken - the addressee has to infer that the speaker was using irony. To the contrary, violation is the condition in which the speakers know that the hearers will not know the truth. They intentionally generate a misleading implicature (Thomas 1995: 73). Notice the following example:

Mom asks her son, who has been playing all the day.

Mom: Did you study all the day?

Son: Yes, I have been studying all the day.

Here, the son is intentionally lying. Before studying the possible account of tweets as conversational implicatures, it is paramount to identify how violations of the Cooperative Principle can be analyzed as deceptive acts. Turner et al. (1975) present taxonomy of deception strategies (Distortion, Concealment, and Diversionary responses). McCornack (1992) extends Turner et al.'s idea and relates it to the Cooperative Principle and proposes Information Manipulation Theory (IMT). According to McCornack, deceptive messages are constructed by violating one or more of the Grice's maxims. Meilbauer (2005), motivated by the work of Adler (1997), presents a speech act analysis of deceptive implicatures within the framework of Grice's Cooperative Principle. Burgoon et al (1996) proposes a variant of McCornack (1992) and postulates five dimensions, namely, Veridicality, Completeness, Directness/Relevance, Clarity and Personalization. Four common dimensions are found in McCornack's model

with Veridicality being related to Quality, Completeness being related to Quantity, Directness/Relevance being related to Relevance, and Clarity being related to Manner. McCornack (1992) argues that the intended violation of the maxims of conversation to mislead is a deceptive act, which is framed in Information Manipulation Theory (IMT). The study is built on the concept of Grice's maxims and IMT. The findings suggest that violation of Grice's maxims will be perceived as dishonest. IMT explains how deceptive messages form in conversation. IMT claims that when humans consider that a message might be deceptive, the message directly violates one or more of the Gricean maxims. McCornack and others' (1992) empirical test on IMT evaluates perceptions of messages honesty and message competence. They investigated whether information could be manipulated by other veracity (i.e. by violating the other maxims of conversation rather than just quality).

DePaulo and others (2003) also explain deception detection. They find that liars provide less information than truth-tellers. This finding is in line with McCornack's (1992) notion of the purposeful violations of Grice's maxims. DePaulo and others (2003) argue that lies sound less plausible and are more likely to make people have doubts about the information. This notion fits the violation of the maxims as a deceptive act: the information that the sender is providing is purposefully faulty. Olekalns and Smith (2009) also argue that trust emerges from an individual's expectations of intentions because cognitive trust and affective trust function differently, with different consequences. In addition, McAllister (1995) writes "the amount of knowledge necessary for trust is somewhere between total knowledge and total ignorance" (1995: 26). Knowledge is the foundation for the start of trust, and the more knowledge people have, the less they need to rely on trust. Swift and Hwang (2013) argue that cognitive trust needs to reduce uncertainty because of its growth through shared experiences. Communication, according to Putnam and Roloff (1992), involves information-sharing, omission and misinformation to achieve the goals. Tweeters, for example, use an arsenal of strategies of bluffing (misinformation) to deceive their followers. Falkenberg, Galeazzi, Torricelli and others (2022) analyze tweets related to the Conference of the Parties (COP) to clarify the nature of polarization in political debates on climate change. They show

how the climate discussion is structured on Twitter in terms of the plurality of views. They found that a prominent opposition to the dominant pro-climate discourse has established itself since late 2019.

III. Data and Methodology

The type of data used in the study consists of actual instances of 420 live tweets in English which are responses to climate change discussions. The data contain only texts; therefore, multimodal data such as images and videos are not considered. There are 13,160 tweets in the data set. I manually checked all the tweets and sampled 420 tweets of skeptics which convey implicature. All kinds of posts such as tweets, replies and mentions are included in the study. I collected tweets with hashtags and certain keywords such as #climatechange to identify the tweets which convey implicatures. The criteria of data selection depend on:

1. Twitter manual search
2. Tweets which have denials and implicatures

I chose 24 tweets as purposive sampling in the study. This method is often used in qualitative research. I selected them because they are clear examples Gricean implicatures which are used by climate change skeptics to deny climate change. Because many climate change skeptics are politicians and economists, I observed many implicatures are used by Donald Trump who is a prominent skeptic of climate change. Geographic dimension is not included; i.e. the country of the trending hashtag is not a criterion. In order to gain a better and more thorough academic understanding of tweets which are responses to climate change discussions, I undertake an analytical study which handles data taken from the 'real world'. First, I searched famous hashtags by inputting hashtag #climatechange into Twitter Search to ascertain the top tweets which were posted. Then, I categorized the responding tweets into implicatures. I also drew on Grice's maxims as a technique to analyze the tweets.

IV. ANALYSIS

This section is concerned with presenting a content-based and category-based analysis of the tweets utilized in this study. Notice the three categories in Table 1:

Table 1. *Overview: Types of conversational implicatures in 420 tweets*

Type of Tweets	Frequency	Percentage
Denial	**42**	**10%**
Implicatures triggered by flouting	**171 (77 cases of irony with 45%)**	**40.7%**
Implicatures triggered by violating	**207**	**49.3%**
Total no. of tweets	**420**	

It is noticed that implicatures triggered by violating the maxims are used more than implicatures triggered by flouting the maxims. Implicatures in general are used more than direct denials. Climate change skepticism was on the rise from 2012 till 2020: While in the first two years there was more denial; the last eight years witnesses more flouting and violations of the Cooperative Principle as fake news spread quickly.

V. DISCUSSION

In this section, examples of conversational implicatures are analyzed to show how climate change skeptics utilized them in their stance. The first two examples are direct denial of climate change. Denial is achieved by negation of proposition which means denying a sentence denoting a proposition. According to Duzi (2018), negation can be narrow-scope or wide-scope. He argues that the former is presupposition-preserving; the latter is presupposition-denying. In the following example, the tweeter denies the proposition of climate change overtly by negating the sentence. If a sentence has a presupposition, narrow-scope negation is the relevant one, because wide-scope negation is presupposition-denying. He proposed a solution to the dispute about

Russelian vs. Strawsonian analysis of the sentence "The King of France is bold". Notice in the following example how negation is utilized to deny climate change.

Example (1)

There is no Global Warming, Climate Change..it's all part of the agenda to control us.. (Glinys 2022)

Denial of climate change is sometimes issued by presupposition-preserving negation. Although it is unstated, the tweeter, in the following example, assumes that global change is a matter of existential, not pragmatic, discourse.

Example (2)

Global warming has been proven to be a canard repeatedly over and over again. (Trump 2012)

Negation is expressed lexically by the adjective "canard". The presupposition-preserving negation is undermined by the use of the passive. Climate change skeptics later in the following examples utilized non-literal meaning to give hints and clues that help them persuade their audiences. The following examples are conversational implicatures triggered by flouting one or more of the Gricean maxims. In Example (3) the tweeter flouts the maxim of relevance. In the next example Trump escalted his denial of climate change.

Example (3)

Waste! With a $16T debt and $1T budget deficit, @BarackObama is sending $770M overseas "to fight global warming" (Trump 2012)

If the reader assumes that the tweeter is in fact observing the cooperative principle and the maxim of relevance, then the tweeter must be communicating some related proposition (i.e. a true proposition). He communicates the proposition that spending money on climate change is a waste. The inverted commas in "to fight global warming"

are used to imply that the cause is false. The same type of reasoning can be inferred in the following tweet where Trump expressed the proposition that while the world is busy with serious issues, Obama is busy with climate change.

Example (4)

Russia is on the move in the Ukraine, Iran is nuking up & Libya is run by Al Qaeda, yet Obama is busy issuing 'climate change" warnings. (Trump 2014)

The proposition that climate change is trivial is communicated in Example (4) in the form of an implicature. Flouting the maxims is sometimes utilized to express irony. Verbal irony is analyzed as implicating the opposite of the literal meaning (the speaker says something that is blatantly false). The hearer is forced to look for a related proposition that helps to go with the maxim of quality. The related proposition is often conceived as an implicature of the utterance. The following examples are implicatures triggered by flouting the quality maxims. The contrast with the literal use of language becomes clear if we compare the above non-ironical utterances with the following ironical utterances. The next tweet by Trump is an irony which is classified by Grice (1975) as a case of figurative meaning. Trump flouts the maxim of quality because when he issued the literal meaning; he contradicted the real meaning that no country intends to destroy the competitiveness of its industry.

Example (5)

Let's continue to destroy the competitiveness of our factories & manufacturing so we can fight mythical global warming. China is so happy! (Trump 2012)

A few days later Trump issued the tweet in example (6) and admitted the proposition that they cannot destroy the competitiveness of our factories and at the same time he expressed an overt denial of climate change by using the adjective "nonexistent". At

the end of the tweet, he expressed the irony that China is thrilled with destroying the competitiveness.

Example (6)

We can't destroy the competitiveness of our factories in order to prepare for nonexistent global warming. China is thrilled with us! (Trump 2012)

Irony is expressed in many tweets. The following two tweets exploit the irony that people are talking about global warming while it is snowing.

Example (7)

It's freezing outside, where the hell is "global warming"?? (Trump 2013)

Example (8)

It's 46º (really cold) and snowing in New York on Memorial Day - tell the so-called "scientists" that we want global warming right now! (Trump 2013)

In the previous examples, Trump encoded a proposition that is clearly false, since global warming is manifestly not seen as the disappearance of snowing or freezing temperature. More examples can be seen in the following two tweets which include rhetorical questions. Ironically, Trump wonders where global warming is.

Example (9)

It's freezing in New York–Where the hell is global warming when you need it? (Trump 2013)

Example (10)

Wow, 25 degrees below zero, record cold and snow spell. Global warming anyone? (Trump 2015)

These implicatures allow the readers to restore the application of the quality maxim by conveying a true proposition. The same type of reasoning (involving a blatant flouting of the quality maxim) can be seen in the following two tweets where Trump commented on the change of the term "global warming" to "climate change".

Example (11)

Wow, record setting cold temperatures throughout large parts of the country. Must be global warming, I mean climate change! (Trump 2013)

Example (12)

Massive record setting snowstorm and freezing temperatures in U.S. Smart that GLOBAL WARMING hoaxsters changed name to CLIMATE CHANGE! $$$$ (Trump 2014)

Trump wants to convey the proposition that climate change supporters stopped using the term "global warming" because they failed to persuade people and he called them "hoaxsters". It is manifestly clear in Example (13) that he is not literally intending to communicate that China loved Obama's speech. The irony is meant to convey the opposite of the literal meaning. He creates the irony that Obama is not aware of China's leading world economy.

Example (13)

China loved Obama's climate change speech yesterday. They laughed! It hastens their takeover of us as the leading world economy. (Trump 2013)

As shown above, the previous examples involve implicature based on flouting the Gricean maxims. The Gricean conditions in irony are met since something blatantly false has been said with the intention to communicate the opposite. Thus, on a Gricean approach, the tweet is flouting the maxim of quality. In the next examples, implicatures are triggered by violating the maxims to deceive the addressees. Implicature in the next

tweet is triggered by violating the maxim of relevance which can be seen as a type of deceptive utterance. The tweeter wants to relate events in the 1920s with global change.

Example (14)

In the 1920's people were worried about global cooling--it never happened. Now it's global warming. Give me a break! (Trump 2012)

Climate change skeptics tried to make use of any past events to persuade their audience.

Another implicature is triggered by violating the maxim of quality in example (15). Trump uses a rhetorical question to communicate the proposition no one would believe Al Gore when he blamed climate change for the hurricane.

Example (15)

Do you believe @algore is blaming global warming for the hurricane? (Trump 2012)

Another violation of the maxim of quality can be realized in the following example by Trump.

Example (16)

Global warming is based on faulty science and manipulated data which is proven by the emails that were leaked (Trump 2012)

Here the implicature is a deceptive utterance. The violation of the maxim of quality takes place because the tweet depends on a released email which is not scientific evidence. Trump wants to convey that global warming is a fake issue. In fact, this kind of communication without evidence is called disinformation. The purpose of communication is persuasion; i.e. changing the addressees' world views. The stronger the speaker's evidence, the easier the persuasion. One way for the deceivers to disseminate disinformation is to downplay their commitment to what they mean

through the utterance by making it less informative or producing under-informative utterances. For rather obvious reasons Trump kept repeating the same implicature in the following tweet.

Example (17)

The concept of global warming was created by and for the Chinese in order to make U.S. manufacturing non-competitive. (Trump 2012)

This phenomenon of truthfully misleading information is supported by business leaders to mitigate the high tone of climate change. They directly or indirectly expressed the proposition that climate change is fabricated and fake. The levels of false information are peddled by business leaders as well as advertisers. The problem of reliability of information goes much deeper. In fact, human knowledge in the age of post-truth is susceptible to Third-party manipulation. Herman and Chomsky (1988: 381) argue that mass communication media are "effective and powerful ideological institutions that carry out a system-supportive propaganda function, by reliance on market forces, internalized assumptions, and self-censorship, and without overt coercion", by means of the propaganda model of communication. Notice how the implicature in the following tweet is based on fabricating scientific truth.

Example (18)

Man does not control climate. CO2 is not the climate control knob. (3) CO2 follows temperature rise. The geological record shows CO2 levels have been far higher in the past, there was no runaway greenhouse, nor did the oceans boil away. CO2 levels are now at an historical low. (Carfoot 2019)

Violation, in the previous tweet, takes place because the user intentionally falsified scientific truth to express implicit denial. Another deceptive utterance is achieved in the following tweet by issuing an implicature.

Example (19)

Stopping climate change is only expensive compared to an imaginary world where climate change doesn't exist. It's *incredibly cheap* compared to the actual cost of a 3 degree warmer world. (Klein 2019)

The tweeter violates the maxim of quality; the implicature aimed at misleading from the true intent of stopping climate change. Understatement is also achieved by violating the maxim of quality as in the following example.

Example (20)

We don't emit CO2 with malign intent. Indeed, it is a byproduct of giving humanity access to unprecedented amounts of energy, which has lifted more than a billion people out of poverty in just the past 25 years. (Lomborg 2019)

Violation is meant in the previous tweet to describe climate change in a way that makes it less important. Another violation of the maxim of quality can be seen in the following tweet.

Example (21)

CO_2 and climate make world greener Climate net problem but breathless reporting ignores global greening "highly credible evidence of anthropogenic climate change" 1982-2019 world added leaves with a total area equivalent to 3x Continental US … (Lomborg 2022)

Many climate change skeptics politicize the cause of climate change. In the beginning of the cause, some of them overtly denied climate change. Others depended on flouting the Gricean maxims to implicate that the cause was false. They also violated the maxims to disseminate false information. In the following example, the tweeter admits that he is not skeptical about climate change, but he is skeptical of the causes.

Example (22)

Climate change skeptics are not skeptical there is climate change. We are skeptical that humans are the main cause & especially of the silly notion that it's an "emergency". The Russian invasion of Ukraine is an emergency. So is the idiocy of "Net-Zero". It is collective suicide. (Moore 2022)

Skeptics utter implicatures based on violating the maxims by giving half-truth or misleading information. In reply to skeptics, climate change proponents refute their arguments by explaining the true proposition in the following examples.

Example (23)

"Human CO^2 emissions are only 4% of natural CO^2 emissions". Technically that's true, but when it occurs on top of the natural carbon cycle where sources and sinks balance each other, the result looks worrying. (Rantanen 2019)

The seriousness of the cause is expressed by President Biden in the following tweet.

Example (24)

Climate change is an existential threat to our planet. That's why the Build Back Better Framework will be an unprecedented effort to combat climate change and puts the United States on track to meet our target of reducing greenhouse gas emissions in half by the year 2030. (Biden 2021)

It is noticed that climate change skeptics rely on implicature as a kind of non-literal meaning to give disinformation on climate change.

VI. CONCLUSION

Environmental change—climate change and global warming—is significant challenges facing the world, climate change skeptics attack academics, scientists and caused an increasing emergence of struggles between business leaders and climate change defenders. In the recent years credibility of science has been challenged and especially topics like climate change are increasingly polarised and politicised. Twitter had content management teams and a sustainability arm to delete and suspend accounts that deny climate change. Recently, it lifted the bans on those skeptic users such as Donald Trump.

To conclude, the study argues that climate change skeptics utilize negation to deny climate change. They frequently depended on implicatures to support their stance. From a Gricean point of view, they flout the maxims to implicate that climate change is not real. They also violate the maxims to deceive their audience. Questions about the emergence of climate disinformation surrounding environmental/climate change and global warming are raised by the growing use of Twitter as a platform for sharing and discussing scientific information. Climate change skeptics use non-literal meaning, such as implicature, which acts as a discursive strategy to provoke the others with a different position and climate change falls into polarisation. Irony was also employed when people expressed skepticism about climate change. It is a technique for expressing one's viewpoint by either muting its critical nature or exaggerating the criticism in a humorous way.

 Thus, the study reveals that tweets demand inferential process to understand the implicatures in the tweets of climate change skeptics. Twitter is distinctive from other platforms or social networks because it is a short-message service (normally up to 280 character). The study can be enhanced by more exhaustive analysis that reveals the nature of implicit meaning in Twitter. Twitter is a powerful means of political propaganda. The wealth of data, with their interactive features, provides an ideal medium to analyze the political messages which are conveyed indirectly by conversational implicatures.

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