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Metaphor, topoi, and cognitive heuristics in climate governance: a dual-staged metaphorical argumentation analysis of climate political speech

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Although metaphors are widely recognised as central to climate communication, scant studies have explored how they function as structured arguments that exploit cognitive heuristics in political discourse. This study proposes a dual-staged model of metaphorical argumentation that links Toulmin's layout, discourse-historical topoi and cognitive accounts of heuristics, applied to a corpus-assisted analysis of US officials' speeches at the 2021 Leaders Summit on Climate. Using Wmatrix-assisted metaphor identification, the study identifies JOURNEY, CONSTRUCTION and ILLNESS as predominant metaphors, with relevant expressions reconstructed as chained argumentative stages. The analysis shows JOURNEY argumentation normalises cooperative, time-bound climate action, CONSTRUCTION framing legitimises incremental, techno-economic solutions and ILLNESS metaphors provide danger and moral urgency. Across patterns, these metaphorical argumentative cells combine into a macro-argumentative chain that organises and narrows the space of acceptable climate responses. The study illuminates how metaphor-based argumentation steers public reasoning in climate governance, offering valuable insights into the cognitive-discursive mechanisms of metaphorical argumentation.

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Introduction

Climate change—widely recognised as one of the most urgent global challenges—has long been conceptualised and discursively communicated, transitioning from an initially scientific matter into a profoundly contested social and political issue (Deming, 2005). In this transition, discourses play a significant role in shaping public understanding, influencing climate policy and legitimising proposed actions (Fløttum, 2010; Finnegan, 2022). Extensive scholarly attention has thus been directed toward diverse aspects of climate change discourse, ranging from discursive representation (Atanasova and Koteyko, 2015; Koteyko and Atanasova, 2016), framing (Koteyko et al., 2010; Nisbet, 2009; Shaw and Nerlich, 2015) to argumentation (Augé, 2023, 2024). Across these studies, metaphor has emerged as a particularly prominent topic and the pivotal role of metaphors within climate-related argumentation has become an emerging research trend (Augé, 2023), yet this trend has received relatively limited attention.

Q1–Q4

As a significant tool for conceptualising climate change and shaping climate policies, metaphors facilitate public perception by virtue of simplifying complex and abstract climate-related issues through embodied experiences (Väliveronnen and Hellsten, 2002). This conceptual simplification helps to achieve public consensus and guides public reasoning about climate threats and potential solutions (Shaw and Nerlich, 2015). Thus, metaphors determine how climate issues are perceived, interpreted and responded to by both policymakers and the public. Given its powerful role in shaping perceptions, metaphor selection becomes a key issue within climate communication, as it decides which aspects or claims of climate change are constructed and highlighted for the audience (Koteyko and Atanasova, 2016; Hidalgo-Downing and O’Dowd, 2023; Semino, 2021; Semino et al., 2017). Previous research has found such recurring metaphors as WAR (CONFLICT), JOURNEY, ILLNESS and RELIGION, which are frequently employed to verbally represent issues related to climate change. For instance, WAR metaphor invokes well-established knowledge of confrontation against a formidable enemy, highlighting the potential risks of climate change (Currie and Clarke, 2022), whereas ILLNESS metaphor evokes audience’s empathy and sympathy via personification—a widely employed construction that the Earth is represented as a patient suffering climate illness (Atanasova and Koteyko, 2015, 2017)—to make an ethical case for action (Sontag, 1989). These metaphors play a decisive role not only in conveying the complexity of climate change but also in steering audiences towards accepting different narratives, political stances, or moral positions.

Considering that a central aim of climate communication is to present arguments that can secure endorsement for particular courses of action and sustained public engagement (Fløttum, 2010), it is necessary to examine the argumentative functioning of metaphor in climate communication (Ervas et al., 2018). However, despite extensive research on metaphors’ role in conceptualising climate change, comparatively scant studies have addressed how metaphors contribute to the argumentativeness of climate-related discourse. To be more specific, we still lack a detailed, discourse-grounded account of how metaphors in political climate speeches are organised as arguments that could shape audience judgements from cognitive perspectives. It becomes particularly pertinent in relation to the emerging perception that metaphor is an implicit and condensed argument (Rossi, 2016; Lakoff, 1993; Sopory and Dillard, 2002; Thibodeau and Boroditsky, 2011, 2013), which tactfully governs audience’s interpretation of and identification with the policy in question.

Given these considerations, this study examines how predominant metaphors in political speech at the 2021 Leaders Summit on Climate, a significant event marking the United

States’ transition from the Trump administration’s ‘withdrawal policy’ (Jotzo et al., 2018), are employed to construct and support essential arguments in climate governance, and to steer public reasoning about climate responsibilities and solutions. These questions are asked to address the above concerns:

- (1) What are the predominant metaphors in speeches?
- (2) How do these metaphors organise the argumentation, with what underlying ideologies these metaphorical argumentations embed?

By developing a dual-staged model of metaphorical argumentation that integrates Toulmin’s (2003) argument layout, discourse-historical approach (DHA) on topoi (Wodak, 2001; Reisigl and Wodak, 2016) and cognitive accounts of heuristics and adapted cognition (Hart, 2013; Sperber et al., 2010), this study explores how recurrent metaphors in climate political speech argumentatively operate in two stages to support a specific claim, with what cognitive mechanisms underlie these processes, thereby addressing the above gap.

Theoretical framework

Metaphor and argumentation. Research examining metaphors and argumentation has become an emerging and increasingly debated area of study, with divergent focus regarding which types of metaphors (e.g. deliberate versus non-deliberate metaphors) should be recognised as genuinely argumentative. Conventional studies of argumentation in its narrow sense as pragma-dialectics (de Lavalette et al., 2019; Juszczak et al., 2022; van Poppel, 2020) are characterised by a structured four-stage argumentation model (see van Eemeren and Grootendorst, 2016), highlighting adversarial settings and the interactive process of deliberate critical examination and questioning (van Eemeren and Grootendorst, 2004, 2016). Proponents argue that only deliberate metaphors (Steen, 2017) can function in this narrow view—as persuasion, warranting argumentative analysis (Wodak, 2001; van Poppel, 2020).

This view, however, has been significantly challenged by cognitive linguists who claimed that real-world argumentation often operates beyond clear argumentation structures (Ihnen and Richardson, 2011), and metaphors within—both deliberate and non-deliberate—can function as powerful argumentative tools through multiple cognitive mechanisms (Lakoff, 1993; Sopory and Dillard, 2002; Thibodeau and Boroditsky, 2011, 2013). Such cognitive-oriented criticism has prompted scholars to seek a broader interpretation, capable of capturing the complexity of actual argumentative practices, especially in political and media discourse (van Dijk, 2006; Hart, 2013). The broader interpretation gradually gains recognition, holding that ‘any conveying of alleged reasons in support of conclusions’ that a speaker or writer intends the audience to accept (Ervas et al., 2018: 153) is intrinsically connected to reasoning. It aligns more closely with manipulation rather than mere persuasion (van Dijk, 2006; Hart, 2013).

Manipulative communication is about exploiting heuristic-based ways in which the audiences process information, such as cheater-detection mechanism, epistemic vigilance, or emotion module (Buller, 2005; Cosmides, 1989; Sperber et al., 2010), requiring the speaker to employ discourse strategies or cognitive tools to establish associations between the audience and these modules, prompting audiences towards spontaneous reasoning and evaluation (Hart, 2011, 2013; Maillat and Oswald, 2011). This broader interpretation is particularly necessary for understanding how arguments operate in contexts where power relations and

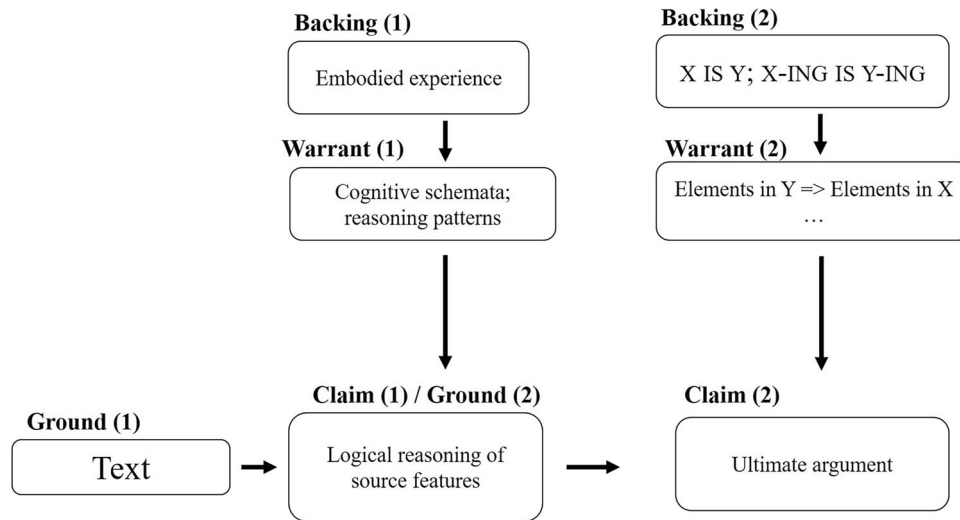


Fig. 1 Metaphorical argumentation model (based on Herman, 2018; Xu and Wu, 2014). This figure, based on Toulmin’s argumentation model and Conceptual Metaphor Theory, presents the dual-layered metaphorical argumentation model for the current study. The model includes two parts, the source domain layer and target domain layer, constructing a dual-layered reasoning chain for any arguments or claims that argued by metaphors.

ideological effects may be more significant, i.e. political discourse, than adversarial or debate-oriented process.

Within this broader interpretation, metaphor thus acts as a cognitive mechanism that can activate heuristics—‘cognitive shortcuts’ (Hart, 2013: 202), to bypass critical evaluation of arguments through activating familiar, entrenched modules, thereby manipulating audiences into accepting specific claims. Recent research by Augé (2023, 2024) adopts this perspective to investigate climate crisis discourse, revealing how conventionalised metaphors, such as BODY metaphors highlighting the mapping between lungs and forests, guide audiences to comprehend the vital necessity of forests to planetary health. These metaphors work not only through explicit logical connections but also by activating adapted cognitive mechanisms related to body schema and vital organ function, thereby strengthening the argumentative force. Moreover, metaphor’s capacity to selectively foreground some aspects of a source domain while backgrounding others enables speakers to steer attention towards particular conclusions and away from alternatives, foregrounding preferred policies or solutions while marginalising competing options (Cameron and Deignan, 2006; Charteris-Black, 2011; Musolff, 2016). In a word, argumentativeness of metaphor derives from its dual levels: it simultaneously prompts explicit reasoning processes and activates implicit cognitive shortcuts that manipulate information processing and decision-making. Building on this insight, the present study aims to reveal how these two levels interact in climate discourse.

Metaphorical argumentation model. Building upon the aforementioned broader view of argumentation, this study adopts the following metaphorical argumentation model (Fig. 1).

Such model draws upon Toulmin’s (2003) classical argumentation framework, focusing on the interplay among claim, ground (or data) and warrant (or topos), explicitly foregrounding the reasoning processes. Since it has often been critiqued for focusing on a single, linear argument, which underrepresents the recursive or chain-like progression of many real-world arguments (Cramer and Kempen, 2022), some scholars (Herman, 2018; Santibáñez, 2010; Xu and Wu, 2014) suggest chains of metaphorical argumentation, in which a claim is derived from source domain become the premise (‘new ground’) for target reasoning, creating

what have been termed as ‘sequential arguments’ (Aberdein, 2005: 300) or ‘argumentation streams’ (Knipping and Reid, 2019: 8).

To be specific, the metaphorical argumentation model consists of two sub-argumentation processes (source and target), with a mapping relation added. Ground (1) refers to the metaphoric expressions in the text, which activate a set of cognitive schemata about specific source domain (e.g. PROGRESS, DESTINATION, TRAVELLERS in JOURNEY metaphor) as Warrant (1), backed up by the corpus evidence and embodied experience. From there, Claim (1) is an interpretive inference that (i) recognises which aspects or elements of the source domain frame are highlighted through repetition, emphasis, or focus on the text and (ii) reasons about what these emphasised features suggest about the nature or requirements of the source domain. Once Claim (1) is established, it automatically becomes Ground (2) for the target domain argumentation, where the conceptual mapping legitimises the transfer of inferential structure onto the target domain. In other words, the systematic nature of mapping preserves inferential structure (Gentner and Bowdle, 2008; Lakoff, 1993), projecting the logical inference results of source domain’s features into target domain, which receives a correspondent reasoning with concrete element mappings (Lakoff, 2014). For instance, in the metaphor [LAWYER IS SHARK] under court trial context, the reasoning of the source domain highlights the aggressive character of the shark instead of the animal feature, and through the concrete mapping onto target domain, an aggressive lawyer is drawn as conclusion. Indeed, the features highlighted may be different in different contexts, lawyers may also accept the sharp-teeth source feature mapping. In any case, this provides cognitive legitimacy for transferring claims from source to target. Additionally, the transfer between two sub-argumentations is an argumentative move with explicit interpretive step that can be critically evaluated (Tindale, 2004), enabling complex reasoning through analogical transfer, which also provides legitimacy. Therefore, the first interpretive claim grounds the second sub-argumentation, where Warrant (2) and Claim (2) set forth how the frame elements in source domain are mapped to the target domain. Through this dual-stage arrangement, metaphors introduced early in the discourse establish cognitive frames that reverberate in later segments of the argument, effectively inheriting or transferring interpretations from source to target, progressively strengthening the argumentative force.

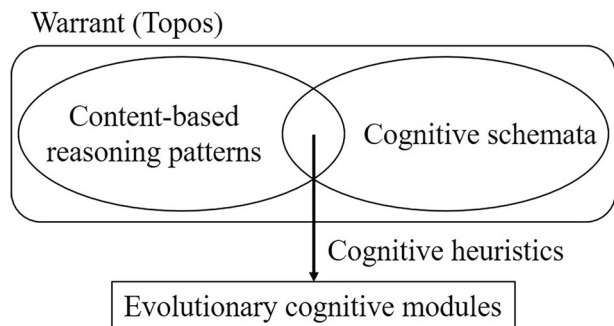


Fig. 2 Restructured warrant in metaphorical argumentation model. Based on evolutionary psychology, the figure reconstructs the warrant in the metaphorical argumentation model, indicating its reasoning mechanism. That is, the argumentative effects of metaphorical argumentation are mediated by cognitive heuristics, which themselves rest on deeper, evolutionarily shaped cognitive modules.

While this model explicitly represents the logical processes of metaphorical argumentation, it overlooks the implicit activations of cognitive mechanisms. Classical and discourse-historical work has shown that warrants (or topoi) can be candidates for manipulative acts of communication (Hart, 2013). From the cognitive-pragmatic perspective, warrants (or topoi) are not merely passive connectors between domains; rather, they actively trigger shortcuts towards adapted cognitive modules on two levels—cognitive and discourse-level (Buss and Jost, 2006), to invite rapid, default inferences rather than effortful reasoning (Hart, 2013; Sperber et al., 2010).

At the cognitive level, source-domain topoi manifest as domain-specific cognitive schemata—basic conceptual elements and relations structuring our understanding of particular experiential domains. Target-domain topoi function as fundamental cross-domain mapping rules ensuring systematic inferential transfer, establishing the foundational patterns through which knowledge from one domain can be meaningfully applied to another. These mapping rules, grounded in cognitive linguistics research (Lakoff and Johnson, 1980; Gentner and Bowdle, 2008), maintain the logical and structural relationships that make metaphorical reasoning possible. Since source topoi trigger immediate access to familiar experiential knowledge structures, and target topoi enable rapid transfer of inferential patterns across domains, they activate audiences' embodied experience and pre-existing cognitive frames to access the argument, achieving certain manipulative effects without elaborated evaluation of their reasonableness.

At the discourse level, topoi operate as content-related conclusion rules closely tied to specific fields of social action and communicative contexts (van Eemeren et al., 1996; Walton et al., 2008). While it can be distinguished with several types (e.g. van Eemeren et al., 1996; Walton et al., 2008), the study in CDA usually resort to the 15 types systematically identified in immigration discourse (see Wodak, 2001). Unlike cognitive-level topoi, these discourse-level topoi reflect institutionalised and cultural norms shaping reasoning patterns in particular social and cultural contexts. For instance, the topoi of danger dominates security-related discourses, while the topoi of burden frequently occur in immigration arguments. It has been proved that when audiences encounter familiar argumentative structures (e.g. danger-based reasoning in security contexts), they automatically associate with established reasoning patterns, significantly reducing the likelihood of detailed evaluative processing on the rationality of arguments (Boukala, 2016; Wodak, 2001).

Integrating both cognitive and discourse-level dimensions (as illustrated in Fig. 2), topoi function as cognitive triggers that activate cognitive shortcuts in audience' mind towards domain-specific cognitive modularities to efficiently guide information processing and judgement formation (Buss and Jost, 2006; Hart, 2013). For instance, metaphorical expressions within climate change discourses explicitly structure arguments via mappings (e.g. EARTH IS A PATIENT, to support urgent climate actions) while resorting to topoi of danger and urgency to support the arguments. These topoi involve threat-response module and avoidance mechanisms (Cosmides, 1989; Buss and Jost, 2006), prompting intuitive acceptance of arguments without elaborate consideration and judgement (Flusberg et al., 2017). By restructuring the warrants, metaphorical arguments can operate simultaneously through multiple cognitive pathways: schematic structures provide the basic inferential framework, while content topoi guide domain-specific reasoning patterns, which are combined to activate heuristics manipulating audience' information processing. Each level makes respective contributions to the argumentative process, though interacting in complex ways that shape both explicit reasoning and implicit cognitive processing.

This perception indicates how metaphorical argumentation operates in climate change discourse through three interconnected parts: (1) the explicit argumentative structure provided by metaphorical mapping on the typical argumentation model, (2) the embedded topoi that serve as heuristics triggers and (3) the underlying mental modules that these mechanisms activate. By examining these levels, we can better understand how metaphorical argumentation achieves its effects through both reasoning scheme and cognitive processing.

Data and methodology

Data. This study examines political speeches by United States officials, represented by President Biden, delivered on 21–22 April 2021 during the Virtual Leaders Summit on Climate. The summit, convened by the Biden administration and held virtually due to the COVID-19 pandemic, brought together forty national leaders to discuss global climate action and to signal renewed US commitment after the country's withdrawal from, and subsequent re-entry into, the Paris Agreement (Jotzo et al., 2018). The US voices occupied a central position in framing the summit's agenda and in projecting a particular vision of climate leadership to domestic and international audiences. Meanwhile, the summit marked a discursive turning point in US climate governance and established the foundation for subsequent climate initiatives and participation in COP26, making it a particularly significant arena for examining how metaphorical argumentation is mobilised to reconstruct credibility and justify new policy directions.

The corpus consists of 15 speeches primarily delivered by United States officials, with President Biden and Special Presidential Envoy for Climate John Kerry accounting for the majority, amounting to approximately 23,610 words in total. Transcripts were obtained from the official White House website (The White House, 2021) and checked against video recordings where necessary. Table 1 provides an overview of the dataset.

The summit is structured around visible political figures, complemented by themes from key cabinet members responsible for defence, foreign affairs, energy, commerce, the treasury and homeland security. The topics span core dimensions of contemporary climate governance, including ambition-raising, climate finance and investment, clean energy innovation, climate–security linkages, economic opportunity, justice and resilience, with primary focus on economy and investment. This distribution underlines that the corpus captures both headline political narratives and more specialised policy framings,

Table 1 Overview of US speeches.

Speaker	Topic	Words (Approx.)	Date
Biden (President)	Raising climate ambition	2300	22 Apr
	Mobilising climate investment	2200	22 Apr
	Economic opportunity of climate action	2500	23 Apr
	Closing session (represented by Tai)	700	23 Apr
Kerry (Presidential Envoy)	Ocean-climate crisis and solutions	1500	22 Apr
	Investing in climate solutions	1700	22 Apr
	Clean innovation	1400	23 Apr
Austin (Defence Secretary)	Climate crisis and national security	1700	22 Apr
	Collective action for future	1000	23 Apr
Blinken (Secretary of State)	Climate threat and shared opportunity	1500	22 Apr
Raimondo (Commerce Secretary)	Clean energy innovation and jobs	1600	23 Apr
Harris (Vice President)	Climate impacts, justice and resilience	600	22 Apr
Yellen (Treasury Secretary)	Sustainable climate investment	1510	22 Apr
Mayorkas (Homeland Security Secretary)	Climate adaptation and resilience	1510	22 Apr
Granholm (Energy Secretary)	Clean energy innovation and deployment	1890	23 Apr
Total		23,610	

providing a suitable basis for examining how metaphorical argumentation operates across different roles and issue foci within a single prominent climate event.

Methods. The method combines corpus-assisted metaphor identification with reconstruction of metaphorical argumentation. The procedure comprises two main steps. First, Wmatrix is used to assist in identifying metaphor-related expressions in the corpus and in establishing the relative prominence of different conceptual metaphors through resonance. Secondly, specific metaphorical sentences and paragraphs are selected for detailed argumentative components identification to reconstruct the two-staged metaphorical argumentation patterns described in the theoretical framework.

In the first step, the corpus of summit speeches was uploaded to Wmatrix 7.0 for semantic tagging. Wmatrix generates frequency profiles of semantic domains and allows comparison across texts and sub-corpora. The semantic-domain lists were inspected to identify domains that were both (a) salient in the corpus according to their relative frequency and log-likelihood statistics, and (b) potentially metaphorical in the context of climate politics. For instance, high or significantly patterned frequencies in domains relating to motion, construction/architecture, health/illness, or conflict were treated as candidates for JOURNEY, CONSTRUCTION, ILLNESS or WAR metaphors, respectively. For each such domain, concordance lines were retrieved to examine the co-text of the relevant lexical items. The metaphor identification was also proceeded via Metaphor Identification Procedure (MIP; Pragglejaz Group, 2007), informed by the Wmatrix output. For each candidate lexical unit highlighted by the semantic tags, coders considered (i) its contextual meaning in the specific sentence, and (ii) its more basic, historically prior or concrete meaning as recorded in a general English dictionary. A lexical unit was annotated as metaphor-related if its contextual meaning contrasted with, yet could be understood in relation to, its more basic meaning, such that a cross-domain mapping was needed for interpretation. This procedure was applied to all tokens within the candidate semantic domains, and to additional items identified through close reading of the speeches. Metaphor-related lexical units were then grouped into typical conceptual form of ‘A is B’ (Lakoff and Johnson, 1980) based on shared source-domain scenarios and consistent patterns of mapping.

To assess the prominence of different metaphors, the resonance was calculated following Charteris-Black (2004): resonance = Types × Tokens, where Types represents the number

of core cognitive elements of distinct metaphors (e.g. ‘road’, ‘path’, ‘step’, ‘move’ for JOURNEY), and Tokens the total number of occurrences of those forms. Wmatrix frequency lists were used to support the counting of types and tokens. Resonance thus captures not only how often a metaphor appears but also how lexically varied it is; metaphors with high resonance are both frequent and woven in the discourse. The most prominent metaphors in the dataset were selected for detailed argumentative analysis.

Secondly, the focus shifts from individual metaphors to the reconstruction of two-staged metaphorical argumentation. For each predominant metaphor, instances identified in the corpus were examined in their concordance lines and reconstructed as source- and target-domain argument chains, specifying argumentative components like data/ground, claims and warrants following Toulmin (2003). Preference is given to stretches where multiple metaphorical lexical units co-occur in close proximity and are embedded in recognisable argumentative moves, such as justifying a target, proposing a course of action or evaluating a policy. Particular attention was paid to the reconstruction of source warrants including core cognitive schemata associated with each source domain and content-related topoi that legitimise the move from the stated ground to the explicit or implicit claims. In this way, the method yields, for each predominant conceptual metaphor, a holistic two-staged argumentation pattern. Importantly, these patterns are established at corpus level rather than for isolated examples: recurring inferential moves across multiple tokens are abstracted into stable argumentation schemes, thereby capturing the typical ways in which particular metaphors are used to support clusters of related policy claims and to transfer inferential structure from source to target domains (Gentner and Bowdle, 2008).

Subsequent analysis draws on these reconstructions to (1) explain how metaphors operate in two-staged argumentation; (2) explain what cognitive schemata and topoi the argumentation recruit, with what functions; (3) analyse the effectiveness of the metaphorical argumentation; and (4) analyse how the resulting metaphor-based arguments serve specific communicative and political purposes in the context of United States climate diplomacy.

Critical analysis on metaphorical argumentation

The occurrence of predominant metaphors. In accordance with the above identification procedure, three recurring metaphors are identified as predominant (see Table 2).

Three metaphors—JOURNEY, CONSTRUCTION/BUILDING and ILLNESS/HEALTH—are predominantly used. The JOURNEY metaphor is the most prominent, with 86 metaphorical tokens and a resonance value of 774, indicating both high frequency and substantial lexical variety. It is realised by nine distinct keywords such as path, goal, progress, move, road, step, travel, boat and obstacle, collectively instantiating a JOURNEY schema in which TRAVELLERS move along a PATH towards a DESTINATION, with PROGRESS conceptualised as forward motion or OBSTACLES conceptualised as stagnation. In the speeches, these lexical items frequently co-occur with collective pronouns ('we', 'our') and modal or process verbs ('have to move', 'need to step up'), particularly in President Biden's addresses on raising climate ambition, mobilising investment and framing the 'economic opportunity of climate action', as well as in closing remarks that emphasise 'the road we'll travel together' and the 'path to meet our goals'. It thus provides a shared cognitive frame for presenting climate policy as a collective, goal-directed process, structuring how addressees are invited to understand effort and responsibility across the claims.

The CONSTRUCTION metaphor occurs as the second most frequent (47 occurrences), with 7 distinct keywords (build-er/ing, lay, construct, forge, upgrade, brick, foundation), yielding a solid resonance of 329. These expressions activate a CONSTRUCTING/BUILDING schema involving an AGENT (builder) using MATERIALS or COMPONENTS to establish FOUNDATIONS and to complete STRUCTURES that are intended to be durable and beneficial. In the corpus, they are especially salient in speeches devoted to the 'economic opportunity of climate action', 'clean innovation and deployment' and 'clean energy innovation and jobs', delivered primarily by President Biden, the Energy Secretary, the Commerce Secretary and the Treasury Secretary. Phrases such

as 'lay a foundation for economic growth', 'build a resilient economy' and 'constructing the future of new energy' frame climate action as a constructive, stepwise process of assembling robust, future-oriented structures. In this way, the CONSTRUCTION metaphor links the summit's economic and technological themes—investment, innovation, industrial policy—to a familiar image of building something solid and durable, thereby making abstract policy trajectories appear tangible, staged and materially grounded.

The ILLNESS metaphor, also recognised as DISEASE metaphor involving with HEALTH conception (Zhao and Wu, 2023, 2025), is less frequent than the other two but still displays a notable resonance (192), with eight distinct metaphorical keywords: care, cure, recovery, fever, disease, stabilise, health and heal. These items instantiate a HEALING schema organised around a PATIENT with SYMPTOMS that need special TREATMENT and RECOVERY. Within the summit, they occur in speeches around the 'climate threat', 'climate crisis and national security', 'climate impacts, justice and resilience' and 'climate adaptation and resilience'. Expressions such as 'urgent care to our environment', 'heal our planet', 'reduce the fever of global warming' and 'stabilise the planet's health' personify the Earth as a vulnerable patient and conceptualise climate change as a serious illness that endangers both environmental and economic well-being. This metaphor thereby aligns with topics that foreground risk, inequality and vulnerability, providing a salient frame for conveying urgency, ethical obligation and the perceived necessity of timely intervention.

JOURNEY-based argumentation. The extensive use of JOURNEY metaphor primarily supports the claim that collaborative international actions are required to address climate change. This claim is holistically realised through a dual-staged argumentative structure that integrates multiple levels of warrant and cognitive mechanisms, mapping physical journey attributes onto climate action imperatives, as shown in Fig. 3.

The high frequency and significance are in resonance with its entrenchedness in embodied experience. Following examples are particularly representative of this pattern:

(1) *By maintaining those investments and putting these people to work, the United States sets out on the road to cut greenhouse gases in half—in half by the end of this decade...*

Source	Freq	Resonance
JOURNEY (M1, M2, M4, M6)	86 (54.8%)	774
CONSTRUCTION (H1, O1.1, O1.3)	47 (29.9%)	329
ILLNESS (B2)	24 (15.3%)	192

Total tokens across these three predominant metaphors = 157.

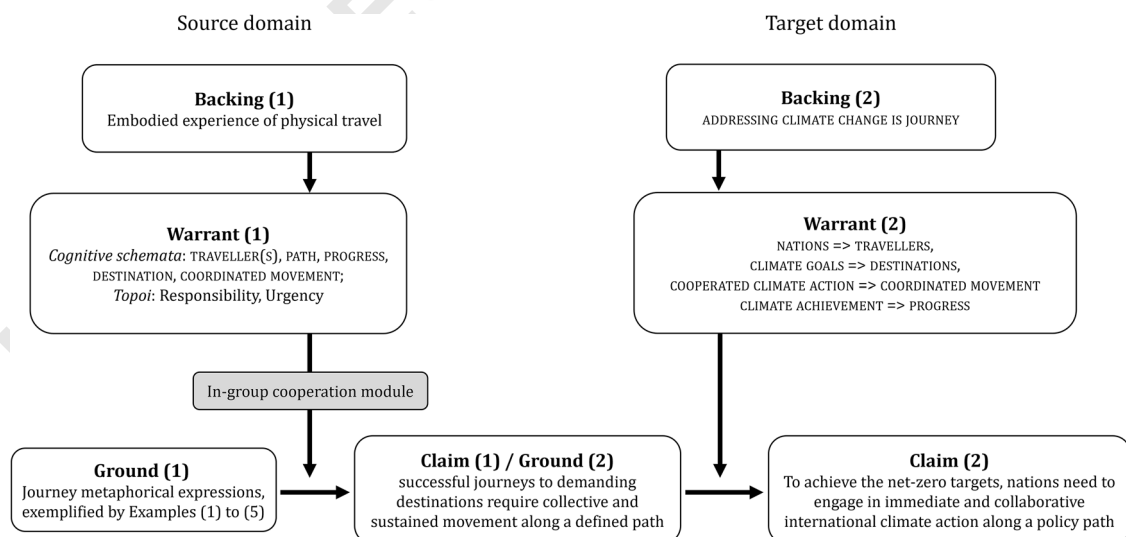


Fig. 3 Reasoning process of JOURNEY metaphorical argumentation. The figure illustrates the reasoning pattern of journey metaphors in dual-staged model, mapping physical travel logic onto the imperative for collaborative international climate action.

You know, these steps will set America on a path of net-zero emissions economy by no later than 2050. But the truth is, America represents less than 15 percent of the world's emissions. No nation can solve this crisis on our own, as I know you all fully understand. All of us, all of us—and particularly those of us who represent the world's largest economies—we have to step up

(Biden, 22 April)

(2) This summit is our first step on the road we'll travel together to and through Glasgow this November and the U.N. Climate Conference... to set our world on a path to a secure, prosperous and sustainable future.

(Biden, 22 April)

(3) We have to move. We have to move quickly to meet these challenges. The steps our countries take between now and Glasgow will set the world up for success to protect livelihoods around the world and keep global warming at a maximum of 1.5 degrees Celsius. We must get on the path now in order to do that.

(Biden, 22 April)

(4) And today, America is once again stepping into the leadership role. We will be partner[s] for the nations and efforts on the path to decarbonize critical sectors across the board including industrial sector, where we'll join with Sweden and India; the power sector, where we'll work alongside...; and in agricultural sector, [others]... to spread progress and speed it up both here and around the world.

(Biden, 23 April)

(5) But of course, no country can reach that goal (1.5 degrees Celsius) alone. We're in the same boat. And what each of our nations does or does not do will not only impact people of our own country, but people everywhere. Many of us, perhaps all of us, feel a strong sense of urgency and want to step forward. That's why we're here. We need to make the progress necessary during this critical year and over this decisive decade.

(Blinken, 22 April)

Examples (1)–(3) cluster JOURNEY lexemes around explicit climate targets ('cut greenhouse gases in half', 'net-zero emissions economy', '1.5 degrees Celsius') and temporal markers ('by the end of this decade', 'between now and Glasgow', 'this decisive decade'), while examples (4)–(5) integrate them with expressions of leadership, shared risk and urgency ('stepping into the leadership role', 'we're in a same boat', 'step forward'). They show how JOURNEY metaphors are embedded in extended argumentative moves rather than isolated phrases.

In the first, source-domain stage, these examples holistically establish journey-based reasoning: a successful journey involves sustained movement along a path towards a clearly valued destination, undertaken by a group whose members coordinate their efforts. Metaphorically, the phrases 'sets out on the road', 'our first step on the road we'll travel together', 'we must get on the path now' and 'we're in a same boat' provide the Ground (1). The backing (1) derives from entrenched embodied experience of travel (Boroditsky, 2000; Ritchie, 2008; Kövecses, 2010; Semino, 2008), audiences can be expected to immediately activate

cognitive schemata as warrant (1), including TRAVELLER(S), PATH, DESTINATION, MANNER and PROGRESS. Meanwhile, these examples discursively resort to culturally available topoi of responsibility (those who can act must act, especially if they have contributed to the problem) and urgency (imminent threats demand prompt action), making it appear self-evident that coordinated movement is required (Wodak, 2001: 74). In example (1), the statement that 'all of us... particularly those of us who represent the world's largest economies—we have to step up' implicitly claims that those who contribute significantly to a problem, and have the capacity to act, bear a special responsibility to move first and faster. The modal word 'we have to...', 'we need to...' with adjectives 'quickly' in example (1), (3) and (5) then entails a topos of urgency: if delaying action or inaction will jeopardise the goal (here, keeping warming to 1.5°C), then rapid, coordinated movement is required. Example (5) combines both: 'we're in a same boat' foregrounds shared vulnerability, while 'step forward' and 'make the progress necessary during this critical year and over this decisive decade' link that vulnerability to a time-bound obligation to act.

Crucially, the warrant (1) is systematically reinforced by collective identity markers (van Leeuwen, 2008). In examples (1) to (3) and (5), movement and path expressions co-occur with 'we', 'our', 'all of us' and 'together' and with inclusive formulations such as 'we're in a same boat'. Out of the 86 JOURNEY tokens identified, 70 appear in such collectivising markers. This pattern activates, at a cognitive level, the schemata of coordinated movement, while at the discourse level it reinforces the topos of collective responsibility: because the fate of all travellers is bound together, each is obliged to contribute. Therefore, these warrants recruit a group-cooperation module (Kiyonari and Yamagishi, 2004): audiences are encouraged to see themselves and their nations as members of an in-group moving towards a common goal, and thus to default to cooperative judgements rather than to competitive or individualistic ones. This heuristic provides a fast, intuitive shortcut that supports the conclusion that 'we have to step up', without inviting detailed scrutiny of alternative forms of climate engagement. Together, these components support Claim (1): that successful journeys to demanding destinations require collective and sustained movement along a defined path. This claim, abstracted from the examples above, serves as Ground (2) for the second target-domain stage.

In the second stage, JOURNEY attributes are mapped onto climate policy through systematic conceptual correspondences: NATIONS ARE TRAVELLERS, CLIMATE GOALS/SUSTAINED FUTURE ARE DESTINATIONS, COOPERATED CLIMATE ACTION IS COORDINATED MOVEMENT, and CLIMATE ACHIEVEMENT IS FORWARD PROGRESS. Warrant (2) thus legitimates the transfer of the source-domain inference: if states wish to achieve the agreed temperature and net-zero targets within the specified timeframe, they must move forward together along a coordinated policy path (Claim 2). The conclusions that follow—explicitly, that 'no nation can solve this crisis on our own' and that 'we have to step up' (example 1), or that 'no country can reach that goal alone' and 'we're in a same boat' (example 5)—are thus presented not as controversial propositions but as the natural target-domain counterparts of familiar journey logic.

The argumentative effectiveness of JOURNEY metaphor thus arises from that it helps organise a particular form of climate-political reasoning that is both cognitively intuitive and discursively powerful. Cognitively, framing climate policy as a shared journey constructs climate governance as goal-oriented behaviour, making progressive approaches appear more reasonable and realistic than radical breaks or non-cooperative strategies, and partly hinders access to alternative cognitive routes for tackling this problem (Maillat and Oswald, 2011). The linear, progressive nature of the journey schema (Dávid and Furkó, 2015) makes ambitious climate targets ('cut greenhouse

gases in half; ‘net-zero emissions economy’; ‘1.5 degrees Celsius’) sound more manageable and achievable, potentially increasing audience acceptance. Discursively, topoi of responsibility and urgency highlight the necessity of travellers’ movement (The capable should act) and immediacy of travelling manner (urgent problems need rapid/immediate action). The interconnection of journey schemata with collective pronouns (‘we’, ‘our’, ‘all of us’) and topoi further supports a heuristic of in-group cooperation (Kiyonari and Yamagishi, 2004): the audience is invited to see itself as part of a cohesive group moving together towards a shared destination. This can reduce cognitive dissonance around burdens and sacrifices by normalising cooperation as the default, collectively endorsed course of action. Additionally, the JOURNEY metaphor resonates with American cultural narratives in which national identity is conceptualised as a voyage (Example 5) or road trip (Example 1–4) (Morris and Waldman, 2011). Metaphors that align with such narratives gain additional persuasive force through the activation of shared cultural knowledge (Kövecses, 2005), amplifying the perceived naturalness of the underlying arguments.

This argument serves crucial political purposes in the specific context of post-Trump climate diplomacy. The argumentative strategy employed—specifically, the JOURNEY metaphor—is characterised by a high frequency of repetition, which endows it with a truth-value due to the validity effect (Hackett, 2004): the higher the truth-value an argument has, the more likely it is to go unchallenged on subsequent occasions of use, which provides legitimisation of the imperative for cooperative climate action. Moreover, since the U.S. withdrawal has caused negative knock-on effects on other countries’ emissions, America’s rejoining international climate efforts is what has long been expected (Sælen et al., 2020). Consequently, even though the argument may not be truth-conditionally felicitous, it gains effectiveness from the confirmation bias (Oswald and Grosjean, 2004) as it confirms expectations of the participating nations, thereby exerting a manipulative influence on them to accept the essential arguments about climate coordination. The subsequent large financial support and investment from over 40 international organisations observed in COP26 partially underpinned its manipulateness (O’Neill, 2022). Moreover, the expression like example (5) embedded leadership claims within cooperative frameworks. This nuanced structure helps reconstruct American engagement in global climate efforts and positions them as an advocate and leader moving ahead. All in all, such argument basically attempts to rebuild diplomatic credibility, helping manage potential resistance from other major powers by presenting climate action as a shared journey rather than an imposed directive, while still maintaining space for American leadership.

However, the argument based on the JOURNEY metaphor is also constrained by the inherent structure of the underlying schema. Its source–path–goal configuration tends to imply that steady, collective movement will reliably and genuinely bring actors closer to a stable destination, which understates the non-linear, uncertain and potentially abrupt dynamics of climate systems (Hart, 2024). Likewise, the emphasis on forward motion leaves little conceptual space for regression, stasis or abrupt re-routing, thereby marginalising scenarios in which policies fail, stall or require radical reorientation (Shaw and Nerlich, 2015; Zhao and Wu, 2025). These structural features may, therefore, make the cooperative, incremental approach appear more robust and inevitable than it actually is and render alternative, more disruptive or precautionary strategies unthinkable.

CONSTRUCTION-based argumentation. The employment of CONSTRUCTION metaphor primarily supports the claim that climate action involves sustained advancement of technology and

economy. By mapping physical construction processes onto climate policy development, this metaphor constructs a novel conceptualisation that frames climate action as a construction project that involves tangible actions and systemic steps like deliberate planning, assembly of resources and structural reinforcement.

(6) ...to mobilize the trillions of dollars needed to make the most of the opportunity to **build a clean-energy, job-rich path** to meet our goals.

(Biden, 22 April)

(7) As a global community, it is imperative that we act quickly and together to confront this crisis. And this will require innovation and collaboration around the world. It will require the use of renewable energy and new technologies. And it will give each of our nations the opportunity to **build healthier communities and resilient economy with net-zero emission goals**.

(Harris, 22 April)

(8) If we work together, we can do more than just address this crisis. We can turn it into an opportunity to improve our societies and deliver for people worldwide, and we can **lay the foundation** for cooperation on other shared challenges.

(Blinken, 22 April)

(9) An old proverb states: When the winds of change blow, some build brick walls... others build windmills. So, **fellow windmill builders: Let’s get rid of those old bricks of doubt and fear**. Climate disasters worldwide tell us that the scariest thing we could do is nothing at all.

(Granholm, 23 April)

Examples (6) and (7) cluster construction terms around explicit references to climate-related objectives—clean-energy, job-rich paths, healthier communities and resilient economy—and around investment or technological innovation. Examples (8) and (9) extend the schema to cooperative structures (‘lay the foundation for cooperation’) and to responses to systemic change (brick walls...), again linking the act of building to evaluative judgements about appropriate climate responses.

In the first, source-domain stage, these examples holistically establish a construction-based line of reasoning: large-scale challenges are best met by ‘building up’ solutions from the ground, and successful building requires systematic planning, appropriate materials and solid foundations. Phrases such as ‘build a clean-energy, job-rich path’, ‘build resilient economy’, ‘build healthier communities’ and ‘lay the foundation for cooperation’ provide the Ground (1) for this layer. Backing (1) is everyday embodied experience of constructing or assembling objects and structures, audiences can be expected to draw on a cognitive schema in which AGENT/BUILDERS join COMPONENTS, lay foundations and produce a CREATED ENTITY (Gallese and Lakoff, 2005). These cognitive elements convey the inference that when faced with complex, long-term challenges, the most stable and resilient way is to build robust structures step by step on firm foundations, using suitable materials and designs. Such an inference is discursively combined with topos of ‘usefulness or advantage’ (Wodak, 2001: 74). In examples (6) and (7), the repeated linking of ‘build[ing]’ to ‘job-rich’ opportunities, ‘resilient’ economies and ‘healthier communities’ encodes a reasoning pattern whereby actions that construct robust

economic and social structures are justified because they yield multiple advantages (jobs, stability, well-being). Example (8), ‘lay the foundation for cooperation’ projects present climate action as the basis for future cooperation, reinforcing the collaborative intention. In (5), the proverbial contrast between ‘brick walls’ and ‘windmills’ further reinforces the usefulness topos by contrasting defensive, obstructive building with constructive, opportunity-oriented building.

The warrant (1) thus operates simultaneously at a cognitive and a discursive level. Cognitively, it generates predisposition to conceptualise complex tasks as sequences of incremental, manageable steps, with visible progress (laying foundations, erecting structures). Discursively, it operationalises the topos of usefulness/advantage by presenting construction as a pathway to valued outcomes (jobs, resilience, cooperation), thereby justifying such conceptualisation. The warrant activates what Nalau et al. (2021) describes as adaptation heuristics: simplified rules for managing risk that favour visible, structural interventions and a sense of tangible progress. This may recruit cognitive modules related to shelter-building, tool use and future planning: humans have long relied on constructing protective structures and infrastructure as a means of coping with environmental uncertainties. When climate change is framed through such schemata, audiences may therefore default to viewing construction-like solutions as natural and prudent, without considering other alternatives. They create the shortcut to receiving Claim (1): that well-structured building processes are the appropriate and beneficial means to ensure stability and resilience in dealing with long-term challenges.

In the second, target-domain stage, these insights are transferred to the climate domain through systematic mappings in Warrant (2): NATIONS ARE AGENTS/BUILDERS, CLEAN TECHNOLOGY IS COMPONENT, and RESILIENT ECONOMY/BETTER WORLD IS EXPECTED ENTITY. The Claim (2) is thus formed that just as robust buildings must be constructed progressively on solid foundations from appropriate materials, so effective climate responses must be built through bottom-up and incremental efforts with clean technology as ground, so as to produce valued outcomes. The conclusions that follow—explicitly, that climate change ‘presents one of the largest job creation opportunities in history’ (example 7), that it gives nations ‘the opportunity to build healthier communities and resilient economies’ (example 7), and that present action can ‘lay the foundation for cooperation on other shared challenges’ (example 8)—further justify the claim.

The CONSTRUCTION metaphor organises a distinctive form of climate-political reasoning that foregrounds tangibility, gradualism and durability, thereby gaining its effectiveness in argumentation. By framing climate action as building rather than, for instance, as sacrifice or conflict, the discourse encourages audiences to approach the climate crisis as a project that can be undertaken step by step, with visible structures and concrete payoffs. Terms such as building or foundation cue a heuristic of systematic progression and structural reinforcement: they invite audiences to perceive proposed policies and investments as parts of a coherent blueprint rather than as ad hoc or destabilising interventions (Nalau et al., 2021). The repeated emphasis on ‘opportunity’, ‘job-rich’, ‘resilient economy’ and ‘healthier communities and stronger economies’ suggests that climate initiatives are justified not only because they neutralise threats, but because they promise material improvements. This makes steady, construction-based climate action appear both advantageous and morally responsible.

From a critical perspective, this pattern can also be seen as implementing a form of context-selection constraint (Maillat and Oswald, 2011). Urgent, disruptive responses that challenge existing economic models are less readily activated when the

dominant frame suggests a slow, planned process of construction on existing foundations. Construction schemas also naturally incorporate expectations of durability and stability, reinforcing arguments for long-term infrastructure solutions. In Hart’s (2011, 2013) view, such framing increases the likelihood that audiences will accept the associated claims in a relatively automatic fashion, reducing the perceived plausibility or visibility of alternative, non-constructional approaches.

This metaphor serves specific political functions in the US climate diplomacy. Domestically, it offers a ‘tangible, solid’ approach to climate challenges that can appeal to audiences wary of alarmist or overtly disruptive framings. By linking climate actions to ‘job-rich’ opportunities, ‘resilient economy’ and ‘a fair shot’, the metaphor aligns climate action with core themes of employment, growth and fairness in this summit, thereby making climate policy more palatable to business-oriented and economically cautious nations and audience (Nisbet, 2009). Internationally, references to ‘lay[ing] the foundation for cooperation on other shared challenges’ present climate-related building as an investment in future multilateral problem-solving, potentially enhancing the legitimacy of US leadership.

Nevertheless, construction frames can, as context-selection constraint suggested, inadvertently downplay the complexity of climate systems by suggesting that once a solid structure is established, challenges can be naturally resolved (Nerlich and Jaspal, 2013). In addition, the CONSTRUCTION metaphor, embedded within an economic narrative prioritising jobs, markets and competitiveness, has a potential inclination to marginalise ecological or cultural concerns within its ‘construction’ paradigm. In this sense, the CONSTRUCTION metaphor and its offshoots may limit climate communication to a domain where financial feasibility and market viability take precedence over environmental or ecological imperatives, just as what have been observed in climate discourse before 2008 financial crisis (Liverman, 2009). All in all, the CONSTRUCTION metaphor remains persuasive to the audience, favouring pragmatic, growth-oriented solutions and may help garner broad support for major infrastructure investments targeting climate resilience.

ILLNESS-based argumentation. The ILLNESS metaphor is found to be one of the most conventional conceptualisations in climate discourse (Zhao and Wu, 2025). It primarily supports the claim that climate change is an urgent disease requiring immediate therapeutic intervention. By mapping medical treatment processes onto climate action imperatives, the Earth is conceptualised as a patient in urgent need of care and nations involved as medical practitioners, responsible for climate actions as treatments. The following examples are particularly representative of this pattern:

(10) *the United States will mobilize resources, institutional knowledge, and technical expertise from across our government, the private sector, civil society, and research universities to help. We want every country here to know: We want to work with you to **heal our planet**, and we’re all committed to finding every possible path of cooperation on climate.*

(Blinken, 22 April)

(11) *From coast to coast and across the world, the climate crisis has caused substantial damage, put people in danger, the **planet in fever**, making it more difficult for us to carry out our mission.*

(Austin, 22 April)

(12) *I'm privileged to be the Special Envoy... And I have to tell you, I come here today as I'm sure some of you do, with not a small amount of frustration about where we find ourselves and with a heightened sense of urgency, because the planet is in a **bad illness** and countries are in a bad condition. Now, it is imperative that we **take urgent care to save our planet**.*

(Kerry, 22 April)

Examples (11) and (12) cluster ILLNESS lexemes around explicit judgements of severity and danger ('in fever', 'bad illness', 'bad condition') and around global vulnerability ('people in danger', 'our planet'). Example (10) and (12) integrates medical expressions ('heal', 'urgent care') with appeals to collective action ('as a global community', 'together').

In the first, source-domain stage, these examples holistically establish a health-based line of reasoning: serious medical conditions demand prompt, coordinated intervention and care. Metaphorically, phrases such as 'heal our planet', 'the planet in fever', 'the planet is in a bad illness and countries are in a bad condition', 'take urgent care... to save our planet' provide Ground (1). The backing (1) is the universal embodied experience of sickness, medical treatment and recovery: audiences can be expected to activate a cognitive schema with core elements such as PATIENT, SYMPTOMS, TREATMENT, and RECOVERY processes (Zhao and Wu, 2023, 2025). In these examples, the severity of symptoms is foregrounded—'fever', 'bad illness', 'bad condition'—and treatment is framed as urgent, collective care. At the discourse level, illness framing draws predominantly on the topos of danger and threat (if there is a serious danger, one must act to remove it) and a related topos of humanitarian or moral responsibility (if a vulnerable entity is in danger, those able to help ought to intervene) (Wodak, 2001: 74). In example (11), the 'climate crisis' has 'put people in danger' and rendered 'the planet in fever', implying that inaction would be tantamount to abandoning a seriously ill patient. Example (12) encodes both topoi explicitly: 'Now, it is imperative that we take urgent care to save our planet' suggests that the seriousness of the condition makes rapid, collective treatment a moral necessity.

The warrant (1) thus operates simultaneously at a cognitive and a discursive level. Cognitively, it activates the schemata of severe illness, especially when accompanied by visible symptoms such as fever, requires immediate and often aggressive treatment; postponement or partial measures are intuitively understood as irresponsible or dangerous. Discursively, it implements the topoi of danger and humanitarian responsibility by insisting that the 'bad illness' of the planet and the 'bad condition' of countries leave no morally acceptable alternative but urgent intervention. This configuration may recruit both a threat-response module (prioritising rapid action to avert harm) and caregiving/empathy modules associated with protecting vulnerable others (Cosmides and Tooby, 2000; Damasio, 1994; Decety, 2005). When audiences are invited to see 'our planet' and 'our communities' as a sick patient whose 'health' and 'recovery' depend 'on what we do now', they may be inclined to accept the need for intervention quickly and emotionally, rather than carefully considering a full range of possible responses. Together, these elements support Claim (1): that serious, systemic illness requires urgent, coordinated treatment motivated by both prudence and care.

In the second, target-domain stage, these health-based inferences are projected onto the climate domain through systematic conceptual mappings in Warrant (2): [THE EARTH/ECONOMY/COMMUNITY IS A PATIENT], [CLIMATE CHANGE IS ILLNESS],

[CLIMATE ACTION IS TREATMENT], [CLIMATE IMPACTS ARE SYMPTOMS], [NATIONS ARE DOCTORS]. Example (10) explicitly formulates this mapping by stating that 'we want to work with you to heal our planet...to find every possible path', construction international cooperation as a multidimensional treatment specifically drawing on 'resources, institutional knowledge and technical expertise'. Example (12) diagnoses that 'the planet is in a bad illness and countries are in a bad condition', suggesting that both the global environment and national societies are patients in need of therapeutic attention. The call to 'take urgent care and together to save our planet (12)' formulates climate policy as emergency medicine. Just as severe illness in a valued patient makes urgent, coordinated treatment obligatory, so a planet and communities in 'bad condition' make urgent, coordinated climate action obligatory. Claim (2) follows: because climate change is conceptualised as a dangerous disease affecting planetary and societal health, nations must rapidly implement climate actions together to heal communities, economies and planets.

By invoking familiar sickness experience especially via the personification construction which humanises the Earth, this metaphor elicits strong urgency-related emotional responses that prime audience to perceive the climate challenge as an acute, treatable condition. This framing naturally triggers a threat-response module, where the audience is inclined to support swift, targeted interventions that promise immediate relief, much as administering a fast-acting remedy in a medical emergency. Consequently, such a framing converts the complex, systemic nature of climate change to a binary state of illness versus health. This reduction simplifies decision-making processes, leading audience to favour technical, short-term fixes over more nuanced, long-term strategies that might otherwise be considered. In addition, personification invokes empathy that is related to the cognitive ability of perspective-taking (Decety, 2005), thereby reducing likelihood of arguments being refuted and achieving manipulation effectiveness. Politically, the integration of economic concerns within the health frame, as in 'economic recovery' and 'recovery of our environment and economy', attaches economic pursuit and possible market-oriented policy to the emotional resonance. By presenting economic and environmental health as correlated goals, such metaphors provide legitimisation for the following new industrial policy prioritising economic recovery to environmental protection.

However, reducing the dynamic, interconnected nature of climate systems to a binary state of health versus illness risks oversimplifying the problem. It suggests that once appropriate 'treatment' has been applied, the patient can be expected to return to a stable, healthy status, underplaying the possibility of irreversible change, thresholds or long-term systemic shifts. As van der Hel et al. (2018) note, illness metaphors can easily slip into alarmist registers, generating a sense of acute crisis that may lead audiences to favour rapid and instant solutions instead of longer-term, coordinated and systemic approaches that are more effectively captured by the JOURNEY (emphasising coordinated and sustained action) or CONSTRUCTION (focusing on systemic and incremental progression). The coexistence of these frames can result in mixed signals: one frame insists on immediate 'treatment', the others stress sustained and stepwise 'travel' and 'building'.

Nonetheless, they jointly underpin a broader narrative in which climate change is first diagnosed as a dangerous condition that must be treated, and then addressed through ongoing journeys and construction projects—a narrative that both motivates rapid engagement and channels it into particular, policy-preferred pathways.

Discussion

From Toulmin-based perspective, the three metaphorical argumentations reconstructed above do not function as isolated rhetorical devices but as interconnected ‘argumentative cells’ whose Claims, Grounds and Warrants are systematically chained across the climate summit (Herman, 2018: 41). In this sense, the summit develops what Oswald and Rihs call a form of ‘complex argumentation’ (2014: 135) built through extended metaphorical framings, while simultaneously exemplifying the view that metaphor is a bridge between framing and reasoning rather than a merely ornamental device (Ervas et al., 2018).

At the macro-level, the three metaphorical argumentative cells form a sequential argumentative chain that moves from diagnosis to collective trajectory and then to systemic construction. The ILLNESS argumentation holistically constructs an initial argumentative cell in which the Grounds are symptoms of planetary ‘fever (Example 11)’, ‘bad illness and bad condition (Example 12)’, supported by a health-care schemata and topoi of danger and humanitarian responsibility as Warrants (if a valued patient is in serious danger, urgent treatment is mandatory). This yields Claim (Illness-C) that climate change constitutes a dangerous disease affecting planetary and socio-economic ‘health’ and therefore requires immediate, coordinated treatment. In the JOURNEY cell, Illness-C is implicitly presupposed as part of the Grounds for embarking on a collective path; the discourse no longer needs to argue that some response is necessary, but focuses instead on how the response should be organised. Here, the Grounds become temporal and directional expressions (‘this decisive decade’, ‘on the road’, ‘path to sustained future’ in examples 1, 2 and 5) combined with collectivising markers (‘we’, ‘all of us’, ‘together’), while the Warrants invoke embodied journey schemata and topoi of responsibility and urgency (those who can act, especially major emitters, must move quickly along an agreed path). Taken together, these components support Claim (Journey-C): that only coordinated, sustained movement by nations can credibly deliver the agreed temperature and net-zero targets. The CONSTRUCTION cell then takes Journey-C as part of its background and rearticulates the ‘path’ in terms of building a robust techno-economic edifice. In this third cell, the Grounds are expressions such as ‘build a clean-energy, job-rich path’, ‘build resilient economy’ and ‘lay the foundation for cooperation’ in examples 6 to 8, which combine construction lexemes with references to jobs, growth, resilience and future multilateral problem-solving. The Warrants draw on a construction schemata and on the topoi of usefulness/advantage (actions that create durable, beneficial structures are justified), yielding Claim (Construction-C) that climate responses ought to take the form of incremental, foundation-based investments in clean technology and infrastructure that secure both environmental protection and economic prosperity. Through this chaining, the illocutionary force of the initial diagnosis (Illness-C) is not lost but recontextualised: climate change is still a ‘dangerous’ condition, but the preferred response is now framed as a shared journey whose specific realisation is the stepwise construction of resilient, opportunity-rich economies.

The three cells thus organise a coherent argumentative macro-structure in which each metaphor contributes a distinct inferential profile. ILLNESS foregrounds why action is needed at all (because a valued entity is in danger), JOURNEY addresses who should act and in what temporal and directional mode (coordinated, time-bound progress along a shared path), and CONSTRUCTION specifies what kinds of actions are most appropriate (stepwise, technology-driven building on solid economic and institutional foundations). This serial configuration enhances the argumentative potential metaphorical framing as both a linguistic ‘packaging’ and a reasoning device (Ervas et al., 2018: 155): the

cluster progressively narrows the space of acceptable inferences from the very general premise that ‘something must be done’ to the more specific conclusion that this kind of cooperative, incremental, techno-economic action is the natural and responsible choice.

At the same time, the cell generates cognitive resonance between partially overlapping schemata and topoi. When JOURNEY and CONSTRUCTION arguments co-occur (e.g. the example 6 ‘build a clean-energy, job-rich path’), JOURNEY’s source–path–goal structure (with its linear, forward-oriented movement and group-coordination modules) is superimposed on CONSTRUCTION’s incremental, foundation-building schema and usefulness/advantage topoi. The result is an integrated macro-warrant: stable and desirable futures are those in which cooperative travellers gradually build robust, future-proof structures along a shared route. When ILLNESS argumentation is involved with JOURNEY or CONSTRUCTION expressions (e.g. ‘heal our planet...to finding every possible path’ in example 10), the topoi of danger and the threat-response modules activated by health framing are channelled into the journey and building logics. The metaphor cluster thereby mobilises several cognitive modules—in-group cooperation, adaptation heuristics, threat response—concurrently and aligns them with a single family of policy conclusions. This is very much in line with experimental findings that metaphorical framings can silently reorient everyday reasoning and evaluations of argument strength (Thibodeau and Boroditsky 2011, 2013).

However, the argumentative chain that enhances coherence also multiplies constraints. Each individual metaphor already narrows the range of imaginable responses: JOURNEY privileges linear, forwarding progress and marginalises reversals or radical re-routing; CONSTRUCTION privileges planned, structural development and sidelines ecological or cultural perspectives that cannot easily be rendered as ‘projects’ or ‘infrastructure’; ILLNESS tends to compress complex systemic dynamics into a health/illness binary that suggests a return to a good status once ‘treatment’ is applied. When combined, these constraints are mutually reinforcing. The chain encourages audiences to conceive climate change as a serious but ultimately manageable condition that can be treated through a time-bound, cooperative progress of building techno-economic structures, thus making more disruptive or precautionary strategies cognitively and discursively less accessible. In Herman’s (2018) terms, the argumentative cells are arranged so that the justified Claims of earlier cells function as largely unquestioned grounds or backings for later ones, making the overall structure more ‘resistant to contest’.

Finally, the chain of three cells introduces internal tensions that do not fully resolve at the macro-level. The ILLNESS cell pushes towards an image of acute crisis, foregrounding urgency and the moral necessity of rapid intervention; the JOURNEY and CONSTRUCTION cells, by contrast, naturalise a temporally extended, step-by-step progression that sits uneasily with the possibility of tipping points and irreversible changes. The illness framing can encourage short-term, remedy-oriented thinking, while journey and construction framings lend themselves to longer-term, process-oriented reasoning (van der Hel et al., 2018). These divergent temporalities coexist within the same argumentative cluster, generating potentially mixed signals: the audience is told at once that climate change is an emergency and that it will be addressed through gradual travel and building. The overall effect is a sophisticated metaphorical argumentation that simultaneously motivates engagement and channels it into a highly specific, policy-preferred pathway. Recognising both the integrative power and the constraining effects of this metaphor cluster is therefore crucial for understanding how the summit’s discourse shapes, and delimits, the ways in which climate change can be reasoned about and acted upon.

Conclusion

This study has examined how political speech at the 2021 Leaders Summit on Climate deploys three recurrent metaphors—JOURNEY, CONSTRUCTION, and ILLNESS—to organise and justify climate-related argumentation in United States climate diplomacy. Integrating Toulmin's argument layout, DHA work on topoi and adapted cognitive accounts of heuristics, the analysis combined corpus-assisted identification of predominant metaphors with the reconstruction of dual-staged model of metaphorical argumentation, showing that metaphors function not as rhetorical devices but as complex argumentative configurations that structure explicit reasoning while simultaneously activating implicit cognitive shortcuts.

The JOURNEY metaphorical argumentation drew on and combined journey related cognitive schemata and topoi of responsibility and urgency, coupled with collective pronouns, to support the claim that collaborative international actions are required to address climate change and reach the net-zero target. The CONSTRUCTION-based argumentation drew on building schemata of agents, components, foundations and structures, combined with a topos of usefulness or advantage, support the conclusion that appropriate climate responses take the form of incremental, foundation-based investments that deliver jobs, resilient economies and healthier communities. The ILLNESS metaphor drew on schemata of sickness and treatment, together with topoi of danger and humanitarian responsibility, to cast climate change as a serious disease affecting planetary and socio-economic health, and to legitimise urgent, coordinated climate actions. Across these three patterns, metaphorical argumentation has been shown to operate through the interaction of cognitive-level and discourse-level topoi. At the cognitive level, each source domain activates entrenched schemata and associated heuristic modules: journey invokes in-group cooperation; construction mobilises adaptation heuristics that favour tangible progress; illness triggers threat-response and emotion related modules. At the discourse level, these schemata are organised through content-related topoi—responsibility, urgency, usefulness/advantage, danger—that function as conclusion rules within the institutional and cultural context of US-led climate diplomacy. In doing so, the warrants do not merely connect Grounds and Claims in an abstract logical sense; they create cognitive shortcuts that actively guide audience's information processing towards rapid, default inferences that favour particular policy options while reducing the likelihood of detailed critical scrutiny.

The discussion has further shown that these three metaphorical 'argumentative cells' are serially and cumulatively organised into a macro-argumentative chain. ILLNESS argumentation diagnoses climate change as a dangerous condition that makes intervention morally and emotionally unavoidable; JOURNEY argumentation specifies that this intervention should take the form of cooperative, time-bound movement along a shared path; CONSTRUCTION argumentation elaborates this path as a project of building techno-economic structures. Co-occurring metaphorical expressions generate cognitive resonance, as partially overlapping schemata and topoi reinforce one another and align in-group cooperation, adaptation heuristics and threat-response modules with a single family of policy conclusions. Such argumentative chain encourages audiences to conceive of climate change as a serious but manageable problem, to be addressed through cooperative, incremental and technologically mediated pathways that re-legitimate US leadership. However, each metaphor restricts the imaginable space of alternative responses in specific ways, and their combination mutually reinforces these constraints, manipulating attention towards market-compatible, stepwise and state-led solutions.

Overall, the study provides detailed, discourse-grounded analysis of how metaphorical argumentation in climate political discourse operates simultaneously through explicit logical reasoning and implicit heuristic-based cognitive processes, demonstrating the value of a dual-staged model that links Toulmin's layout, topoi and heuristics to capture the interplay between mapping, reasoning and adapted cognition in metaphor use. Future works should examine audience reception empirically, tracing how metaphor-based arguments are taken up, recontextualised or contested in media coverage, policy debates or citizen responses. In addition, comparative studies across communicative genres should also be considered.

Data availability

All data and materials supporting this study are openly available in: Wu, Yuxin (2025). Data of '2021 Virtual Climate Summit Speech'. figshare. Dataset. <https://doi.org/10.6084/m9.figshare.29064308.v5>. The repository contains (a) raw transcripts of the 15 summit speeches with speaker and session metadata; (b) the fully annotated metaphor dataset used in the analysis (including id, speaker, speech_file, metaphor_type, expression, lemma, concordance); (c) Wmatrix output files and derived frequency lists; and (d) distribution of metaphors by speakers. Since the calculation formulae has been indicated within the text, no additional data or scripts were needed in this study.

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Author contributions

Yuxin Wu wrote the main manuscript text and prepared all figures. Mengyao Liu and Xiufeng Zhao reviewed the manuscript, providing revision advices.

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The authors declare no competing interests.

Ethical considerations/Informed consent

This article does not contain any studies with human or animal participants, thus the ethical approval and informed consent are not required.

Additional information

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