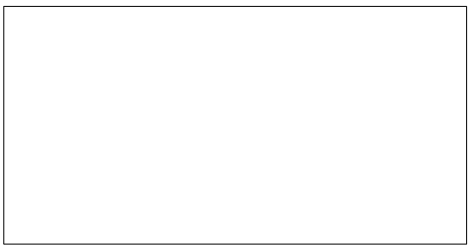

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# 'The end of civilisation': Exploring children's eco-narratives through an analysis of visual grammar

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ABSTRACT

This article reports on findings from a study investigating how a sample of 40 children aged 5–11 perceive and represent environmental issues through multi-modal eco-narratives (n = 40) that they have produced in response to a visual stimulus. Using a multimodal discourse analysis framework, the research explores the discursive and semiotic strategies children employ to express their knowledge, attitudes, and emotions about climate change and ecological harm. Findings reveal that children demonstrate a strong awareness of environmental degradation, particularly its impact on animals, often portraying humans as either passive observers or heroic saviours, but rarely as contributors to environmental harm. The visual elements of the eco-narratives frequently depict environmental damage as agentless events, suggesting a gap in children's understanding of the causal role of human activity. We interpret these elements as naturalising environmental harm and softening human culpability at an age where socialisation into responsibility is formative. The study highlights the emotional weight of children's responses, with sadness and eco-anxiety emerging as dominant themes. These insights underscore the importance of integrating multimodal approaches in climate education and suggest that future curricula should more explicitly address human agency and empower children with actionable knowledge to confront environmental challenges. The study also makes a methodological contribution to the field of ecolinguistics in exploring the ways in which the analytic tools of visual grammar and multimodal discourse analysis can be used to further understandings about how ecological discourses are constructed in texts.



## 1. Introduction

As a global society now firmly in the process of what increasingly looks to be irreversible climate warming (IPCC, 2023), we need robust and creative methods of finding new ways of mitigating the worst of the climate emergency and/or adapting to a changed world, both psychologically and physically. Some of this action is currently being undertaken by climate activists, commentators and scholars (Climate Cares at Imperial University, nd., The Climate Coalition, nd; Hickman, 2024; Schlosberg and Craven, 2019; Sydney Environment Institute, 2021). But we argue that listening to and harnessing children's thoughts and feelings with regards to climate, their environment and nature, more broadly, is also vital, given that

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their generational experience differs significantly from their elders. It is this generation who will also be at the forefront of managing and responding to ongoing climate change, therefore it is important to understand their current knowledge and perceptions of, and feelings about, climate change and its effects on the environment.

This study therefore explores children's perceptions and experiences of, and attitudes towards, climate change through an analysis of elicited eco-narratives. Eco-narratives can be defined as 'a form of environmental writing, a text that passes ecological tenets through rhetorical, linguistic and cognitive strategies' (Soloshenko, 2016: 148). This can include re-categorising extant literary works but must also include newly-produced narratives that have ecological aspects at their heart. Our interest lies in how visual choices encode agency, affect and evaluation, thereby shaping children's ecological 'storyworlds'. Eco-narratives created by children may give an insight into their current knowledge levels and understandings, as well as their feelings and attitudes, which are crucial to consider as both sites of ideas for climate adaptation and mitigation and as tools for working with worries about the future for the adults responsible for the children's wellbeing to understand and hopefully mitigate eco-anxiety. Hickman (2019) has highlighted the critical importance of managing the increase in eco-anxiety in children, because while eco-anxiety can galvanise climate action (van Valkengoed, 2023), it is also vital for educators and mental health practitioners to address with today's children.

The overall aim of the research project is to explore the discursive and visual semiotic features used by primary/elementary-aged children in narratives that they produced about the environment in order to discover their current knowledge levels and knowledge gaps, as well as investigating what they perceive as salient environmental issues. This project aligns with the broader aims and scope of ecolinguistics in its investigation of the relationships between language and ecological contexts, and the ecological impacts of particular kinds of language use (Li et al., 2020). The larger project comprises multiple analyses of the same eco-narrative texts presented and analysed in this paper. The application of multiple analytic frameworks allows for an in-depth examination of how particular ecological discourses are produced in the narratives through different aspects of the language and visual elements produced by the children. In terms of the broader methodological development of ecolinguistics, our research aims to explore the specific contributions that various forms of discourse analysis can make to the field. The eco-narratives produced by the children in the study are multi-modal in that they consist of both text and hand-drawn images. In previous research, (Clare Cunningham and Helen Sauntson, in press), we have analysed the textual elements of the narratives using social actor representation analysis as a part of critical discourse analysis. We are also using appraisal analysis (Helen Sauntson and Clare Cunningham, forthcoming) to more explicitly focus on how the children's feelings and attitudes towards environmental issues are encoded in their linguistic choices in the narratives. In this paper, we turn our attention to the visual components of the narratives which we analyse using Kress and van Leeuwen's (2001, 2006) framework of visual grammar.

The research questions addressed in this paper are:

1) What are the visual grammatical features adopted by children in their written eco-narratives?
2) What does visual grammar analysis reveal about the children's current knowledge and understandings of climate changes, and their feelings and attitudes towards it?

In answering these research questions, findings from this research could be significant in terms of helping to develop more effective climate education for children in this age group. The research provides information about this age group's current understandings of climate change and environmental issues, identifies some potential knowledge gaps, and provides insights into the children's key environmental concerns as well as what they are currently finding motivating and engaging in terms of learning about environmental issues. It also demonstrates how visual elements of eco-narratives are important within ecolinguistics more broadly and can offer insights into the role of multi-modality in creating new stories-we-live-by (Stibbe, 2021). At the time of writing, the use of multimodal discourse analysis within ecolinguistics has been given very little, if any, attention. In this article, we aim to illustrate the potential value of multimodal analysis for developing understandings of how narrators use visual elements within eco-narratives to construct ecological discourses. The findings of this research could provide useful information about what to include in climate education programmes for this age group not just in the UK but internationally. More effective climate education should ultimately enable children to develop the knowledge and skills required to respond to ongoing climate change as they grow older.

## 2. Context

Sanson et al. (2019) offer a sobering overview of the research into the myriad ways in which children and youth globally are amongst the most vulnerable to the impacts of the climate crisis, physically and psychologically. They note that while, to date, the reality has been that it is the children of what we now call the Global South who are most susceptible to the damaging effects, in terms of injury, illness, death and trauma, the distinctions between what they term the 'developing' and the 'developed' world are now 'rather arbitrary' (Sanson et al., 2019: 202), as extreme weather events and other climate-related impacts are now seen in all parts of the globe. This means the experiences of all children in relation to the climate emergency are becoming less 'vicarious' (Sanson et al., ibid) and ever more present.

This ever-present threat is seen manifesting globally in the expanding work on eco-anxiety and climate distress in children and youth, with multiple surveys demonstrating a significant increase in negative psychological reactions amongst children and youth, varying in degrees from the PTSD experienced by those directly affected by climate disasters, for

example, in Pakistan (Gibbons, 2014) to the large-scale surveys of children in Australia (Chiw and Ling, 2019) and the UK (UNICEF, 2013). Randall (2019) suggests those working in this field might usefully adopt the term 'climate distress' instead of 'eco' or 'climate anxiety' due to the simple fact that a negative psychological reaction to the climate emergency is a situationally highly appropriate response. She also notes that there are a range of emotional reactions to the climate crisis beyond being anxious, including guilt, shame and anger, which are also captured in the diverse surveys of this growing distress.

Alongside this well-documented rise in such distress captured through survey methodology has grown a complementary area of research considering the role of climate education, often adopting a creative approach, which has been seen, over time, to be highly beneficial in other crisis situations for giving space to process powerful psychological reactions (Gürle, 2018; Malchiodi, 2015). Previous studies in this growing area have analysed children's drawings about the environment (Ahi and Atasoy, 2019; Barraza, 1999), adopted a focus group methodology to foster discussions about nature (Rios and Menezes, 2017), and sought to elicit children's reactions or prior knowledge and awareness of climate issues and risks through environmental story-telling (Carone and Marincioni, 2020; Yilmaz et al., 2020). Researchers have analysed children's writings about their nature drawings (Kalvaitis and Monhardt, 2012) and collaborations between teachers and pupils to co-create narratives about the Education for Sustainable Development goals have been explored (Häggström, 2022). However, research based around encouraging children's creativity through free-writing about the environment and allowing space for multi-modality, coupled with a systemic analytical focus aimed at understanding children's use of these multi-modal resources in offering a space to process these emotions remains limited. This project aims to fill this gap through a systematic analysis of the visual grammatical features present in children's narratives about climate and the environment.

## 3. Data and research methods

### 3.1. Visual stimulus

The research design involved offering a visual stimulus to children in the form of an imaginary aerial map. This map (see Fig. 1) included both natural and human geographic features and was designed to stimulate children's imaginations with its visual similarity to the kind of maps one sees at the beginning of children's and fantasy books. Participants were asked to respond to it by writing a piece of their choosing, fiction or non-fiction, long or short, handwritten or typed, with or without pictures, to form a corpus of narrative texts for analysis.

**Fig. 1.** Stimulus map
[Image description: A colour map (not representing any geographical location) containing the following images/features: icebergs, a beach (with three people on it), snow-capped mountains, rivers, two lakes, sea/ocean, a desert with pyramids, trees, houses, wind turbines, an areoplane, a boat, a train, a farm, roads, a camel, a frog, two turtles, a crocodile, a whale, a factory with smoke clouds above it, cooling towers, two people swimming in water.].

Buckingham (2009) comments on the recent increase in the use of visual methods in research with children, and the use of the map as a visual stimulus here offered a sense of place to the children, seen as valuable in much of the literature (Blizard and Schuster, 2007) without them needing to leave the home or club. The stimulus map was also likely to be a factor in motivating the children to create their own visuals to support their written narratives, thereby creating the opportunity for a visual grammatical analysis of their creations.

This tool was also of practical benefit for this exploratory study in which the researcher was not present for data collection as it ensured a comparable experience for each participant. The project was designed to be able to be completed by children independently. It was decided that a school was not the ideal location for the data to be collected, as there were concerns over how much the children might be affected by worries about making mistakes and the pressures of trying to conform to teachers' usual expectations. Therefore, participants were recruited for the study through social media networks and personal contacts, with the children either completing the stories in their homes (during the Covid-19 lockdown period) or at an after-school club.

### 3.2. Data collection

Data collection took place between February and July 2021. A Microsoft Forms survey was produced to give information about the project, to ensure consent (from both the responsible adult and the child), and to capture demographic information (child's age/location). It then went on to give instructions for the task for an adult to read out to younger children, including the visual map prompt, and to give instructions to the responsible adult (parent or after-school club leader) about how to upload the completed stories to a shared folder. This resulted in 45 Forms being returned. However, only 40 stories were eventually uploaded to the shared folder, and those Forms not related to a submitted story were removed from the set. The final list showed the participants spread quite evenly between the ages of five and eleven. All were English speakers and lived in England except one child living on a British Forces base in Germany. All except ten of the other children lived in the same northern English city, which was an artefact of the data collection method due to the location of the researcher, and the use of one particular after-school club once the Covid-19 lockdown period was over. See Table 1 for a full list of participants and their ages along with brief information about the types of narratives produced in response to the stimulus.

**Table 1**
Participants: Age and story information.

| Age | Story/file title[b] | Mode | Length[a] |
|---|---|---|---|
| 5–6 | Whale | Mono-modal: Handwritten | Short |
| 5–6 | Stuck | Mono-modal: Handwritten | Short |
| 5–6 | Special | Mono-modal: Handwritten | Short |
| 5–6 | Push whale in | Mono-modal: Dictated oral narrative | Medium |
| 5–6 | Mouse 22 | Mono-modal: Handwritten | Medium |
| 5–6 | The sad whale | Mono-modal: Handwritten | Medium |
| 5–6 | Saving animals | Multi-modal: Handwritten narrative with visuals | Medium |
| 5–6 | Katie's story | Multi-modal: Dictated oral narrative with separate visual | Long |
| 5–6 | When the polar bear went to his school | Mono-modal: Dictated oral narrative | Long |
| 5–6 | The world with no environment | Multi-modal: Dictated oral narrative with separate visual | Medium |
| 5–6 | About the world | Mono-modal: Handwritten | Medium |
| 7 | Alien | Multi-modal: Visual with handwritten text | Short |
| 7 | Flooding | Mono-modal: Handwritten | Short |
| 7 | Kind girl | Multi-modal: Handwritten with visual aspect | Medium |
| 7 | Mongolia's wonders | Multi-modal: Handwritten with visual | Long |
| 7 | Seaweed whale | Mono-modal: Handwritten | Medium |
| 7 | Sad animals | Mono-modal: Typed | Medium |
| 7 | Food chain | Multi-modal: Handwritten with visuals | Medium |
| 7 | Rescues | Mono-modal: Handwritten | Medium |
| 7 | Environments | Mono-modal: Handwritten | Medium |
| 7 | Tyler's enviro story | Mono-modal: Typed | Long |
| 8 | People helping/not helping | Multi-modal: Visual with handwritten text | Short |
| 8 | Beach | Mono-modal: Handwritten | Long |
| 8 | Forest | Mono-modal: Handwritten | Medium |
| 8 | Save the world dream | Multi-modal: Handwritten with visuals | Long |
| 8 | The arctic whale | Multi-modal: Handwritten with visuals | Long |
| 8 | The rubbish patch | Multi-modal: Handwritten with visuals | Long |
| 9 | Saving the farm | Mono-modal: Handwritten | Medium |
| 9 | Amazon rainforest | Multi-modal: Handwritten with visual | Medium |
| 9 | Our world | Mono-modal: Handwritten | Long |
| 10–11 | Swamp | Mono-modal: Handwritten | Medium |
| 10–11 | Tale of the whale | Mono-modal: Handwritten | Long |
| 10–11 | Poem: City | Mono-modal: Handwritten | Medium |
| 10–11 | The town of the big | Mono-modal: Handwritten | Medium |
| 10–11 | The camel who knew | Mono-modal: Handwritten | Long |
| 10–11 | Frog | Mono-modal: Handwritten | Medium |
| 10–11 | Act now | Mono-modal: Handwritten | Long |
| 10–11 | The polushark | Multi-modal: Typed with visuals | Long |
| 10–11 | The end of civilisation | Mono-modal: Typed | Medium |
| 10–11 | Save the sea | Multi-modal: Handwritten with visuals | Medium |

[a] Short = under 15 words, Medium = 16–99 words, Long = 100+ words.
[b] Stories were named by the children themselves or their parents.

The nature of the participants' brief and varying ages of the children meant that the resulting data varied in its eventual format. The data mainly comprised handwritten stories, sometimes clearly fiction, sometimes not, and that at other times seemed to combine elements of fact and fiction. Some stories incorporated visual elements of the map itself whilst others incorporated none of the map's elements and bore no resemblance to it. The stories were often accompanied by illustrations, fourteen being therefore categorised as multimodal in Table 1. Some narratives were actually drawings, a couple were oral narratives that were transcribed by an adult before submitting, and others were typed by the child. As shown in Table 1, there were six contributions that were limited to just one or two sentences, nearly all from the youngest age group. However, the majority of texts were significantly longer, and it is important to note the value of the oral narrative for the younger age group as the eco-narratives shared in this way offered much more detail. The longest handwritten piece was composed by a nine-year-old (Our World) and the longest typed story (The Polushark) was over 300 words long. One of the longest narratives (at 288 words) was a transcribed oral narrative from one of the youngest children. This, of course, serves to highlight the value of offering an oral approach to this kind of project in the early years. Often, the children added images to their narratives using the same ball–point pen they were writing in, suggesting an immediacy and fluency in the creative process and a focus on the written element of the task but seven of the stories utilised colour either in images or text for effect.

All of the eco-narratives were uploaded into Atlas.ti (version 8), a computer-assisted qualitative data analysis software (CAQDAS), as this technology allows for the variation in format and for ease of aggregating and comparing the resulting codes. Using this software also affords easier analysis-sharing between co-analysts.

### 3.3. Ethical considerations

Participation in the study was voluntary, and adults and children were informed they could withdraw if they wished to by contacting the researcher. Demographic information was gathered anonymously through Microsoft Forms and the uploaded stories were also gathered anonymously, apart from the two children who put their names in the story titles (no other identifying factors are present). Parental consent was provided to reproduce the images in published outputs. The study was granted ethical approval by the university's ethics committee (approval code: RECLL00027).

### 3.4. Data analysis: visual grammatical analysis

Kress and Van Leeuwen (2001) posit that multimodality in text production may be more natural for children than for adults, who have been socialised into a world that values mono-modality. With this in mind, and to ensure that the potential understandings of the visual aspects of the children's eco-narratives are considered, a visual grammatical analytical approach was used to analyse the data. Analysis of the textual/linguistic elements of the narratives are explored in greater detail elsewhere (Clare Cunningham and Helen Sauntson, in press; Helen Sauntson and Clare Cunningham, forthcoming).

According to multimodal discourse analysis scholars such as Kress (2011), Kress and van Leeuwen (2006), O'Halloran (2004) and Machin and Mayr (2023), language is viewed as just one resource for meaning-making amongst many potential modes. In many of the narratives in our data-set, written language was used alongside hand-drawn images as another communicative resource with the interaction between the two communicative modes creating a coherent meaning-making whole. It was necessary, therefore, to use a detailed and systematic framework to analyse the visual features of the narratives in terms of how they interact with the textual elements in order to create meaning.

Kress and Van Leeuwen (2001, 2006) were among the first scholars to develop a detailed and systematic descriptive framework for visual textual analysis, arguing that visual modes of communication have a 'grammatical' structure in a similar way to language. Their framework was informed by social semiotic theories of representation and, most notably, by Halliday's (1978, 1994) foundational work in systemic functional linguistics. Halliday proposes that meaning is created in language through three 'metafunctions' which always operate simultaneously in any communicative situation. The ideational metafunction is concerned with how language functions to represent experiences, ideas and concepts. It essentially refers to what language is being used to talk/write/sign *about* as well as what is happening in any communicative situation. The interpersonal metafunction is concerned with how language is used to interact with others and how it is used to signal, construct and maintain social relationships within a communicative situation. Finally, Halliday's textual metafunction relates to how language is organised in ways that create coherent texts which function as required, and is understood as intended, within the communicative context.

In what they term 'visual grammar', Kress and van Leeuwen propose the metafunctions can also be applied to the analysis of how visual meaning-making happens in texts. We briefly explain each metafunction and introduce the visual elements of texts which are analysed within each one. The visual elements of texts listed in each case are drawn from a combination of Kress and van Leeuwen's (2006) original framework and Machin and Mayr's (2023) more recent adaptation of it within a broader multimodal critical discourse analysis approach.

Kress and van Leeuwen (2006: 42) define the ideational metafunction in multimodality as follows:

> Any semiotic mode has to be able to represent aspects of the world as it is experienced by humans. In other words, it has to be able to represent objects and their relations in a world outside the representational system.

Within this metafunction, the visual features which may convey meaning in a text include visual social actor representation and any other visual choices made by the text producer. This includes visual absences and exclusions–who or what does not get represented, or who gets represented less? When examining how social actors are visually represented in a text, attention can be paid to representations of body movement and positioning, gaze, distance of social actors from each other and/or from the perspective of the viewer, represented angle of social actors to each other and/or to the viewer, whether social actors are presented as individuals or as groups, and whether the text contains generic or specific visual representations of social actors. The ideational element may also examine how actions are represented and an analysis of visual transitivity. Following Halliday, Kress and van Leeuwen propose that visual grammatical forms can be seen as resources for encoding interpretations of experience. This entails a consideration of what, visually, actors are represented as doing. In examining represented actions, we can also look for instances where there has been deletion of agents i.e. where actions are represented but with no 'doer' of the action. We can also look for who or what is represented as active and passive in this element of the ideational analysis. Attributes are another element of ideational analysis which focus on how ideas and values are communicated by objects and how they are represented, and the discourses they may communicate.

In describing the interpersonal dimension of multimodality, Kress and van Leeuwen (2006: 42) state:

> Any semiotic mode has to be able to project the relations between the producer of a (complex) sign, and the received/producer of that sign. That is, any mode has to be able to represent a particular social relation between the producer, the viewer and the object represented.

Interpersonal visual meanings may be expressed through visual settings (backgrounds) or what Kress and van Leeuwen term 'coding orientations'. Coding orientations refer to whether the setting is naturalistic, scientific/technical (e.g. graph, diagram) or abstract (e.g. map). Settings and coding orientations can be used to connote particular discourses and values. Another feature is salience in which certain features of the text are made to stand out more than others. Visual salience may be achieved in texts through the use of visual cultural symbols, size, colour, tone, focus, and the foregrounding of certain elements. Visual modality is another way in which interpersonal meanings may be realised in multimodal texts. Visual modality refers to the 'truth value' or credibility of the ideational meanings conveyed in the text, and to text producers' level of commitment to what they are conveying. Visual modality can be identified through features such as the level of detail in an image, the degree of 'realness', and the degree of depth articulation and articulation of the background.

Finally, Kress and van Leeuwen (2006: 42) define the textual metafunction of multimodality as follows:

> Any semiotic mode has to have the capacity to form *texts*, complexes of signs which cohere both internally with each other and externally with the context in and for which they were produced.

Visual analysis of textual meanings focus on how the text is structured and may include an examination of features such as typography and layout, as well as examining how the language elements interact with other communicative modes used in the text.

Not all elements in the Kress and van Leeuwen and Machin and Mayr frameworks are included in the analysis due to space limitations and also because not all of them featured in the narratives produced by the children. The elements included in the analysis are those which were the most salient across the data-set. A summary of the features analysed within each metafunction is included below:

*Ideational* – Visual social actor (participant) representation; represented actions; visual transitivity; attributes

*Interpersonal* – Visual settings and coding orientations; salience; visual modality; typography and layout

*Textual* – How the language elements interact with the visual mode

## 4. Analysis

Systematic and rigorous application of the visual grammar analytical framework outlined above revealed a number of important findings, with some recurring meanings created across the series of eco-narratives. The following analysis is organised into the ideational, interpersonal and textual metafunctions. Figures (images of the children's eco-narratives) are included to illustrate the visual elements of each multimodal metafunction discussed within each subsection. The titles of the figures highlight the key multimodal features of interest in each case which are discussed in the accompanying text.

### 4.1. Ideational

Analysis of how participants[1] were visually represented in the narratives revealed a combination of narrative and conceptual patterns of representation, along with a combination of human, animal and object participants. Some texts took

[1] Kress and van Leeuwen (2006) refer to social actors as 'participants' in their framework, therefore we refer to 'participants' throughout the analysis section.

the form of a narrative pattern of representation. For example, one image, in conjunction with the accompanying text, creates a narrative of an alien visiting earth. Another creates a narrative about humans putting buckets of water onto a whale in order to try to save it. Other stories were more conceptual in that they presented a particular idea or were focused on a specific issue. For example, some stories included images of power stations with clouds being emitted, images of litter in water, or isolated images of individual animals which were not always set against any background. The animal and other non-human participants represented in conceptual patterns included a fish, birds, a turtle, whales, a shark and an alien. These kinds of visual representations were conceptual in that they functioned to create 'ideas' about environmental harm, particularly in relation to animals.

Within the narratives, participants who were visually (and linguistically) represented as human tended to be presented as active 'agents' of processes whilst animal participants were more often presented as passive recipients of human actions. For example, in a number of stories, humans are represented as actively saving or helping animals. Examples of how animals are visually represented as passive recipients of human 'helping/saving' actions include a shark being surrounded by human divers and a whale having water poured onto it by humans (both shown within the same image – Fig. 2) and a whale being pushed into the sea by humans (Fig. 3).

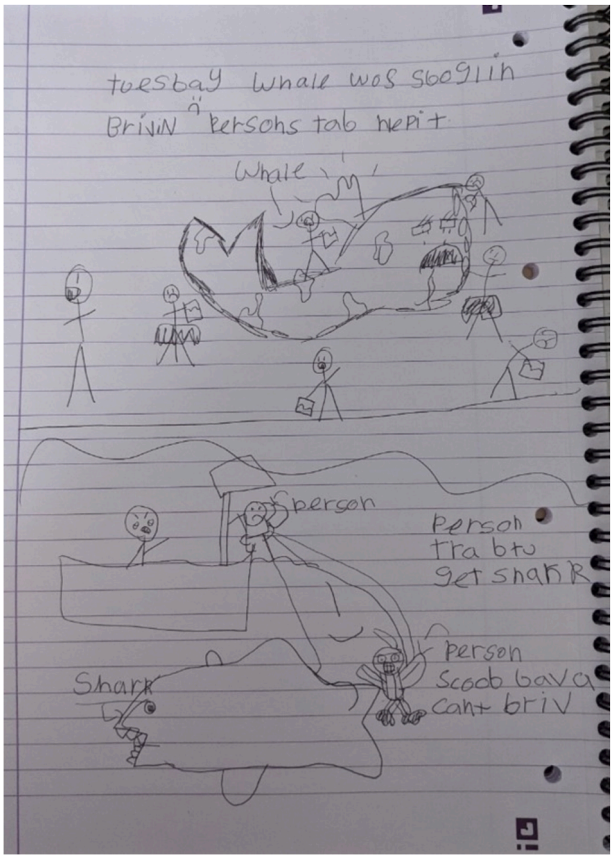


**Fig. 2.** Animals represented as passive recipients of human actions
[Image description: Top section – a children's drawing of a whale with stick figure people carrying buckets and pouring water onto it. Bottom section – a children's drawing of two stick figure people in a boat. Underneath is a shark next to a person scuba diving.].

These representational patterns cumulated in humans often being constructed as 'heroes' of the stories. Animals themselves were almost always passive and subjected to human actions rather than acting on humans.

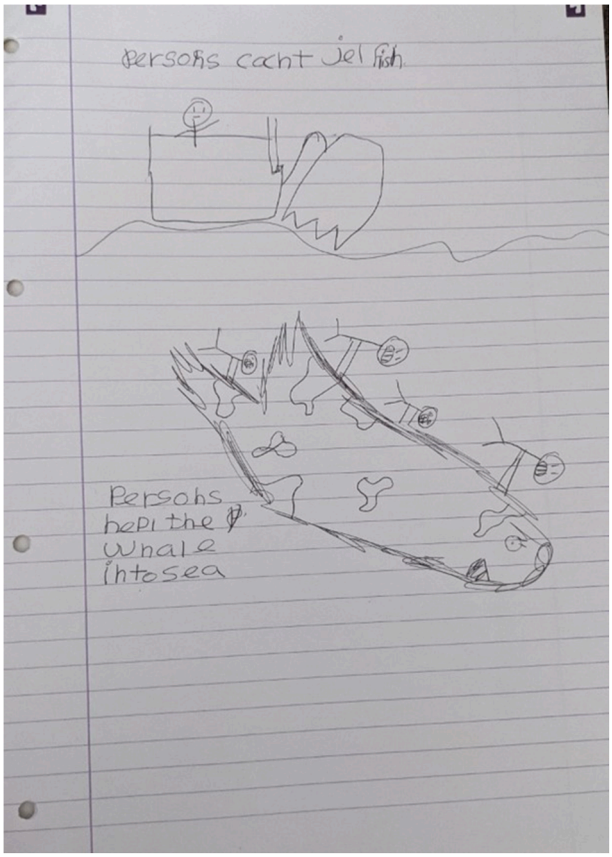


**Fig. 3.** Animals represented as passive recipients of human actions
[Image description: A children's drawing of a stick figure person in a boat with a line catching a jellyfish. Underneath is a drawing of a whale with four stick figure people pushing it.].

Interestingly, human participants were rarely visually or linguistically represented as engaging in actions which resulted in environmental damage or harm to animals or the environment (other than one narrative in which a jellyfish is caught by humans). This is despite widespread established knowledge about climate change being accelerated by destructive human activity as discussed earlier. Such representations include an image of cooling towers emitting clouds (Fig. 4), images of litter in water (Fig. 5), a turtle in a net (Fig. 5) and a built-up urban environment (shown through an image of a row of houses at the top of the text – Fig. 6).

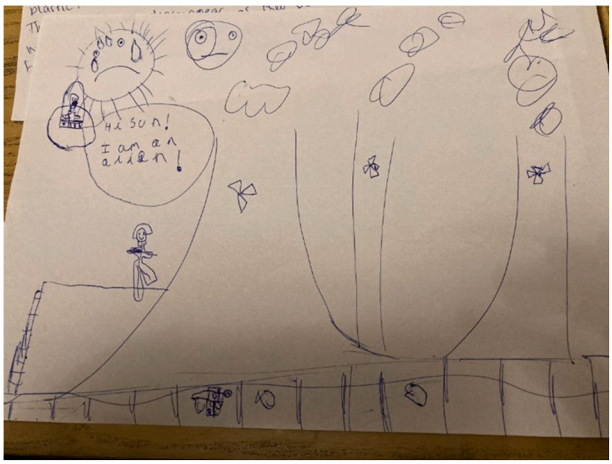


**Fig. 4.** Clouds emitted from chimneys as a form of environmental damage represented as an agentless 'event'
[Image description: A children's drawing of three chimneys with smoke clouds above them. In the top left is a drawing of a sun with a sad face and tears. Next to it is another round face with two eyes and a straight line mouth. Underneath the sun is an alien in a spaceship with a speech bubble saying 'Hi sun, I'm an alien!'. On the left hand side next to the chimneys is a drawing of a person. Along the bottom of the drawing is a line representation of water containing two fish and a turtle.].


**Fig. 5.** Litter as a form of environmental damage represented as an agentless 'event'
[Image description: A children's colour drawing of a number of objects: A green and yellow bottle labelled as 'Sprite'; a square net; a brown and green turtle with its mouth in a net; a blue and yellow crisp packet labelled as 'salt'.].

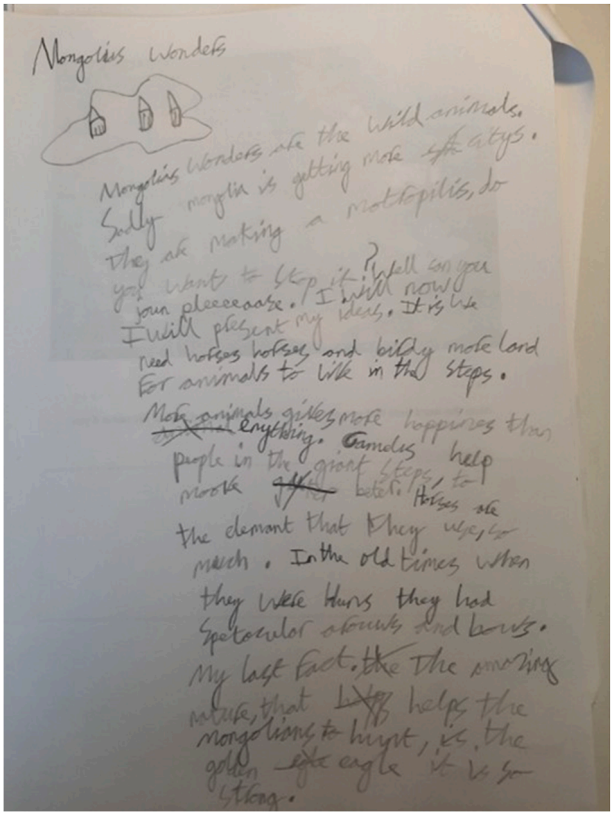


**Fig. 6.** Environmental damage represented as row of houses/urbanisation
[Image description: Mainly text but on the top left corner is a small children's drawing of three houses in a row inside a bubble outline.].

These visual representations involving agent deletion or absence are defined by Kress and van Leeuwen as 'events' – representations of actions which only include a goal (i.e. something is happening to someone or something but we can't see who or what makes it happen). Other examples of these kinds of 'events' in the data-set include images of animals with down-turned mouths (expressing negative emotion) or being represented in distress or difficulty (such as a whale stranded on a beach, a turtle caught in a net). Non-animal-focused environmental harm representations without an agent included

items of litter in water, clouds being emitted from chimneys and tumbleweeds on an otherwise barren landscape. In these examples, no participant is represented as doing the actions which produce the litter, clouds and the net which catches the turtle. Another story contains a drawn sign which reads 'Stop the pollution' (Fig. 7).

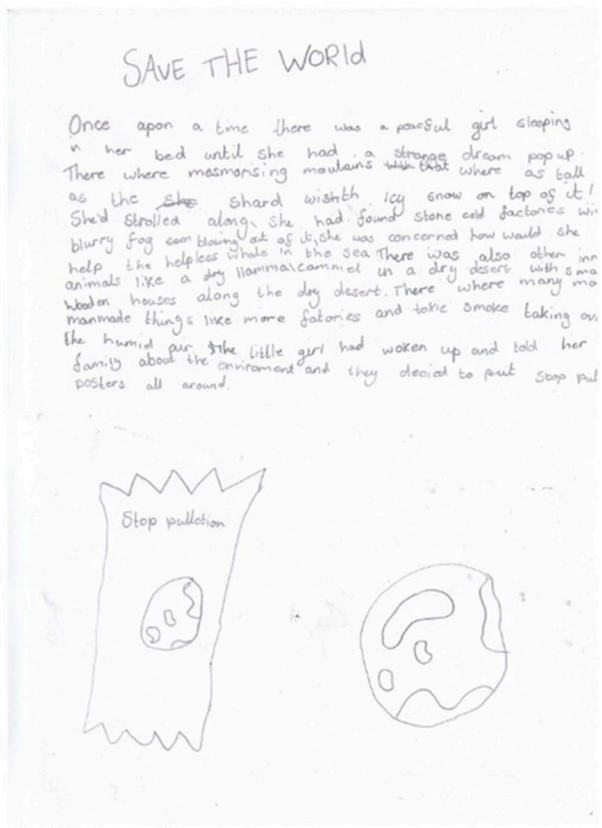


**Fig. 7.** 'Stop the pollution' agentless image
[Image description: Two side-by-side children's drawing underneath a paragraph of text. Image on left is the earth contained within a line shape which is straight on the sides and jagged on the top and bottom. Image on the right is a drawing of the earth.].

Interestingly, no visual indicators of pollution are actually drawn in this narrative – the visual representation consists only of the sign plus an image of the world on the right-hand side. No-one is therefore represented as responsible for causing the pollution or for stopping it. Significantly, this means that the children are routinely *not* attributing blame to humans in the visual elements of the stories. Perhaps this reflects a reluctance to directly attribute blame to humans and/or it may be linked to the young age of the children and not yet having developed knowledge and understanding about the scientifically-proven links between human activity and environmental harm. We return to this point in the conclusion.

In sum, the overarching pattern of visual human representation across the data-set is humans either being shown as saving animals, or as not actually doing anything at all but simply being visually present. In the latter case, a lot of human participants are represented in what Kress and van Leeuwen term non-transactional processes and actions. Some of the represented actions comprise relational processes. For example, in one story a family group is drawn with one family member reaching out a hand to another, thus conveying a positive relationship between participants.

Furthermore, when human participants are visually represented as children (indicated through their relative size to adult humans who are also present in the image, or through linguistic labelling), children are often visually represented as 'reacters' in that they are shown as 'looking at' negative environmental phenomena and thereby involved in largely reactional processes. For example, in Fig. 4, a human participant is shown to be looking at the clouds being emitted from chimneys. And in Fig. 8, a human social participant is represented as looking at balls of tumbleweed.

**Fig. 8.** Child human participant represented as a reacter (within a naturalistic coding orientation)
[Image description: Children's colour drawing. Blue colouring along the top. Brown colouring along the bottom. Middle section contains a stick figure person with a sad face next to two grey-coloured tumbleweeds to the left and a yellow and grey coloured tumbleweed to the right.].

Children participants, then, are most often represented as observing damage to the environment but are not shown as engaging in any actions beyond that. In fact, across the whole data-set, human participants are often represented as reacters in that they are shown to be 'looking at' actions rather than directly involved in them. This may suggest how the children producing the narrative feel – at this stage in their life, they may feel that all they can do is 'look at' (and feel sad about) environmental destruction. The feelings of sadness or negative affect more broadly indicated through the visual feature of down-turned mouths may also be a manifestation of children's eco-anxiety and feelings of helplessness.

In terms of visual attributes which convey ideational meaning in the narratives, both animal and human participants are often represented with either up-turned or down-turned mouths thereby indicating relational processes in which participants 'feel' particular emotions. This prevalence of participants being drawn with down-turned mouths resonates with Feng and O'Halloran (2012) who observe that most emotions (in their case in comic book illustrations) are most easily expressed in the lower part of the face. We see that clearly in this data set with the children locating emotion almost entirely in the mouth area on the drawn human faces. The accompanying linguistic analysis revealed that the most used adjective across the 40 narratives was 'sad', again suggesting strong negative feelings in response to what the children perceive as environmental harm. The down-turned mouths may indicate anxiety as well as sadness, as children of this age are unlikely to have artistic skills which are sophisticated enough to convey nuanced negative emotions – visual representations of emotions are more likely to take the form of a simple 'positive' and 'negative' polarity. The attribution of emotion to animal participants as well as humans could simply be an anthropomorphising device, reproducing a fairly typical feature in much children's literature, but it could also suggest that children are more open to seeing the world through a more post-human lens, which would have implications in the future for ecological justice and a potential growth in the rights accorded to non-human elements on earth. In the small number of cases where human participants were represented with up-turned mouths, they were visually represented in non-environmental settings (e.g. as a conceptual family group or individual). When human participants with a negative emotion (which may be read as sadness or anxiety) attribute were represented, it was usually in relation to a visual representation of some sort of harm or danger to animals or another form of environmental damage. In Fig. 4, for example, the sun is shown with a down-turned mouth and shedding tears, again attributing negative emotions such as sadness or anxiety to the sun as a participant. In this same example, the sun is also a reacter – it is shown to be looking down at clouds being emitted from industrial chimneys.

### 4.2. Interpersonal

Across the data-set, interpersonal meanings were conveyed through predominantly naturalistic coding orientations (see Figs. 8 and 9). Many of the images drawn by the children consisted of nature scenes with just one or two industrial settings, and some having a more abstract coding orientation (such as a visual representation of a decontextualised family group). Only one story has technical/scientific coding orientation – this text comprises a visual representation of a food chain with arrows indicating the direction of the chain (Fig. 10).

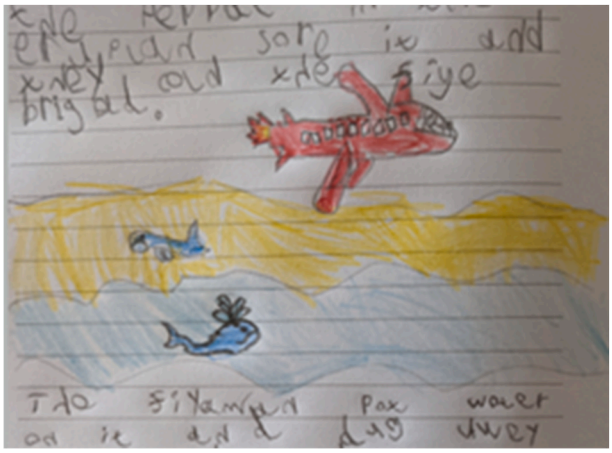

**Fig. 9.** Naturalistic (sea/beach) coding orientation
[Image description: Children's colour drawing comprising three horizontal sections. Top section contains a drawing of a red aeroplane. Middle section contains a blue whale set against a yellow wavy background. Bottom section contains a whale spouting water set against a blue wavy background.].

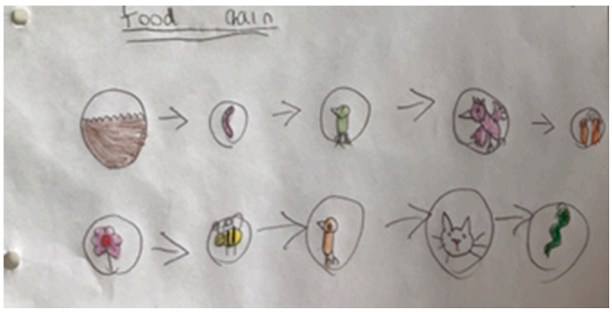


**Fig. 10.** Food chain as scientific coding orientation
[Image description: Children's drawing of a 'food chain' diagram. Top line of drawing comprises five circles connected by arrows moving from left to right. From left to right, the circles contain drawings of mud, a worm, a small green bird, a larger purple bird, a red figure (difficult to decipher what it represents). The bottom line of the diagram comprises five more circles connected by arrows moving from left to right. From left to right, the circles contain drawings of a flower, a bee, a bird, a cat, a snake.].

In terms of visual modality, there was a low degree of realness in all of the narratives as would be expected given that these were children's drawings. There were, however, clearly some attempts at naturalistic representations through, for example, realistic colour choices and colour patterns for particular animals and natural elements (blue for water and sky, brown for earth and so on). These attempts at naturalistic coding orientations suggest that the narrators who used them were interpersonally engaging the reader by trying to visually persuade them of the 'truth value' of their narratives. This suggests the children who attempted to incorporate visual naturalistic representations into their narratives were developing an awareness that more convincing eco-narratives may be ones that embody naturalistic coding orientations within the interpersonal metafunction.

In terms of typography and layout, there was a mixture of horizontal and/or vertical structuring in images which comprised narrative representations in some of the stories. As Kress and van Leeuwen argue, visual representations of information value (e.g. presenting information horizontally or vertically) encourages the reader to read the visual information in a particular narrative direction, thereby engaging them on an interpersonal level. In the food chain image in Fig. 10, the arrows clearly indicate the intended direction of reading of the image from left to right. Through interpersonally engaging with this information value representation, readers are guided through the text in order to gain specific knowledge or meanings. In Fig. 10, for example, this knowledge comprises understanding how food chains work. The children who incorporated horizontal or vertical representations of information value were arguably showing knowledge of how readers will interpersonally engage with the text (i.e. reading from left to right or top to bottom).

As is to be expected due to the age of the children, some were clearly starting to develop these skills in constructing narrative forms, both visually and in their writing, whilst others had yet to develop those skills.

### 4.3. Textual

Textual meanings in the data-set were conveyed through the fact that most narratives produced were multimodal in that the accompanying text was needed in order to interpret the images. In this way, the multimodal elements of the texts were highly dependent on each other for their meaning. This finding is, again, perhaps more reflective of the fact that it is young children producing these texts. Children of this age are usually limited in terms of how much they can communicate through written language so visual elements are often included to clarify and add meaning as well as to engage the reader.

## 5. Discussion

A number of key findings emerge from the systematic application of the visual grammatical analysis presented above. Firstly, whilst the brief that was set for the children was purposely vague and used words such as 'nature' and 'environment' rather than 'climate', and there was absolutely no reference to 'climate change/emergency/crisis' in the project information sheet, the majority of the children did focus in their writing on issues relating to the climate emergency. This suggests that the children have knowledge about climate change, and environmental issues more broadly, and consider it as important. Only four children produced a story that was a straightforward nature or animal-related fictional narrative with no acknowledgement of the impact of a changing climate. The writers show a good level of knowledge of what environmental harm looks like and the forms it can take. For example, the narratives include visual representations of air and water pollution, litter, urbanisation and desertification. Secondly, the children appear reluctant to attribute blame for environmental damage to humans. The routine representation of animals as being in distress and as 'sad' indicates their knowledge of the impact that climate change is having on animal species. The various forms of environmental harm presented in the visual narratives are presented as 'events' which, in Kress and van Leeuwen's framework, entails the presentation of a situation with no agent.

When humans are included in the visual components of the narratives, they are either represented as 'heroes' or as passive 'reacters'. 'Hero' representations often involve human participants being represented in material processes which involve them helping and saving animals who are represented as passive recipients of the 'saving' actions. A significant visual absence across the data-set is that no humans are ever represented as engaged in actions which result in environmental harm. For example, no human participants are present in the images which show litter – no-one 'drops' the litter – it is just there. In the images of desertification and air pollution, a human is present in each case but only as a reacter, not as an agent of actions which produce these forms of environmental degradation. In these images, the humans are shown to be observing the environmental harm but not doing anything to cause it (or, indeed, to try to prevent it). This pervasive reluctance to attribute blame to humans is perhaps a result of the children simply not yet understanding the links between human actions and environmental damage due to their young age. This resonates with Stibbe's (2004) analysis of how the topic of climate change is dealt with in language textbooks. Stibbe finds that environmental issues are often presented in textbooks without addressing their underlying causes and in ways which present issues as 'placeless' (see also Ortaçtepe Hart, 2023). Stibbe also finds that environmental problems are often described in textbooks with any attribution of agency. What is clear from this cumulative research is that eco-education for children should not only focus on the forms that environmental damage can take, but should also emphasise the role of human activity in causing such damage, as well as being presented with alternative choices humans can make in order to counter such harms. We propose that this is a useful recommendation for educators planning and delivering eco-education not just in the UK but internationally.

Unsurprisingly, animals feature heavily in the narratives in both the visual and the linguistic elements. Children's fiction often makes use of animals in anthropomorphic representation so it is not unusual to see children themselves producing narratives which also feature animals. Animals were also included on the stimulus map so this may be another reason for the children including animals in the both the visual and textual elements of their narratives, although it is useful to note that multiple children chose to focus their narratives on animals that were not present on the map, such as a mouse or a polar bear, and many, in fact, included none, which suggests that the map stimulus was not too significant an influence on their choices. Harm to animals is clearly a key concern of the children in the study. Although not represented in the visual elements, some stories actually included the death of particular animals in their linguistic elements. If educators want to further develop children's knowledge and understanding of climate change and its effects on the natural world, perhaps focusing on the detrimental effects on animal species may be an effective way to engage children in such issues in ways which may ultimately affect the environmental choices they make later in life.

As with Gauntlett's (1997, cited in Buckingham, 2009: 646) study asking children to produce videos about the environment, we see here in this data some useful insights into 'how children employ (and are positioned by) different discourses on this topic' but that there is perhaps far less of the mass media influence in the discursive features employed here than has been suggested by others (Lombardi and Sinatra, 2010). It was noted, however, that only eleven of the eco-narratives contain what might be termed as solutions or ideas to tackle the issues raised in the stories. They are limited in their scope to very typical and individual responses to climate change, such as those that have been traditionally presented in the media, in education and in environmental campaigning. Five were related to litter picking or not dropping it in the first place, and two made reference to putting up posters to encourage others to litter pick. Planting trees, avoiding urbanisation, and moving away from threatened areas were amongst some of the other suggestions, but as is often seen in fiction relating to climate change, action was taken by characters in the children's eco-narratives on the basis of a relatively limited exposure to facts, which as Gaard (2014) points out, is rather unrealistic.

Whilst activist-like work such as writing to local representatives and corporations and building local community responses was present in only two or three of the narratives, we noted, in fact, as Cutter-Mackenzie and Rousell (2019: 97) did during their child-led climate education project, just how 'insightful, creative and politically active [the] young people' in this study were in their writing despite the lack of focus on solutions. There was a strong pragmatism present in many of the eco-narratives, and an undeniable sense that the older children especially understood what is at stake, with the title '*The End of Civilisation*' adopted by one of the children making that abundantly clear.

## 6. Conclusion

The findings presented and discussed in this paper are part of a broader ecolinguistics exploration of the discursive and visual semiotic features used by primary-aged children in narratives produced about the environment in order to examine what these features reveal about their feelings, attitudes and levels of knowledge about environmental issues. The larger study deploys multiple discourse analytic frameworks to provide a rigorous and in-depth examination of how the children produce particular ecological discourses in their narratives. Within this larger study, the findings reported in this paper focused on what a visual grammatical analysis revealed about the meanings constructed by the children through the use of visual features in their narratives. This revealed significant information about what the children perceived as important relationships in nature, their current perceptions and knowledge of what constitutes environmental damage, their feelings and attitudes towards environmental issues, and the role of humans in relation to the environment.

The geographical location of the children means the data sample was a fairly homogeneous, likely largely middle-class demographic situated in a cultural context that places a high value on written texts as well as being in a part of the world that has experienced the climate emergency as a more abstract or 'vicarious' threat until more recently. This means that the corpus of narratives collected in this study is likely not to be transferrable to all contexts and is certainly not representative. Clearly, the timing of the data collection during and just after the COVID-19 lockdowns in the UK means these narratives may also be an artefact of that particular, now historic, period. It would, therefore, be beneficial to broaden the data collection base for future similar work. Future work could expand on the narratives by using them as stimula for focus group interviews or general discussion to elicit thoughts on why children wrote as they did, to establish how much were explicit decisions being made and how much was less conscious and perhaps habitus-driven. Future work may also benefit from extending the initial eco-narratives task so that children might be encouraged to come up with ideas and resolutions to the challenges they raise in their stories as this element was notably absent from the data-set as discussed above.

However, the current findings do have potentially significant implications, particularly for teaching about environmental issues to this age group. Sanson et al. (2019) point out that story-telling is a particularly valuable educational tool for developing key individual characteristics, interpersonal skills and social/civic engagement in a time shaped by the need to foster climate resilience amongst our young people.

Future climate education therefore could include utilise individual and collaborative story-telling to develop these individual characteristics through consolidating children's existing knowledge about the various manifestations of environmental harm, as well as working on emotional regulation, empathy and creativity. Climate educators could also focus more on the causal relationship between types of human actions and behaviours and forms of environmental damage, as an understanding of this causality is currently missing from the children's narratives analysed in this research. This is a crucial element of the interpersonal skill development that Sanson et al. (2019) discuss, highlighting the need for increasing capacity in negotiation and conflict-resolution.

Finally, climate education programmes could include a greater focus on what humans could do in order to address forms of environmental damage. Human agency was noticeably absent from our stories and therefore something which should arguably be central to children's future climate education. The Australian Psychological Society, in their information sheet for parents entitled Raising Children to Thrive in a Climate Changed World (2018), are adamant that the social and civic engagement element of climate resilience is fundamental. We propose that incorporating these types of individual and collaborative story-telling opportunities into climate education programmes for children of this age group much more broadly could more effectively help to equip them with the knowledge, skills and mindset required for developing climate solutions, becoming resilient and adaptable in the face of climate change, and thriving in an uncertain future.

### CRediT authorship contribution statement

**Helen Sauntson:** Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Clare Cunningham:** Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

### Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work the author(s) used Microsoft Co-Pilot in order to create an abstract from the contents of the paper. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content.

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## Declaration of interest statement

We have nothing to declare.

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## Data availability

Data will be made available on request.

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