

Is tragedy the true language of science?

Unleashing the emotional power of theatrical storytelling for climate change communication

Should scientists extend their climate change communication beyond factual reporting? A transdisciplinary and participatory theatre project exemplifies the power of storytelling in climate change communication by eliciting emotional responses.

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Abstract

The complex and interconnected nature of current global challenges such as climate change call for new and creative ways of communicating research. To help people make sense of phenomena, improve information acquisition and retention, build collective awareness and public engagement, emotions are often more impactful than factual reporting. In this context, this paper builds on transformative narrative theory to investigate the efficacy of theatrical storytelling in unleashing emotions in relation to climate change. As part of a transdisciplinary and participatory theatre performance combining the arts, science, and activism, a brief questionnaire was administered to the audience to exploratively assess emotional changes before and after the play. Significant emotional changes highlight the potential of participatory theatrical storytelling as a powerful tool for communicating climate change and encourage further exploration of this approach in transdisciplinary (theatrical) projects and science communication efforts.

Keywords

art-science integration, climate change communication, emotions, narratives, storytelling, theatre

Led by five black-clad, closed-eyed actresses (figure 1), the audience attending the theatre play *Anthropos, Tyrann (Ödipus)* (henceforth *Anthropos*) (Eisenach 2021), embarks on a journey exploring human responsibility, hope and fate in relation to climate change. “Our actions leave traces in the skin of the Earth forever. Is the language of science the true language of this tragedy? Or is tragedy the true language of science?” (adapted from Eisenach 2021).

These questions ring in the ears of the audience, compelled to ponder whether scientific language can truly capture and transmit the depth of the climate tragedy or if the emotional and immersive experience of theatre is a more effective way to convey its urgency and consequences. The stage, covered in red sand and overhung with stones, and the sudden bursts of strobe lights and sounds offer spectators a chilling glimpse of what the future might look like if concrete action on climate change is not taken. This annihilating effect is offset by a participatory moment, where spectators, actresses, researchers and climate activists collectively envision alternative climate futures and explore strategies for their realisation.

We conducted an explorative assessment of spectators’ emotional responses to the play *Anthropos* to investigate the potential of transdisciplinary and participatory theatrical storytelling as a valid tool for emotionally engaging, comprehensible, and impactful climate change communication. Our hypothesis was that this form of storytelling could impact emotions by creating a collective space and spark motivation for finding collaborative solutions. A comparison of the spectators’ emotions before and after the performance confirms a strong potential for such formats to enhance climate change communication.

In this paper, we first highlight the transformative role of arts and (theatrical) storytelling in climate change communication. We then delve into the theoretical background, inspired by transformative theatre and narrative theory, which serves as the foundation for our investigation. Following the introduction of the exemplary case of *Anthropos*, we present the data and methods used in our study. Finally, we conclude by summarizing the findings and discussing their implications for future research and applications in climate change communication.

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The transformative role of the arts and theatre in climate change communication

The impacts of climate change, such as rising sea levels, extreme weather events, increased wildfires, floods, and resulting health threats and damage to settlements, infrastructure, and ecosystems, are well documented (IPCC 2022). Despite the overwhelming evidence, scientists have been unsuccessfully warning of the perils of climate change for over 50 years. Part of the problem lies in the traditional approach to scientific communication, which has been marked by descriptive, unemotional reporting of technical knowledge. While this approach can enhance the credibility of scientific findings, it often falls short in motivating people to take action (Juárez-Bourke 2018), as it predominantly appeals to reason. However, human behaviour and engagement are also often driven by emotions, which should be considered as a vital element in climate change communication.

One of the most powerful ways to unleash emotions lies in creating narratives and stories. In fact, these “provide concrete examples of abstract issues or concepts, can be extended to provide multiple and varied ‘experiences’, can be crafted to relate to people’s lives and what they already know” (Kearney 1994, p. 434). Storytelling has therefore emerged as a valuable tool for helping people make sense of data, for improving information acquisition and retention, and for building confidence and public engagement (Corner and Clarke 2017). A growing body of literature suggests that climate communication should focus not only on the evidence it is providing but also on how this evidence is presented (see, e.g., Bloomfield and Manktelow 2021, Jones and Peterson 2017). Recent reviews of climate communication research have highlighted several promising approaches, including the use of narratives, especially those with characters that people can relate to, transdisciplinarity, the use of positive emotions, the suggestion of possible policy solutions and the role of cultural expressions in effectively communicating climate change (Jones and Peterson 2017, Moser 2016).

Indeed, the arts can advance climate communication by embracing transdisciplinary approaches and expanding conventional knowledge towards practical, embodied, and emotional domains (Heras et al. 2021).¹ In fact, especially media arts, such as film and fiction, have been used to communicate climate change and have proven impactful on receivers’ awareness, understanding and even behaviour (see, e.g., Gustafson et al. 2020, Bieniek-Tobasco et al. 2019, Milkoreit 2016). In the context of art-science collaborations (Paterson et al. 2020), particularly theatrical storytelling on climate change has shown a strong potential for fostering social transformation (Balestrini 2019) and for shaping public opinion through empathy and emotion (Trott et al. 2020), by immersively mirroring reality through fiction (French 2019). Moreover, theatre experiences, complemented by common discussions and shared reflections, result in a broader discourse on climate change, more awareness and sustainable attitudes (Law et al. 2021). Finally, theatrical storytelling on sustainability holds the potential to establish transdisciplinary cooperations between



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FIGURE 1: *Anthropos, Tyrann (Ödipus)* (performed at Vereinigte Bühnen Bozen 2022): To draw a parallel between Oedipus’ blindness and our society’s lack of awareness towards climate change, the actresses performed with their eyes closed. The majority of the acting was done chorally, emphasizing the impact of the climate crisis on the whole community rather than just on individuals.

science, art, and even activism by developing a “dynamic and complex relationship between different ways of knowing and different ways of making worlds” (Heinrichs and Kagan 2019, p. 437).

Although single aspects of transdisciplinary or participatory theatre representations have been studied independently, there is a lack of understanding regarding the effectiveness of mixed experiences in eliciting emotional responses. We address this research gap by quantitatively exploring how a participatory and transdisciplinary theatre play might enrich emotional and effective communication, providing new insights for climate change communication research.

Transformative theories of theatrical and narrative storytelling

Theatre is an age-old art of embodied and performative storytelling humans adopted to explore their emotions, reflect on social conditions, experience other worlds, and give meaning to life. Theatre represents thus a social way of communicating cultural values (Nellhaus 2010), carrying an inherent political element that has been present since its very beginning (Müller-Schöll 2004).² However, contemporary scholars argue that reducing theatre to an educational instrument deprives it of its intrinsic value (van Lente and Peters 2022). In fact, theatre is understood as a performative, self-referential and unique event, requiring the relational space between actors and the audience. Spectators are

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¹ Several embodied and theatrical approaches for dealing with emotions and enhancing communication are, for example, adopted in the psycho-educational context, including socio-drama, dramatherapy using narrative techniques such as story constellations.

² A case in point is the highly politicised theatre of Aristophanes.

no longer passive observers but substantially part of the performance. As such, theatre enables both emotional and synaesthetic experiences, affecting all senses. Thanks to these “embodied affects”, theatre leads to a multidirectional and open-ended transformation of individuals (Fischer-Lichte and Wihstutz 2017). At the same time, theatrical fiction constructs reality through storytelling and narratives, appealing to human intellect, cognition, and opening a “space of potentiality” (Müller-Schöll 2004).³

Narratives are studied by the humanities and social sciences (Hühn et al. 2014), holding that both literary works and human everyday-discourse evoke complex cognitive processes that shape humans’ understanding of the world, of others, and the self (Brooks 2022). Through narratives, individuals re-elaborate settled knowledge with new input to form updated cognitive judgements and retrospectively make sense of phenomena (Herman 2013). In this process, emotions are “part of an interpretive and self-regulatory feedback system allowing people to track, update, and modify their understanding of themselves and the world” (Chapman et al. 2017, p. 851). Narratives and the herein suscitated emotions are moreover always embodied, grounded in a position and in a subjective way of experiencing input, so as to make them complex, non-linear and highly subjective (Herman 2013). Nevertheless, narratives mediate between subjective experience, social identity, personal history, and contextual knowledge, giving room to collective understandings and identities. Conceived as such, narratives enable impactful communication through collective reasoning processes (Czarniawska 2004). In the context of theatre, these reasoning processes are deemed even more powerful if participants actively contribute to the performance, as applied social, educational, and political theatre highlights (Campbell 2019).⁴

Based on these theoretical foundations, we assume that the transdisciplinary art-science play *Anthropos* has a large transformative potential because of 1. its fictional, symbolic, and scientific narratives about climate change; 2. participants’ active contribution in sharing personal experiences and reflections; 3. the imminent synaesthetic and relational experience of the theatre performance itself. Taken together, our aim is to explore whether such a novel approach combining transdisciplinary art-science collaborations and participatory elements in theatrical storytelling can impact participants’ emotions about climate change, which we interpret as evidence for a successful communication.

The case study *Anthropos, Tyrann (Ödipus)*

From March 26 to April 8, 2022, the Vereinigte Bühnen Bozen (VBB) theatre staged Alexander Eisenach’s (2021) *Anthropos, Tyrann (Ödipus)*, directed by Carina Riedl.⁵ In contrast to Eisenach’s premiere at the Schaubühne in Berlin (Germany) in 2021, which was live-streamed due to the pandemic, the version staged in Bolzano (Italy) was performed with an audience present.

Loosely based on Sophocles’ *Oedipus Tyrannus*, *Oedipus at Colonus* and *Antigone*, the classical myth was read in the light of the

problems of the Anthropocene. The figure of Oedipus, the king who did not want to see nor accept the uncomfortable truth that gradually emerges over the course of the performance, namely that he had unknowingly killed his own father and fathered children with his own mother, served as a metaphor for humanity’s reluctance to acknowledge the impending climate crisis and take action to restore the harm done to the environment, fellow human beings, animals and plants (Ugolini 2021). The metaphorical use of the myth is nothing new: as in ancient Greek tragedies, poets could not explicitly refer to current events⁶, they drew on myths as metaphors for the present. In order to strike a balance between leveraging the strong educational and emotional effect of the *Oedipus Tyrannus*, already pointed by Aristotle (Aristotle 1932, XIV, 1453 b), and help people in associating the myth with climate change, *Anthropos* drew on the powerful original narrative of Sophocles and enriched it with several modern narratives. Moreover, Eisenach’s play shows how theatre can serve as a bridge between science and society, as noted by Apostolo (2021).

The staging of *Anthropos* in Bolzano was developed through a transdisciplinary process involving the director as project leader, the dramaturge, actresses, researchers, and activists, who reflected together, shared their knowledge and personal stories. The result was an art-science collaboration which aimed at 1. thematizing human responsibility, guilt, hope, and fate in relation to climate change; 2. presenting possible practical solutions as well as theoretical-philosophical post-anthropocentric thinking, for example, by Haraway (2016), Braidotti (2016), and Tsing (2015); 3. sensitizing the audience to the seriousness of climate change through storytelling; and 4. promoting public dialogue and collective engagement through participatory methods.

The performance directed by Carina Riedl was divided into two main parts. In the first part, excerpts from Sophocles’ tragedies of the Theban cycle were staged by five actresses although interspersed with several modern interludes: a local photographer telling about his experience in documenting the ongoing melting of local glaciers; a kongolese percussionist musically narrating the eruption of the Nyiragongo Volcano in 2021; five audio recordings by scientists highlighting the consequences of the climate crisis and the urgently needed measures to contrast it; and the narration of neurologist Jill Taylor’s experience⁷ of a temporary left brain hemisphere paralysis which made her feel interconnected with the surrounding nonhuman environment. In fact, human interwovenness with nonhumans was thematised in several sections (“Either we will become with each other or not at all”), and the concept of “man is the measure of all things” was deconstructed (“We are creatures out of mud, not from the sky”)

3 Please note that, due to space constraints, we cannot account for the complete discussion and theory in theatre studies.

4 For instance, the well-known “theatre of the oppressed” has proven to be particularly empowering and enhancing social action.

5 See VBB trailer *Anthropos, Tyrann (Ödipus)*, Spielzeit 2021 to 2022: www.youtube.com/watch?time_continue=8&v=3f9BjU-lsIQ&feature=emb_logo.

6 With the notable exception of Aeschylus’ *Persians*.

7 Bolte Taylor (2009).

TABLE 1: Plot of *Anthropos* and symbolical references to the climate crisis.

PLOT OF ANTHROPOS		SYMBOLIC METAPHORS FOR CLIMATE CHANGE
Oedipus Tyrannus	After years of political stability, King Oedipus's reign over Thebes is shaken to its foundations by the outbreak of a plague, that prompts him to search for the cause of the disease afflicting the city. According to an oracle, the plague was sent by the gods to punish an unsolved crime: the murder of the previous king, Laius. When Oedipus decides to identify the culprit, he sets in motion a series of events that will lead to the play's tragical conclusion. The evidence that Oedipus gradually collects begins to point to him as the culprit, and when Oedipus finally acknowledges the truth, that he himself caused the plague, he blinds himself and begs to be banished. His physical blindness reflects the metaphorical blindness Oedipus showed in failing to "see" the truth that had been in front of him for years (figure 1, p. 297).	<p>Refusal to see reality: The plague is a symbol of societal wrongs. Society pretends not to see that the climate crisis is happening.</p> <p>Responsibility: Oedipus looks for a culprit, but fails to look at himself. Humans fail to acknowledge their own responsibility for the climate crisis.</p> <p>The future and hope: Humans cannot hold against the unavoidable climate crisis. Hope keeps Oedipus moving further in his quest but slows down the progress of fate.</p> <p>Human hybris as the pride of creation: Oedipus' smartness leads him to hybris and thus to tyranny. His errors stem from not recognizing his own human limits. The same applies to the human-environment relationship.</p> <p>Blindness: Reflects the need for humanity to recognise the gravity of the climate crisis and take responsibility and appropriate action.</p>
Oedipus at Colonus	Oedipus, blind and poor, is banned from Thebes together with his daughter Antigone, but receives hospitality in Athens. In the wood of the Eumenides he is finally assumed into heaven among the gods (apotheosis).	Reconciliation and the overcoming of dualism: In the woods, Oedipus re-establishes his relationship with nature and gains peace. The human no longer is the sovereign of all things, but is embedded into the wholeness of all living beings.
Antigone	After Oedipus's apotheosis, his sons kill each other in a civil war. The new king Creon forbids to bury one of the sons. Antigone however defies the decree, and buries him, appealing to the fact that the laws of the gods override the law of men and exclaiming "I was born to love, not to kill". She is then sentenced to death.	<p>Love and justice: include nonhuman beings within an environmental care perspective.</p> <p>Mourning: Human beings must acknowledge and mourn what has been and what is being lost due to the climate crisis, before moving towards a more sustainable and just way of life.</p>

(adapted from Eisenach 2021). Table 1 gives a brief overview of the plot of *Anthropos* and how symbolical references in the Oedipus myth (Vernant and Roßler 1987) were adapted as metaphors for climate change.

At the end of the first section of every theatre performance in Bolzano, the scene was disrupted by activists from *FridaysForFuture* who burst onto the scene throwing leaflets and shouting slogans with megaphones, thus marking the transition to the second part of the evening. In fact, the scene changed and the spectators were invited by the actresses to actively engage in a discussion with the *FridaysForFuture* activists, actresses and scientists on climate change (figure 2, p. 300). Five different scientific positions were represented by nine researchers, namely a glaciologist, a geoecologist, a biologist, a human geographer/ethnologist, and a group of five researchers from the social sciences, including the authors of this paper. In each performance, the audience could debate with researchers from a different scientific position for one hour. Each scientific position was present two to three times, for a total of twelve performances.

Data and methods

To exploratively assess the emotional reactions about climate change of the theatre spectators before and after having seen *Anthropos*, we chose a quantitative approach. More precisely, a short survey was administered containing the question "Which emotions do you feel when you think about climate change?",

asked both before and after the play. Age group (under 18, 18 to 30, 31 to 60, over 60 years), and the scientific position performing the discussion (biology, geoecology, glaciology, human geography/ethnology, social sciences) were also collected (see survey in the online supplement⁸).

To answer the main question, participants ticked emotions from a predefined list handed out at the entrance of the theatre by selecting up to two emotions that best described their actual, immediate feeling about climate change and repeated the procedure after the theatre experience. The list included the most common emotions related to climate change as described in literature (Brosch 2021, Iniguez-Gallardo et al. 2021, Neckel and Hasenfratz 2021), namely: anger, anxiety, calm, concern, confusion, guilt, hopeful engagement, indifference, optimism, powerlessness, resignation, sadness. The definition of the emotions was left open to the participants' interpretation, as our aim was to exploratively investigate the theatre play's emotional impact without dwelling into the interpretation of single emotions and their different individual understandings. Data analysis was carried out using R statistical software. Absolute and relative frequencies were calculated, followed by McNemar's tests for paired binomial data and logistic regressions on single and aggregate emotions (for more information on data and methods see appendix in the online supplement⁸).

⁸ See the online supplement <https://doi.org/10.14512/gaia.32.3.6.suppl>.



FIGURE 2: Activists, scientists, and actresses, sitting on the right and left sides of the stage, rehearse the discussion with the audience.

Results

In total, the show sold 1,276 tickets, and 342 valid panel questionnaires were collected, stating 619 emotions before and 585 emotions after the play. Figure 3 shows the emotional changes following the performance, indicating which emotions became which by showing all possible combinations of the emotions mentioned. Overall, before the theatre play, concern (28.9%) and powerlessness (16.8%) were mentioned most frequently, while after the play also hopeful engagement (14.9%) and confusion (12.1%) gained a larger share. Figure 4 (p. 302) shows which emotions were more and less ticked by the participants after the play: the most striking thing is that after the play, concern was no longer mentioned by 91 people who had stated it earlier, while it was additionally stated by 39 people who had not stated it previously. A similar pattern is observable for powerlessness (−69, +30), while the largest positive changes are hopeful engagement (−16, +59) and confusion (−28, +50).

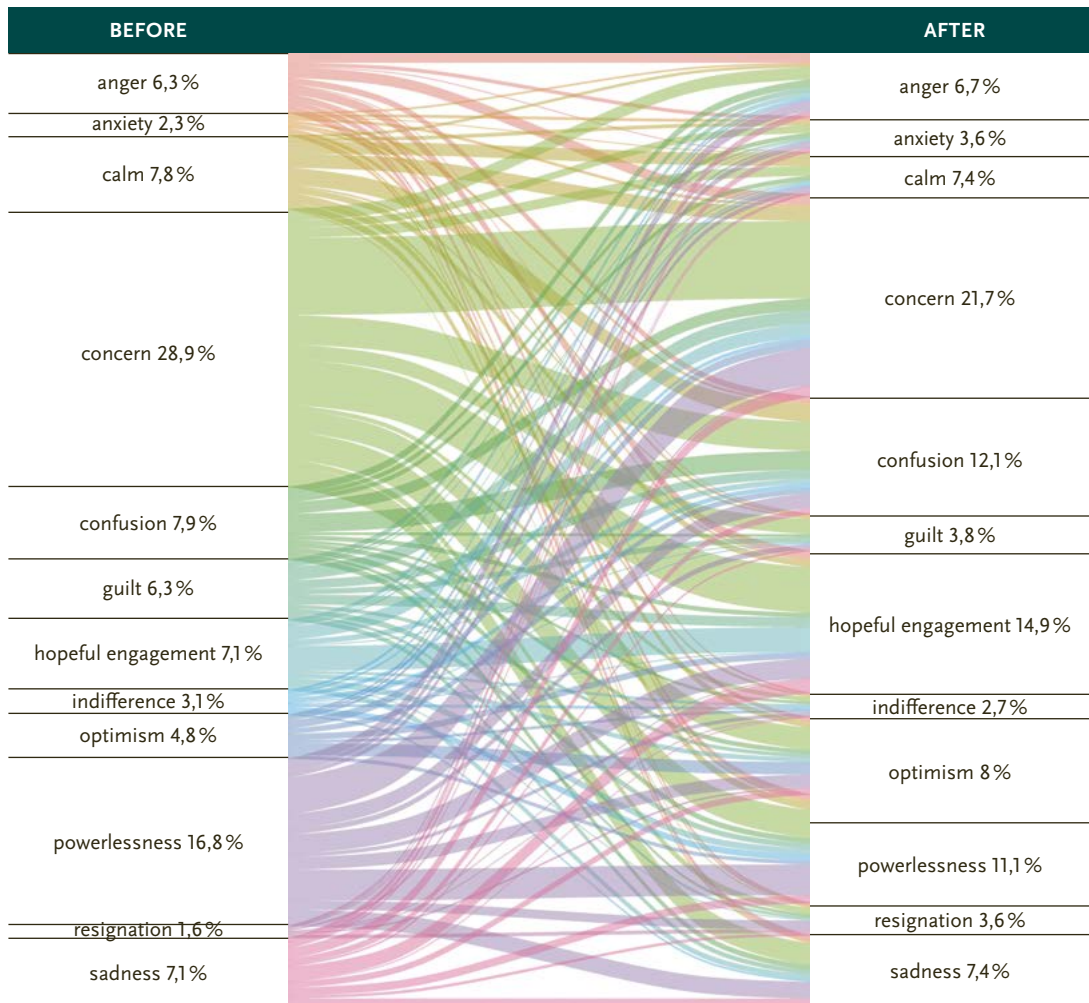
The statistical analysis (McNemars' tests and logistic regressions on each single emotion) confirms that hopeful engagement is most likely to increase, while concern, powerlessness, and calm are most likely to decrease after the theatre play. Furthermore, guilt is somewhat likely to decrease, whereas resignation, optimism and confusion are somewhat prone to increase. Anxiety, indifference, sadness, and anger are not likely to change. Considering age class and scientific position on the aggregate im-

pact of the theater play, we find no significant effects. However, one can observe that the theatre play has significantly impacted the emotional responses of participants towards climate change, and that the way in which they changed was highly heterogenous.

These changes point thus to the effectiveness of *Anthropos* in unleashing emotional responses in relation to current crises and possibly in conveying inputs regarding solutions and collective responsibility. In fact, while in the first part of the play, climate change was metaphorically narrated through the Oedipus myth and factually described by researchers, the discussion in the second part of the play allowed for audience members to contribute to the overall storytelling, providing a platform for sharing personal experiences and for actively engaging with the topic and other people in the audience and on the stage.

Discussion, conclusion and limitations

In this paper, we examined the potential of transdisciplinary and participatory theatrical storytelling as a tool for communicating climate change in a more emotionally resonant and thus understandable and impactful way. In particular, through the case study *Anthropos*, we conducted an empirical assessment of how the intertwining of theatrical, scientific, and personal narratives can effectively elicit emotional responses in the audience. In line with

FIGURE 3: Composition and change of the emotions stated before and after the performance (all possible emotional combinations are displayed).

narrative theory (Czarniawska 2004, Herman 2013), we understand in fact emotions as an integral part of people's knowledge building and sense-making. As *Anthropos* weaved diverse perspectives from Sophocles, researchers, artists, activists, and audience members, it allowed for a broader range of narratives and characters the audience could relate to and develop empathy for (Talgorn and Ullerup 2023, Jones and Peterson 2017). Scientific facts, myths, music, metaphors, photographs, eyewitness and audience accounts were blended in an overall synaesthetic theatrical experience. The overlapping narratives, shifting between the ancient myth, current realities, and the future of planet Earth, explored themes of responsibility, interconnectedness with nature, and a reevaluation of humans' role in creation (Jones and Peterson 2017). This intricate narrative web exposed spectators to novel perspectives that triggered a process of enriching or even revisiting settled knowledge (Herman 2013), as the changes in emotions seem to point out. The rise in confusion could hint to such a development: indeed, environmental psychologists argue that confusion arises when established systems collapse to make room for something new (Iniguez-Gallardo et al. 2021), while the

increase in hopeful engagement and the decrease of concern and powerlessness may suggest an overall trend towards pro-environmental attitudes.⁹

However, as emotional reactions to climate change communication remain always multidirectional and open-ended (Schneider et al. 2021, Chapman et al. 2017), rather than delving into the changes of single emotions, our focus is on highlighting the broader impact of *Anthropos* on participants' emotional engagement with climate change. This interpretation underscores the potential of transdisciplinary art-science-activism storytelling within a participatory theatre context to enrich and enhance climate change communication. The theatrical setting here emerges as an ideal arena, as it further encourages transformation through affects, embodied experience, and relational presence (Fischer-Lichte and Wihstutz 2017). Moreover, it creates the ideal condi-

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⁹ While positive emotions are deemed helpful in fostering climate-friendly attitudes (Schneider et al. 2021), there is a lively debate within environmental psychology concerning the emotions of concern and hope that we cannot account for here.

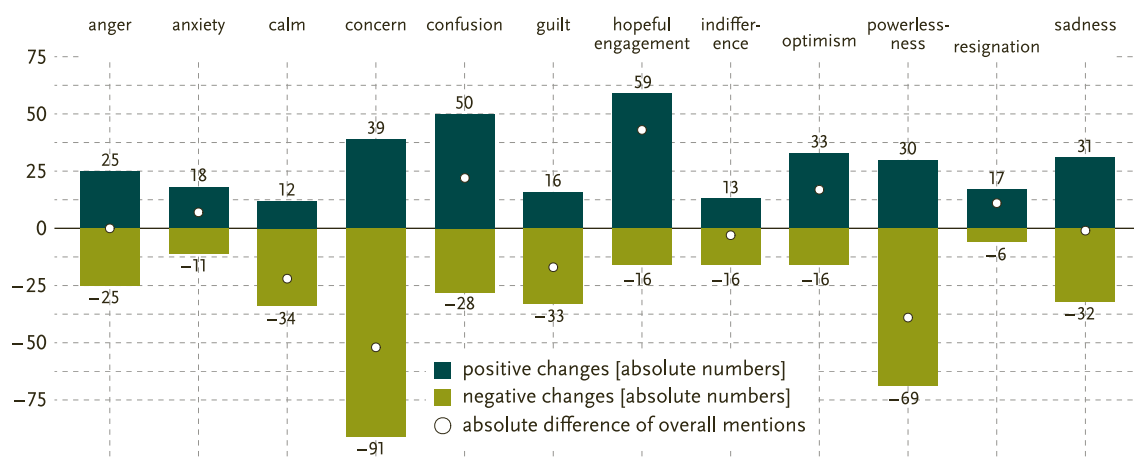


FIGURE 4: Emotions after the theatre play in relation to the emotions mentioned before: number of people who selected a new emotion after the play (positive change) or who stopped ticking an emotion (negative change).

tions to disrupt the ingrained one-way nature of current climate change communication (Woodley et al. 2022), by engaging the audience in co-envisioning alternative scenarios beyond apocalyptic imaginaries (Sou 2023). Indeed, the participatory elements, which are known to increase awareness, empower people, foster a sense of collaborative agency (Talgorn and Ullerup 2023, Law et al. 2021) and positive emotions by focusing on solutions rather than only on problems (Jones and Peterson 2017), likely played a significant role in enhancing the overall impact of the play.

Our study yields thus practical insights for future climate change communication strategies and engagement initiatives. The effectiveness of *Anthropos* in unleashing emotions suggests that incorporating transdisciplinary and participatory theatrical storytelling elements can enhance the impact of communication efforts, as engaging audiences through emotionally charged narratives offers a promising way to drive sustainability engagement. Indeed, creating spaces for audiences to share personal experiences and contribute to the narrative can foster a sense of community and empowerment, transforming climate change communication into a two-way dialogue (Woodley et al. 2022) that resonate on a deeper level. Practical implications thus encompass embedding multiple narratives, fostering audiences' engagement in storytelling and facilitating two-ways communication, encouraging transdisciplinary partnerships among researchers, artists, activists and laypeople, and evaluating the short term as well as the medium-to-long term impact of these mixed representations.

However, as the study centered on immediate emotional responses, investigation into long and medium-term evolutions is warranted and the following research questions may arise: Do new narratives about climate change emerge in the aftermath of such a play? Does increased political engagement, behavioural change, or social action result from the experience? Furthermore, it is essential to delve deeper into the significance and underlying causes of emotions stirred by narratives within the context of transdisciplinary and participatory theatre initiatives. This case study paves the way for future transdisciplinary studies at the crossroads of art, activism, and science, including communica-

tion science, psychology, culture, politics, and theatre studies. In doing so, it unveils the capacity of transdisciplinary and participatory theatrical storytelling to communicate climate change through the power of emotions, as tragedy is indeed the true language of science.

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