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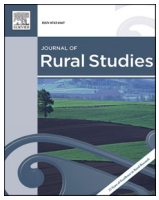

An examination of digital empathy: When farmers speak for the climate through TikTok

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ABSTRACT

Food production contributes to and is affected by climate change. With this dual-sided nature of food production, separate from policymakers, the media, scientists, and activists, how climate dialogue engagement occurs when farmers speak about climate is the interest of this research. Due to the important role of youth in climate activism, we analyze climate dialogue engagement on the youthful platform of TikTok during the most recent United Nations COP26 meeting, when climate dialogues peaked globally in the media. This study includes a two-step analyses: Step-I involved a post-focused analysis investigating digital empathy surrounding TikTok posts created by farmers. Step-II was a user-focused analysis exploring TikTok farmers' perspectives on the public engagement with their climate-farming related posts. The results suggest that the typical empathic engagement of the analyzed climate dialogue is emotional reactions (expressed briefly or explicitly). Even though the analyzed videos contain alternative ways of communication (dynamic demonstrations, humor), cognitive empathy can differ based on the narrative and narrator. These findings contribute to studies investigating the outcome of climate communication among communities that share specific interests, elaborating on the role of alternative ways of communication in climate dialogues, and exploring how digital empathy serves to break down self-silencing among farmers and the online communities that they reach out to.

1. Introduction

Food production contributes to and is affected by global climate change. Both animal and plant-based foods are sources of greenhouse gas emissions that contribute to global household emissions (Crippa et al., 2021; Xu et al., 2021). At the same time, the effects of climate change present a significant threat to food production through a reduction in crop and livestock productivity, as well as soil and water quality and quantity (Hatfield et al., 2011).

This dual-sided nature of food production puts farmers at the central point of climate dialogues, which is mainly headed by the media, scientists, policy makers, and activists. One side of the climate dialogues is focused on the contribution of food production to global climate change, where farmers are receivers of information about how to build practical improvements on farms and build new relationships with consumers and citizens (van der Ploeg, 2020). The majority of communications engagement surrounding the climate impact of food production occurs at both the social and political level. Apart from global political meetings (e.g., United Nations Climate Change Conferences), there are high levels of social and media interactions where groups such as activists and creators of social movements coordinate actions to create community social capital. These dialogues are mainly aimed at promoting the environmental benefits of reducing livestock farming, clearing land for grazing, and decreasing other agriculture related activities that have a high share of global emissions, such as food processing, transport, retail, and packaging.

On the other side of the climate dialogues surrounding how food production is affected by global climate change, farmers are again receivers of information about the threats due to uncertainty, the expected risks associated with climate change, and how the adoption of new farm management practices can help to deal with the negative effects of climate change (Sorvali et al., 2021; Bavorová et al., 2020). The

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communications engagement on the risks of climate change on food production includes some communications challenges (between scientists, media and farmers) due to differences in climate change beliefs and the willingness to implement climate change measures on farm management practices (Wilke and Morton 2015; Getson et al., 2022; Telg et al., 2020; Fiala et al., 2021).

At the intersection of this climate dialogue, apart from scientists, the media, policymakers, and activists, how dialogue engagement occurs when farmers speak out about the climate is the motivational interest of this research.

Investigating climate dialogue engagements requires consideration of three dimensions of the topic. First, previous studies note the importance of the demographic dimension (Hautea et al., 2021; Basch et al., 2022). Due to climate dialogue engagement becoming an increasing concern among younger generations, this study explores youth engagement particularly. Second, one must consider when individuals feel empowered to participate in the dialogue (Ettinger et al., 2023). We narrowed down our research period and viewed the 26th United Nations Climate Change Conference (UN COP26) as an opportunity to reach broader individuals engaged in the global climate dialogue. Third, it is essential to distinguish between the venues where the dialogues take place (Ettinger et al., 2023). Given that farmers have traditionally been positioned as silent individuals in public discussions in the media (Stevens et al., 2016), our study chose TikTok. This platform has dominated social media in recent years and is a potential venue for farmers, particularly young farmers, to engage more readily in climate discussions relative to other social media platforms due to its youthful and playful characteristics (Basch et al., 2022).

1.1. Dialogue principle of empathy informing the study

Understanding the components of dialogue engagement is as necessary as exploring how dialogue engagement is fostered. To that point, the framework of empathy holds a key potential as a facilitator of difficult climate discussions for social change (McBeth et al., 2022; Swim and Bloodhart, 2015).

This study is centered upon the empathic dialogue principle, and investigates the engagements in climate dialogues initiated by farmers, and aims to contribute to the question of: "Has the popularization of the playful and youthful social media platform of TikTok fostered empathic dialogue engagement surrounding the climate discourse?"

This broader question is approached by a multi-method design study and involves investigating TikTok posts created by farmers (step-I: post-focused analysis) followed by interviewing TikTok users who identify themselves as a farmer (step-II: user-focused analysis).

In step-I, post-focused analysis within the digital empathy framework, we approached the question of "How does engagement occur when farmers talk about their climate-farming concerns?" We were interested in the informants' engagement (the data includes comments on the selected TikTok videos of farmers) over a specific time period, particularly when climate dialogues peaked globally on social media. All publicly available TikTok posts created by farmers that used the hashtags of UN COP26 (e.g., #cop26; #cop26uk) were gathered, and we investigated the dialogue engagement of TikTok videos (N = 29) by working through the text-based comments (N = 2965). We explored the dialogue engagement patterns by categorizing the TikTok comments based on the EPITOME framework, a new conceptual framework of expressed empathy developed by Sharma et al. (2021), which is used to understand empathy in text-based, asynchronous online conversations.

In step-II, user-focused analysis, we focused on explorative questions that considered the subjective opinions of TikTok users: "-Which values play a role in the study participants being active on TikTok in connection to their professional identities (as farmers)? Which attitudes did they develop when initiating and engaging in climate-farming conversations? What are their beliefs (personal opinions) on the features of the TikTok platform that facilitate the empathic climate dialogue engagement?" We aim to explore the participants' (data includes interviews with TikTok farmers) values, attitudes, and beliefs representing their perspectives on climate dialogue engagement. The Values Coding approach has been used as an affective coding method that investigates the subjective qualities of the individuals by directly naming their experiences (Saldaña, 2021).

This paper is structured into six sections: The following section provides the background information followed by the third section which gives the study framework of digital empathy. Next, the data and methodology section describes the data collection procedure and details the nine methodological steps that we followed. The findings section presents the results of the step-I, and step-II respectively. The final section concludes with a summary of the study results, provides limitations of the study, and giving recommendations for future research.

2. Background

Prior to presenting the study framework of digital empathy, this section aims to provide the main scholarly arguments and findings as background information within the three contexts that are the focus of our study.

2.1. UN COP26 as a landscape for contemporary youth activism

The UN COP26, held in Glasgow, Scotland (on October 31st-November 13th, 2021), is an annual meeting that brought together 120 world leaders and over 40,000 registered participants to assess and negotiate paths for mitigating and adapting to climate change (UN, 2022). At that time, due to intensive coverage of the conference in traditional and social media, awareness about the conference increased significantly among the public (Boykoff et al., 2022; Conner, 2021).

UN COP26 brought together a global range of young environmental activists. Despite the many disappointments about the output of the conference (Bloomfield and Steward, 2022), the young activists have been described by the media as, "The new generation of young climate activists is tougher, stronger, better organized and a thousand times more numerous than we were at their age" (Ramsey, 2021).

This study decided to use the UN COP 26 as an opportunity to explore the voices of farmers (as agricultural advocates, environmental activists, or non-expert participants) as an occupational group that has rarely been involved in climate dialogues in the past. Understanding the engagement patterns in farmer-led climate dialogues during UN COP26 may give insights into how to connect climate change with specific values, attitudes, and beliefs among the communities to which farmers currently reach out to.

2.2. Social media, climate dialogue, and farmers

Previous studies report that most farmers are in the climate-silent group, or in defensive mode due to the strong voices surrounding agri-food issues, such as activism against industrial livestock farming, food scandals, and conflicts between animal welfare activists and farmers (Stevens et al., 2018; Rotz, 2018; van der Ploeg, 2020).

Even though young farmers around the world are becoming involved in climate actions in different forms (e.g., marches to make climate change policy a priority in the 2023 Farm Bill in the US, calls for climate actions to ensure generational renewal in the EU), farmers are still at the early stages of using social media to initiate a climate dialogue with their professional identities (Unay-Gailhard and Brennan, 2023).

However, in the new media age, consumers increasingly rely on social media for news and weather information (Liu and Kim, 2021), and they're looking for transparency in agri-food systems and want to know who their farmer is and how their food is produced (Petril'ák et al., 2020). These trends highlight that consumers are increasingly willing to ensure a sustainable agri-food sector by supporting farmers involved in decisions to mitigate and adapt to climate change. These trends indicate

an opportunity for farmers to engage more directly with the public and their consumers.

2.3. TikTok as a social media platform for climate dialogue engagement research

Within recent years, TikTok, a video-sharing platform, started to dominate social media. In 2022, TikTok was the most downloaded app globally and is particularly popular among the younger generation. TikTok is best known for its playful and youthful variety of content, from music-dance videos to political and financial advice with a "millennial humor" style of communication (Anderson, 2020; Bhandari and Bimo, 2022).

Besides all these best known characteristics, the educational content of TikTok is also widely consumed. Previous studies that have explored the educational landscape of TikTok have documented how science content that's presented in TikTok videos helps in the academic development of youth (Azman et al., 2021); increases engagement in scientific experiments (Habibi and Salim, 2021); brings success for new science communication creators in geoscience (Zawacki et al., 2022); and inspires for better instruction in higher education (Radin and Light, 2022).

In terms of climate dialogue engagement, previous studies (Basch et al., 2022; Hautea et al., 2021) show that TikTok allows non-expert users to engage in climate conversations, and this makes the platform a vital tool for understanding climate change opinions among various professionals. Therefore, TikTok presents an opportunity as an alternative way of communication and connecting climate dialogue with diverse communities including farmers and non-farmer communities.

There is growing evidence that alternative ways to communicate climate change other than using shock and fearful tones, such as playful demonstration (vs. a lecture style) or humor (vs. anger), influences users' engagement (Kovacheva et al., 2022; Manzo, 2012). Meijers et al. (2019) have documented that positive communication (e.g., using visual impact metaphors) increases public engagement in climate dialogues. Boykoff and Osnes (2019) evaluated how climate change issues are discussed, proposing that humor (e.g., sarcasm) can be an effective alternative to climate dialogue engagement. Based on the analysis of wildfire cartoons in the media, Moret-Soler et al. (2022) found that humor and irony-based cartoons help construct an understanding of complex climate change realities. The recent literature reviews on humor in climate communication (Kaltenbacher and Drews, 2020; Russell et al., 2023) concluded the benefits and challenges of the use of humor and highlighted the fact that the use of metaphors and cultural references has the power to reach an audience. Even though *"it is still unclear whether using humor in environmental communication is doing more harm than good"* (Kaltenbacher and Drews, 2020, p.718), there is documented evidence of the positive effects of humor in raising awareness, changing perceptions, increasing learning, and behavior changes (Kaltenbacher and Drews, 2020).

Our study explores the climate dialogue engagement in the TikTok platform based on three considerations. First, to reach a broader segment of global youth where group discussions are based on specific interests (interest in farmers' attitudes, values, and beliefs) among diverse communities including farmers and non-farmer communities. The TikTok platform is a popular activism hub, particularly among youth (Hautea et al., 2021). Second, climate dialogue engagement patterns have already been studied on the social media platforms of Twitter, YouTube, and Instagram (Chang et al., 2022; Park et al., 2021; Riley and Robertson, 2021), and there might be differences in the reported patterns on under-examined platform of TikTok. Third, based on the alternative way of the communication potential of TikTok, our rationale for using TikTok was that this would likely be a platform where young farmers would present their climate concerns in a different conversational tone than on other social media platforms, which could foster various forms of dialogue engagement experiences.

3. Study framework: digital empathy

The dynamics of our lives have changed with the rise of social media, and the critical importance of empathy in our society transferred into a search for digital empathy in our digital lives. In this section, we first introduce the emerging framework of digital empathy in different study fields, including its importance in climate dialogue studies, followed by the used definition of digital empathy in our research.

3.1. The emerging framework of digital empathy

A growing amount of literature on digital empathy shows the measurable impact of virtual empathy on individuals and communities. A Web of Science keyword search for "digital empathy" and "virtual empathy" indicates a growing body of literature over the last twenty years, particularly in educational research (Chen, 2018; Redden and Way, 2017; Wambsganss et al., 2021; Friesem, 2016); the medical literature (Terry and Cain, 2016; Sperandeo et al., 2021), and communications studies (Deri et al., 2018; Hale et al., 2020; Ravishankar, 2021; Lovell et al., 2022; Zhou and Jurgens, 2020; Sharma et al., 2021).

In the study fields that intersect with communications literature, the predictability potential of digital empathy arises as an essential question (Deri et al., 2018; Hale et al., 2020; Ravishankar, 2021; Lovell et al., 2022; Zhou and Jurgens, 2020; Sharma et al., 2020, 2021). For example, the factors influencing digital empathy have been investigated for individuals with limited mobility (e.g., cancer patients) and groups with weak offline support (e.g., marginalized farmers in remote regions and anorexia patients). Hale et al. (2020) explored the predictors of digital empathic support for social media posts created by cancer patients, reporting how the construction of online narratives influences the reception of digital empathic support. Ravishankar (2021) investigated digital platforms' potential to generate empathy and collect small loans for marginalized farmers to fight poverty in India, while a study by Lovell et al. (2022) examined the role of empathy-based communication in public organization communications during COVID-19.

3.2. Digital empathy in climate dialogue studies

The importance of empathy in the climate dialogue first began to be documented in recent years. According to findings by Swim and Bloodhart (2015), empathic messages positively affect engaging in pro-environmental behavior, particularly facilitating donating to environmental groups. Hobson and Niemeyer (2013) explain that empathic negation is one of the essential components of climate change skepticism, which explains what climate skeptics value and believe.

Compared to many communication studies incorporating digital empathy, few studies provide insights into dialogue engagement when farmers speak about their climate concerns. The experimental research by McBeth et al. (2022) asked the question, "*Do climate change skeptics empathize with a narrative that argues the opposite, and does it matter who tells the narrative?*" and found that climate change skeptics empathized more with an organic farmer when he/she shares a pro-climate change narrative than they did with another occupational group (i.e. mechanics) when they shared the same narrative. The study results suggest that for climate change skeptics, it is not the narrative but the narrator who matters most of the time.

As documented by previous rural sociology studies that explore the use of social media by farmers, the new media creates a sense of self-recognition among "others" at the global level both by validating or invalidating career self-concepts (e.g., recognition of interest in their product from far away cultures versus disrespect due to food and dietary-related movements) (Unay-Gailhard and Simões, 2022). The study by Riley and Roberston (2021) found that farmers' social media posts resonate with "empathy rituals" when discussing the difficulties of contemporary farming practices. In this sense, these "empathy rituals" include the online provision of thoughts and values by sharing

emotional engagements (Brownlie and Shaw, 2019).

Due to skepticism about climate change appearing as a current social phenomenon (Hobson and Niemeyer, 2013), which is reflected by a growing polarization of climate change communication on social media (Colvin et al., 2020), we assume that the framework of digital empathy holds an important potential for distinguishing climate dialogue engagement patterns.

3.3. Definitions: digital empathy and the EPITOME framework of expressed empathy

Based on the previous studies by Davis (1980) and Sharma et al. (2020), we define digital empathy as, "traditional empathic characteristics that include emotional empathy (emotional reactions) and cognitive empathy (interpretational and explorational engagements) through text-based online communications."

Studies that are interested in online communities as a source of support have used both qualitative and quantitative analyses to measure digital empathic support based on different measurement scales (Hale et al., 2020; Sperandeo et al., 2021; Zhou and Jurgens, 2020; Wambsganss et al., 2021). In this study, step-I of the analyses was based on the EPITOME framework to qualitatively measure the empathy expressed in online text messages (detailed in the following section).

The EPITOME framework was chosen due to the objective of the study, which was to measure expressed empathy in text-based messages. The EPITOME framework was designed by Sharma et al. (2020) and developed explicitly to understand empathy in online conversations that use text-based asynchronous contexts. TikTok is a type of asynchronous communication platform where videos dominate the platform and it does not explicitly rely on time-based dialogue engagement in its text-based messages.

4. Data, methodology and study samples

This study utilized a multi-method design that includes two research steps: Step-I, post-focused analysis, and step-II, user-focused analysis with nine main stages. Fig. 1 provides an overview of the methodological flow of the study.

4.1. Step-I: post-focused analysis

The data collection of this study commenced with the creation of new TikTok accounts. For each step (step-I and II), to collect the maximum number of data and avoid bias caused by a single user's profile, we created two new TikTok accounts with two different mobile devices and IP addresses, in addition to using an already created TikTok account. This is because TikTok's algorithm heavily depends on a user's profile, such as their sign-up information, using a mobile device, IP address, and user interactions, such as liking, commenting, and sharing videos.

In step-I, we analyzed text-based comments on the selected TikTok posts. This step aimed to understand how dialogue engagement was directed and attached to the farmers that created the posts on climate-farming issues.

i) Identification of a socio-political actuality at a global scale: We began the purposive sampling by identifying an appropriate socio-political actuality on social media that potentially triggered young farmers and let them comment on their climate concerns. The UN COP 26 was chosen because it was the most recent socio-political event at a global scale at the time of the study that also witnessed a high number of environmental activism from youth. As highlighted by previous studies, the hashtags of international events are more likely to end up with hundreds of thousands of media engagements globally (Liu and Kim, 2021). UN COP26, as a global socio-political occurrence, was an opportunity for encouraging farmers to post personalized information about the event, and it was thus considered timely to observe the online dialogue engagement surrounding this event.

ii) Identification of relevant hashtags: The data collection strategy followed the practice of prior social media studies that use hashtags as a research starting point (Riley and Robertson, 2021, 2022; Basch et al., 2022; Chang et al., 2022). Data was collected from January–February 2022 via the most popular UN COP26 hashtags (#cop26; #cop26uk; #cop26glasgow) used together with the farming-related English-language hashtags (#farmer; #farmlife; #farm365; #farm24; #dairy; #dairyfarm; #dairy-farming; #ranchers; #usfarmers; #ukfarming; #australiafarmers;

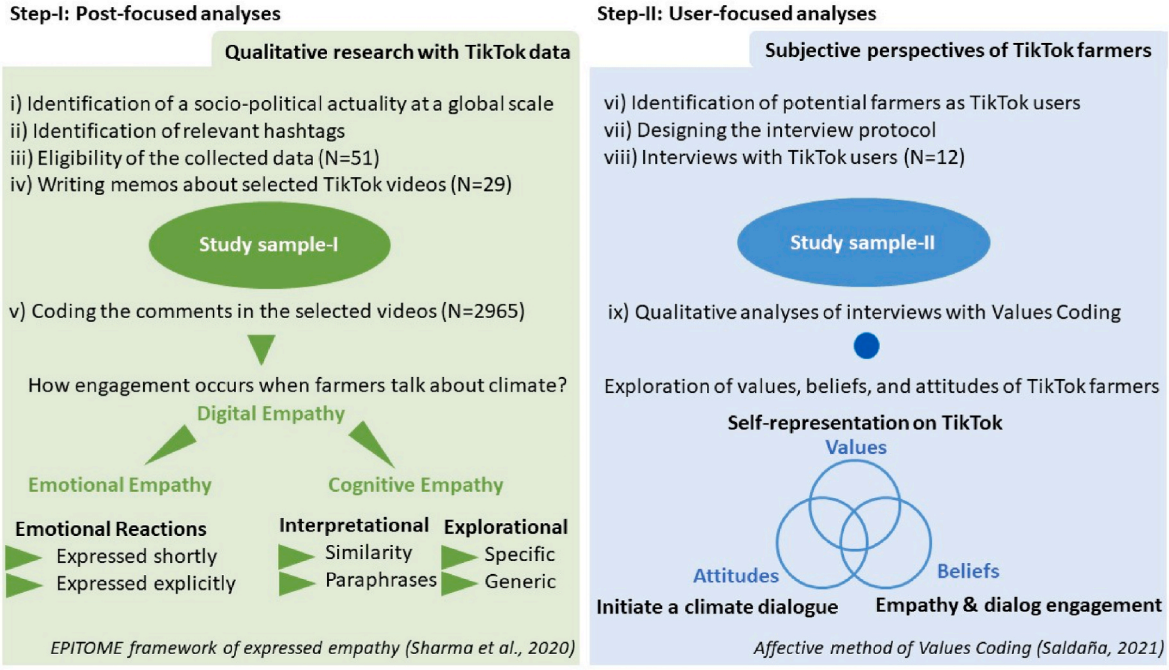

Fig. 1. Methodological flow of the study.

#irelandfarming; #newzelandfarm; #canadafarmers). Since it was not possible to conclude that these hashtags confirmed a TikTok user was an actual farmer, we also checked their accounts to determine their professional identities.

iii) Eligibility of the collected data (N = 51): The first two authors watched 51 identified videos together and discussed their eligibility. 22 videos were excluded based on four main criteria: 1)the post did not have any reactions from viewers, such as posts that did not have like(s), comment(s), or emoji(s); 2)the TikTok post was not in English; and 3)the post did not include the searched-for content. TikTok may incentivize users to use popular or actual hashtags that might not relate to their content, so we thus eliminated videos that used the identified hashtags but were not actually about the relevant content. Based on these selection criteria, we concluded with 29 eligible videos, which, along with the accompanying comments, were downloaded and stored using the screen recording function.

iv) Writing analytical memos about the selected TikTok videos (N = 29): Before starting to code the digital empathy of the TikTok comments, the first two researchers collectively wrote an analytical memo. As suggested by previous studies, writing analytical memo documents reflections and helps to create an intellectual workplace for researchers (Saldaña, 2021; Thornberg and Charmaz, 2014). In our study, the process of writing analytical memos aimed to create a common understanding of the content and context of the video.

Study sample-I: 29 videos were consisting of 2965 conversations involving about 187 accounts. Based on what the videos featured and the users' "bio" information, we concluded that the sample included TikTok users from the US, the UK, Canada, Ireland, Australia, New Zealand and was comprised of 14 men and 10 women (in 5 videos there was no identity-related information). The selected videos frequently included the following five content aspects: 1)documenting their current work setting; 2)depicting exchange to create awareness about environmental concerns surrounding their farming practices; 3)expressing feelings and emotions; 4)expressing mockery with sarcasm and humor; and 5) thinking in a reflective manner by sharing personal knowledge and perspectives.

v) Coding the comments in the selected TikTok videos (N = 2965): The first two authors read each comment during the same timeframe, considering the semiotic interactions of written text, emojis, and images used in the comments. After reading the comments, the authors individually classified each comment with the guidance of the EPITOME framework (Sharma et al., 2020).

The EPITOME framework includes three digital empathic communication mechanisms: for emotional empathy I-Emotional Reactions, and for cognitive empathy II-Interpretation Engagement, and III-Explorational Engagement. The EPITOME framework differentiates between these three categories as "no" communication, "weak" communication, and "strong" communication.

However, moving through the coding, to be more explicit regarding the annotation details, we adjusted these differentiated coding categories based on the structure of our data and our own interpretations. In our study we coded the digital empathy of the comments of the selected TikTok videos with four online dialogue engagement categories, and eight sub-categories, which was: I-Emotional Reactions (differentiated between i) expressed briefly or ii) expressed explicitly); II-Interpretation Engagement (differentiated between iii) similarity or iv) paraphrases); III-Explorational Engagement (differentiated between v) specific or vi) generic); and IV-Non-communication of Digital Empathy (differentiated between vii) civil tone or viii) uncivil tone).

4.2. Step-II: user-focused analysis

As a second step, we considered the perspectives and experiences of TikTok users (farmers). This step was aimed at understanding the TikTok users' practices of posting and engaging with TikTok regarding their climate-farming related concerns.

vi) Identification of potential farmers as TikTok users: The potential study participants were identified by three sampling strategies: 1) publicly available data of the TikTok users that we analyzed in step-I; 2)a hashtag search, and publicly available press articles that present TikTok influencers from the farming sector; 3) snowball sampling where research participants were asked to assist the study in identifying other potential farmers who use TikTok with their farming identities. The identified relevant users (N = 87) were approached via their publicly available contact information, such as email addresses, phone, or social media accounts.

vii) Designing the interview protocol: The interview protocol was developed by addressing the perspectives of TikTok users regarding their values towards engagement on TikTok with their professional identities, the attitudes they develop on the platform, and their beliefs on the features of TikTok that facilitate climate dialogue engagement. Our questions were purposely open-ended to guide the discussion. The participants whose TikTok videos we analyzed in step-I (N = 4) were approached with further questions about their experiences regarding the engagement to elicit deeper discussions on their videos posted during UN COP26. An ethical clearance certificate was obtained from the ethics committee of the first authors' institution.

viii) Interviews with TikTok users: In total, we interviewed 12 TikTok users who self-identify themselves as farmers and who were English speaking. Interviews were conducted online and in person from January–March 2023. Each interview lasted between 30 and 40 min and all of the interviews were recorded with the participant's permission and transcribed with Nvivo software.

Study Sample-II: Our sample consisted of 12 TikTok users who had public accounts with a varied number of followers (max ~820,000 and min ~800). Five of the TikTok users reported that they post frequently about their environmental concerns surrounding farming. Our sample comprised of five men and seven women (US = 6; UK = 3; Canada = 2; Australia = 1). The average age of the respondents was 34 and all of our participants were full-time farmers. Most participants were multigenerational farmers involved in animal and crop farming, while others were engaged in mixed farming and logging. In terms of their social media use, all participants reported that they are also active on other social media platforms, with Instagram, Facebook, and YouTube being the most common other platforms they were active on in parallel with TikTok.

ix) Qualitative analysis of the interviews with Values Coding: Data collected from the semi-structured interviews aimed to investigate the subjective perspectives of TikTok users by directly acknowledging their experiences. We used the affective coding methods of Values Coding and analyzed the data using short codes (e.g., professional responsibility, sociability, timeliness) rather than sentences. Values Coding is considered an integrated system of values, attitudes, and beliefs of human experiences (Kozinets and Gambetti 2021; Daiute, 2013), and defined as "a value is what you think/feel is important. An attitude is how you think/feel about someone or something. And a belief is what you personally think/feel to be true" (Saldaña, 2021, p. 168). Codes are constructed inductively, and reflection on their meanings and interaction between values, attitudes, and beliefs is presented with three broad themes.

5. Findings

Our findings focus first on exploring expressed empathy and the non-communication of empathy towards TikTok videos posted by farmers during the UN COP26. We then explore TikTok farmers' perspectives on the TikTok platform's potential for emphatic support.

5.1. Results of step-I: post-focused analysis

Our results highlight the central finding that digital empathy includes all of the investigated empathy categories with different levels of support. The typical engagement style of the analyzed climate dialogues is supportive, with a strong level of emotional reactions and involvement with a non-communication of empathy with a civil tone. There was a moderate level of interpretational engagement. We observe a tentative level of support for explorational engagement and involvement in dialogue with an uncivil tone. Fig. 2 provides a detailed overview of the findings from the emerging digital empathy, as well as the no empathy categories and exemplar quotes.

I **Emotional Reactions:** We found a strong level of support for emotional reactions. Most of the time, emotional reactions aim to express a mutual understanding through thoughts, feelings, and stories. The comments briefly expressed their understanding, with just short text messages or emojis being more frequent than comments expressing mutual understanding explicitly with further thoughts and feelings. Emotional reactions tended to come from both farming and non-farming participants.

i) Expressed briefly: Comments that expressed the feelings, experiences, perceptions, and viewpoints with warmth and compassion towards the TikTok user/dialogue participants, often including support, agreement, and confirmation in the form of short text messages, such as "I love your logic". Some comments did not include any text-written comments but included supportive and conformational emoji(s) or just likes, with the applause emoji, heart emoji, and hundred points emoji being the most often used ones.

ii) Expressed explicitly: Comments that were explicitly expressed often included one or several additional supportive messages such as "So good to see that there are actually people who care about the environment whilst still getting the job done. Love it". We found that explicitly expressed thoughts in our sample tended to hold an orientation that was either linked to personal concerns (e.g., comments using 'I" such as "So true. I've never thought about it like this. Great point") or to be driven by relational concerns with others (e.g., comments using "we," such as "We need the farmers to keep producing excellent meat, keep it up please").

II **Interpretational Engagement:** Our study found a moderate level of support for interpretational engagement. Even comments that included information sharing about a topic may indicate an understating of the TikTok user/dialogue participants' viewpoints but do not count as communicating an understanding (e.g., "big dairy companies are the polluters, not the farmers"). The study annotated these comments under the non-communication of empathy.

iii) Similarity: Interpretational engagement comments described similar feelings of the TikTok user/dialogue participant. The comments tended to communicate understanding through the emphasizing of individual agreement (e.g., "I had this conversation with my other half yesterday. So true").

iv) Paraphrases: Comments that contained paraphrases of the TikTok user's/dialogue participant's expressions, such as "Definitely, stop shipping meat halfway round the world when we can produce better here" for a TikTok post on a similar topic. Such expressions tended to show an interpretational engagement by re-expressing the meaning of the TikTok post by using different words.

III **Explorational Engagement:** Even though we found a tentative support for an explorational engagement, the number of explorational reactions was very high for certain videos, particularly for videos where the TikTok users created content that valued the process and kept a conversational tone. Most of the time, such explorational engagement comments tended to be from a non-farming audience, and contained curiosity, questioning, and a willingness to resonate with the answer if coherence emerged through dialogue.

v) Specific: Often, comments specifying a certain point included direct questions to the TikTok user/dialogue participants aiming for a personal discussion, such as "If you plant a tree, what's the chance it will reach maturity? I doubt more than half but what do I know three planted is sure better than nothing".

vi) Generic: Comments that did not specify a certain point to the TikTok user/dialogue participants and were often aimed at a further discussion on a general topic related to the stated or not stated issue in the dialogue. These commenters mainly used the space for social debate, and TikTok posts helped them to connect quickly with diverse communities (farmers and non-farmers). These generic comments often supported the TikTok user's post with not stated but related arguments via open and close-ended questions such as "Can anybody name anything that has changed in your daily life due to the local effects of climate change?" In some cases, such a way of engaging in a dialogue tends to privilege personal opinion at the expense of reducing expert authorities' views that rely on science-based evidence.

IV **Non-communication of Digital Empathy:** We found strong support for the non-communication of empathy on a spectrum between engagement with civil to uncivil attitudes. In our sample most of the non-empathic comments were containing civil tones, providing factual, personal, and statistical information.

vii) Civil tone: Comments only providing information and advice in a civil tone mainly included three types of expressions: 1)providing informational comments gathered from informant actors such as the media and scientists (e.g., "The science shows that grass-fed livestock is carbon neutral. The issue is with intensive farming and food issues"); 2)sharing their perceptions and understandings (e.g., "Deforestation will eventually put loggers out of business"); and 3)sharing personal experiences (e.g., "I'd take 1980 in a heartbeat, I went to the creamery meeting today. 15 farmers showed up from five countries, used to be 400 farmers from two countries"). Furthermore, many civil tone comments specifically referred to their job titles to display their expertise with the discussed subjects, such as "I'm a teacher of …"; "I have a master in …"; "I work in both sectors …".

viii) Uncivil tone: The uncivil comments included criticisms of political leaders, countries due to their unethical economic interests, activists, and the TikTok user/dialogue participants. The uncivil patriotic statements expressed were as persistent as unpatriotic ones (e.g., "Irish farming is one of

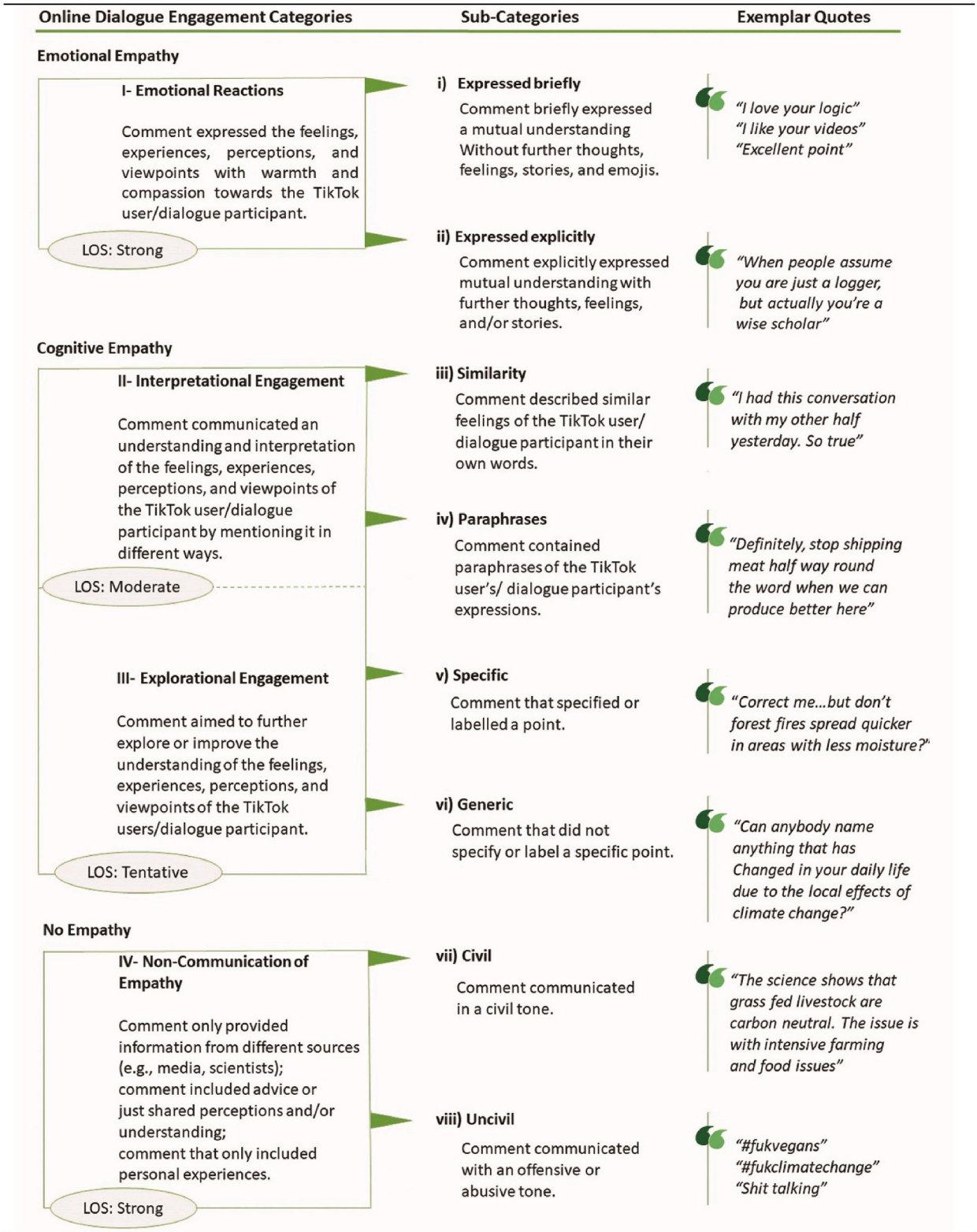

Fig. 2. Findings of step-I: How does engagement occur when farmers speak out about the climate?
Note: Following studies by Clair and Dufresne (2004) and Unay-Gailhard and Simões (2022), we indicate the Level of Support (LOS): Strong support: a majority of the analyzed TikTok comments were included in this category of online dialogue engagement; Moderate support: some of the analyzed TikTok comments contained statements in this category; Tentative support: a very small number of the analyzed TikTok comments included statements in this category.

the best ways of farming in the world. FACT" versus "Truth hurts. Urban sprawl especially here in the US is probably the worst thing that's happening"). Most of the time, the negative regard for other countries' success in climate policies or comparison between countries' greenhouse-gas emissions from food production helped with the easy engagement of external comments formed around the topic that kept the dialogue continuing. Many uncivil comments about vegans, vegetarians, and climate activists used short insults. In many posts, the written statistics, in combination with sounds and visuals, reinforced a dialogue showing skepticism of the sources of the information, and in some cases, in an uncivil way. Particularly notable is that critics emphasized that the shared factual information was wrong and, therefore, they are not qualified to keep speaking about the impacts of climate change with these given facts (e.g., "shit talking"; "bias research, it's inhuman to ignore the facts").

5.2. Findings: Step-II, user-focused analysis

Our results give insights into the TikTok farmers' perspectives, and particularly for three broad themes. The first concerns their values that play a role in being active on TikTok with their professional identities and the reasons they believe their self-representation on TikTok is important for social interactions. The second theme focuses on the attitudes they developed when they initiated their climate-farming related concerns, including the perspectives of climate-silent participants. The third theme concerns TikTok users' opinions on the features of the TikTok platform regarding public engagement of climate-farming conversations. Fig. 3 provides the list of codes with three themes.

5.2.1. Theme-I: Self-representation on TikTok with a professional identity

Among the respondents, one of the highly pronounced core values of TikTok for their farmer identities is the self-representation to a global/wider audience through simple actions (e.g., micro-videos with simple content and a light communication style). What participants value in TikTok is not only related to its best-known characteristics of enjoyment (e.g., joy, humor, playfulness, easygoingness), but also as a professional tool (e.g., being in contact with the next generation of consumers, a business presence) as put forward by farmer 7 and farmer 8 from the US:

> "The research shows that Gen Z decides within the first eight seconds of whether or not they're interested in a product … TikTok is where the next generation of consumers are headed."

> "It is just I'm a business owner, and you know, you got to keep up with the time."

Besides the importance of social interactions (e.g., meeting new people, cooperation) and following the direction of digital life (e.g., embracing new platforms in a timely manner), the participants also stressed the potential of TikTok as a dynamic learning landscape (e.g., gathering inspiration, knowledge-exchange with the Q&A feature that allows users to ask or answer questions on the app). As a farmer 10 from Scotland and a farmer 4 from Australia, put it:

> "It's been a really good way to share skills. I would say TikTok is an amazing learning platform. It's quite different from YouTube. There are no classics professors and lots of tutorials."

> "People are willing to learn, and I can respond easily with a video … sometimes comments can be taken out of context. So that's what I like about TikTok. At the end of the conversation, you can have a script of videos on the one subject."

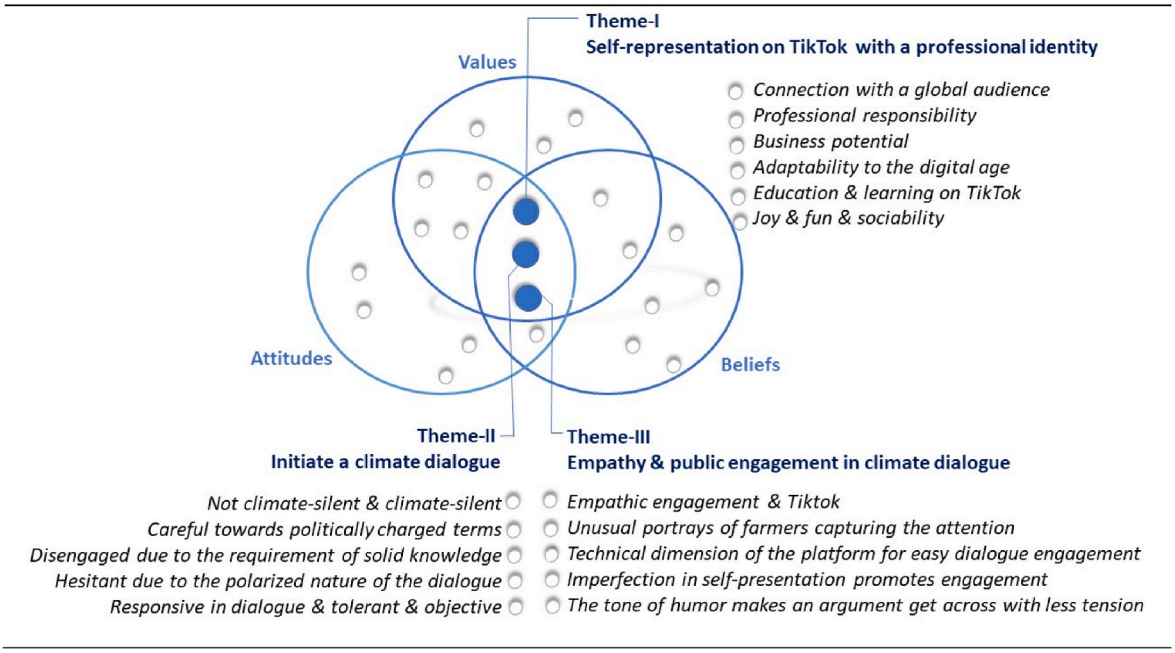

Fig. 3. Findings of step-II: TikTok farmers' values, attitudes, and beliefs
Note: In step-II study approached the questions "-Which values play a role in the study participants being active on TikTok in connection to their professional identities (as farmers)? Which attitudes did they develop when initiating and engaging in climate-farming conversations? What are their beliefs on the features of the TikTok platform that facilitate the empathic climate dialogue engagement?" with qualitative analysis of interviews with the Values Coding approach. This figure shows the codes that were used to present this study's step-II findings within three themes.

These orientations are directly connected to respondents' values of TikTok interactions with their professional identities. Involvement in TikTok is about having a voice and investing in others while balancing joy and professionalism.

5.2.2. Theme-II: Initiate a climate dialogue

Respondents believed that only a few farmers prefer to engage in the climate dialogue in their daily life and on social media. For most participants, farmers' engagement in the climate dialogue via their social media accounts requires courage, solid knowledge, cautiousness, and deliberate communication due to the polarized and intimidating nature of the dialogue. In our sample, we observed both participants who do not prefer to initiate climate-farming conversations (climate-silent participants), as well as those who initiate climate-farming conversations on a regular basis through their TikTok accounts (not climate-silent participants). Perspectives of these two groups are presented in the following:

5.2.2.1. Group-I: perspectives of not climate-silent participants. Core to most respondents' motivation to initiate a climate dialogue is their belief in the subsequent need for more information on climate issues from farmers' perspectives. Participants from that not-silent group repeatedly said: "Most people do not know how farmers respect the environment for their farming practices." This belief is highly evident through the motivation among participants to keep creating climate-farming content. Participants generally expressed how engagement in the climate dialogue mainly comes from the younger generation from local, national, and global areas, including farming and non-farming communities. As a result of support from their audience (e.g., spreading a video with millions of views or asking specific questions about current climate-farming related events), farmers noticed that they had a position in the climate discourse and felt the responsibility, as expressed by female farmer 2 from Canada, and male farmer 10 from Scotland:

> "On TikTok, the most important lesson I've learned is that people do not know what farmers are doing to help the climate. I'm connecting the dots by showing our farm, how we reduce fertilizer emissions."

> "In climate change discussions, one needs to recognize that farmers are at the forefront of the solution, not just the problem."

Interviewees shared a range of attitudes for promoting public engagement in the climate-farming-related dialogue on TikTok, and diverse outcomes such as engagement might be expected to contribute to dialogue participants' understanding. For the most part, these attitudes and expectations let them emphasize key arguments in their videos, such as providing personal life stories (e.g., "I'm the 4th generation living on this land, then I care about the health of my soil"), sharing firsthand farming issue experiences related to climate change, or providing statistics from official sources in their countries via visuals, music, and texts.

Key elaborated attitudes that participants develop when they initiate and engage in climate-farming conversations were: i) choosing to not use too defensive of a tone, to not use jargon, abbreviations, and big words; ii) to be reactive to all polarized comments with compassion; and iii) to keep objectivity as a goal to meet when they engage in replying to any opposition. Two farmers from Canada and Scotland, respectively, expressed their acknowledgment of other climate dialogue participants as:

> "The middle ground approach is possible. It's always one person's completely right or another person's completely wrong. I've learned to take both of those, combine them, and just make a thing that makes sense for both parties. I find that has the most success."

> "One of the things that doesn't work is excluding people from the conversation … how you respond to comments is as important as how you engage."

5.2.2.2. Group-II: perspectives of climate-silent participants. Participants who prefer to be silent on their climate-farming related concerns on TikTok or who prefer to post about their environmental concerns indirectly (e.g., share other users' posts) are likely to have the perception that they will face judgment from the public. In the case of these silent farmers, uncomfortable experiences with their previous posts about the climate lead to not engaging in actual climate discourses, and rather to talking indirectly to convey that farmers should not be treated as "climate deniers".

The narratives of climate-silent participants tell the position of their profession in the climate discourses as an "easy target" due to the land occupation and involvement with animal farming, which are highly leading conflicts in soil health and animal welfare conversations. Initiating a climate dialogue is associated with "risky content" due to the potential to destroy their accountability among their consumers, or such a dialogue requires "endless conversation" with a lot of effort, regardless of whether the conversation is related to the farming sector.

As a consequence, a TikTok user, no matter their interest in pursuing conflict or not, must interact with another video and overcome with another attitude. Furthermore, the narratives of these climate-silent participants repeatedly mention the platform's limitations. For almost all, the complexity of the topic is colored by the perception that the short video format of TikTok is not suitable for explaining their concerns. As a result of all these messages, farmers may easily choose to be silent (or self-censor them) to avoid conflict or to present a political opposition.

5.2.3. Theme-III: Empathy & public engagement in climate dialogue

The respondents have a similar view about the high potential of empathic reactions in environmental conversations on TikTok relative to other social media platforms. Their thoughts were most prominent when they described the potential of empathic reactions: First, the importance of the architecture of the platform. Second, a belief that participants have the potential to capture attention with their look that is different to how farmers are portrayed on traditional and other social media platforms. These two most prominent thoughts were presented in the following way:

The first significant emphasis was related to the characteristics and architecture of the TikTok platform concerning four key arguments:

i) the way of spreading messages in a sensational way ("like a caffeine bomb") that results in a high number of engagements in a short time that is different than a YouTube videos which need more time to be consumer and with different approaches (such as "get your coffee, and have a seat").
ii) relative to Instagram (as described in the narratives as a "static piece of art," "pleasing approach," "esthetic"), on TikTok, the imperfection in self-presentation promotes engagement that values the person more than, as these words put it:

> "Having face-to-face video interaction with people, replying again with face-to-face interaction videos makes the platform (TikTok) a lot genuinely nicer about it and more empathetic".

iii) compared to Twitter, which is associated with several narratives that are "highly polarized" and "wordy", on TikTok, the straightforward self-representation with playful and humorous tones means that arguments take place with less tension, as put forward by farmer 1:

> "Backgrounds of TikTok posts create incentives to get to know somebody better than just words written on a paper. What people argue is against words, not against people".

iv) the technical dimension of TikTok that contributes to easy dialogue engagement are described as “giving a space for a more experimental way of communication,”; “easy to respond to other people with micro-videos,”; and “superior editing tools.”

As a second major emphasis, respondents often referred to the large part of the power of empathic engagement in dialogues to stem from the particularity of farming as an occupation, which is related to their unusual portrayal on TikTok that destroys the “fixed views towards farmers”. The core belief of many interviewees is that farmers in society are perceived as “part of the environmental problem”, “often portrayed in old school way of discussions with conservative moods”, and “talking about the profession more mechanically”. This shared belief forms a core guidance that defines the way they search for new storytelling styles and how they elaborate upon the reasoning for empathic reactions.

6. Discussion and conclusion

This study explores public engagement in farmer-led initiated climate dialogues on TikTok. The research centers on the empathic dialogue principle, and we investigate engagements in climate dialogues by identifying emotional and cognitive empathy in conversations and extracting their rationales. A two-step analysis was involved that investigated digital empathy towards TikTok posts created by farmers (step-I: post-focused analysis) and exploring TikTok users’ perspectives on public engagement with their climate-farming related posts (step-II: user-focused analysis). Including these two main data sources allowed us to understand the differences between the two, that is how engagement occurs when farmers present their point of view to others versus how farmers perceive the engagement to their posts when talking about the climate.

Our findings conclude with four main points that provide directions for future research. First, our results provide insight into studies investigating the outcome of climate communication among communities that share specific interests and values (Hayhoe, 2021; van Swol et al., 2022). Second, this study advanced the research on cognitive engagement in climate communication (Topp et al., 2019; McBeth et al., 2022). Third, this research answers the call to explore the climate conversation on under-examined social media platforms (Pearce et al., 2019; Liu and Kim, 2021) and elaborates on the role of humor in environmental communication (Kaltenbacher and Drews, 2020; Russell et al., 2023) while also exploring the educational landscape of TikTok (Zawacki et al., 2022; Tan et al., 2022). Finally, the results expand our knowledge on the effects of social media on farming identities (Riley and Robertson, 2021; Unay-Gailhard and Brennan, 2023), mainly giving insights into how digital empathy serves to break down self-silencing among farmers. The following subsection aims to discuss these four points with concluding remarks.

6.1. Emotional empathy in the climate communication and community shared values

First, the results of this study suggest that the typical empathic engagement is emotional reactions (expressing emotions briefly or explicitly), followed by cognitive engagement (interpretational and explorational engagement, respectively). The subjective perspectives of TikTok users demonstrates that their climate-farming related TikTok posts with self-representation (e.g., showing their environmental farming practices, demonstrating how climate change is harming production) creates empathic reactions or civil tone dialogue engagements, particularly when they’re involved in a dialogue with a manner of acknowledging and being reactive to the participants’ comments.

This empathic reaction pattern aligns with a previous study that has highlighted the public’s engagement with farmers’ social media posts with "empathy rituals" (Riley and Robertson, 2021). Considering the online networks of farmers as an affluent community in terms of the presence of conversations based on the shared values about farming, food production, a rural way of life, the observed empathic reaction is consistent with communication studies that have shown evidence that having climate dialogues with individuals that share specific values and interests can support positive conversational outcomes (Bloomfield et al., 2020; Hayhoe 2021; Ettinger et al., 2023).

6.2. Cognitive empathy and climate-communication engagement

Second, our analysis reveals that even though the climate dialogues that farmers facilitate contain alternative ways of communication (e.g., expressing emotions with mockery or reflectively sharing their thinking with dynamic demonstration videos), it was not sufficient to create a strong level of support for cognitive empathy. In our sample, the involvement in climate dialogue with cognitive engagement (particularly as an explorational engagement including comments that aim to explore feelings, experiences, and viewpoints of the TikTok user/dialogue participant) was very high only for certain videos. Understanding the rationale behind this finding requires further analysis of cognitive engagement and its relationship between the narrative (story) and narrator (identity).

Further to that point, our findings align with the study by Topp et al. (2019), which found not a direct but indirect link between cognitive engagement and entertaining climate videos. The authors found that entertaining videos may increase the perceived entertainment, and that perceived entertainment increases the cognitive engagement independently from the narrator’s characteristics (e.g., narrator’s political identity, age, and education).

As documented by McBeth et al. (2022), who investigated the narrative with which identity plays a role in the climate conversation engagement: listening to climate-related narratives from organic farmers versus mechanics matters for climate skeptics. In our study, while the narrators share similar professional identities (farmer), a potential challenge is that the characteristics of the narrators and the communication style of the narrative (e.g., engaging presenters with charisma) may impact the explorational cognitive engagement. Apart from the relationship between narrative versus narrator, the findings of a relatively low level of support for explorational cognitive engagement (compared to an emotional empathic reaction and interpretational cognitive engagement) is also understandable because cognitive engagement, most of the time, requires advancing on the paths of emotional reactions.

To that point, citizen engagement and activism represents a complex web of contexts and emotions. While some research does point out that discrete emotional reactions are not as reliable for predicting engagement with climate activism (Chapman et al., 2017; Ettinger et al., 2021; Sanford et al., 2023), the emotional bonds between individuals are seen as the foundation for individual and community agency around common general needs (Brennan et al., 2022; Odera et al., 2022; Matarrita-Cascante and Brennan, 2012). For the latter, engagement is an outcome of the relationships developed through purposive interaction around common general needs. It is this interaction that builds social and emotional bonds, increases understanding, awareness and empathy, and opens up venues for engagement over a range of topics, including climate activism. Similarly, recent work has focused on environmental empathy as a factor in behavioral changes toward pro-environmental activism (Berenguer, 2007, 2010; Tam, 2013). Altogether, the motivations for activism represent a complex web of societal, cultural, and personal attributes that can emerge at the local level, while also being applied to a more global level.

6.3. Farmer-led climate communication on TikTok platform

Third, we found a strong level of support for the non-communication of empathy on a spectrum between engagement in climate dialogue with civil to uncivil tones. Together with all investigated categories

(communication and non-communication of empathy), the results suggest that the non-communication of empathy with comments containing civil tones is as persistent as empathic comments that express emotions briefly or explicitly. The evidence from our two-step analysis suggests that emotional reactions and non-communication of empathy with a civil tone tended to come from both farming and non-farming participants.

These findings show that TikTok does not view engaging in climate conversations just with emotional empathic support to the posts of farmers; it is also a platform that includes non-empathic communication with comments that share beliefs, gather knowledge from different sources, give advice, and share perceptions and understanding. Because the TikTok platform differs in terms of the way of communication and the architecture of Twitter, Instagram, YouTube, and Facebook, our results are well-suited for comparison with other platforms.

Social media and climate conversation studies are in the early stage of understating the different roles that social media platforms play in facilitating dialogue engagement (Liu and Kim, 2021). Each social media platform may affect climate dialogue participation differently (Tuitjer et al., 2022), and to what extent non-expert individuals feel empowered to participate in climate dialogue depends on the dialogue venue (Ettinger et al., 2023).

For example, climate dialogue on Twitter contributes to a polarization between climate skeptics and climate-aware individuals (Moernaut et al., 2022). While we are living with solid evidence that a dairy- and meat-based diet is causing devastation to the environment, Facebook discussions on livestock production may encompass the controversy and polemical representations and shed light on the ways of livestock production legitimization on its platform (Olausson, 2018). The analysis of Greta Thunberg's YouTube videos document how strongly ageism, sexism, and ableism are ingrained in climate change communication (Park et al., 2021).

Climate dialogue among non-experts on TikTok. Responders notions about the potential for TikTok to influence non-expert youth engagement are highly consistent. Our results show that TikTok offers significant potential for discussion among non-experts and, most of the time, is associated with seeking an imperfect climate discourse (different than the "*elite discourse*" (Olausson, 2018) nature of Twitter) with brief pre-dialogue opportunities. This result aligns with the findings of Basch et al. (2022) and Hautea et al. (2021), which highlight the TikTok platform's affordances that help with the involvement of non-experts in climate dialogues among diverse backgrounds.

TikTok as a learning landscape. What is notable among the narratives of the study participants is how the TikTok platform provides a learning landscape. Even though there is a rising interest in the educational dimensions of TikTok (Azman et al., 2021; Habibi and Salim, 2021) as a possible way of effective science communication (Zawacki et al., 2022; Tan et al., 2022), there are limited studies that investigate the alternative ways of climate-farming communications on social media. As our findings suggest, the self-representation of farmers on TikTok with professional identities is not only about having a voice and joy but also reciprocally investing in others: gathering and sharing experiences and knowledge by entertaining videos with informal educational contexts.

Alternative ways of climate communication on TikTok. For non-climate silent study participants, mockery (the use of sarcasm, irony, humor) was noted as one of the strategies for engaging with other users. Creating climate-farming related content with short, experimental, and dynamic style videos and expressing mockery can turn into sensational attention, expressed as "*like a caffeine bomb*" and emphasized as a way to raise awareness. This finding contributes to studies documenting the relationship between humor and climate communication engagement (Boykoff, 2011; Boykoff and Osnes, 2019; Kaltenbacher and Drews, 2020; Russell et al., 2023), particularly within the study by Kovacheva et al. (2022) and Manzo (2012), which provides evidence of how simple, humorous messages (e.g., cartoons, internet memes) can encourage people to engage in online conversations about climate change.

6.4. Farmer identity in the digital age

Fourth, our analysis identified some fundamental values that shape the attitudes towards climate-dialogue initiation efforts among farmers, which end up with a division of non-climate silent and climate silent groups. The core belief of the need for further information on climate issues from farmers' perspectives conditions the degree to which farmers do initiate a dialogue.

For the non-climate silent group, as a result of empathic support from their audience, farmers noticed that they had a position in the climate discourse and sought to promote engagement. For the climate silent group, the complexity of the topic (political dimensions and its scientific knowledge intensive nature) led them to self-censor the climate dialogue. This research assumes that the framework of digital empathy holds the potential to understand rationales that mobilize dialogue engagement and helps to overcome the "climate spiral of silence" (Ettinger et al., 2023), where individuals are not willing to express their opinions if their belief is not shared by others, which in turn creates a climate silence spiral (Geiger and Swim, 2016).

Even though food-related social movements (e.g., organic and local food movements) have motivated a growing number of youths, particularly females involved with alternative farming practices as a means of transforming the food system or experiencing a way of farm life (Bruce, 2019; Unay-Gailhard and Bojnec, 2021), farmers are still in the early stages of using social media with their professional identities (Unay--Gailhard and Brennan, 2023). Further to that point, our results note how digital empathy contributes to breaking down the "climate spiral of silence" among farmers and the communities they reach out to. These results give insights into the changing dynamics of farming identities in the digital age, where "*(re)presentations*" of farming live (Riley and Robertson, 2022)- may signal a need for emotional and cognitive public support.

6.5. Limitations and future research

This study has some limitations and also there's potential to further explore digital empathy in climate dialogues initiated by farmers. First, the sample sizes of qualitative analysis are limited regarding the number of farmers' integrations on TikTok with the climate-farming dialogue. As noted by previous studies (Stevens et al., 2018; Masambuka-Kanchewa et al., 2021; Unay-Gailhard and Simões, 2022), due to the strong voices surrounding the agri-food scandals and activist groups (animal welfare activism, vegan and vegetarian activism), few farmers feel empowered to initiate a climate-farming dialogue on social media. Therefore, reaching out to farmers who are engaging in climate conversations is a difficult task, and particularly reaching out to such farmers using their social media accounts with professional identities.

The second limitation is the language challenges related to the study of TikTok at a global level. In our study, we target English-language hashtags and posts for data collection. Such a data sampling strategy requires comparing studies that consider non-English language countries' perspectives to handle the limitation of geographical settings.

This study investigates the empathic dialogue engagement in TikTok with qualitative research with TikTok data, and interviews with TikTok farmers, and there is a future potential to explore the power of digital communication technologies in shaping specific strategies for more effective engagement in climate-farming dialogue. This starting point may assist further studies that aim to explore cognitive engagement and its relationship between the narrative (story) and narrator (identity) by considering the new farmer identity in the digital age.

Declaration of competing interest

I have no relevant interest (that might appear to affect my ability to present data objectively) to disclose. There is no financial relationship that might be construed as a conflict of interest significant enough to

influence the results or interpretation of submitted study.

Data availability

The data that has been used is confidential.

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References

Anderson, K.E., 2020. Getting acquainted with social networks and apps: it is time to talk about TikTok. Libr. Hi Tech News 37 (4), 7–12.
Azman, A.N., Rezal, N.S.A., Zulkeifli, N.Y., Mat, N.A.S., Saari, I.S., Ab Hamid, A.S., 2021. Acceptance of TikTok on the youth towards education development. Borneo International Journal eISSN 2636-9826 4 (3), 19–25.
Basch, C.H., Yalamanchili, B., Fera, J., 2022. # Climate change on TikTok: a content analysis of videos. J. Community Health 1–5.
Bavorová, M., Unay-Gailhard, İ., Ponkina, E.V., Pilařová, T., 2020. How sources of agriculture information shape the adoption of reduced tillage practices? J. Rural Stud. 79, 88–101.
Berenguer, J., 2007. The effect of empathy in proenvironmental attitudes and behaviors. Environ. Behav. 39 (2), 269–283.
Bhandari, A., Bimo, S., 2022. Why's everyone on TikTok now? The algorithmized self and the future of self-making on social media. Social Media+ Society 8 (1), 20563051221086241.
Bloomfield, J., Steward, F., 2022. Strategies for climate change post COP26. Polit. Q. 93 (2), 278–287.
Bloomfield, E.F., Van Swol, L.M., Chang, C.T., Willes, S., Ahn, P.H., 2020. The effects of establishing intimacy and consubstantiality on group discussions about climate change solutions. Sci. Commun. 42 (3), 369–394.
Boykoff, M.T., 2011. Who Speaks for the Climate?: Making Sense of Media Reporting on Climate Change. Cambridge University Press.
Boykoff, M., Osnes, B., 2019. A laughing matter? Confronting climate change through humor. Polit. Geogr. 68, 154–163.
Boykoff, M., Katzung, J., Nacu-Schmidt, A, Pearman, O., 2022. A Review of Media Coverage of Climate Change and Global Warming in 2021. Media and Climate Change Observatory. Cooperative Institute for Research in Environmental Sciences, University of Colorado. (Accessed 13 July 2023).
Brennan, M.A., Dolan, P., Odera, E., 2022. From regiments and radicals: the critical need for empowering youth as radical agents of change. Educ. Citizen Soc. Justice 17 (3), 210–223.
Brownlie, J., Shaw, F., 2019. Empathy rituals: small conversations about emotional distress on Twitter. Sociology 53 (1), 104–122.
Bruce, Analena B., 2019. Farm entry and persistence: three pathways into alternative agriculture in southern Ohio. J. Rural Stud. 69, 30–40.
Chang, C.H., Armsworth, P.R., Masuda, Y.J., 2022. Environmental discourse exhibits consistency and variation across spatial scales on twitter. Bioscience 72 (8), 789–797.
Chapman, D.A., Lickel, B., Markowitz, E.M., 2017. Reassessing emotion in climate change communication. Nat. Clim. Change 7 (12), 850–852.
Chen, C.W.Y., 2018. Developing EFL students' digital empathy through video production. System 77, 50–57.
Clair, J.A., Dufresne, R.L., 2004. Playing the grim reaper: how employees experience carrying out a downsizing. Human relations 57 (12), 1597–1625.
Crippa, M., Solazzo, E., Guizzardi, D., Monforti-Ferrario, F., Tubiello, F.N., Leip, A.J.N.F., 2021. Food systems are responsible for a third of global anthropogenic GHG emissions. Nature Food 2 (3), 198–209.
Colvin, R.M., Kemp, L., Talberg, A., De Castella, C., Downie, C., Friel, S., et al., 2020. Learning from the climate change debate to avoid polarisation on negative emissions. Environmental Communication 14 (1), 23–35.
Conner, J., 2021. What Impact Did COP26 Have on Public Opinion? YouGov. (Accessed 13 July 2023).
Daiute, C., 2013. Narrative Inquiry: A Dynamic Approach. Sage Publications.
Davis, M.H., 1980. A multidimensional approach to individual differences in empathy. JSAS Catalog of Selected Documents in Psychology 10, 85.
Deri, S., Rappaz, J., Aiello, L.M., Quercia, D., 2018. Coloring in the links: capturing social ties as they are perceived. Proceedings of the ACM on Human-Computer Interaction 2, 1–18. CSCW.
Ettinger, J., McGivern, A., Spiegel, M.P., et al., 2023. Breaking the climate spiral of silence: lessons from a COP26 climate conversations campaign. Climatic Change 176 (3), 22.
Ettinger, J., Walton, P., Painter, J., DiBlasi, T., 2021. Climate of hope or doom and gloom? Testing the climate change hope vs. fear communications debate through online videos. Climatic Change 164 (1–2), 19.
Fiala, V., Freyer, B., Bingen, J., 2021. Environmentally sound agriculture between transformation and conformation: the changing portrayal of the growing organic farming movement in Austria's newspaper coverage. Environmental Communication 15 (4), 495–513.
Friesem, E., 2016. Empathy for the digital age: using video production to enhance social, emotional, and cognitive skills. Emotions, technology, and behaviors 21–45.
Getson, J.M., Church, S.P., Radulski, B.G., Sjöstrand, A.E., Lu, J., Prokopy, L.S., 2022. Understanding scientists' communication challenges at the intersection of climate and agriculture. PLoS One 17 (8), e0269927.
Geiger, N., Swim, J.K., 2016. Climate of silence: pluralistic ignorance as a barrier to climate change discussion. J. Environ. Psychol. 47, 79–90.
Habibi, S.A., Salim, L., 2021. Static vs. dynamic methods of delivery for science communication: a critical analysis of user engagement with science on social media. PLoS One 16 (3), e0248507.
Hale, B.J., Collins, R., Brown, D.K., 2020. Posting about cancer: predicting social support in Imgur comments. Social Media+ Society 6 (4), 1–14.
Hatfield, J.L., Boote, K.J., Kimball, B.A., Ziska, L.H., Izaurralde, R.C., Ort, D., Thomson, A.M., Wolfe, D., 2011. Climate impacts on agriculture: implications for crop production. Agronomy journal 103 (2), 351–370.
Hautea, S., Parks, P., Takahashi, B., Zeng, J., 2021. Showing they care (or don't): affective publics and ambivalent climate activism on TikTok. Social media+ society 7 (2), 1–14.
Hayhoe, K., 2021. Saving Us: A Climate Scientist's Case for Hope and Healing in a Divided World. Simon and Schuster.
Hobson, K., Niemeyer, S., 2013. What sceptics believe": the effects of information and deliberation on climate change scepticism. Publ. Understand. Sci. 22 (4), 396–412.
Kaltenbacher, M., Drews, S., 2020. An inconvenient joke? A review of humor in climate change communication. Environmental Communication 14 (6), 717–729.
Kovacheva, A., Wiener, H.J., Kareklas, I., Muehling, D., 2022. Online engagement with memes and comments about climate change. Sustainability 14 (14), 8900.
Kozinets, R.V., Gambetti, R., 2021. Netnography Unlimited: Understanding Technoculture Using Qualitative Social Media Research. Routledge, London.
Liu, B.F., Kim, J., 2021. Social media and climate change dialogue: A review of the research and guidance for science communicators. In: Yusuf, Juita-Elena (Wie), John III, Burton St. (Eds.), Communicating Climate Change. Routledge, London, pp. 97–115.
Lovell, D., Dolamore, S., Collins, H., 2022. Examining public organization communication misalignments during COVID-19 through the lens of higher education. Adm. Soc. 54 (2), 212–247.
Masambuka-Kanchewa, F., Rumble, J., Buck, E., 2021. Exploring differences in communication behaviors between organic and conventional farmers. J Agri Food Sys Comm Dev 10 (3), 205–219.
Matarrita-Cascante, D., Brennan, M.A., 2012. Conceptualizing community development in the twenty-frist century. J. Vocat. Technol. Educ. 43 (3), 293–305.
Manzo, K., 2012. Earthworks: the geopolitical visions of climate change cartoons. Polit. Geogr. 31 (8), 481–494.
Meijers, M.H.C., Remmelswaal, P., Wonneberger, A., 2019. Using visual impact metaphors to stimulate environmentally friendly behavior: the roles of response efficacy and evaluative persuasion knowledge. Environmental Communication 13 (8), 995–1008.
Moernaut, R., Mast, J., Temmerman, M., Broersma, M., 2022. Hot weather, hot topic. Polarization and sceptical framing in the climate debate on Twitter. Inf. Commun. Soc. 25 (8), 1047–1066.
Moret-Soler, D., Mateu, A., Domínguez, M., 2022. Incendiary humor: climate change, biodiversity, and politics in wildfire cartoons. Environmental Communication 16 (3), 296–303.
McBeth, M.K., Lybecker, D.L., Sargent, J.M., 2022. Narrative empathy: a narrative policy framework study of working-class climate change narratives and narrators. World Aff. 185 (3), 471–499.
Odera, E., Brennan, M., Dolan, P., Davis, J., 2022. Enhancing research and practice: understanding paths and options for youth citizenship and social justice. Educ. Citizen Soc. Justice 17 (3), 224–234.
Olausson, U., 2018. Stop blaming the cows!": how livestock production is legitimized in everyday discourse on Facebook. Environmental Communication 12 (1), 28–43.
Park, C.S., Liu, Q., Kaye, B.K., 2021. Analysis of ageism, sexism, and ableism in user comments on YouTube videos about climate activist Greta Thunberg. Social Media+ Society 7 (3), 1–14.
Pearce, W., Niederer, S., Özkula, S.M., Sánchez Querubín, N., 2019. The social media life of climate change: platforms, publics, and future imaginaries. Wiley interdisciplinary reviews: Clim. Change 10 (2), e569.
Petril'ák, M., Janšto, E., Horská, E., 2020. Communication of local farmers' products through Facebook: the case study of Nase-vase. Commun. Today 11 (1), 150–163.
Radin, A.G., Light, C.J., 2022. TikTok: an emergent opportunity for teaching and learning science communication online. J. Microbiol. Biol. Educ. 23 (1), e00236-21.
Ramsey, A., 2021. In: World Leaders Failed Us at COP26. But Change Doesn't Come from Glitzy Conferences [online], open- Democracy. https://www.opendemocracy.net/en/why-cop26-gave-me-hope. (Accessed 19 March 2023).

Ravishankar, M.N., 2021. Social innovations and the fight against poverty: an analysis of India's first prosocial P2P lending platform. Inf. Syst. J. 31 (5), 745–766.
Redden, S., Way, A.K., 2017. 'Adults don't understand': exploring how teens use dialectical frameworks to navigate webs of tensions in online life. J. Appl. Commun. Res. 45 (1), 21–41.
Riley, M., Robertson, B., 2021. # farming365–Exploring farmers' social media use and the (re) presentation of farming lives. J. Rural Stud. 87, 99–111.
Riley, M., Robertson, B., 2022. The virtual good farmer: farmers' use of social media and the (re) presentation of "good farming". Sociol. Rural. 62 (3), 437–458.
Rotz, S., 2018. Drawing lines in the cornfield: an analysis of discourse and identity relations across agri-food networks. Agric. Hum. Val. 35 (2), 441–456.
Russell, C., Chandler, P., Dillon, J., 2023. Humour and environmental education. Environ. Educ. Res. 29 (4), 491–499.
Saldaña, J., 2021. The Coding Manual of Qualitative Researchers, fourth ed. Sage Publications, Thousand Oaks, CA.
Sanford, M., Witkowska, M., Gifford, R., Formanowicz, M., 2023. Emotional framing in online environmental activism: pairing a Twitter study with an offline experiment. Front. Psychol. 13, 1099331.
Sharma, A., Lin, I.W., Miner, A.S., Atkins, D.C., Althoff, T., 2021. April. Towards facilitating empathic conversations in online mental health support: a reinforcement learning approach. In: Proceedings of the Web Conference 2021, pp. 194–205.
Sharma, A., Miner, A.S., Atkins, D.C., Althoff, T., 2020. A computational approach to understanding empathy expressed in text-based mental health support. In: Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing. ACL, pp. 5263–5276.
Sorvali, J., Kaseva, J., Peltonen-Sainio, P., 2021. Farmer views on climate change—a longitudinal study of threats, opportunities and action. Climatic Change 164, 1–19.
Sperandeo, R., Cioffi, V., Mosca, L.L., Longobardi, T., Moretto, E., Alfano, Y.M., Scandurra, C., Muzii, B., Cantone, D., Guerriera, C., Architravo, M., 2021. Exploring the question:"Does empathy work in the same way in online and in-person therapeutic settings?". Front. Psychol. 12, 671790.
Stevens, T.M., Aarts, N., Termeer, C.J.A.M., Dewulf, A., 2016. Social media as a new playing field for the governance of agro-food sustainability. Curr. Opin. Environ. Sustain. 18, 99–106.
Stevens, T.M., Aarts, N., Termeer, C.J.A.M., Dewulf, A., 2018. Social media hypes about agro-food issues: activism, scandals and conflicts. Food Pol. 79, 23–34.
Swim, J.K., Bloodhart, B., 2015. Portraying the perils to polar bears: the role of empathic and objective perspective-taking toward animals in climate change communication. Environmental Communication 9 (4), 446–468.
Tam, K.P., 2013. Dispositional empathy with nature. J. Environ. Psychol. 35, 92–104.
Tan, K.H., Rajendran, A., Muslim, N., Alias, J., Yusof, N.A., 2022. The potential of TikTok's key features as a pedagogical strategy for ESL classrooms. Sustainability 14 (24), 16876.
Telg, R., Wandersee, C., Smith, D., Mukhtar, S., 2020. Engaging in conversations about climate change with cattle producers. J Human Sci Ex 8 (1), 3.
Terry, C., Cain, J., 2016. The emerging issue of digital empathy. Am. J. Pharmaceut. Educ. 80 (4).
Thornberg, R., Charmaz, K., 2014. Grounded theory and theoretical coding. The SAGE handbook of qualitative data analysis 5 (2014), 153–169.
Topp, K., Thai, M., Hryciw, D.H., 2019. The role of entertainment in engagement with climate change. Environ. Educ. Res. 25 (5), 691–700.
Tuitjer, L., Dirksmeier, P., Mewes, L., 2022. Geographies of climate change opinion. Geo Com 16 (5), e12619.
UN, 2022. COP26: together for our planet [online]. https://www.un.org/en/climatechange/cop26#:~:text=The%20UN%20Climate%20Change%20Conference,observers%20and%203.886%20media%20representatives. (Accessed 19 March 2023).
Unay-Gailhard, I., Bojnec, Š., 2021. Gender and the environmental concerns of young farmers: do young women farmers make a difference on family farms? J. Rural Stud. 88, 71–82.
Unay-Gailhard, İ., Simões, F., 2022. Becoming a young farmer in the digital age—an island perspective. Rural Sociol. 87 (1), 144–185.
Unay-Gailhard, İ., Brennan, M.A., 2023. Young farmers in "The New World of Work": the contribution of new media to the work engagement and professional identities. Rural Sociol. 88 (2), 426–460.
van der Ploeg, J.D., 2020. Farmers' upheaval, climate crisis and populism. J. Peasant Stud. 47 (3), 589–605.
van Swol, L.M., Bloomfield, E.F., Chang, C.T., Willes, S., 2022. Fostering climate change consensus: the role of intimacy in group discussions. Publ. Understand. Sci. 31 (1), 103–118.
Wambsganss, T., Niklaus, C., Söllner, M., Handschuh, S., Leimeister, J.M., 2021. Supporting cognitive and emotional empathic writing of students. In: Proceedings of the 59th Annual Meeting of the Association for Computational Linguistics and the 11th International Joint Conference on Natural Language Processing, ume 1. https://doi.org/10.18653/v1/2021.acl-long.314. Long Papers), pages 4063–4077, Online. Association for Computational Linguistics. (Accessed 13 July 2023).
Wilke, A.K., Morton, L.W., 2015. Climatologists' communication of climate science to the agricultural sector. Sci. Commun. 37 (3), 371–395.
Xu, X., Sharma, P., Shu, S., Lin, T.S., Ciais, P., Tubiello, F.N., Smith, P., Campbell, N., Jain, A.K., 2021. Global greenhouse gas emissions from animal-based foods are twice those of plant-based foods. Nature Food 2 (9), 724–732.
Zawacki, E.E., Bohon, W., Johnson, S., Charlevoix, D.J., 2022. Exploring TikTok as a promising platform for geoscience communication. Geosci Comm 5 (4), 363–380.
Zhou, N., Jurgens, D., 2020. Condolence and empathy in online communities. In: Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing (EMNLP. ACL, pp. 609–626.