Affordances-in-Practice: How Social Norm Dynamics in Climate Change Publics Are Shaped on Instagram and Twitter

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Abstract

Social norms are flexible regulating forces of human behavior. They are shaped by humans, whose actions in turn are shaped by their environment, including the online social spaces they venture into. The objective of this research is to create an understanding of how the affordances of social media platforms shape social norm dynamics in online publics, particularly in climate change publics. For this purpose, we make a comparative analysis of the practices of users on Instagram and Twitter that engage with climate change content. We conducted 22 in-depth interviews with a purposively selected sample of worldwide Twitter and Instagram users. We investigated how each platform's specific affordances shape the participants' sense of community and how they participate in social norm enforcement and contestation, also called "callouts." This "affordances-in-practice" perspective brings observations on the differences in how users can actualize the novel affordances of "interventionability" and "external visibility" on both platforms. This research provides a deeper insight into the socio-technical processes underlying the (self-)organization of social movements and provides a pathway to investigating discursive practices of online publics on other platforms. The study avoids debating which norms should prevail over others in the online climate discussion, but does reflect on the negative impact that certain outcomes of norm enforcement and contestation might have on democratic deliberation on climate change. The main findings are that actualizing these affordances on Twitter anno 2023 makes climate discourse sensitive to group-loyalties, whereas on Instagram it makes it dependent on norm leaders in the form of content creators.

Keywords

affordances, climate change, Instagram, social norms, Twitter

Introduction

At a November 2023 Climate rally in Amsterdam, Greta Thunberg, world-renowned climate activist, shared the stage with pro-Palestinian protesters, and in her speech connected the struggle for climate justice to the occupation and war in Gaza.[1] She was abruptly interrupted by a protester who had climbed on stage, took her microphone and said "I came here for a climate demonstration, not a political view." The protester was escorted off stage and booed by the audience, but was defended by several users on social media who agreed the war in Gaza should not have been mentioned in this climate protest (RTL Nieuws, 2023). The incident illustrates how climate publics are diffuse, contradictory, and diverse, and sometimes do not see eye to eye, both in the offline and the online world. They might stand for different solutions to the problem of climate change, or have a broader or more narrow perspective on the actual issue at hand (Levy &

Spicer, 2013; Pearce et al., 2019). Given these variations, there can be conflict over acceptable norms of behavior in climate change publics. The protestor from our example tried to enforce a norm on what he thinks the climate change movement should be about and was met with resistance. He himself had a norm enforced on him on how this disagreement should be vocalized.

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This research zooms in on how such norm enforcements in climate change publics are done on social media, more specifically on Instagram and Twitter (now X, but referred to as Twitter in this paper because the data collection happened in 2023). We approach this phenomenon through a socio-technical lens, building on the work of scholars in Science and Technology Studies (STS). This choice for a social-technical approach is motivated by the long-standing finding that technological architecture and its affordances in the physical and digital world can influence people and their behavior, and vice versa (Bijker et al., 1989; boyd, 2010; Lievrouw & Livingstone, 2006). While this lens has been applied plentiful to study how the use of technology is mutually shaping use patterns and practices, it has much less so been applied to study the dynamics of social norms, as our literature study will show. To understand what we mean by this focus, we can go back to the incident in this introduction. The voice of the protester who reprimanded Thunberg would likely not have been heard by all participants had he stayed in the audience. When he got on stage and took over the microphone, his voice was amplified, affording visibility to his intervention or "callout." He actualized the affordances of the physical space to try to enforce on someone else a norm of what he thought should be acceptable behavior in the climate change movement. As this paper seeks to demonstrate, affordances shape these social norm mechanisms on social media as well.

More concretely, the objective of this research is to create an understanding of how users on Instagram and Twitter actualize the respective platform's affordances to shape norms in climate change publics. In the theoretical exploration, we expand on the existing research upon which we build our understanding of how social norm enforcements in publics are influenced by platform technologies. We then make an overview of the social norm affordances of Instagram and Twitter, highlighting two relevant affordances for social norm processes as described by Van Raemdonck and Pierson (2022); interventionability and external visibility. We finally analyze the practices of users on Instagram and Twitter in climate change publics, based on interviews of a purposefully selected sample of 22 Instagram and Twitter users, done between April 2023 and December 2023. We analyze how these users actualize the affordances of these two platforms in regards to normative behavior, thereby getting an affordances-in-practice perspective (Costa, 2018). With these results, we make a comparative analysis of the two platforms, and how platform affordances of Instagram and Twitter potentially shape normative processes differently.

This research provides a deeper insight into the role platform technologies play in the development of norms of acceptable behavior of social movements on social media. The premise of the research is however that there is no such thing as a "good norm," and that norm enforcement is not intrinsically good or bad. As Rawls said (cited by Brock (2012)], *display of moral behavior by members of one group may well look like deviant behavior to members of the other*." We thus refrain from norm absolutism. We do on the contrary provide some reflections on the consequences of certain normative behavioral outcomes that are generally perceived as unfavorable for democratic deliberation on climate change, such as the spiral of silence (Noelle-Neumann, 1974) where users are too afraid to speak out against certain norms and affective polarization (Esau et al., 2024; Sunstein, 2009), where interactions between groups become more hostile and the "other side" is seen as untrustworthy. We conclude by reflecting on how these differences impact climate change discourses.

Affordances, Normative Processes, and Publics

This research attempts to look at the role affordances play in shaping social norm dynamics in climate change publics. To answer these questions, we must first dive into the concept of affordances and find the answer to questions such as which norms are we talking about, how are norms developed, and what are 'climate change publics'?

Social Norm Affordances: Shaping Users Who Shape Norms

Affordances are a relational concept that describes the ability technological artifacts afford to their environment (boyd, 2010; Bucher & Helmond, 2018; Davis, 2020; J. J.Gibson, 1979; Treem & Leonardi, 2013). Although architecture can be a regulating force, affordances do not cause behavior or determine outcomes, they merely provide opportunities, constrain, and guide behavior. The concept of affordances helps to develop a middle ground between technological determinism and social constructivism. Through affordances, architecture has the power to shape interactions and communities. There is also agency for social media users in the face of such digital architectures through "actualizing" affordances. We know that social media users actively appropriate and adapt digital technologies to better reflect their own goals and lives (Bucher & Helmond, 2018). Costa (2018) introduced the concept of "affordances-in-practice," to make sure our understanding of affordances is based on how users actualize them in their unique context.

When it comes to the literature about the interaction of digital affordances and social norms, little has been written about the actual opportunities or constraints architecture offers to users to shape social norms themselves in their digital environment. Much more foundational research has focused on the norms that are contained in the architecture itself (Bijker et al., 1989; Lessig, 2006; Masullo et al., 2022; Nissenbaum, 1998; Norman, 1988). This is a logical line of thinking, since designers encode values and norms in the infrastructure they create, consciously or unconsciously, as a result of the social context in which they are

embedded. Platform users also protest this top-down shaping, as Reynolds and Hallinan (2024) recently demonstrated how users hold platforms like Youtube accountable for the norms they set through their architectures. What these perspectives sometimes overlook is the agency of platform users to create social norms themselves. People do not simply endure social norms encoded in the architecture, they actively co-construct norms that shape other users, they enforce them and transform them through contestation. This actor-centric perspective is also lined out in Kennedy et al. (2016) who described how social practice can entrench particular norms on social media, but did not center the actualization of affordances in these social practices. We posit that affordances can have a second-order social norm effect, by shaping the agency of the users who shape the norms of other users.

There are a few notable exceptions to the lack of research on the actualization of affordances for social norm shaping such as studies done on Reddit. This platform has salient social norm signaling and enforcement mechanisms done by dedicated volunteer moderators (Seering, 2020). The shaping of volunteer moderator's actions by the platforms architectures have been studied among others by Matias (2019), Chandrasekharan et al. (2018), and A.Gibson (2019), whereas the shaping of in-groups and their toxic norms through Reddit's upvoting mechanism have been observed by among others Massanari (2017) and Gaudette et al. (2020). Researchers have also explored how platforms like Weibo have been experimenting with digital tribunals (Yu, 2024; Zhao, 2023), where a select group of users-juries can vote on content moderation cases. Similarly research has looked at the bipartisan power of Twitter's former "birdwatch," now "community note" program, which has given a select group of users the power to add additional information to certain misleading tweets (Allen et al., 2022). Other platforms like Twitch, Youtube, TikTok live, or Bilibili have opened features for a select group of fans to moderate livestreams, which researchers like Xiao (2024) have explored through the lens of affective labor. These all afford a specific set of users power to shape social norms, which Jhaver et al. (2023) call the "middle levels" of platform governance. Non-structural digital tribunals have also been studied in the form of so called "callouts" or less productively "cancel culture" (Clark, 2020), where users "control the boundaries of what can be said, how and by whom" (Farries et al., 2025, p. 5). Nakamura (2015) frames the practice of callouts as a form of volunteer labor to educate social media users about racism and misogyny. Such callouts can be done in numerous ways, and Hallinan et al. (2024) show how creators execute this policing through the use of copyright callouts. Twitter and Instagram are platforms where such callout practices have been previously observed (Childs, 2022; Marwick, 2021), but few have analyzed how this practice is part of collective social norm processes that are shaped by platforms affordances.

There is also a vast body of work that has looked at the ways social media in general has afforded collective action opportunities to social movements. Especially in STS, technology and social practices of groups are seen as mutually constitutive (Baym, 2010; Lievrouw, 2014; Milan, 2013). Also called "collective affordances" (Weichold & Thonhauser, 2019) or "connective affordances" (Hatfield, 2024), there are ways platforms shape users' efforts for collective action (Dolata & Schrape, 2016) like building networks (Ahuja et al., 2018) constructing a collective identity (Khazraee & Novak, 2018) self-organizing a movement (Vaast et al., 2017) and asserting values through rituals of commemoration (Hatfield, 2024). Other research has looked at which values users associate with engagement features, so-called value affordances (Scharlach & Hallinan, 2023). There is however a puzzle piece missing to understand collectives on particular platforms like Instagram and Twitter and that is how affordances shape social norm processes within such collectives, which restrict and shape the actions of those collectives. A first attempt has been made with the conceptual framework of social norm affordances developed by Van Raemdonck & Pierson (2022) who differentiate between a variety of platforms, from which we will draw two insights on affordances for this affordances-in-practice study.

Social Norms for Ideological Enforcement

To understand how affordances shape social norm processes, we must first develop a basic understanding of social norms themselves. A social norm is a non-institutionalized rule that temporarily sets the demarcations on what is acceptable behavior. There are several kinds of social norms, which we can divide in micro and macro norms following the tradition in sociology to look at micro-level and macro-level social processes. Micro norms regulate interactions and ways of communicating, for example, norms around civility (Gagrčin & Milzner, 2023), or norms on communicating in an optimistic or pessimistic way about the climate (Russill, 2023), or norms around remaining factual during discussions (Felton et al., 2024). Macro norms regulate "acceptable" behavior in broader societal arrangements, like how to deal with the climate crisis (Steentjes et al., 2017). This can go from taking a train instead of an airplane, to always adopting an intersectionality perspective when talking about climate change (Mikulewicz et al., 2023).

Conflict over these macro norms of behavior seems similar to deliberation over ideology. This is because macro norms can be informed by ideology. This can cause some confusion as to whether we are speaking of conflict of norms or merely conflict of thought. They often run parallel, as normative enforcement can be a mechanism of ideological domination, as we know from social control theory (Janowitz, 1975). To get society to enact the same behavior to accomplish ideological goals, norms can be a regulating mechanism. This is not without its pitfalls. As authors like Marwick

(2021) also argue when observing morally motivated networked harassment, social norm enforcement can disproportionately affect minorities when they aim to bolster dominant societal ideologies. Norms are however flexible and subject to a constant need for consensus, or at least a perception of consensus (Cialdini & Goldstein, 2004). This constant scrutiny to reach consensus can be fruitful to keep people involved in public deliberation such as the one on climate change. Scholars like Ettinger and Painter (2023) observed the importance of providing a space for individuals to express their doubts, opinions, and beliefs to engage more people in climate change discourse. However, this constant scrutiny can also provide an opening for climate deniers to participate in agenda setting by offering up their perspective as a viable alternative (Adam et al., 2019).

Norms as a Process: Enforcement, Contestation and Transformation Through Small Acts and Norm Leadership

While the regulating power of norms themselves is interesting, we are particularly interested in the process by which norms are enforced, contested and transformed by social media users. Norms emerge from social interactions, and their endurance is dependent on at least two aspects: the group in which they exist and the means of making them known. We know from research in social psychology that a sense of belonging to an in-group makes people more inclined to behave according to this group. Sharing a social identity makes people view themselves as the "in-group," which influences compliance with norms. Group belonging therefore determines whether the norm has any power (Bavel & Packer, 2021; Tajfel & Turner, 1986). We will come back to the boundaries of such "groups" on social media in the next part of our theoretical exploration. Second, humans become aware of norms by observing the type of interactions that are tolerated or opposed (Rimal & Lapinski, 2015). Often norms only become visible when someone breaks them and a correction ensues. Such corrections are also referred to in the communications literature as "callouts" (Farries et al., 2025), a confrontation where someone is publicly reprimanded for certain comments, often by vulnerabilised people and groups (Clark, 2020). This means norms are at their core a communicative phenomenon (Geber & Hefner, 2019), and the ways in which they are visibly enforced matter a great deal for their functioning. We will come back to the affordances of Instagram and Twitter that can shape how users make norms visible and to whom in the penultimate part of this theoretical exploration.

Within a group, norms can be contested by dissent, where people refuse to comply with norms, even after corrections. If dissenters find companions that are also considered in-group, it disrupts the perceived consensus over the norm, which could lead to the norm transforming or even disappearing. The spiral of silence theory (Noelle-Neumann, 1974) posits that dissidence in a group rarely occurs when people think they have a minority viewpoint. This is because dissidence can lead to social sanctions, which are often "othering," meaning dissenters would be considered an "out-group." The visibility of dissent plays an essential part in the transformation of norms, as it can disrupt the perception of consensus over a norm and break the spiral of silence. If a dissenter finds companions but there is still a strong in-group enforcing the norm, the group can also fracture into camps that have a conflict over such norms. This can lead to affective polarization, where group members dislike and distrust the out-group, making democratic deliberation difficult (Sunstein, 2009). Suppressing dissent can thus be done to avoid norm transformation, or to avoid polarization.

The last key to understanding social norms is the roles of people participating in normative processes. The literature on social norms considers both successful norm enforcers and dissenters "norm leaders," as they have the power to maintain or transform a norm (Legros & Cislaghi, 2020). On social media, such norm leaders are more likely users with a visible presence as they can influence the perception of consensus over a norm. Norm leaders can gain such visibility from a large following, or from algorithmic amplification, the latter being dealt more to moral-emotional content on social media platforms (Brady et al., 2020). Norm leaders are however not the only actors able to steer social norms. Since norms always hinge on a (perception of) consensus, everyone who considers themselves a member of a group can hypothetically play a role through large and small interactions. In audience studies, a variation in online interaction is described with the Small Acts of Engagement framework by Picone et al. (2019), who make the argument that small acts like sharing, commenting and liking are also audience engagements with content flows. From our perspective of social norms, those actions also provide small normative signals by supporting the enforcement of norms, or can break the spiral of silence by supporting dissent.

The Climate Change Public and Its Group Boundaries

We now know social norms are directly linked to the group in which they are maintained. But what constitutes an "in-group" on Instagram and Twitter? Authors like Ito (2008) and boyd (2010) previously spoke of "networked publics" to denote online publics that are connected by networking technologies, and several scholars wrote about "groups" on these two platforms, for example, "Black Twitter" (Brock, 2012) or "Feminist Instagram" (Caldeira, 2024), but what determines their group membership?

If we look at "groups" from an architectural standpoint, we can draw from Papacharissi's (2009) work, which posits that the potential membership to a group can be determined

by the "online borders of a network." Such network borders are clear on a platform like Reddit or Whatsapp, which Malhotra (2024) calls "bounded social media spaces" or Van Raemdonck and Pierson (2022) call "closed many-to-many" interactions. They can be "joined" and have a specific "space" on the platform. Group borders are however not built into the architectures of Instagram and Twitter, apart from private group chats. Bruns and Highfield (2015) proposed and Bruns (2023) later reiterated that for such unbounded platforms we can look at groups such as our climate change publics as clusters, which they call "public spherules." These are dynamic intersections of personal publics, where several online users share the same following and followers in the network, combined with issue publics, where users are brought together through hashtags or algorithmic sorting based on their shared interests. Public spherules give us a language to consider groups in the networked publics from an architectural standpoint.

These spherules that interact with climate change content can have shared social norms, but they are not necessarily one big "in-group." There can always be disagreement over social norms in such spherules, which can form in- and out-groups. We know that exposure to dissenting views can increase "partisan sorting," forcing people to choose a side (Bail et al., 2018; Törnberg, 2022). This is because people who break a norm, trigger the need for a correction and make the social norm visible. This forces others to either uphold the consensus or deviate from it and split into new in- and out-groups. This means that there might be a second-order sociotechnical shaping of groups. The first is the architectural one that could denote borders of interaction, which we identify as a public spherule for Instagram and Twitter, and the second one is where users actualize affordances to form in-groups and out-groups based on norm differences. It is thus possible our climate change publics are gathered in one large public spherule on Twitter or Instagram, but that there exist dynamic in- and out-groups with differing social norms within such a public spherule. How affordances contribute to shaping this second-order shaping of groups is highly relevant to social norm processes and the subject of this research.

Social Norm Affordances on Twitter and Instagram

Before we head to the empirical portion of this paper, we give an overview of what we know architecturally about Instagram and Twitter, and how they afford agency to users for normative processes. There are many architectures on both platforms that are relevant for how users contest, enforce, or transform social norms. The most obvious ones are how users on both platforms can comment or like. We are curious how Instagram and Twitter differ in shaping these social norm processes. This will give us the language to understand the affordance-in-practice perspective from our interviews. For the explanations below, we limit ourselves to public profiles, as we are interested in behavior in the public spherule, which goes beyond the personal public of users' private account.

On Instagram, senders can post public content via Posts and via disappearing Stories, whereas on Twitter, senders publicly post content only via tweets. The location of the interactional spaces, the place where an audience can react to a sender's content, is different for these two platforms. Most important for this research is the difference between the interactional space of an Instagram Post and a Twitter Post. On Instagram, the reactions remain in the comment section of that post, whereas on Twitter, this comment exists elsewhere on the platform and can lead a life on its own. This matters for social norms because of the interventionability affordance it enables, or as Van Raemdonck and Pierson (2022) put it, 'the ability to intervene on other people's behavior and enforce or contest a norm.' Since the comment remains on the Instagram post, the poster can remove a comment and enforce their own social norms. On Twitter, that comment tweet belongs to the user who made it, and it cannot be moderated away by the user to whom it was responded. Interventionability thus comes in the form of removing or hiding others' comments for Instagram users. Interventionability for Twitter users only comes in the form of commenting, or blocking the user from further interacting with them (which Instagram users are also able to do). This fixed interactional space also matters for the external visibility affordance, or the possibility to "give content visibility outside of its original context" (Van Raemdonck & Pierson, 2022), since every comment on Twitter can be reposted through retweets and quote-tweets. This is not the case for Instagram, as the comments remain in that interactional space.

The second important architectural difference for this research is how reposted content follows a different path on Instagram than on Twitter. Only Instagram posts can be shared by everyone, and they can only be shared through Stories, whereas on Twitter all tweets—even comments as we just mentioned—are reposted in the same manner. This means that only those who make Instagram Posts can have their content seen beyond their followers, whereas on Twitter all types of interaction can be reposted, affording Twitter users with more external visibility opportunities over other people's content.

It must be noted that external visibility as an affordance is closely related to visibility, which has been conceptualized many times by other authors such as boyd (2010), Treem and Leonardi (2013), and most recently Stegeman et al. (2024) as ways the platform offers users to make themselves more or less visible. Van Raemdonck and Pierson (2022), however argue that external visibility exists as a social norm affordance, where users are able to shape the visibility of other users. It affords users the possibility to induce a "context collapse" to other users, which Marwick and boyd (2011) describe as an instance where multiple social contexts with diverging norms become visible to each other.

Contextual Determinants

We finally still want to acknowledge that there are definitely contextual determinants that influence why there might be certain differences in normative processes between Instagram and Twitter. Twitter and Instagram have different platform cultures and cultural production practices, as described in seminal works by Leaver et al. (2020) and Burgess and Baym (2020), which affect creator industries differently as Poell et al. (2022) describe. Their architectures can attract different types of users with different cultural practices. As Leaver et al. (2020) write, for example, Instagram's architectures foster a more visual discursive culture, whereas Twitter's microblogging features foster more of a text-based discursive culture (Bruns & Highfield, 2015). We thus note this important caveat that different platform populations have different cultures which play a big role in normative processes. While these cultures are also shaped by the architecture, we are mostly interested in the socio-technical shaping of normative processes itself; how norms in such cultures are enforced, contested, and transformed.

Methods

We chose Instagram and Twitter as our object of study,[2] even if these two platforms underwent some transformation during the course of our research. Twitter, rebranded as "X" since July 2023, has long been a very influential platform for climate change discourse, but since Elon Musk's takeover, there has been a decline in usage (Hern, 2024) and a pivot to more algorithmic sorting based on out-of-network sources.[3] Instagram and Twitter are still useful sites of investigation due to its (former and current) intensive circulation of climate change content. They are also large unbounded spaces where the aforementioned callout practices are prevalent and afford users with external visibility opportunities beyond mere algorithmic engagement.

To identify the mutual shaping of affordances and normative processes, we conducted 22 in-depth interviews with a purposively selected sample of worldwide Instagram and Twitter users who engage with climate change content. We opted out of interviewing climate deniers to keep our focus on climate publics that agrees that anthropogenic climate change is real. In this way, we keep our focus on norm conflict, rather than drift into conflict over truth, although, as we will mostly see for Twitter, there is some disagreement over engaging with these denialist communities that has a social norm affordance component.

Interviews were conducted online by the first author over Microsoft Teams and in-person between April 2023 and December 2023 and lasted around 1 hour to 1.5 hours. All participants provided written informed consent prior to participating, or verbal informed consent that was audio-recorded prior to participating. We opted for a maximum variation of our sample, selecting users with various sizes of followers, following the previously mentioned relevance for "norm leadership," and users that participate in different ways in normative processes on the platforms (posting, commenting, sharing, and liking), following the previously discussed Small Acts of Engagement framework by Picone et al. (2019). We gathered respondents by asking our personal and professional networks to spread a call for participants who engage with climate change content on Instagram and Twitter, and then snowballed from there. We sampled respondents from different regions around the globe and with different perspectives on how to tackle anthropogenic climate change to reach theoretical saturation. We stopped when additional interviews no longer yielded new insights relevant to our research objectives of understanding how users actualize affordances to shape social norms with in-groups and out-groups. The reason we opted for a maximum variation sampling within a population that engages with climate change content, was to make sure we captured different perspectives on social norms, thereby gaining different points of view on social norm conflict on these two platforms.

Of the 22 respondents, 10 used both Instagram and Twitter, 5 exclusively used Instagram, 7 exclusive used Twitter. Our 22 respondents came from 5 different continents, primarily in Europe, where 11 identified as men, and 11 as women, with ages ranging from 20 to 72. They held different perspectives on how to tackle climate change, such as through degrowth (reducing economic growth and consumption), ecomodernism (technology-driven solutions), progressive nuclear solutions, climate justice (equitable climate policies), and climate alarmism (need for urgent, drastic action). They fulfilled diverse roles in regard to climate change, ranging from activists for Fridays for Future (youth climate movement) and Extinction Rebellion (nonviolent civil disobedience), to nongovernmental organization (NGO) employees, academics, educators, a meme maker, a Green politician, a "trollhunter" (reporting climate misinformation and harassment), and a few climate-interested citizens. With these variations in mind, we aimed to reach a deeper understanding of the shaping role of Instagram and Twitter's affordances for normative processes in online climate change publics. We pseudonymized the respondents in the excerpts below, keeping their perspective or role to situate the reader who these respondents might possibly consider their "in-group." We also added how many followers users have with a category, where "Low" are people with very few followers, of which most are people they know offline, "Medium" are people with more followers they do not know offline (between 1,500 and 4,500) and "high" are people with followers above 10,000.

The interviews were semistructured, and the majority of them[4] included an elicitation technique where we used a shared drawing board native to Microsoft Teams for online
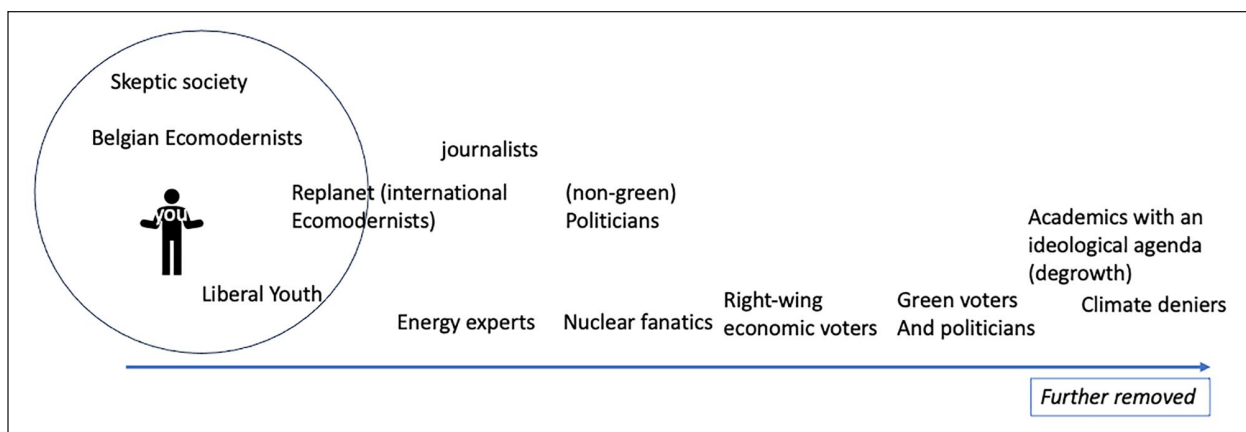
Figure 1. Final screen of elicitation with respondent "Ecomodernist (Medium)" for Twitter.

interviews, and paper for the offline interviews. This elicitation method is based on open card-sorting research techniques described by Conrad and Tucker (2019) which provide an interactive object-oriented approach to make complex ideas and concepts more concrete for participants. See Figure 1 for an example of the final result. In Step 1, respondents were asked to list all the climate-related groups of people they know on the platforms, meaning they have interacted with them or these have appeared in their information ecosystem (to determine their "climate public spherule"). They wrote these down on small pieces of paper in the offline interviews, and in the online interviews, we put them on the side of the drawing board. Next, we drew a persona on the canvas representing themselves, with a line moving away from them, and asked them to position these pieces closer or further away from their persona on the canvas. In Step 2, we drew a circle around their persona and asked which groups they would put inside their circle.

This visualized for users what kind of groups they would self-identify with, which helped us identify their in-group. It allowed us to prompt users to describe the norms within this circle and their own position toward these norms by asking if they have ever had their behavior corrected, corrected others, or seen a correction happen, and what impact it had—whether they or others modified their behavior. We then probed which features of the platforms play a role in how they saw this in-group and which features played a role in becoming aware of behavioral corrections. We then asked which features play a role in their experience of being on the receiving end of a normative correction, and which features influence their own contributions in enforcing or contesting norms. This provided valuable insights which affordances play a role for normative processes. Interviews were coded using MaxQDA software following a Grounded Theory approach, where we did rigorous analysis from the concrete realities of respondent's replies to a conceptual understanding from these data (Charmaz, 2006).

Findings

We structure these findings by going over who respondents saw in their public spherule and who they regarded part of their in-group with shared norms, how they experience norm contestation from and with people they do not regard as part of their group (an "out-group") and how they experience norm enforcement and dissent from and with their in-group. We thereby find out how users are able to shape the boundaries of their in-group on Instagram and Twitter and how they contest, enforce, and transform norms on the platform.

Which Public Spherule and its in-Groups?

One of the first findings from the interviews is how Instagram and Twitter users have different notions of the climate change spherule that they are part of, which affects how they perceive their "in-group." In the first step of the elicitation, Instagram users would list groups that they mostly agreed with or shared the same perspective with, and stated that they had little contact with groups that they disagreed with. For example, ecomodernists and degrowth activists did not put each other on the map on Instagram. From this observation, we can infer that there were several climate public spherules that had little interaction with each other. From the interviews, we can gather that this is due to a combination of personal choice (they prefer to see accounts with the same interests) and architecture (the explore algorithm mostly present them with similar content). Thirdly there is a social norm affordance element, as the people they follow reshare mostly agreeable content from others. A selective actualization of external visibility thus does not enlarge the spherule to contradictory perspectives. The second step of the elicitation proved to be difficult for Instagram users. Who they put in their "circle" hinged less on the content but rather on the type of activity they exhibited. The common denominator was that the users who are "engaged for the climate" were

considered as their climate change in-group. When we probed on which features played a role, often the creation of Posts was essential. Their "in-group" perception appeared to be influenced by the possibility to actualize the external visibility of these other users, as they also noted how only Posts can be made visible in the public spherule through reposts in Stories. This means that content creators are more likely to influence norms, and be perceived as norm leaders.

Twitter respondents, on the contrary, listed many groups in the first step of the elicitation, among which several they disagreed with, even denialists (which were largely missing from Instagram's respondents answers). This was similarly due to a combination of personal choice (they use Twitter to gather broad perspectives) and architecture (the algorithm often shows them tweets of people they do not follow). But there was also a social norm affordance element, as the people they follow make others visible not just by retweeting their tweets, but even by merely interacting with them through comments or even likes. This user engagement gives the interaction an algorithmic boost and provides it external visibility. As a consequence, the climate public spherule on twitter is pretty wide, beyond merely agreeable people.

For the second step of the elicitation, Twitter respondents based their in-group mostly on the content they agreed with, such as what kind of climate mitigation is more important (the macro-norms), but also which tone to strike about solutions or how to interact with people they oppose (the micro-norms). For example, one Twitter respondent noted how they did not like the dismissive tone used by Twitter users who also support pro-nuclear solutions, and distinctly othered that group "*We would sometimes interject by saying, you know, not all nuclear advocates feel this way, or you can be pro nuclear and pro renewables (Nuclear progressive, High)*." The high exposure to disagreeable content in the spherule (which is shaped by users' external visibility) contributes to "partisan sorting," where the presence of a group with differing norms forces users to pick sides. That in-group becomes salient through users' interventionability, as users comments make their side clear. Conversely, this partisan sorting dynamic also consolidates one big in-group in the climate public spherule due to the presence of climate deniers on Twitter. One respondent explained it saying "*I don't care about divisions as long as we are all committed to the science of it*" *(Trollhunter, Low)*. There thus exist several intersections of in-groups and out-groups in the climate public spherule of Twitter that users negotiate through actualising their interventionability.

Contestation With the Out-Group

So we know that Instagram users have little exposure to out-groups as they are mostly situated in agreeable public spherules. Respondents do not see many ways to contest norms of out-groups that they are aware of, apart from commenting on other users' Posts. If they make a Post or story themselves disagreeing with an out-group, respondents know these are mostly seen by an in-group audience. Some respondents are also aware that a post owner has more interventionability to remove or hide comments, due to the more fixed interactional space. This means interventionability is asymmetrically afforded to senders over audience, which adds another barrier to contest norms with an out-group. Instagram respondents also often feel alone in their contestation, as their followers do not see this norm contestation in their feed. Instagram respondents who attempted to make norm contestations with out-groups employed certain strategies to bring external visibility to this out-group. As one respondent explained when enforcing climate awareness norms on certain jetsetting celebrities or politicians "W*e tend to comment on their post and then we reshare their posts in our stories. And we tell people, either go like the comment or go post your own comment on their post*." *(EU activist, High)* In this way, users call out norm leaders in different spherules in higher numbers and disrupt the perceived consensus over norms for their audience. Many Instagram respondents however chose not to "spend energy" on contesting norms of an out-group. Some even report feeling like they are "intruding" in someone else's personal space, making it an infrequent activity.

For Twitter respondents, reaching a disagreeable audience happens very easily, with or without interacting with the out-group due to the previously mentioned external visibility. This means users are always potentially contesting someone's norm with their mere online presence, exposing them to callouts that can be experienced as what Marwick (2021) called "morally motivated networked harassment." While many respondents saw this external visibility as a problem as they got harassed often, others saw it as an opportunity. They engaged with people they considered an out-group in the hopes of also reaching an "imagined audience" (Marwick & boyd, 2011) that was not very committed to a "camp," so they could disrupt the consensus and transform their norms. Some respondents were very vigilant to respect micro-norms of civility to keep the civic space open for dialogue, as one respondent explained "*The fact that so many people read along is kind of a reason for me to be as polite and respectful as possible, even if I'm trying to stay true to my cause*" *(eco-modernist, Medium)*. Other respondents felt that respect for norms of civility was less important than enforcing their macro-norm, some citing the limitations in word limit. These priorities of norms can explain why our respondents noted that Twitter is a very tough place to interact compared to Instagram.

In short, Instagram users are not afforded many possibilities to enforce norms outside of their public spherule and strategically actualize external visibility to collectively challenge out-groups from their personal space, whereas Twitter

users will constantly be challenging out-group norms by their mere presence on the platform, and will strategically respect certain norms to attempt to transform norms with users who have not engaged in partisan sorting.

Dissent in the in-Group

As we explained in the beginning of this analysis, Twitter's public spherule has several dynamic in- and out-groups. Most respondents expressed a fear of weaponization of visible disagreements, especially by denialists, as disagreeing with people who could be considered "in-group" might be leveraged by "out-groups." As one respondent put it "*We don't think it's going to help the movement to point out our differences. I think that will give them tools to say, see right there, they're fighting between themselves, can't agree on what they want to do.*" *(indigenous activist, Medium).* This kind of dissent tends to get punished by the in-group with social sanctions such as othering. One respondent, a climate alarmist, told us he had been othered when he openly disagreed on certain climate projections and statistics. When some denialists shared his comments, his motives for the climate were subsequently questioned by a big science-account, and he was accused of being part of the Fossil Fuel lobby. This fear of weaponization made most Twitter respondents carefully negotiate their corrective interactions when it concerned in-group members. They tried to have them in private conversations as much as possible, which indicates a spiral of silence.

Visible in-group disagreements were a bit more common on Instagram. Norm leaders often used their own space for such actions, as it would allow them to reach most of the in-group. The lower external visibility that hinders out-group contestation is in that regard a great asset for in-group dynamics. Partly because there is less chance that disagreement gets weaponized by an out-group, and because it is easier to communicate with the in-group from the own space. Respondents would still more likely send a Direct Message out of politeness, whose private character would make it more an act of "calling in" rather than the public act of "calling out" (Woods & Ruscher, 2021), but respondents would also not hold back to make a correction in their Posts or Stories. As one respondent explained "*what i would maybe do is a story that doesn't necessarily mentions names, but says like, individual change is important but we need to focus on systemic change*" (*Activist Fridays for Future, High*). When it comes to contestation done by users with less followers, Instagram audiences feel hindered by their limited interventionability which is less a stumbling block for Twitter users. As one respondent who rarely reacts said "*I'm just going to assume these bigger accounts that I follow are not going to see my comment*" *(climate interested citizen, Low).* Content creators do claim to pay attention to these small acts of normative interventions, although they are more receptive

when they come in high numbers with many likes, and when those users are following them.

Often audience interventions on Instagram were about widening a creator's content frame and sharing their platform for other issues such as the conflict in Gaza. This happens because an in-group audience can also follow users from different spherules that hold different norms. Most content creators we spoke attempted to transform their previously held norms to keep up with the norm expectations of growing audience that belonged to different public spherules. They however also felt pushback when they transformed norms. As one respondent experienced "*some people would complain because they only follow my page for environmentalism. But I tell them like, I personally care about things besides it and it's still MY account.*" *(educational memes, High)*. This creates a tension field for users with many followers on Instagram. Between transforming norms according to their own personal convictions and appealing to a larger audience, or keeping the same focus, they feel contestation over how they manage "their space" as a norm leader in a public spherule. This is reflected in research done on the influencer industry where content creators are strategically navigating their audience relationships when performing relational labor (Glatt, 2024). The fixed interactional space of Instagram however gives them interventionability to silence dissent where they see fit, although respondents were hesitant to wield that weapon for fear of larger callouts.

In short, Twitter users fear weaponization of disagreement in the in-group, whereas Instagram in-groups can enforce norms from their own space without fearing much out-group weaponization. On Twitter, attempts to transform norms are often suppressed to not fracture the in-group, leading to a spiral of silence, whereas on Instagram norms are transformed by norm leaders when they chose to appeal to norm contestations of followers from other public spherules.

Discussion and Conclusion

This study has sought to provide another perspective on online discourse by investigating the shaping role of platform architectures on social norm processes. We find that on both platforms, users actualize external visibility and interventionability differently, which impacts their self-organization on those platforms. We analyze how this has an impact on climate change discourse on both platforms and beyond.

We find that Instagram users shape their in-groups primarily through external visibility by sharing content of people they agree with, whereas on Twitter external visibility is afforded through every type of interaction, doing little for in-group shaping. This makes Twitter users shape in-groups through contestation using their interventionability in the form of commenting and quote-tweeting. This finding reveals how there is indeed a second-order sociotechnical

shaping of groups through social norms and that it is different on Instagram and Twitter. As a consequence of this prevalent actualization of interventionability on Twitter, normative corrections are ubiquitous on Twitter, fostering affective polarization. These corrections are often experienced by our climate change respondents as harassment, which is also reflected in studies on callout culture on Twitter (Kim et al., 2022), where users perceived calling out practices and harassment as highly interconnected. Kim et al. found that this also has a silencing effect, which respondents also reported.

For Instagram, respondents report less harassment and many seem to be inhibited themselves to signal norms with others and contest certain behaviors. Unequally afforded interventionability appears to influences users' perceptions of their ability to reach the "right" imagined audience. This indicates a form of learned helplessness, where users may come to believe they have no control over a situation and therefore do not take any action (Seligman, 1972). This can be positive in light of how Twitter users experience many norm contestations as harassment, but when it comes to climate discourse, it can stifle exchanges as well.

On the whole, climate change creators hold most power over social norms on Instagram due to the external visibility and interventionability affordances of the platform. They also feel pressured by their audience to adapt their norms. This finding is corroborated by Jurg et al. (2024) who found that an infamous Youtuber's audience also engaged in callout practices to make the creator stick to certain norms. They called this practice "audience capture," where influencers are influenced by their own audiences. This means for climate change discussions on Instagram that creators feel pressure to expand their norms and include an ever increasing set of topics under the climate change umbrella. This practice both avoids polarization within a climate change public that seeks connection with broader social justice movements and leads to tension between creators and their audiences that might prefer to stick to a bounded definition of climate change and dissent from a new norm.

Finally, because of Twitter's extensive external visibility, in-group dissent can be seen and weaponized by outsiders to divide them into even more groups. Respondents fear this weaponization, pushing them into a spiral of silence to not correct their in-groups on climate-related matters. This dynamic stifles productive climate conversations and hinders the formation of new consensus on climate action, which is problematic for climate discourse on Twitter. This finding is reflected in previous research which Pearce et al. (2019) summarized, saying that climate change discourse on Twitter is mostly focused on the settled science, and far less on the mitigation and adaptation.

From the triple articulation between affordances, norms, and platform cultures, we learn that the tension field for norm conflict on Instagram is situated on the "own space," particularly that of content creators, and on Twitter on a perceived "public space" where interactions are visible to all. We show that this technosocial process affects the discursive practices and self-organization of social movements on these two platforms, which has repercussions beyond climate change discourses. It is imperative that we investigate what agency certain platform designs afford to users to shape other users' norms. Platforms are already shaping self-moderation practices on platforms like Instagram and Twitter where there are no designated user moderation roles, yet little is known of the ways in which their platforms shape external visibility and interventionability affordances, and how these impact affective polarization, spiral of silence, learned helplessness, and power centralization with certain users. Hence, these insights can be valuable input for appropriate governance, value-driven design, and enhanced critical digital literacy of social media platforms.

In conclusion, this research provides valuable insights into the social norm shaping affordances of platforms like Instagram and Twitter. It also has limitations. The focus on Instagram and Twitter, the specific sample of climate change respondents, and the evolving nature of these platforms mean that the findings may not be universally applicable or even replicable in the near future. For instance, "likes" going private on Twitter (now X) may have changed user behavior on feeding the algorithm and increasing external visibility now that there is no public scrutiny over what exactly they liked. Future research could investigate the transformative nature of increasing algorithmic influences on external visibility, and explore other platforms such as TikTok or Telegram, which are important online places for public debate and have unique affordances, to investigate how different user demographics interact with different affordances. Future research could also investigate the shaping role of external visibility and interventionability affordances on platform cultures more broadly. For instance, respondents who used both platforms noted Instagram had a far more agreeable and supportive culture but was less interesting to converse than Twitter, with some noting the absence of journalists and experts on Instagram. The potential lower external visibility for Instagram comments might contribute to less engagement of such actors, shaping the cultures on these platforms.

Declaration of Conflicting Interests

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Notes

1. Following the Hamas attacks on Israel on 7 October 2023, Israel bombed the Gaza strip with 25,000 tons of explosives by November 2023 which had a big environmental impact according to the Euro-Med monitor https://euromedmonitor.org/en/article/5908/Israel-hits-Gaza-Strip-with-the-equivalent-of-two-nuclear-bombs.
2. By the end of 2023, Instagram counted 1.35 billion users worldwide, Twitter counted 354 million users worldwide (Statista)
3. This means Twitter increasingly shows content from outside of the user's follower network similar to their interests. See Twitter's explanation on how the algorithm works since April 2023 https://web.archive.org/web/20240424020949/https://blog.x.com/engineering/en_us/topics/open-source/2023/twitter-recommendation-algorithm
4. There were time constraints with a few interviewees that did not allow us to run though the full elicitation or could not do them for both platforms. We instead asked these respondents directly who they regarded their in-group and who else they see on the platform.

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