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Social media provide a participatory space for citizens to communicate with each other on important policy issues. However, political discussions on social media are usually filled with rampant incivility and inter-party hostility, which deviates from the normative ideal of public deliberation that yields actual opinion changes and consensus formation (e.g., Fishkin, 1991; Mutz, 2006). Recently, scholars have started considering the role of platform design in users' digital communication behavior (e.g., Matias, 2019) and argued that information technology companies need to develop democratic communication systems that afford rational and constructive policy discussions (Jaidka et al., 2019). Building upon this renewed scholarly interest in the "communication as design" paradigm (Aakhus, 2007), this pre-registered web experiment manipulates two of social media's most frequently employed interactive features — reply and reaction (upvote and downvote) — and investigates how they regulate communication dynamics in a custom-designed messaging platform.

We pre-registered the following hypotheses for empirical analyses: First, reply, reaction, and their interaction will decrease the number of messages, both at the individual level (H1a) and at the room level (H1b); Second, reply, reaction, and their interaction will decrease incivility (H2a) and increase rationality (H2b) at the message level, measured by a political deliberation classifier developed in Jaidka et al. (2019); Third, reply, reaction, and their interaction will increase the perceived discussion quality (H3), self-reported by participants in the post-survey; Fourth, reply, reaction, and their interaction will encourage opinion change (H4), measured as the individual-level absolute opinion change (i.e., the difference between their policy opinions before and after the discussion); Fifth, reply, reaction, and their interaction will lead to conformable opinion change (H5), measured as the relative individual-level opinion change against the majority opinion of the room before the discussion; Sixth, reply, reaction, and their interaction will lead to more consensus formation, both at the individual level (H6a) measured as the distance between an individual's post-discussion opinion and the room's average post-discussion opinion, and at the room level (H6b) measured as the standard deviation of room participants' post-discussion opinions; Seventh, when we consider each chatroom as a *messaging* network (a directed network where nodes denote messages and edges denote the logic of relying, shown in Figure 1 Panel B as the network graph on the left), reply and reaction will respectively lead to higher (H7a) and lower (H7b) maximum network depths, measured at the room level; Eighth, when we consider each chatroom as a *conversation* network (a directed network where nodes denote participants and edges denote the logic of relying, shown in Figure 1 Panel B as the network graph on the right), reply and reaction will respectively lead to higher (H8a) and lower (H8b) structural virality (Vosoughi et al., 2018) which measures how closely connected participants are from each other; Ninth, reply and reaction will lead to higher

(H9a) and lower (H9b) structural inequality in the conversation network, measured as the in-strength centralization of the network; Tenth, reaction will lead to lower (H10) topical entropy and diversity, measured by KL divergence and recall.

We recruited online workers from Amazon Mechanical Turk to voluntarily join our live policy discussion on the topic of "social media content regulation." Upon filling out a pre-survey on basic demographics and indicating their pre-treatment opinions on the policy, participants arrived at our waiting room and got matched with four other participants, with whom they discussed the issue for 30 minutes in a messaging platform that resembles WhatsApp and WeChat. We randomly assigned the chatroom's features to one of the four conditions — reply and reaction both enabled, reply enabled with reaction disabled, reply disabled with reaction enabled, reply and reaction both disabled. Upon finishing the discussion, participants were redirected to a post-survey where they evaluated the discussion quality and reported their post-treatment opinions on the policy. Participants who joined the discussion and finished all surveys ($N = 1500$, 300 rooms, 5 participants per room) were rewarded \$6.5, participants who did not match with other players ($N \approx 300$) were rewarded \$1.5, and participants who did not join the waiting room ($N \approx 3000$) were rewarded \$0.5, all exceeding the federal minimum wage of the United States. Data were collected from February to April 2021, during which misinformation about the COVID-19 vaccine and the deplatformation of Donald Trump from Facebook and Twitter have made "social media content regulation" an engaging and prominent topic in Americans' public discourse. Figure 1 Panel A summarizes our research design.

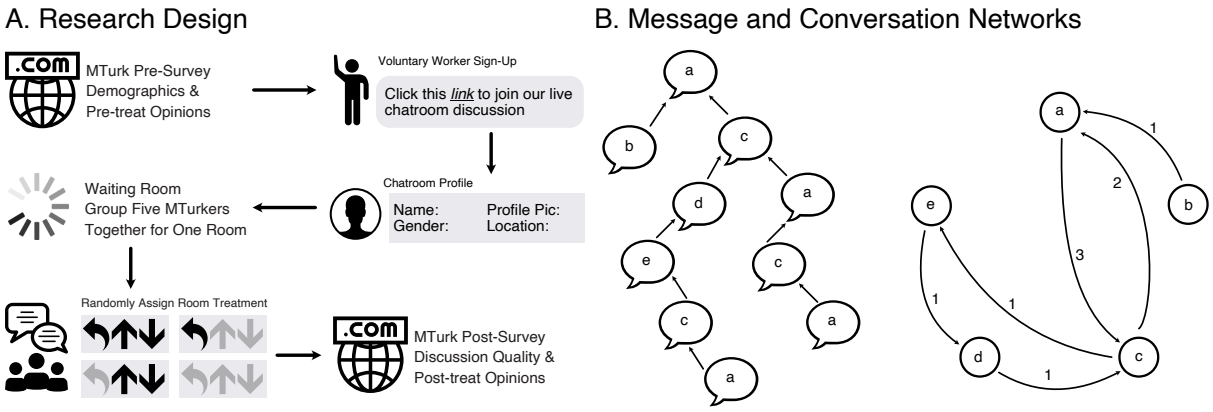

Figure 1: Research Design and Network Construction (letter a/b/c/d/e denotes participants)

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