Not Quite Filling the Void: Comparing the Perceptions of Local Online Groups and Local Media Pages on Facebook

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With the steady closure of local newspapers, news consumers increasingly turn to community forums and neighborhood apps to fill the information void. This study investigates how local online groups are perceived relative to more traditional local news outlets, and compares the benefits provided by each information source. Based on prior theoretical contributions, we develop a framework for measuring the benefits of local information on individual-level pro-community attitudes (attachment, knowledge, and civic attitudes.) In a field experiment ($N = 170$), we asked frequent Facebook users living in four U.S. cities to start following local news pages or local online groups on Facebook for one month, and compared their perceptions of source quality and changes in pro-community attitudes. We find that posts from local news pages are perceived to be of higher quality than posts from local online groups. However, following local news pages or local groups did not lead to significant changes in pro-community attitudes during our study period. We discuss implications for the future study of local news in a changing media ecology.

CCS Concepts: • **Human-centered computing** → **Empirical studies in collaborative and social computing**; *Collaborative and social computing theory, concepts and paradigms*; **Social media**.

Additional Key Words and Phrases: social media; facebook; local news; online experiment; local online groups

1 INTRODUCTION

Local journalism offers distinct benefits to communities, such as a sense of belonging, perception of local knowledge, and increased civic participation [24, 49, 67]. Despite the benefits and the pressing need for reliable local information, the local media ecology in the U.S. is unstable and undergoing fundamental change. Over one fourth of local newspapers in the U.S. have shut in the last 15 years, leaving many communities without reliable news [1]. In the absence of a strong local media, scholars fear that prosocial community attitudes may also wane, leading to a less politically engaged and more polarized population [25, 43].

At the same time, there is more local information available online, both from local media and from other sources, as the share of digital outlets expands [60]. Local news television and newspapers have moved to Facebook pages to provide faster coverage and live updates, better presence in local communities, and higher engagement with their audiences through comments, likes, or shares [5, 41, 71]. Additionally, non-news community actors (e.g., local governments, non-profits, neighbourhood groups, and city services) are generating and disseminating local information to their communities directly on Facebook [73].

Local social online information streams, such as neighborhood groups on platforms like Nextdoor or on Facebook, offer an alternative way for individuals to stay current with local developments. Today, local online Facebook groups are one popular form of digital local information sharing. Though the exact number of local Facebook groups is not known, over 1.8 billion people report being part of a Facebook group [54]. A study conducted by Meta researchers underscored the prevalence of local Facebook groups on the platform, identifying that geographic user concentration plays an important role in the formation of Facebook groups [26].

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Early explorations indicate that local Facebook groups may provide some of the same advantages offered by local media organizations. De Meulenaere et al. [10] find that posts made in hyperlocal Facebook groups may contribute to an "ambient news stream" comparable to hyperlocal news media. Studies have also explored local government, organization, and business Facebook groups and found that these can be spaces for important civic discussion comparable to news organizations [23, 38, 73]. These explorations indicate that digital communities may fill some gaps created by the closure of local news organizations, but further work is needed to understand how people perceive these online spaces and how they may change community attitudes and behaviors.

We focus on the intersection of local journalism and local social media, tackling an increasingly salient area of study within the CSCW community. Prior human-computer interaction and computational social science work has been instrumental in mapping the different types of content people may be exposed to on local social media forums [30, 42, 44]. Social computing work has also explored how aspects of technology can be incorporated into the medium and practice of journalism [12, 59], though less focus has traditionally been granted to local journalism in this field. This paper focuses specifically on local journalism and local social media as an area that is of increasing importance to study in tandem.

How can we understand the benefits provided by different channels of local information? We follow this research question, aiming to understand whether online community groups may contribute to the same pro-community attitudes as local journalism.

1.1 Online Local Groups

As they shift toward online local content, audiences encounter local information in non-traditional ways. Research from Pew found that the internet plays an increasing role in how people access local information: 89% of U.S. adults get at least some local news online and almost as many people prefer getting local news updates online as through local TV stations [17, 61]. One way this shift has been evidenced is through the formation of "hyperlocal journalism" sites, which are digital native, citizen-journalism media reporting projects [77]. Scholars have explored whether these hyperlocal news sites can help maintain the benefits to communities of traditional local journalism. Work on hyperlocal media has found that these services can bring clear advantages to communities by centering issues of local relevance, yet find there is a certain "de-professionalization" of content where fewer sources are cited than in traditional local media, and topics covered are less civically important or investigative in nature [21, 32, 55, 78].

Another type of local information source are online local online discussion groups, which we focus on in this study. In a 2019 Pew survey, 59% of respondents stated they access local information from online forums or discussion groups [61]. A recent Knight/Gannett poll outlined that *"local news is eclipsed by social networks"* as a primary way for Americans to become involved in politics [66]. Popular community-oriented discussion groups include Facebook local and neighborhood groups, geographically-oriented discussion forums on Reddit, and the neighborhood-based social media app Nextdoor. López and Butler [42] termed these places *"locally-focused online social systems,"* highlighting that they center *"user-generated information about local communities."* We align ourselves with the authors' definition of Facebook neighborhood groups as *"local online groups,"* and we study these spaces in this article. A key distinction between local journalism, hyperlocal media, and local online groups is the degree of professionalism, curation, and moderation that is embedded in content production: while hyperlocal media often involves a mix of journalists and citizen journalists [55], there is no expectation that people in local online groups are journalists.

Local online groups appear to enjoy a broad reach and be gaining popularity, and recent studies of local information behavior reflect their growing importance [40, 52, 56]. A study of news habits and information needs amongst Philadelphia residents found that Facebook emerged as a major

way that people received news, and that people turned to both newspapers and apps to receive hyperlocal information [11]. As Delli Carpini et al. [11] highlight, people do not only seek local information in a top-down approach: *"people of all backgrounds react most positively to information that is provided within social networks, and from individuals and organizations that are seen as members of that social network."* A similar study of disinvested residents in Dallas found that social media was the primary way people kept informed of local news, with participants specifically calling out neighborhood Facebook groups as a key place they get local news [14].

Multiple studies have indicated that social media and internet-based local services can provide benefits to local communities. At a high level, greater usage of social media to engage with local organizations has been associated with reporting greater community connection [19]. Attempts to marry online and offline civic actions have suggested integrating Facebook into local networks can lead to hybrid, infrastructured community action [39, 47]. Augmenting local news posts with hyperlocal microblog content has been shown to make people more aware of local news and improve community connection [22].

Research that specifically examined community-based Facebook groups has shown that these groups can offer a space for local information exchange and public discussions in various contexts such as crisis management, support groups, political mobilization, and civic engagement [16, 34, 36, 46]. In content analyses of local online Facebook groups, commonly identified themes include highlighting local events, buying and selling, providing information, or sharing problems [2, 10, 42]. Afzalan and Evans-Cowley [2] found that most members believe the forums have *"great capacity to inform the members about their neighborhood issues."* De Meulenaere et al. [10] explore how local online Facebook groups compare with traditional local news, and find that while posts in these groups lack journalistic rigor, these groups act as *"a prominent gateway to neighborhood information and news."* In a broader survey study, Kwon et al. [37] find that more frequent use of local social media is associated with higher interpersonal trust. Overall, prior research posits that Facebook groups offer benefits local communities, suggesting that a better understanding of measuring their impact would be valuable.

Nonetheless, experimental approaches to studying the perceptions and impact of local Facebook discussion groups remain few, and our understanding of the causal contribution of local online groups to communities is still limited. In particular, as the local press crisis continues, we must reliably establish how the benefits offered by local online groups compare with those offered by local journalism and media. In this paper, we aim to provide a framework that can directly measure and compare the perceptions and contributions of each local information source, and help provide an indication of the expected shift in society as these local online groups augment and outpace other local sources of information.

1.2 Local Media and Community Outcomes

A healthy local news presence has long been hailed as a positive, and even an imperative for the health of communities and democracy. There is a significant literature looking at the impact of local news on communities. We build on this literature to develop a framework for measuring healthy community attitudes that could also be applied to other local information sources.

At its most basic level, local news is intended to keep communities informed, and thus influence local action and hold local powers to account. Communities have specific "information needs," which the local press help to serve [76]. These often include daily updates such as knowledge of the weather, traffic, public transport, and local crime events [11]. Local news media can also serve acute information needs: the COVID-19 pandemic has been an example of a state of crisis where the public relied on local news to obtain vital information [4, 69].

More generally, higher local news consumption is significantly correlated to people "feeling informed" about current events, though not necessarily to their actual knowledge [64]. Although the idea of an "informed citizen" has been subject to critique [80, 81], both local knowledge and local action have been shown to be influenced by the presence of local news. For example, during the COVID-19 crisis, the provenance and focus of local information has been shown to significantly impact people's social distancing behaviors [35]. In a large-scale analysis, Hayes and Lawless [24] found that an increase in political local news coverage could be tied to increased political knowledge, though experimental settings have failed to demonstrate this relationship in the past [18]. Scholars highlight that local press is necessary to hold local powers to account [57], and local news presence was also found to reduce corruption and increase government spending in an area [8]. A significant value of local news can thus be seen in regulating local powers by keeping citizens informed.

Another key contribution of local news presence is strengthening individual attachment to communities and increasing intra-community social ties. One frequently explored area is the connection between local news and concept of *community attachment*, which Rothenbuhler et al. [63] defined as *"identification with the community combined with an affective tie."* In particular, Janowitz [31] has been a key figure in demonstrating a two-sided relationship between community newspaper readership and feelings of community attachment. The causal relationship between the concepts has been a target of investigation as well. For example, Hoffman and Eveland [29] performed a longitudinal, large-scale panel study and did not find a causal relationship between community attachment and local news exposure, though the study did confirm the correlation.

Finally, local news presence has been linked to increased political participation and civic engagement. Case studies and quantitative analyses have found that, when there is a weaker local news presence, the resulting lower political knowledge has been associated with more polarized electoral outcomes and lower voter turnout [3, 24, 48, 68]. This polarization effect is generally attributed to voters having less nuanced information about individual candidates through their local press, and thus being more likely to vote based on party affiliation rather than individual policies. Beyond their impact on political participation and outcomes, local news presence and attention to local news has also been linked to other types of civic engagement, such as volunteering or attending community meetings [62, 67, 70].

1.3 Framework and Hypotheses

Despite sometimes conflicting experimental results, the literature generally agrees that local news presence provides vital benefits to communities and contributes to healthy democracy. In parallel, the literature also suggests that some of these benefits may also be bestowed by other local information sources. The common implied outcome suggests a need to develop a more comprehensive framework to measure the contribution of these disparate sources on key community attitudes.

Drawing on prior work outlined above, we suggest an individual-level framework for outcomes of local information, in terms of community attitudes (Figure 1). The framework's suggested outcomes include community *self-perceived knowledge*, *attachment*, and *attitudes towards civic engagement*. These concepts, as we outline below, have largely been developed and externally validated prior to our study in different contexts [13, 33, 51]. These dimensions capture how *informed*, *attached*, and *responsible* for the community an individual feels at a point in time. We chose not to include community-related behavioral measures in this framework, but these community attitudes have been shown to be pre-cursors to behaviors. For example, *self-perceived knowledge* has been shown to increase voter turnout [24]. While an ideal study could study and measure both attitude and behavioral outcomes, we opt in this work and framework to focus on attitudes. Attitudes are easy to measure via surveys; and without shift in attitudes one might not expect to see a shift in

behavioral outcomes. Our attitudes-based framework thus provides a first indicator of the impact local information may provide, and potentially allows for more rapid research of this impact.

A precursor in our framework to attitude change is understanding how different local information sources are perceived in digital environments. Early studies of hyperlocal media, for example, note that hyperlocal media content is "de-professionalized, and that community-generated content is different to "traditional" media content [10, 55]. Additionally, prior qualitative studies of local online groups groups have found that people are particularly wary of commercial or spam posts [44]. One study also found that people tend to perceive posts shared by friends on Facebook as less credible than posts shared by news organizations [72]. These analyses might suggest people would evaluate local online groups as being of overall lower quality than local news outlets. Conversely, there is significant evidence that people trust any local content more than national content, regardless of the source [20]. In particular, U.S. republican audiences trust local news much more than national news [65]. These findings motivate the question of the different perceptions of quality and trust in content between different local sources. In the context of our study, we formulate the following research question:

> RQ: Is there a difference in the perceived quality and trustworthiness of information from local news pages and local online groups?

As noted above, beyond perceptions of local information sources, we seek to understand how the source of local information impacts individual-level community outcomes. Given the general agreement in the literature that exposure or local news presence is correlated with pro-community attitudes, we hypothesize:

> H1: One or more attitudes towards community will increase over time as a result of following local news pages or joining local online groups on Facebook, but not when joining non-local online groups (control).

We posit that exposure and perceived information quality are key mediators that impact how the source of local information will effect community attitudes. The impact of exposure has been modeled by others who ran similar experimental studies on Facebook [7, 58]. The intensity of exposure on Facebook has been associated with greater treatment effects [51], and higher exposure to local media has been associated to higher community outcomes [49]. We therefore also hypothesize:

> H2: The level of exposure and perceived quality of local information sources will be positively associated with an increase over time in positive community attitudes.

Finally, previous studies have identified that the length of time in a community is likely to be highly correlated with community outcomes (e.g. [29]). We thus need to control for length of time in a community as a key variable that may decrease potential change in community attitudes. An additional variable that may attenuate any effect is prior exposure to news on Facebook; if a participant is already following local outlets, following additional outlets may have a lesser effect. To account for these explanatory variables, we also hypothesize:

> H3: Length of time in community and amount of prior news exposure will moderate the increase over time in positive community attitudes.

We represent this framework and the hypothesized relationships in Figure 1.

2 METHOD

We test our hypotheses using an online field experiment. The study followed a pretest-posttest design with three experimental conditions (local news pages, local online groups, or control). At the beginning of the study, all participants completed a pre-treatment survey. Participants in the

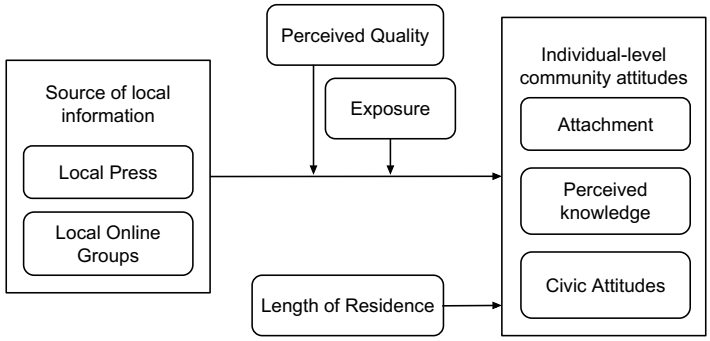

Fig. 1. Proposed framework to assess the impact of local information exposure on individual-level healthy community attitudes

local news pages condition were then asked to "like" three local news Facebook pages from a list of publishers in their area. Participants in the local online group condition were instead asked to join three local online groups from a list of groups in their area. Participants in the control condition were asked to join three hobbyist Facebook groups which had no relation to their local area (for example, wildlife photography). For all groups, participants were presented with a curated list of four to eight options for which groups or pages to follow so that they could manually select the three pages or groups which appealed most to them. This procedure was designed to emulate how one would select a page or group to follow on Facebook, and reduces the individual effect of any one group or page. After four to six weeks of exposure to the pages or groups, participants then completed a post-treatment survey.

We conducted this study in four U.S. cities (Boston, Columbus, Nashville, and Seattle). We limited the number of cities as manual work was required to identify and validate suitable pages and group options for each city. The chosen cities were large enough to enable recruitment, but had a population less than one million. We sought to select cities that were geographically and demographically diverse.

We followed a strict set of criteria for selecting the Facebook groups and pages that we asked participants to join or "like." All selected groups had to have at least 1,000 members, could be public or private, and had to have an average of between 100-1,000 posts per month. Although we did not have access to all private groups in the study, we could still suggest to participants to follow these groups and were able to see high-level information about the groups such as how active they were and select posts. The local online groups all had to contain the city name in the title, be oriented around "neighborhood," "discussion," "community," "event," or "happenings," but not be specific interest groups (e.g. *Seattle Moms*). For selecting the local news pages, we chose the most popular local news pages in an area that were the "official" Facebook pages of a local news media outlet. These pages also had to be active, and post primarily (though not only) about the relevant city or surrounding area. For the control condition, the researchers identified a set of hobby interests that were not locally specific (e.g. wildlife photography) and thus were not expected to influence attitudes towards local community.

2.1 Measures

We collected information and surveyed the community attitudes of participants at the start (T1) and the end (T2) of the experiment.

2.1.1 Healthy Community Attitude Measures. We measured our dependent variables, namely a set of attitudes towards the participant's community, during both the pre-measure and the post-measure survey. All community attitude items were measured on a 7-point scale, and average indices were created for each type of community measure if more than one item was collected. Full scales used are detailed in the appendix.

Community attachment. We measured community attachment using a validated three-item scale, which includes the question "would you say you feel 'at home' in *[city of residence]*?" [33].

Community self-perceived knowledge. We measured participant's perception of community knowledge through the question "overall, how informed would you say you are about news and current events in *[city of residence]*?". This measure is the only item not directly based on scales developed in prior work, though other studies use similar items to assess feelings of informedness [51].

Attitudes towards community civic engagement. We collected participant attitudes towards civic engagement in their local community using the eight-item scale proposed by Doolittle and Faul [13]. In our items, we specifically refer to the community of the city of residence, e.g. by asking "I feel responsible for my *[city of residence]* community." Due to the relative brevity of the study length, we chose to measure attitudes toward civic engagement instead of civic engagement behaviors, which may be slower to change.

2.1.2 Pre-measures. Additional measures collected in the pre-survey were geared at obtaining demographic information and prior news habits.

Demographic information. We collected general demographic information including age, gender, ethnicity, race, income, education, and political affiliation. Due to the homogeneity of participants who responded to our call, we do not use these variables in our analysis. We also collected each participant's length of residence in their current city.

Prior news habits. We asked participants whether they were following local news pages or local online groups prior to treatment start, modeled as a binary variable for our analysis. We also asked participants how closely they follow local news on a four-point scale.

2.1.3 Post-measures. Our additional post-measures are geared at understanding the perceived quality of groups or pages after the participants were exposed to them during the experiment.

Exposure and interactions. We asked participants to confirm that they were still following the treatment groups or pages. We collected the frequency at which participants saw posts from the treatment groups or pages appear on their newsfeed, and asked if they interacted with the posts. For our analysis, we map these interactions to an ordinal scale (0 = no interactions, 1 = passive exposure (saw posts on timeline), 2 = active, low-stake interactions (reacting to content or clicking on the group or page), 3 = active, high-stake interactions (commenting, sharing posts, or posting to the group).

Perceptions of quality. To measure perceived quality, we asked participants to rate the posts they saw from the groups or pages on a 5-point scale for *relevance*, *interest*, and *trustworthiness*. These items were compiled into a mean index which we use as a general indicator of perceived quality for analyses.

2.2 Participants

We recruited participants via Facebook ads, targeting adult audiences that lived in one of the four cities of interest. As an incentive for participation, participants were entered in a lottery in which

10 participants would win $100. We pre-screened respondents to include only people who live in one of the cities listed above, are adults, and indicated that they use Facebook "a few times per week" to maximize treatment exposure. Once selected, we collected informed consent and invited participants to the pre-treatment survey. In total, 358 participants who passed the pre-screener also completed the pre-measure survey, and 179 participants completed the post-treatment survey. Of those, nine participants were removed who indicated in the post survey that they had never followed the groups or pages, or had filled out the survey multiple times and were assigned multiple treatment groups. In total, we received 170 valid responses in the post-treatment survey. All procedures were approved by the Institutional Review Board at Cornell University.

	Seattle	**Columbus**	**Boston**	**Nashville**	*Total*
Control	13	13	13	11	50
Local Online Groups	21	18	11	11	61
Local News Pages	24	16	11	8	59
Total	58	47	35	30	170

Table 1. Experimental Group and Residence City of Participants

Our final participant pool turned out to be fairly homogeneous. Most participants (55.3%) had lived in their current city of residence longer than twenty years. Additionally, our participants skew older, richer, more educated, and whiter than the diverse cities we recruited from. Of the participants who completed the post-treatment survey, 85 (50%) were over 55 years old. There were 92 participants (54.1%) who identified as a woman, 68 participants (40%) who identified as a man, and 6 participants (3.5%) who identified as non-binary. The majority of participants, 135 (79.4%) in total, identified as non-Hispanic White. Four participants (2.4%) identified as non-Hispanic Black, five participants (2.9%) identified as Hispanic, 17 participants (10%) identified as non-Hispanic minorities, and nine participants (5.3%) preferred not to disclose their race. Most participants (137, 80.6%) had a Bachelor's degree or higher, and 92 participants (54.1%) reported an income greater than $75,000 a year. In total, 59 participants were assigned to the local news pages condition, 61 were assigned to the local online group condition, and 50 were assigned to the control condition. We include a full demographics table in the appendix.

2.3 Participant Descriptives

Our pre-measure responses indicate that participants engaged strongly with local content on Facebook. At the pre-measure, 102 participants (60%) indicated they were currently part of a local online group on Facebook, 57 participants (33.5%) indicated they were not part of a local online group on Facebook and 11 (6.5%) indicated they were unsure. A similar number of participants reported following local news pages on Facebook, as 97 participants (57.1%) of the participants indicated they were currently following a local news page on Facebook, 59 participants (34.7%) indicated they did not follow a local news page on Facebook, and 14 participants (8.2%) indicated they were unsure. Surprisingly, calculating the Pearson correlation coefficient between following a local news page on Facebook and being a member of a local news group on Facebook revealed no correlation, even when removing participants who were "unsure" of either, $r(80) = 0.13, p = 0.26$.

At the end of the study, most participants reported seeing the treatment groups or pages often on their feed. Most participants in each condition saw the treatment pages or groups at least a few times per week: 68% in the control condition, 55.9% in the local news pages condition, and 50.8%

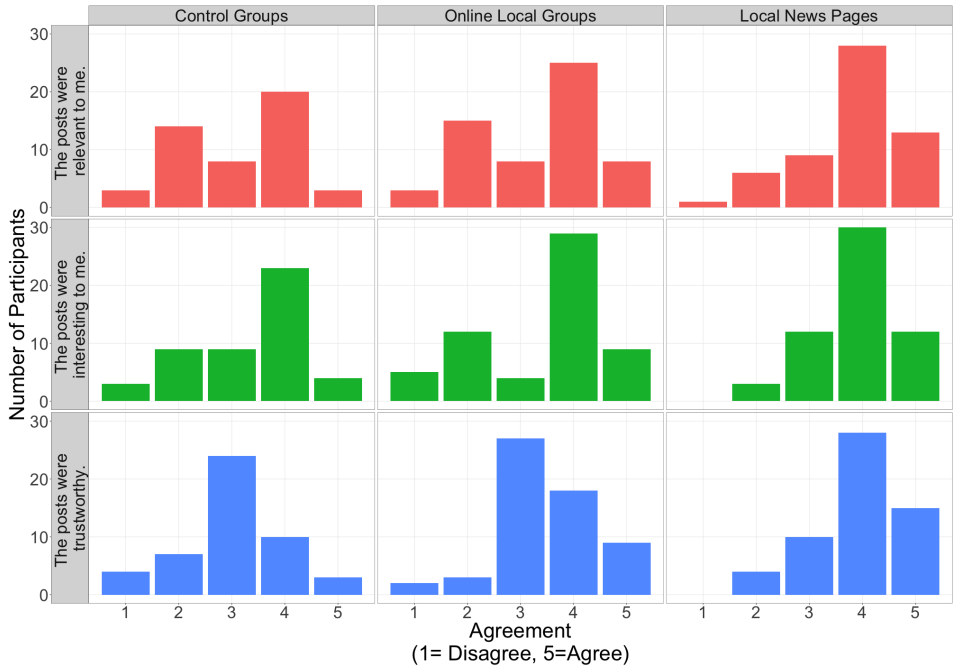

Fig. 2. Perceived quality of posts for three treatment conditions. After the treatment period, participants who saw at least one post on their news feed were asked to evaluate how relevant (red, top), interesting (green, middle), or trustworthy (blue, bottom) they felt the posts to be. Generally, participants deemed content from local news pages to be of higher quality than either of the group conditions.

in the local online groups condition. On average, exposure to the control groups was higher than to either the local online groups or the local news pages, which may have been due to the larger average size or higher amount of content posted to the control groups relative to the local groups.

Finally, we also observed high levels of self-reported engagement with the treatment groups or pages across all groups. Engagement was measured using an ordinal scale, as defined in Section 2.1.3, where we distinguish between (1) participants who passively saw posts, (2) those who reported performing low-stake, active interactions, and (3) those who reported performing high-stake, active interactions. In the local online group condition, these participant distribution were 26.2%, 24.6% and 44%, respectively; compared to 15.3%, 44.1%, and 37.3% in the local news pages condition and 34.0%, 20.0%, and 40.0% in the control condition. For each condition, only a few participants reported never seeing or interacting with any content from the treatment groups and pages (three in the control and local online group conditions, two in the local news pages condition). Overall, participants were actively engaged with the treatment groups and pages, with over one third of participants reporting they either commented on posts, shared posts, or posted to groups themselves.

3 RESULTS

To understand differences in perceived quality by treatment group (RQ1), we perform a Kruskall-Wallis test on the three dimensions of quality, and compare the experimental conditions using post-hoc tests. To test our hypotheses about the impact of treatment condition on individual-level community attitudes (H1-H3) we perform a MANCOVA, followed by a linear model to isolate explanatory variables.

Overall, while we observe differences in the perceptions of quality between the conditions, these did not translate to significant differences in pro-community attitudes over time in our data. We find that local news pages are perceived as being higher-quality than both the local online groups and the control groups. Notably, both types of local information sources were rated as more trustworthy than the control groups. Nonetheless, we find no evidence that the treatment conditions significantly impacted pro-community attitudes of participants.

3.1 Perceived Post Quality

Our research question concerns how post quality is perceived for different local information sources on Facebook. We asked participants at T2 to indicate if they agreed with the statements *"The posts were relevant/interesting/trustworthy to me."* Due to the ordinal nature of the dependent variable, we use a Kruskall-Wallis rank sum test to identify differences between conditions.

Figure 2 shows how the participants in each condition (columns) rated the information they were exposed to based on the three criteria: *relevance* (top), *interest* (middle) and *trustworthiness* (bottom). For example, the middle (green) row suggests that, compared to the control (left) and the local groups (right) conditions, participants in the local news condition (center) generally found the posts more interesting (higher scores). Indeed, Figure 2 shows that participants who "liked" local news pages consistently ranked posts highly across all three dimensions.

Overall, our analysis finds that local news pages were rated as more interesting and relevant than local online groups and control groups, and that both local sources were rated as more trustworthy than the control condition. In detail, statistical tests showed that participants rated posts from local news pages as significantly more *interesting*, $p < 0.01$, *relevant*, $p < 0.05$, and *trustworthy*, $p < 0.001$, than the control condition. The tests also show that local news pages are rated as significantly more *relevant*, $p < 0.05$, and *trustworthy*, $p < 0.01$, than the local online groups condition, though the difference is less stark than between local news pages and control groups. When it comes to trust, we find that significantly more people found posts from the local news pages to be trustworthy than either of the two other groups ($p < 0.001$ for control, $p < 0.01$ for discussion groups), and significantly more people found posts from local online groups to be trustworthy than the control groups, $p < 0.001$. We also find a bi-modal distribution among the two conditions that followed groups, with few participants staying neutral on the *interest* and *relevance* of groups.

3.2 Healthy Community Attitudes

H1 states that following a local news page or a local online group should have a positive effect on one of our community attitudes (*community self-perceived knowledge*, *community attachment*, and *community civic attitudes*). To test our hypothesis, since we have three moderately correlated outcome variables, we conduct a one-way multivariate analysis of covariance (MANCOVA) that simultaneously predicts the three community attitude variables. We include two covariates in our model: the relevant community attitude at T1 and self-reported prior local news following behavior. The MANCOVA revealed no significant multivariate effect of the treatment group on the set of dependent community variables, $F(6, 322) = 0.965, p = 0.45$. The analysis validated that the relevant community attitudes at T1 ($F(9, 392) = 41.76334, p < 0.0001$) and the amount of local news followed prior to the study ($F(3, 161) = 0.9417313, p = 0.02$) both accounted for a significant amount of the variance in community attitudes at T2. The MANCOVA results were calculated using Wilks' lambda statistics. We ultimately cannot reject the null hypothesis for H1, and these results do not suggest that following new local news pages or joining local online groups on Facebook significantly increase the individual-level measures of community attitudes. We provide additional descriptive statistics about each of the treatment groups at T2 in Table 2.

	Community outcome variables at T2		
	Attachment Δ *Mean (sd)*	Perceived knowledge Δ *Mean (sd)*	Civic attitudes Δ *Mean (sd)*
Control	0.13 (0.58)	0.18 (1.66)	0.15 (0.64)
Local Discussion Groups	-0.01 (0.58)	0.13 (1.3)	0.08 (0.85)
Local News Pages	-0.06 (0.47)	-0.08 (1.36)	0.02 (0.79)

Table 2. Table shows the mean change (Δ) between the community measures reported during the pre-intervention survey and the post-intervention survey, summarized by treatment group. Across the conditions, there is no significant delta between pre-treatment and post-treatment community attitudes.

To test H2 and H3, we additionally perform a linear regression to understand if other explanatory factors, such as perceived quality or frequency of posts may impact changes in community attitudes. The outcome variables are *community self-perceived knowledge*, *community attachment*, and *community civic attitudes*. Like for H1, we control for prior local news intensity. We also include the interaction between the prior local news intensity and the treatment group. H2 states that constructs relevant to the local information channel (self-reported level of exposure and perceived quality of local information) will be positively associated with an over-time increase in community attitudes. To assess this hypothesis, we include self-reported post exposure frequency and perceived post quality in the model. We additionally include the interaction terms between the treatment group and the post frequency and perceived quality, as we expect these effects to be stronger for the local treatment groups. H3 states that individual-level factors (the length of time in a community and the amount of prior news exposure) will moderate the increase over time in positive community outcomes as a result of being exposed to new local information channels. We thus also include the amount of time a participant resided in their current city, the intensity with which they reported following local news at T1, and whether they reported following local groups or pages on Facebook at T1. Finally, we include an interaction term between the treatment groups and prior local news following and prior Facebook news following behavior, since we expect that high prior news exposure may attenuate increase in community outcomes at T2 for the local treatment groups.

We find limited evidence that the independent variables impacted the community outcome measures at T2. The relevant community measure is highly significant for all three community outcomes (*self-perceived knowledge*, $p < 0.01$, *attachment*, $p < 0.001$, *civic attitudes*), $p < 0.001$. The frequency at which participants reported being exposed to treatment posts significantly impacted *self-perceived knowledge* at T2, $p < 0.05$. However, this effect was not stronger for the local treatment groups and thus H2 is not supported. The amount of time a participant had lived in their city of residence significantly positively effected their *civic attitudes* at T2, $p < 0.01$. This finding implies that between T1 and T2, those who have lived in a city longer felt more strongly about the importance of contributing to communities. The result is counter to H3, since H3 posited that the civic attitudes of longer-term residents would be less likely to change. Since prior exposure to local news and length of residence has no significant impact on any of the other community outcomes at T2, H3 is not supported. The full results of the regression analysis are reported in Table 3.

Given these findings, we cannot reject the null hypothesis for H1, H2, or H3. Despite participants in all three conditions stating they were frequently exposed to posts from the treatment pages or groups, and perceived quality of posts varying significantly between the groups, we cannot tie new exposure to local content to significant changes in community attitudes.

	Self-perceived Knowledge	Attachment	Civic Attitudes
Intercept	0.78	−0.12	2.66***
	(1.19)	(0.58)	(0.67)
Condition: Discussion Group	1.41	0.28	−1.19
	(1.49)	(0.66)	(0.80)
Condition: Local News Page	2.47	−0.33	−1.51
	(1.71)	(0.76)	(0.92)
Community Measure at T1	0.31***	0.94***	0.55***
	(0.09)	(0.06)	(0.05)
Time lived in City	0.08	−0.02	0.12**
	(0.07)	(0.03)	(0.04)
Prior Local News Following Intensity	0.52	0.10	0.05
	(0.27)	(0.12)	(0.14)
Prior Local News Following on Facebook	0.74	0.31	0.29
	(0.43)	(0.19)	(0.23)
Post frequency	0.38*	0.06	−0.04
	(0.16)	(0.07)	(0.08)
Perceived post quality	−0.15	−0.00	−0.21
	(0.22)	(0.10)	(0.12)
Discussions × Post Frequency	−0.30	−0.03	0.12
	(0.20)	(0.09)	(0.11)
Pages × Post frequency	−0.41	−0.06	0.11
	(0.24)	(0.11)	(0.13)
Discussions × Perceived Post Quality	−0.03	−0.05	0.16
	(0.28)	(0.13)	(0.15)
Pages × Perceived Post Quality	0.13	0.23	0.31
	(0.35)	(0.16)	(0.19)
Discussion × Prior Local News Intensity	0.17	−0.02	0.02
	(0.35)	(0.15)	(0.19)
Pages × Prior Local News Intensity	−0.38	−0.04	−0.09
	(0.35)	(0.15)	(0.19)
Discussion × Prior Local News on Facebook	−0.33	−0.07	−0.09
	(0.59)	(0.26)	(0.32)
Pages × Prior Local News on Facebook	−0.64	−0.51	−0.14
	(0.65)	(0.29)	(0.35)
R^2	0.29	0.71	0.53
Adj. R^2	0.21	0.68	0.48
Num. obs.	164	164	164

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$

Table 3. Regression Table showing the impact of following a 1) Control group (base condition/Control), 2) Local Online Group (Condition: Discussion Group/Discussion) or 3) Local News Page (Condition: Local News Page/Pages) on three community measures at T2 (Self-perceived Knowledge, Attachment, and Civic Attitudes.) The treatment conditions do not significantly influence community measures at T2.

4 DISCUSSION

In this article, we explored two different types of local information sources by contrasting local news pages and local online groups on Facebook. We set up a framework based on prior work to evaluate the impacts of different types of local information sources on community attitudes. Participants in our experiment reported high exposure levels to the treatment local groups and

pages, and interactions with treatment content were high. We found that participants perceived the local information streams on Facebook to be of significantly different standards of quality. However, following a local news page or a local online group on Facebook did not significantly impact individual-level healthy community attitudes. Next, we discuss what these findings mean for the future study of local news, and expand on the potential limitations of this study.

The first contribution of this article is our proposed framework to evaluate the impact of local information exposure on individual-level healthy community attitudes. We summarize work done in multiple areas of sociological and communication theory around community to synthesize three key concepts of attitudes towards community: *self-perceived knowledge*, *attachment*, and *civic attitudes*. As the local news landscape shifts, it is important to keep a pulse on how the health of communities is being impacted. Although many studies have explored various aspects of local news benefits to communities, few synthesize them into an overall evaluation of community health, instead focusing on smaller parts that together constitute a healthy community (e.g. *information needs* are focused on in Duchovnay and Masullo [14], *community attachment* in Kasarda and Janowitz [33], and *civic outcomes* in Hayes and Lawless [24]). A strength of our framework is that it can be assessed, at the individual-level, at any time, to evaluate changes in community attitudes. Our framework could also be used to capture the impact of other local actors, such as hyperlocal media or direct governmental channels of communication. A potential future extension of the framework would be to add behavioral measures.

A key finding of this study is the perceived difference in post quality by type of local news information on Facebook, with participants rating local news pages higher than local online groups. Recent community studies have called upon the industry to think of local news as a collaborative, bottom-up process [11, 14]. However, in this study we present evidence that content from local online groups is perceived as less high-quality than content from local news pages. To fulfill the vision of a trusted, bottom-up local communication network, we thus need approaches that prioritize increasing perceived (and actual) information quality. One promising approach may to embed journalists as curators into these local online groups. In 2021, the *Tennessean* launched a local Facebook group curated by a journalist, and fostered high engagement rates among members [28]. In particular, integrating technology and crowdsourced tools into journalistic processes has been studied widely in the CSCW and related communities (e.g. [12, 53].) Our analysis suggests that this technique may be a promising avenue for combining the quality of local journalism with the attention that people are giving to local online groups, and there may be room for further exploration by social computing researchers.

The finding that local news pages and local online groups are both more trusted than our control group is notable. There is empirical evidence that people trust local news more than national news [20]. However, the present study provides the first evidence to suggest this increased trust may also extend to any local content, including crowd-generated local content. While trust in local community content may strengthen social capital and access to resources, misplaced trust in non-verifiable local content may also make people more susceptible to local misinformation [6]. Alternatively, the free responses indicated at least part of this distinction may be because the control groups were viewed as containing spam or low-quality content.

Another potential explanation for these differences in quality perceptions is that our study participants are the types of people who trust "traditional" local journalism. The participant pool was quite homogeneous, with the majority being white, educated, liberal, and having lived in the same city for a long period of time. This pool of participants is more monolithic than the diverse cities we recruited from, suggesting an exposure bias in the people who saw our advertisement on Facebook, or a selection bias among those who felt inclined to participate. Usher [75] argues that the people who most benefit from "traditional" local journalism today are the intellectual elites.

This effect may be reflected in our study, as those who are catered to by "traditional" journalism see the content produced by these entities as more interesting, relevant, and trustworthy.

Further, we find that perceptions of relevance and interest are bi-modal for local online groups and control groups, but not for local news pages. Even when we break out our results by city, the bi-modal distribution remains. The consistency of this finding suggests that, even when following the same groups, people have divergent perceptions of their *interest* and *relevance*. Commercial content may be one factor that plays into this dynamic: a study on the perception of Nextdoor found that people were particularly wary of overly commercial posts, and *"did not want overt advertising or sales pitches"* [44]. Prior work in CSCW found that posts within local groups are often soliciting action or money from the reader, and that varying post content was a net positive [42]. We also saw this perspective reflected in the free-text responses of those who were dissatisfied with the local groups they followed, stating *"one was nothing but people selling things which should be on Facebook Marketplace."* A previous study has identified that the lack of content moderation on local Facebook groups leads people to follow *"25-30 Facebook groups"* in search of the same quality and breadth of information as they were previously gaining from their local paper [45]. Many of our participants similarly highlighted that some groups were better than others, suggesting that there is an information-seeking load pushed onto people who need to identify worthwhile local groups. Our current study provides the first empirical evidence for the perceived difference in quality from a lack of journalistic curation. These findings, which encompass dozens of public and private Facebook groups, give us a peek at a usually hidden perspective of local information.

While some participants found the quality of local online groups to be lacking, a bigger proportion "somewhat agreed" that the content was *interesting* and *relevant*, backing the theory that local online groups can supplement local information streams. The respondents in our study who viewed the local online groups favorably highlighted that joining the groups gave them exposure to unexplored parts of their city. For example, one participant stated they gained *"interesting insight into parts of Columbus I hadn't noticed before,"* and another explained *"I had no idea so much happens here. I have had a long COVID-19 experience and this group was like taking trips outside my bubble."* This view ties into previous content analyses and findings that local Facebook groups may act as local news in their own right [10, 73]. However, we observe that while local online groups were not seen as contentious, participants who were asked to follow local news pages on Facebook suggest that the comments could be "quite polarized," "vile and overly negative," and "trash." Prior studies similarly found that local community group content may be less political or present fewer polarizing topics than traditional local media outlets [42, 44, 78].

Despite most participants finding value in both local online groups and local news pages, we see no significant effects of increasing local news exposure on Facebook on attitudes towards community. This study reaffirms the difficulty of determining causality between local news presence or quality, and healthy community attitudes. Similarly, when exploring causality between local news media use and community attachment, Hoffman and Eveland [29] were unable to prove such a causal relationship exists. Another example at the national scale is a study by Gerber et al. [18], which found no significant difference on political knowledge or voter data as a result of receiving free newspaper subscriptions. Two recent, large-scale studies of both national and local news found null-effects of over time exposure to news on various positive and negative outcomes [9, 79]. The authors attribute the null effects to the relatively small overall percent of time spent dwelling on news coverage (3.5% of overall information diets consisted of news websites), a finding that others also substantiate in mobile phone environments [50]. Participants in our study reported frequent exposure to the treatment content, however this content may still represent a limited proportion of their overall screen time, leading us to find similar null effects to other studies. On their face, our results do not suggest that increased exposure to local media change community attitudes.

There are a few other reasons why we may not have found an effect of increased local information exposure on community attitudes. Our participants had lived in their city for a long time, potentially making them less likely to be influenced by our intervention. Prior studies have also found null effects of increased exposure to content on Facebook. Although one study has been able to link "liking" a brand's page on Facebook to more positive brand evaluations after one month [7], another tried to tie "liking" political candidates on Facebook to political attitudes without finding an increase in political efficacy or engagement [58]. We might thus hypothesize that while direct effects can be measured through these experiment types, indirect effects such as attitudinal changes may need much larger sample sizes. Another possibility is that changes in community attitudes happen gradually, and our one-month study period was not enough to sway people's attitudes.

In contextualizing our results, we must grapple with how we have used *community* to refer to our participants' *city of residence*. Communities, places, and spaces are vague and contested words, particularly when speaking of online spaces that can be boundless [27, 74]. The news media we included in our study purport to cover a city, county, or state, while the local online groups are specific to a city or neighborhoods, yet we measured community outcomes at the city level. Hess [27] wrote that just because people *"reside in a similar geographic area, it does not necessarily make them part of the same community."* Through asking people about their *city of residence*, we may have picked a community our participants do not necessarily associate with, for example, they may feel more strongly about their neighborhood instead. Further work could extend our findings to understand how these attitudes (and the effect of local media on them) vary by geographic scope.

From a methodological perspective, our study presents a promising direction for generalizable experiments about local news. We need ways to quantify the impact of the changing media ecology on our daily lives and larger democratic processes. Typically, approaches to assessing local media use and exposure are either generic, such as survey-based assessments of local media frequency (e.g. [17]), or limited to a single location or case study (e.g. [68].) One CSCW study, for example, evaluated a local social media platform that encouraged residents of Puget Sound to participate in local civic engagement [15]. The constraints of these studies can make generalizable findings difficult to extract, obfuscating larger trends that stem from changing local information structures. We take steps towards addressing this problem by selecting specific sources across four U.S. cities. In the future, one might imagine our methodology could extend programmatically to allow any participant in any location to participate. For the CSCW community, this is an opportunity to deploy insights and techniques developed for social media research within social scientific surveys.

Comparing traditional and new local media, Nygren et al. [55] state *"in this new hybrid local media ecology, it is more difficult to evaluate to what extent local media fulfill [a] role in the democratic infrastructure."* Local information today is not constrained to our traditional expectations of local media, and our measurements are lagging behind. To understand local journalism today is to understand local information broadly, and as our sources for local information multiply and diverge, we must adopt flexible structures to measure their impact to society and democracy.

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A SCALES FOR COMMUNITY MEASURES

We include the full scales used on the survey to measure community measures at times 1 and 2 in Table 4. These scales are largely proposed and validated from prior work on local measures of community developed by Kasarda and Janowitz [33] (*community attachment*), Müller et al. [51], (*self-perceived knowledge*), and Doolittle and Faul [13] (*civic attitudes*).

Community measure	Scales used
Community attachment	1. Would you say you feel at home in [city of residence]? 2. How interested are you to know what goes on in [city of residence]? 3. Supposing that for some reason you had to leave [city of residence], how sorry or pleased would you be to leave?
Community self-perceived knowledge	1. Overall, how informed would you say you are about news and current events in [city of residence]?
Attitudes towards community civic engagement	1. I feel responsible for my [city of residence] community. 2. I believe I should make a difference in my [city of residence] community. 3. I believe that I have a responsibility to help the poor and the hungry in [city of residence]. 4. I am committed to serve in my [city of residence] community. 5. I believe that all residents have a responsibility to their [city of residence] community. 6. I believe that it is important to be informed of [city of residence] community issues. 7. I believe that it is important to volunteer in [city of residence]. 8. I believe that it is important to financially support charitable organizations in [city of residence].

Table 4. Full scales used on the survey to measure community measures at time 1 and time 2.

B PARTICIPANTS

We include a detailed breakdown of the demographics in Table 5.

We additionally note that there was a higher attrition rate among participants who were assigned to the control condition. This discrepancy may indicate that some self-selection occurred at this stage, and only people who were at least somewhat interested in one or more of the suggested hobby groups continued in the control condition. Aligned with this hypothesis, one prior study found that an initial positive impression of a brand page is required for people to agree to "like" it on Facebook for an experiment [7].

C STATISTICAL TESTING FOR PERCEIVED QUALITY DIFFERENCES BY CONDITION

During the treatment, 164 out of 170 participants saw or interacted with the groups or pages in some capacity. For these analyses, we only include participants who reported seeing posts on their newsfeed at least once during the study duration. We observe significant differences in the ways that participants perceived the quality of posts between conditions.

A Kruskal-Wallis test showed that the treatment condition significantly affected the perceived *relevance* of posts, $H(2) = 10.53, p < 0.006$. Using post-hoc Manning-Whitney U tests with BH-adjusted p-values on all pairs, we conclude that the difference in perceived *relevance* between local news pages and control groups is significant, $p = 0.004$, and that the difference in perceived *relevance* between local news pages and local online groups is significant, $p < 0.045$. The difference in perceived *relevance* between local news groups and local discussion groups was not significant, $p = 0.3$. We also note that the distribution for the perceived *relevance* in the control group and local online group condition appears bi-modal, whereas the distribution for the local news pages condition is uni-modal.

A Kruskal-Wallis test showed that the treatment condition significantly affected the perceived *interest* in posts, $H(2) = 6.96, p < 0.031$. Using post-hoc Manning-Whitney U tests with BH-adjusted p-values on all pairs, we conclude that the difference in perceived *interest* between local news pages and control groups is significant, $p < 0.027$. The difference in perceived *interest* between local news pages and local online groups was not significant, $p = 0.11$, and neither was the difference between local discussion groups and control groups, $p = 0.5$. Once again, the distribution of the local online group's perceived *interest* appears bimodal, though this time both the control groups and the local news pages are uni-modal.

A Kruskal-Wallis test showed that the treatment condition significantly affected the perceived *trustworthiness* of posts, $H(2) = 24.26, p < 0.001$. Using post-hoc Manning-Whitney U tests with BH-adjusted p-values on all pairs, we conclude that the difference in perceived *trustworthiness* between local news pages and control groups is significant, $p < 0.001$, as is the difference in perceived *trustworthiness* between local news pages and local online groups, $p < 0.008$, and the difference in perceived *trustworthiness* between local discussion groups and control groups, $p < 0.001$.

D QUALITATIVE RESPONSE CODING

We include qualitative coding of the participant responses in Table 6. Participants were asked one optional free-text question in the survey at T2, which was *"Do you have any other thoughts about the groups you followed at the beginning of the study or the posts you saw? (Optional)"*. Fifty participants chose to provide a free-text response (29.4%). The codebook was generated using an inductive thematic analysis process. The first author read through all responses, and grouped them into thematic categories. These categories were iteratively discussed with the second author until agreement was reached. Any code with only one corresponding response was grouped into the *miscellaneous* category, as were responses that were off-topic. The codes and their distributions were

Table 5. Demographics of study participants who completed both surveys and followed the treatment condition. Ordinal variables are listed in order. All other variables are listed by frequency. Non-disclosed and self-described variable totals are always listed last. Total $N = 170$, though items with multiple selection may add up to more.

Age	18-24	17
	25-34	25
	35-44	20
	45-54	23
	55-64	29
	65-74	40
	75+	16
Gender	Woman	93
	Man	69
	Non-binary	8
	Prefer not to disclose	2
Ethnicity	Not Hispanic, Latino, or Spanish	160
	Hispanic, Latino, or Spanish	6
	Prefer not to disclose	4
Race	White	141
	Asian	8
	Black or African American	4
	American Indian or Alaska Native	2
	Native Hawaiian or Other Pacific Islander	1
	Prefer to self-describe	7
	Prefer not to disclose	9
Education	High school degree or equivalent (e.g. GED)	1
	Some college, no degree	19
	Associate degree (e.g. AA, AS)	13
	Bachelor's degree (e.g. BA, BS)	67
	Master's degree (e.g. MA, MS, MEd)	47
	Doctorate (e.g. PhD, EdD)	18
	Professional degree (e.g. MD, DDS, DVM)	5
Income	Less than $20,000	7
	$20,000 to $34,999	11
	$35,000 to $49,999	25
	$50,000 to $74,999	35
	$75,000 to $99,999	25
	Over $100,000	51
	Prefer not to disclose	16
Political Party	Democrat	108
	Independent	44
	Republican	4
	Prefer to self-describe	9
	Prefer not to disclose	5
Facebook Use	Daily or more	136
	4-6 times per week	27
	2-3 times per week	7

	Treatment group			
Free response tag	Control	Local Discussion Group	Local News Pages	Total
Connected to community and events		4	1	5
Interesting posts about local community		2	4	6
Lack of trust	2			2
Overly moderating	2			2
Poor quality of discussion	2			2
Post quality varies	2		1	3
Posts didn't show up on timeline	1		5	6
Posts were not interesting	1		1	2
Spammy posts	6	1		7
Subscription/paywall			5	5
Too broad or not relevant	1	2		3
Miscellaneous	1	2	4	7
Total	**18**	**11**	**21**	**50**

Table 6. Table shows the qualitative tags assigned to the free responses for each category. Responses by participants were given to the optional question: *"Do you have any other thoughts about the groups you followed at the beginning of the study or the posts you saw?"*

used to inform the discussion in this paper. In particular, participants in the local conditions reported that they felt "connected to their community and events" and they found "interesting posts about their local community." Participants who were following local news pages also said they felt they didn't see the posts show up on their timeline, and that they would often encounter subscriptions or paywalls on news articles they clicked on. Many participants in the control conditions felt that posts were spammy and repetitive.

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