The (null) over-time effects of exposure to local news websites: Evidence from trace data

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The (null) over-time effects of exposure to local news websites: Evidence from trace data

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ABSTRACT
Scholars and observers attribute many democratic benefits to local news media. This paper examines exposure to local and national news media websites, side-by-side in one model, testing their over-time effects on political participation, knowledge, and affective and attitude polarization. We test whether traditionally disengaged or disadvantaged groups (i.e., racial minorities, those with low education levels, politically disinterested, and those who do not consume national news), may particularly benefit from local news consumption. To this end, we combine three-wave panel surveys (final N = 740) with 9 months worth of web browsing data submitted by the same participants (36 million visits). We identify exposure to local and national news sites using an extensive list of news domains. The results offer a robust pattern of null findings. Actual online exposure to local news has no over-time effects on the tested outcomes. Also, exposure to local news sites does not exert especially strong effects among the tested sub-groups. We attribute these results to the fact that news visits account for a small fraction of citizens’ online activities, less than 2% in our trace data. Our project suggests the need to evaluate the effects of local news consumption on the individual level.

In a country as geographically and socially diverse as the United States, access to a local news source is seen as an important aspect of a healthy democracy. Research consistently finds a link between local news exposure and increased levels of voting, civic engagement, political knowledge, and community togetherness (Hayes & Lawless, 2018; Ali & Radcliffe, 2017; Peterson, 2019), and evidence suggests that local news may help decrease the unprecedented levels of political polarization (Darr, Hitt, & Dunaway, 2018). Many observers argue that local news has an important societal role. This role is ever more vital at a time when the American public is most divided since the Civil War (Settle, 2018), inadequately informed about politics (Delli Carpini & Keeter, 1996; Flynn, Nyhan, & Reifler, 2017), and – apart from a small group of polarized activists – largely disengaged from the political process (Root & Kennedy, 2018).

Despite their important role, local media organizations are under severe financial pressure (Peterson, 2019; Pew Research Center, 2020), leading to outlet closures and layoffs in those that remain open. In this climate, there is a need for research on what is lost when local journalism declines (Wahl-Jorgensen, 2019), particularly as the situation has only worsened since the COVID pandemic (Barthel, Matsa, & Worden, 2020; Tow Center, 2020).

While there is ample evidence supporting the benefits of local news, limitations in previous work mean that the positive outcomes of local news might have been overstated or are conditioned by unobserved factors. Methodologically, past work largely relies on survey self-reports of local news exposure or data measuring local news provision correlated with political behavior at the aggregate regional level (Thorson, Chen, & Lacy, 2020; Hayes & Lawless, 2017; Peterson, 2019). These designs make it impossible to attribute over-time changes in individual attitudes and behaviors to actual exposure. Also, in order to conclude that news consumption – be it local or national – indeed generates detectable increases in democratic outcomes, one has to account for baseline levels of these outcomes, which is rarely done. In addition,

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extant theorizing and research mostly focus on local news in isolation from the larger information and communication ecology of citizens. In turn, we argue that the use of national news media may be a key confounding variable unaddressed by previous work. To the extent that citizens who attend to local news also tune in to national news outlets (Jurkowitz & Mitchell, 2013; Pew Research Center, 2019), the benefits attributed to local news exposure may actually stem from national news and be due to the understudied correlation between these two (see also Thorson et al., 2020). In other words, local news exposure must be investigated alongside national news exposure in order to pinpoint its democratic potential accurately. Relatedly, although previous work on local news has focused on local outcomes such as congressional elections (e.g., Hayes & Lawless, 2018), national level outcomes need to be addressed as well, also due to the documented shift of local news outlets from local to national politics (Martin & McCrain, 2019).

While accounting for national news exposure may reduce the effect sizes of local news use, this may not happen for everyone. Underserved and disadvantaged populations, such as Latino or low-income citizens, could benefit more from local news provision (Abernathy, 2020) partly because they are less likely than Whites and those with higher socio-economic status to attend to national news, be politically knowledgeable, and participatory (Root & Kennedy, 2018). As such, the projection that the declines in local news provisions will cause “citizen engagement in local politics [to] wither” (Hayes & Lawless, 2018, p. 332) is especially worrisome for traditionally disadvantaged groups. If the effects from local news are indeed particularly pronounced among those groups, financial problems facing local news organizations may make it challenging for disadvantaged citizens to learn about issues that impact their livelihood and cast informed votes that adequately represent their personal and community interests.

This project addresses these issues and aims to make theoretical and methodological advancements to extant literature on local news. Rapid developments in the digital news sphere over the last decade mean that it is important to focus on exposure to digital outlets. Because an average American spends 8.5 hours a day online (Audacy, 2021) and the overwhelming majority of citizens get their news online (Schroder, 2019), we examine online news consumption. Importantly, we extend past work by testing the added benefits of consuming local versus national news, testing actual exposure metrics side-by-side in one model. We rely on a unique dataset, which combines online behavioral trace data on exposure to both local and national news websites with longitudinal surveys testing changes in respondents’ political behavior and attitudes over the course of nine months (n = 740). Using an extensive list of news domains (5,400), we estimate the frequency of individual exposure to local and national news, therefore mitigating some problems arising from news use self-reports. Granted, these data overlook individual offline radio and television use, important media for local news (Barthel, Grieco, & Shearer, 2019), a shortcoming we address below.

To our knowledge, this is the first project to calculate actual exposure to both local and national news sites at a granular level, matching it with users’ self-reported political participation, political knowledge, as well as attitude and affective polarization. Our data also enable rigorous examination of exactly who is affected by local news. We focus on racial and ethnic minorities, those with low education levels, the politically disinterested, and those who do not visit national news.

We find that although online exposure to local news correlates with one of the tested outcomes, political knowledge, it does not produce changes in these outcomes over-time, with or without national news exposure in the models. We also show that local news consumption does not exert especially strong effects among people of color, those without college degrees, the politically disinterested, and those with low exposure to national news online. To contextualize our findings, we explore keywords in local versus national news headlines to assess whether these address different topics. We find that national news media cover foreign affairs and detailed national news more frequently than local news, but local news sites show no difference with national ones in their coverage of the 2020
Presidential election. While our work does not deny the benefits of local news, it allows scholars and policy makers to better circumscribe these benefits and the outcomes that suffer as local news declines.

**Local news: Civic roles and importance**

The majority of Americans see local news as an important source for political, civic, and quotidian topics (Pew Research Center, 2019). Local news are publications designed for a geographically-restricted audience, which ideally “reflect their communities through local employees, local news, and a presence and investment in the community” (Hare, 2017 para. 7). In contrast, national news outlets primarily focus on stories relevant to the nation as a whole, so that the headlines of The Washington Post are as relevant to someone in Arizona as Washington D.C.

Although television remains one of the most popular mediums for local news (Barthel et al., 2019), especially among some key socio-demographic groups we study, an issue we discuss below, the shift toward online news consumption (Schulz, 2021) underscores the need to see how established findings on local news effects translate to the digital environment. What are the effects of digital local news exposure?

Scholars identify several core roles for local journalism. Local newspapers “foster community identity and solidarity” (Ali & Radcliffe, 2017, para 20) and offer a platform for local voices and community issues. Community engagement is a key aspect of influential theories on media and democracy (e.g. Dewey, 1927; Putnam, 2000). Sense of community identity may generate willingness and enthusiasm for civic and political participation at local, regional, and national levels. As such, local news matters, especially that there are often few alternatives for citizens to inform themselves about local politics (Peterson, 2019).

Extant research confirms the importance of local news. Engaging with local news is consistently linked to civic engagement, including voting in mayoral and national elections, and the ability to evaluate national representatives (Ali & Radcliffe, 2017; Hayes & Lawless, 2018; Hopkins & Pettingill, 2015). Local reporting on national politics can also enrich the information available to readers through providing area-specific views, context, and fact-checking, missing from countrywide news organizations (Harris, 2019), enhancing citizens’ knowledge. Furthermore, local news may play a role in attenuating political polarization because it contains fewer polarizing cues than national news reporting (Darr et al., 2018; Martin & McCrain, 2019).

Considering these positive effects, a decline in local news media availability and quality may have deleterious effects. People who consume less local news or live in areas with outlet closures report declines in voting, civic participation, and political knowledge, despite the fact that other news outlets remain in their locale (Hayes & Lawless, 2015; Peterson, 2019; Shaker, 2014). Limited availability of and exposure to local news may also feed the unprecedented political divides in America. In fact, recent work shows that polarization (measured as declines in split-ticket voting in the 2012 U.S. elections) increased in counties that lost a local newspaper, possibly because voters made their choices based on partisan cues dominant in national news (Darr et al., 2018). Polarization resulting from local outlet closures may be more troublesome in rural areas than in metro areas, where some form of regional media is likely to remain (Darr et al., 2018; Hayes & Lawless, 2018).

Overall, exposure to local media should increase political participation and knowledge, and attenuate polarization. We note, however, that many of the conclusions about these relationships rely on correlating local media activity with civic and political indicators in the same region. For instance, Peterson (2019) assesses congruence between local newspaper markets with people’s political engagement and ability to recognize their members of Congress measured at the Cooperation Congressional Election Study (CCES). Hayes and Lawless (2018) combine a content analysis of 10,000 local news articles from the 2010 and 2014 US House elections with CCES panel data from the same years. Looking at news presence at the regional level helps to deal with biases inherent in survey self-reports of news exposure (Prior, 2009), but makes it impossible to ascertain exposure to local news and its individual-level effects.

In fact, there is evidence that recent developments in the local news landscape may limit the
impact of these outlets on national outcomes. Reduced staffing leads to fewer stories, leading to a decline in political news in the overall reporting (Peterson, 2020), despite the popularity of in-depth political coverage (Belt & Just, 2008). Also, local news cover ever fewer hard news stories (Peterson, 2020), and reliable local sources are sometimes replaced by low cost, low quality websites which repurpose existing content (Bengani, 2020), potentially lowering the informational benefits of local news. To ascertain the impact of local news on the broader national landscape, our study tests political knowledge, and attitudinal and affective polarization.

When looking at these outcomes, it is particularly important to account for national news exposure alongside local news, a variable absent from many previous studies. National news is repeatedly linked to increased knowledge, participation, and civic engagement (Shah, Cho, Eveland, & Kwak, 2005; Shah et al., 2017; Shahin, Saldaña, & de Zúñiga, 2020), effects that are robust, extensively established, and validated across numerous studies relying on triangulated methods. However, those who attend to local news are also avid national news consumers (Jurkowitz & Mitchell, 2013; Pew Research Center, 2019), making it likely that some of the benefits attributed to local news actually stem from national news. It is possible that local news exposure will have limited effects once national news is accounted for. Some evidence supports this risky preposition: Thorson et al. (2020) show that national news exposure correlates more strongly with community engagement than local news exposure, when using self-reported data. Additionally, while audiences perceive local news more favorably than national news, they consume them less and rate them poorly for community engagement (Murray, Curry, Masullo, & Stroud, 2018), a finding that clashes with their hypothesized role for community building. In short, national news could be a major confounding variable in local news studies, underscoring the need to understand whether local news consumption has overtime effects above and beyond national news consumption. We ask if visits to local news websites promote political knowledge and participation, and attenuate affective and attitude polarization once we account for visits to national news websites (RQ1).

While we caution that not accounting for national news exposure risks overestimating local news effects, online consumption of local news may have particularly strong effects among distinct population groups. The use of local news websites can promote key democratic outcomes among traditionally disadvantaged groups, i.e., racial minorities, those with low educational attainment, and – in general – those who are politically disinterested and do not frequently use national news sites. Local news may have a “gateway effect” for these groups, who may face financial, technological, linguistic, or cultural barriers in accessing quality media. Similarly to evidence from soft news (Baum, 2003; Baum & Jamison, 2006; Prior, 2003), where the politically disinterested encounter current affairs, local news content may be a “safer” and more engaging outlet to learn about politics, enhance knowledge, and better understand the political world.

When it comes to disadvantaged minority groups, local media highlight voices, stories, and experiences of marginalized communities, which would otherwise be ignored (Abernathy, 2020) and provide these communities with relevant information that they would be hard-pressed to find elsewhere (Carey, 2020; Crittenden & Haywood, 2020). In fact Black (46%) or Hispanic (34%) people and those without a college degree (36%) are more interested in local news than whites (28%) and the highly educated (25%), valuing local news for “softer” topics, such as crime, jobs, sports and community activities (Barthel et al., 2019). This preference for local over national media is consistently found, whether considering race, education levels, socio-economic status, and class together or separately, from Appalachian Whites (Carey, 2020) to low-income Black Philadelphians (Crittenden & Haywood, 2020). In addition, many racially and economically marginalized people distrust mainstream outlets (Wenzel, Ford, & Nechushtai, 2020; Pew Research Center, 2019), a problem compounded by the fact they are much less likely to have ever spoken to a journalist than white and wealthy citizens (Grieco, 2019).

Here, we account for the different social groups separately, without attending to the
intersectionality of the different group memberships. We expect that the reliance on local news may serve as a “gateway” to political engagement among these different groups. In short, the effects of exposure to local news websites on political knowledge, participation, and affective and attitude polarization should be stronger among racial minorities (H1a), those with lower education levels (H1b), and those with low political interest (H1c) and low consumption of national news websites (H1d) than among whites, the more educated, those politically interested, and those with higher national news consumption.

That said, we also acknowledge that Black people and those without a college degree prefer consuming local news on TV; in turn the White or more educated Americans prefer online local news (Barthel et al., 2019). Similarly, for Black and Hispanic people, social media are a particularly important avenue to local news, partly due to higher overall social media use among Black and Hispanic adults (Pew Research Center, 2021). We present the differential use of different media for local news consumption among different socio-demographic groups in Appendix Table A1. In short, our data do not capture the various nuanced consumption patterns among these disadvantaged minority groups. Inasmuch, however, as citizens do consume some (local) news online, our focus on online digital use of online news can shed some light on the tested patterns and effects.

Methods

To test our research question and hypothesis we require data on individuals’ political participation, knowledge, affective and attitude polarization, as well as their online news exposure. Our dataset combines panel surveys of American adults with behavioral online trace data from the same respondents. This approach allows us to examine actual exposure to numerous local and national news websites, and – when combined with participants’ self-reported attitudes – ascertain the over-time changes in the outcome variables resulting from this online exposure.

The paper is part of a large 3-wave panel study in which, every three months, the same respondents answered 20-minute surveys about their political views and behaviors and submitted their web browsing data, as detailed below. We recruited the respondents via Lucid, an aggregator of survey respondents, which collects demographic information on the panelists, facilitating quota sampling to match the US Census margins. Quotas on age, gender, education, and race/ethnicity were enforced. 2,462 respondents participated in W1, of which 1,261 followed up in W2, of which 948 completed W3, of which 740 submitted at least 7 days of browsing data in all three waves. For two of our outcomes (affective and attitude polarization), we rely on all three waves; we only measured participation in W2 and W3, and political knowledge in W3, so we restrict the analyses for these outcomes accordingly.1

The final sample (i.e., those completing W3 and providing sufficient browsing data) had a median age of 41 years, was 80% white, 56% female, and 50% had college- or postgraduate degree. In terms of partisanship, 53% identified as Democrats, 33% as Republicans, and 14% as Independents, close to neither party. Appendix A2 reports these statistics in relation to the census margins, shows attrition between waves, and the key socio-demographics of the final sample.2

At each wave, after extensive informed consent which in detail explained the purpose of trace data collection, participants submitted their online data via our open-source tool that allows for transparent data sharing, Web Historian (Menchen-Trevino, 2022). Web Historian is a web browser plug-in that accesses respondents’ browser history stored on their computers, displays it to them using visualizations (e.g. network graph of websites visited, word cloud of used search terms), and allows them to submit it to researchers. Web Historian is advantageous over other solutions. In contrast to black-box tools from proprietary companies (e.g., Wakoopa and Netquest), it facilitates scientific replication and validation. In addition, most existing tools use a data-creation approach, where people first install the software and their data are collected going forward in time. Web Historian uses a found-data approach, in that it relies on the browsing history already stored in a browser, thereby bypassing the problems of participants dropping out during data collection or changing their behavior because they are being
observed (i.e., the data were generated before they entered the study). Relying on an open-source tool, we furthermore circumvent many of the issues associated with commercial providers of trace data (cf. Wu & Taneja, 2021). Appendix A4 details the tool, informed consent, data visualizations, and the steps taken by the participants.

**Measures**

**Online News media exposure**

Web Historian collects up to 90 days of participant’s web browsing history, and so we use data that span three 90-day time periods before each of the three waves for a total for up to nine months of continuous individual-level trace data. Web Historian collects data at the visit level, i.e., each visit to a page is a record that includes a timestamp, the full URL of the site visited, and the title of the page. Having data at the visit level allows us to calculate how often participants visited news websites over a set period. To determine how many of the visits were to news sites, we matched the visited domain (e.g. nytimes.com, foxnews.com) to a list of news organizations. We composed this list from several sources: manually identified news domains from Alexa’s Top 1000 web domains list; the 1000 most browsed domains in our trace data; and the 1000 most shared domains by politicians on Twitter. Given the core interest of this project on local news exposure online, we augmented this list with any missing news organizations from usnpl.com, a website that includes an incredibly large number of local news outlets.

In total, our comprehensive list contains 5,400 outlets, of which 1,629 were actually visited in the trace data analyzed here. Two trained graduate students coded these outlets as “local” (i.e. based in a US state, city or town, and primarily targeting the respective audience), “national” (i.e. known to be circulated nationally), and “international” (i.e. based outside the U.S.). Coding was very reliable (Krippendorf’s alpha = 92.9%). Of the domains visited, 15.8% were national, 78.8% local, and 5.5% international. Although there are more local domains in our data, there is much more browsing to national domains in absolute terms, as detailed below. Because our focus is on local news consumption when accounting for national news consumption, we exclude international outlets. Appendix A5 contains the list of the domains and the detailed information is available on [Anonymized Github].

In total, we analyze over 36 million visits across the three waves. The median participant provided browsing data for 189 days across all three waves and had about 38,000 visits. Using the list of news domains, we created behavioral measures reflecting exposure to local and national news online. We then computed two daily averages: *Online national news exposure* is measured as a participant’s average number of visits to national domains per active day (i.e., a day for which the participant provided data); and analogously, *online local news exposure* as the average number of visits to local domains per active day. If, for example, a respondent had 300 local news visits in W1 in total and was active on 60 days, their value for local news exposure would be 5 in this wave. In all our models, we control for the overall browsing frequency, i.e. the total number of URL visits, to make sure any associations are not driven by browsing behavior in general. To ascertain that our results are robust and not attributable to any specific measurement approach, we re-estimated all our models using an alternative exposure measure, namely the proportion of local (national) news visits of all URL visits. Using this measure, the results do not change in the direction, significance, or magnitude, increasing our confidence in the findings presented, as noted below and shown in Appendix A9.

Descriptive statistics based on the nine months of trace data (i.e., across all three waves) show that – for an average participant – local news exposure ranged from 0.25 daily visits in W1 (median: 0.03) to 0.22 in W2 (median: 0.03) and 0.27 in W3 (median: 0.03). Exposure to national news was more common: On average, it was 3.91 visits per day in W1 (median: 0.72), 5.10 in W2 (median: 0.74) and 5.56 in W3 (median: 0.80). As is usually the case, the discrepancies between mean and median show the prevalence of “news hounds” who visit many more news sites than most participants (see Appendix A6 for detailed statistics). To normalize this skewed distribution, we transform both
local and national news exposure using a log transformation.

**Outcome Variables**

We estimate the effects of these behaviorally tracked exposures on political knowledge, participation, and attitude and affective polarization. Appendix A3 presents question wording and descriptive statistics for all the items. Political knowledge was measured only in W3 with four standard factual knowledge questions and we added the correct answers. As we did not have this measure in any other wave, this variable is only included in our cross-sectional analysis. To measure political participation, we asked subjects to “select all the political activities that you are likely to undertake in the next 12 months leading up to the 2020 Presidential Election” with nine options offered (e.g., “sign a petition” or “vote in a primary election”). The final measure was created by adding the individual activities.

Attitude polarization was operationalized as the strength with which participants held their attitudes on four policies. In each wave, we measured attitudes toward the economy, climate change, gun policy and immigration using twelve questions, three per issue. Participants chose whether they felt closer to a liberal or conservative statement at each end of a 13-point scale (the statements were adjusted from ANES, Pew, and Gallup). We first folded all these items so that a value of 0 represents a truly moderate position, and a 6 the most extreme position, whether liberal or conservative. For parsimony, we then averaged the responses to all the items into a valid and reliable scale for each wave (Cronbach’s alpha W1 = 0.85, W2 = 0.87, W3 = 0.86; W1: mean = 3.72, SD = 1.27; W2: mean = 3.67, SD = 1.32, W3: M = 3.73, SD = 1.28). Also, all the waves contained the standard indicators of affective polarization (e.g., Wojcieszak & Garrett, 2018). Feeling thermometer measures (0–100) asked about feelings toward supporters of the Democratic and the Republican Party and each respondent’s self-reported partisanship was used to create an outgroup feeling measure. Participants also indicated the extent to which they perceived out-partisans as mean, selfish, and stupid (reverse coded). All these items were standardized and averaged into an affective polarization index for each wave (Cronbach’s alpha W1 = 0.86, W2 = 0.85; W3 = 0.87).

**Data Limitations**

Before presenting the results, we acknowledge a key limitation of our project. As other similar studies, we cannot account for the overarching communication and information ecology of our participants. We cannot capture people’s exposure on multiple computers or mobile devices, or speak to news exposure offline or from interpersonal networks. Inasmuch as most people report consuming local news primarily on television (Pew Research Center 2019) or through radio, we are missing these exposures and likely biasing downwards the extent of actual local news use. As aforementioned, it is particularly the traditionally disadvantaged or marginalized populations who are likely to turn to television (Black people 59%, Hispanic people, 44%, less educated 44%) or social media (Black people 15%, Hispanic people, 22%) for local news, leading us to underestimate local news exposure among these groups (Barthel et al., 2019). We address this limitation in the discussion. While this limitation should be kept in mind, we believe the advantages provided by being able to test actual local and national news exposure online side-by-side and over-time justify the effort.

**Results**

Before estimating the over-time effects of exposures to local and national news websites, we ran cross-sectional regressions using one wave of data to explore the relationships between national and local news exposure, and how the latter might have heterogeneous correlations among different groups. Although these models cannot establish causality, they can shed light on potential associations. To test whether the consumption of local and national news websites predicts our outcome (RQ1), we ran linear regression models, controlling for race/ethnicity, age, gender, ideology and partisanship.

For both national and local news, there was a small but statistically significant correlation
between online news exposure and political knowledge (Table 1). Note that the association between local news exposure and knowledge persists when controlling for national news exposure. There were no significant relationships between exposure to local or national news websites and any of the other variables. We also ran interaction models, testing whether any associations between local news use and the tested outcomes were moderated by race/ethnicity, education (college and above versus lower), political interest, and exposure to national news websites. We do not find any significant interactions (see Appendix A8 for the full results).

The lack of associations does not mean that there are no effects of online local news consumption on our outcomes. Using a panel design allows us to examine within-person changes and how these covary with the outcomes. In Appendix A7, we visualize the within-person variation in local and national news exposure online. Even though for most people, exposure remains small across waves, there is some variation. For example, the median participant, visiting about 0.7 national news URLs per day in W1, changed their consumption by half a visit between wave 1 and 2. To exploit such within-subject variation, we turn to fixed-effects models, regressing the outcome on local and national news exposure, with a fixed effect at the person level. Depending on the outcome, the models use data from two or three waves.

Table 2 presents the results and illustrates a robust and consistent pattern of near-zero null effects. Exposure to national and local news websites as tracked in our data does not lead to over-time changes in participatory intentions or attitude and affective polarization. These null effects could be due to heterogeneity: local news may have an effect for those with different race or ethnicity, educational background, political interest, and levels of national news exposure (H1a-d). To examine whether and how the effect might differ across the sub-groups tested, we use another set of fixed-effects models, interacting each of these variables with local news exposure.

As can be seen from Table 3, the expectation that local news exposure produces particularly strong effects among people of color and those with lower education levels is not borne out in our data. Similarly, the coefficients for political interest and national news exposure are insignificant. Models using the alternative news exposure
Table 2. Fixed-effects models showing the individual level relationships between national and local news, and political participation, affective polarization, and attitude extremity.

Main effect models (multi-wave fixed effects)

<table>
<thead>
<tr>
<th></th>
<th>Participation</th>
<th>Affective polarization</th>
<th>Attitude extremity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>Local news exposure</td>
<td>−0.021</td>
<td>−0.003</td>
<td>0.021</td>
</tr>
<tr>
<td></td>
<td>(0.082)</td>
<td>(0.081)</td>
<td>(0.028)</td>
</tr>
<tr>
<td>National news exposure</td>
<td>0.112</td>
<td>−0.068*</td>
<td>0.034</td>
</tr>
<tr>
<td></td>
<td>(0.088)</td>
<td>(0.030)</td>
<td>(0.027)</td>
</tr>
<tr>
<td>Overall browsing frequency</td>
<td>0.010</td>
<td>0.052</td>
<td>0.010</td>
</tr>
<tr>
<td></td>
<td>(0.076)</td>
<td>(0.068)</td>
<td>(0.027)</td>
</tr>
<tr>
<td>Observations</td>
<td>1,480</td>
<td>1,480</td>
<td>2,113</td>
</tr>
<tr>
<td>R²</td>
<td>0.003</td>
<td>0.001</td>
<td>0.004</td>
</tr>
</tbody>
</table>

Note: *p < .05; **p < .01; ***p < .001.

Table 3. Fixed effects models showing the interactions between local news exposure, political outcomes (participation, affective polarization, and attitude extremity), and demographic variables.

Interaction models (multi-wave fixed effects)

<table>
<thead>
<tr>
<th></th>
<th>Participation</th>
<th>Affective polarization</th>
<th>Attitude extremity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>Local news exposure</td>
<td>0.036</td>
<td>0.132</td>
<td>0.064</td>
</tr>
<tr>
<td></td>
<td>(0.095)</td>
<td>(0.134)</td>
<td>(0.153)</td>
</tr>
<tr>
<td>Overall visits frequency</td>
<td>0.049</td>
<td>0.048</td>
<td>0.048</td>
</tr>
<tr>
<td></td>
<td>(0.068)</td>
<td>(0.068)</td>
<td>(0.068)</td>
</tr>
<tr>
<td>Local * National</td>
<td>−0.069</td>
<td>−0.025</td>
<td>0.033</td>
</tr>
<tr>
<td></td>
<td>(0.089)</td>
<td>(0.027)</td>
<td></td>
</tr>
<tr>
<td>Local * education</td>
<td>−0.196</td>
<td></td>
<td>−0.033</td>
</tr>
<tr>
<td></td>
<td>(0.165)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local * White</td>
<td>−0.080</td>
<td></td>
<td>−0.110</td>
</tr>
<tr>
<td></td>
<td>(0.178)</td>
<td></td>
<td>(0.071)</td>
</tr>
<tr>
<td>Local * interest</td>
<td>−0.032</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.068)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>1,480</td>
<td>1,474</td>
<td>1,474</td>
</tr>
<tr>
<td>R²</td>
<td>0.002</td>
<td>0.003</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Note: *p < .1; **p < .05; ***p < .01.

measure (i.e., proportional measure) support these null findings (see Appendix A9).

Exploratory analysis

To shed additional light on these findings, we did an exploratory analysis of 15,158 unique titles from 136 national news domains, and 1,564 unique headlines from 170 local news domains. We relied on the TF-IDF (term frequency-inverse document frequency) approach, developed for document search and information retrieval, which compares textual datasets to show which terms make one textual dataset different from the other (local vs national headlines in our case). Using this unsupervised and inductive approach, we identified which words differentiate the two datasets the most, and later examined the output and its corresponding sources. Figure 1, which plots the 50 top keywords from the examined headlines, visualizes some basic differences between local and regional news sites.

Offering suggestive support for past work, which shows decreases in political reporting in local news (Peterson, 2020), we find that national news largely focuses on the details of national politics and its major events (e.g., Mueller investigation) as well as of foreign affairs and international events (e.g., discussing Iran, Syria, the anti-government protests in Hong Kong, etc.). Also, national outlets offer news about elite media themselves, social media platforms, and digital culture (e.g., mentioning CNN, channels, TikTok, apps, or Facebook). In turn and unsurprisingly, local news headlines disproportionately focus on the locality (mentions of towns or communities, which direct to local events, mayoral races included), sports, and universities or colleges. The absence of words associated with Trump and 2020 Presidential election candidates suggests that
there is no meaningful difference in how often major national events are covered between national and local outlets.

**Discussion**

Our findings suggest that the benefits of digital local news exposure on democratic outcomes may have been overstated. Although this is a very risky conclusion, especially that our sole focus on online news consumption cannot capture exposure to local news offline or on social media, we note that extant work that ascertains these benefits is largely correlational at the aggregate level or uses contextual local news activity, and/or rarely accounts for over-time changes in the tested outcomes and for national news exposure alongside local news exposure. We relied on actual online exposure to both local and national news outlets paired with over-time reports of citizens’ knowledge, participation, and polarization, both attitudinal and affective.

Despite the cross-sectional link between local news exposure and knowledge, the rest of our findings are bleak. They deviate from both past evidence and the commonly accepted truths about the benefits of local news. This deviation is likely due to our design, which uses online behavioral data to track changes at the individual level. Furthermore, we include exposure to both local and national news side-by-side in the same model, thereby addressing complex relationships that may have been missed in previous research. Because those who tune in to national news also consume local news, and vice versa, the effects of the latter cannot be meaningfully distinguished without studying national and local news use simultaneously. Because extant work did not disentangle the effects of these two information sources, it may
have inaccurately assigned various beneficial outcomes to local news.

Similarly, visiting national news websites has very limited effects in our project, a null finding that counters past theorizing and research, which attributes numerous benefits to news exposure. This – again – is likely due to the stringent nature of our design, in which we accounted for baseline levels of the outcomes tested and for actual online exposure, not self-reported news use, which is often over-reported and correlated with various key outcomes (e.g., the politically knowledgeable use more news but are also more likely to over-report this use for social desirability reasons).

It may be the case that turning to online news – local or national – for three months (the time in between our waves) is not sufficient to meaningfully alter individual knowledge or participatory intentions, exacerbate attitude extremity, or shift people’s feelings toward their political outgroup. To the extent that these attitudes and behaviors are rather stable, attained at an early age during socialization, and/or engrained by the polarized nature of partisan politics in the United States, three months’ worth of online news exposure may be insufficient to produce any meaningful change.

Another explanation for the null effects may lie in recent changes to the civic value of local news. Whereas in the past, local news did produce these beneficial effects by publishing content with a high civic value for a broad-based local audience, they may now be reaching only a smaller, highly engaged audience with whatever quality news they still publish. This could be due to the fact that the civic value of local news has declined as economic pressures have led to shrinking news teams and decreases in high-quality content (Abernathy, 2020; Peterson, 2019). Alternatively, the audience itself may have narrowed, as people may use local outlets for sports, crime, weather, or human interest stories. Also, a combination of economic pressures and the popularity of soft news may have pushed outlets to concentrate on what is perceived as commercially viable stories, thereby driving the politically interested readers to national news first.

Alternatively, these disappointing null effects may be due to the limited aggregate news exposure, both to national and local websites, in our trace data. Because politics is sometimes perceived as complex, boring, or overly divisive, people may avoid it altogether, especially as they have nearly unlimited entertainment content at their disposal (Feldman, Stroud, Bimber, & Wojcieszak, 2013; Prior, 2007). Most citizens rarely tune in to the news. News makes up only 4% of News Feed (Zuckerberg, 2008), only between 2% (Wojcieszak et al., 2021) and 7%–9% (Guess, 2020) of all URLs visited by large samples of Americans are news domains, and – across mobile, desktop, and television – news consumption comprises 14.2% of Americans’ daily media diets (Allen, Howland, Mobius, Rothschild, & Watts, 2020). In our data, spanning a total of nine months of individual web browsing, visits to news websites – local and national combined – comprised about 1.9% of the browsing. This is normatively problematic (inasmuch as citizens should stay informed about politics and current events), but – crucially – puts into perspective past evidence and the theoretical hopes regarding the effects of news exposure.

We furthermore hoped that local news would manifest its strongest benefits among the politically uninterested individuals and among populations that are traditionally disadvantaged. Also here, we offer largely disappointing conclusions. It is not the case that racial/ethnic minorities, those with lower education levels, the politically uninterested, and those who rarely tune in to national news particularly benefit from local news. Although racial and ethnic minorities tend to value local news for soft coverage, we find no evidence for the “local news gateway effect.” Past work that examined soft news (Baum, 2003; Baum & Jamison, 2006; Prior, 2003) suggested that Oprah, for instance, acted as a stepping stone for the disengaged viewers and pulled them back into the democratic process. Yet, it is not the case that the local news anchor or one’s community members in local news coverage lead the disadvantaged groups to become more informed or participatory, at least not in our data and among our sample.

This evidence is not to say that there are definitely few benefits to local news, but it points to a need to enrich traditional research designs to test these. National news exposure must be taken into
account alongside local news exposure to avoid the misattribution of effects. Also, researchers need to benchmark attitudes theorized to be influenced by exposure. Unlike self-reports or correlating regional media activity with aggregate civic and political indicators, scholars may consider combining over-time individual-level behavioral news use – online and offline – with self-reports of political attitudes, cognitions, and behaviors. This would offer a rigorous understanding of (the effects of) actual exposure and ameliorate the problems with inaccuracies in news use self-reports, even though – as we note below – may present other research challenges.

Most importantly, our reliance on behavioral indicators of online news exposure in people’s browsing mean that we are missing exposures on devices other than the one from which they submitted their data. It may be the case that participants watch or listen to local news on television or radio over dinner, for instance, and – naturally – our data cannot track the use of these outlets, popular for local news (Pew Research Center, 2019; we do, however, account for participants watching local news online). It is also possible that some participants consume local news on mobile devices or through social media, sources that are not accounted for in our data. Ascertaining whether local news encountered through these other avenues exerts stronger effects may not be possible, as researchers cannot access all the information about all the outlets that people see offline and online, and likely never will. If scholars had access to Facebook newsfeed combined with mobile and desktop data, we would still be missing Facebook Messenger and WhatsApp, which are popular for sharing news (Waterson, 2018). Even if we could access all the digital traces a person produces, actual offline exposure and interpersonal communication are still crucial, and no trace data can account for these sources. In the tested context, it is especially important to account for television, radio, and interpersonal communication about local news (Shah et al., 2017). We also note, however, that to the extent that a majority of Americans (89%) get at least some of their news online and the share of those who prefer to do so is growing (Pew Research Center, 2019), our data offer important – although far from complete or conclusive – insight.

In addition, we admit that studies that rely on online samples willing to share browsing data cannot make point estimates about the population as individuals who are willing to share such data may systematically differ from those who are not (as shown in Appendix A2). In a related vein, even our most socially disadvantaged respondents were able to participate in a longitudinal project that required continuous internet access on a laptop or desktop computer, a requirement which may have excluded some of the most disadvantaged from this study. Black and Hispanic people, and those without a college degree tend to have lower incomes (Earnings Disparities by Race and Ethnicity, 2022; Education pays, 2021), and only 43% of households with an income lower than $30,000 have broadband internet (Vogels, 2021). This intersection between economic, racial, and/or educational marginalization contributes to the digital divide with both internet and device accessibility, leading us to not include and potentially inaccurately capture local news consumption among these groups.

We also acknowledge that our project cannot pinpoint various civic benefits of local news exposure. Our survey did not measure some of the outcomes typically attributed to local news, such as community solidarity or togetherness, and region-specific political knowledge. These are certainly crucial yet – in order to juxtapose local and national news side by side – we relied on the outcomes that are key to democratic functioning – general knowledge and participation. Future work should apply the proposed methodologies to track exposure and changes in citizens’ attitudes and also incorporate questions apt to detecting some community level effects.

Our results show a need to investigate and evaluate the effects of local news using contemporary methodologies best suited to current media ecologies. We hope that instead of discouraging future research or discounting the potential effects of local news altogether, these disappointing, and even bleak, findings encourage further rigorous efforts to pinpoint the effects of local news. For now, theoretically, our project adds to the overall
tradition of “minimal media effects,” which – in the media environment that offers an unprecedented array of entertainment and political choices – may be due to certain exposure types being too minimal to produce any discernible effects.

Notes

1. For consistency and parsimony, we use the same sample \((n = 740)\) for all outcomes. We re-estimated our models using a larger sample for the outcomes available in fewer waves (i.e. participation and knowledge). Results remain the same in direction, magnitude, and significance, increasing our confidence in their robustness.

2. We additionally assessed whether those who merely accepted the study invitation and completed a short screening survey differed from those who submitted their browsing data. As Table A1 shows, those who submitted their browsing data were more likely to be male, younger, and better educated. This is also because the main W1 had the quotas in place already.

3. To maximize the sample size for each model, we used the earliest wave for which the respective outcome was measured, that is W1 for the models on attitude extremity and affective polarization; W2 for participation; and W3 for knowledge.

4. We note that the low correlation between trace-based national news exposure and knowledge \((r = 0.09)\) largely disappears in the regression models once we control for education, which is more strongly associated with both national news exposure and knowledge.

5. For the two moderators for which we have over-time measurements, i.e. national news exposure and political interest, we create an average for each participant: This allows us to assess the variation of local news effects for groups of people with similar levels on the moderators, rather than similar between-wave changes.

6. Although there were two non-null findings, they are not robust and become null with alternate variable specifications. As such, we see the detected findings as consistently insignificant.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Data availability statement

A webink to data repository is available at: https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/LZSS6G

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