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Too Hot to Play it Cool?
Temperature and Media Bias*

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November 2023

Abstract

This paper examines the impact of outdoor temperature on media bias. We use 12 years of daily hand-coded data on the tonality of news broadcast by the three major US news networks, ABC News, CBS News, and NBC News, all headquartered in New York City, and merge it with granular, geospatial weather data. Our identification strategy exploits detailed variations in local daily high temperatures to estimate the effect of heat on media bias in news reporting about the Republican and Democratic parties, controlling for time and network-month fixed effects. We find a positive effect of a substantial magnitude: a 1°C increment in daily maximum temperature on a hot day (>25°C) leads to a 20% increase in the media bias measured as the difference in the share of negative news about the Republicans and the Democrats. This effect exists only for maximum temperatures, as opposed to minimum or average temperatures. The results are robust to placebo tests using past or future temperatures. Our findings extend the previously established link – from hot temperatures to negative affect and a decline in cognitive ability – to the determinants of media bias.

Keywords: media bias, tonality, temperature, U.S. newscasts
JEL Classification: L8, D7.

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One cool judgment is worth a thousand hasty counsels.
The thing to do is to supply light and not heat.

Woodrow Wilson

I. INTRODUCTION

Professional journalism traditionally implies impartial reporting and nonpartisanship (e.g., Kaplan, 2002). Yet media bias remains pervasive in modern mass media (e.g., Groseclose and Milyo, 2005), with potential consequences relating to political polarization and a misinformed public (e.g., Bernhardt et al., 2008). The growing literature on determinants of media bias has paid attention to economic or institutional factors (e.g., Gehlbach and Sonin, 2014; Larcinese et al., 2011) but tends to overlook the role of ecological factors such as global warming. We are the first to propose that outdoor temperatures might be a source of media bias as well. Building on the literature that has established a channel from higher temperatures to negative affect and reduced cognitive performance (e.g., Denissen et al., 2008; Noelke et al., 2016; Heilmann et al., 2021), we hypothesize that high outdoor temperature hinders impartial news reporting by increasing journalists' cognitive load and thus leading them to rely on a more habitual negative bias when presenting news associated with the political party that is less close to their ideological view.

We test our hypothesis using unique, hand-coded data on political coverage of Democratic- and Republican-related news stories by the three major U.S. news networks, ABC News, CBS News, and NBC News. The data comprise over 424'000 news items for 2001-2012. Based on a similar dataset, Bernhard et al. (2023) found a substantial partisan reporting bias among U.S. news networks. The bias is measured as the absolute difference between the average daily tone of the news affiliated with the Republican party and the tone of the news affiliated with the Democratic party. To investigate whether hot weather exacerbates the partisan reporting bias, we merge the media data with granular, geospatial weather data. Our

identification strategy takes advantage of the variation in the same-day local temperatures at the TV channels' headquarters in New York City, controlling for time and channel-month fixed effects. In addition, the news shows analysed, ABC World News Tonight, CBS Evening News, and NBC Nightly News, are similar from various perspectives: they are all major evening news, they all cover similar news, they all have a slightly political leftish slant (Bernhardt et al., 2023).

Our findings are suggestive of an effect of high temperatures on a partisan reporting bias: We find that on a hot day, when the maximum temperature is above 25°C, an additional degree of the daily maximum temperature increases the negative-tonality gap between Republican and Democratic news coverage by 20%. In placebo tests using concurrent minimum and average temperatures or past and future temperatures as counterfactuals, no such effect is found. The partisan reporting bias is mainly driven by the increasing share of negative news reporting for the Republican party, which aligns with the left-leaning political position of the three channels. This paper is the first to document a link between hot temperatures and media bias, hinting at the potential of further rising levels of political polarization as temperatures rise.

Our findings speak to a newly emerging literature on human behavior under higher temperatures, particularly the reversion to „system 1" (heuristic or habit-based) processing (Pocheptsova et al., 2009; Cheema and Patrick, 2012) due to an overload of cognitive function and negative affect linked to heat. Here, our study closely echoes Heyes and Saberian (2019), documenting the negative effect of high temperatures on favorable decisions by U.S. immigration judges, and Heilmann et al. (2021), finding that high urban temperatures (above 24°C or 75°F) increase local crime in Los Angeles.

The remainder of this paper is structured as follows: Section II discusses the data and the empirical strategy. Results for the effect of hot temperatures on a partisan reporting bias are reported in Section III. Section IV concludes.

II. DATA AND EMPIRICAL STRATEGY

Data

Measuring media bias. We employ a dataset collected and coded by Media Tenor International comprised of news programs by three major US news gathering organizations, namely, ABC World News Tonight, the CBS Evening News, and NBC Nightly News, from 2001 through 2012. Each news item was hand-coded by Media Tenor's analysts using a computerized coding mask that listed all variables and possible values according to a binding codebook (for more information, see Bernhardt et al., 2023). The following characteristics are utilized in our analysis: 1) the political affiliation of the protagonist covered by the news (Republican or Democratic) and 2) the tone[1] of the coverage of the politician or the political party evaluated as positive (+1), neutral (0), or negative (-1).

Our hypothesis exclusively predicts a negative affect as a reaction to heat. Thus, we focus on negative tonality and compute a share of negative reports for the Republican and Democratic parties separately within each day for each channel. Our media bias variable is hence the absolute difference between each – the Republican's and the Democrat's – average daily negative tonality multiplied by 100 – in percentage points for convenience of interpretation with a range of [-100;+100].[2] Additionally, we test our hypothesis by looking at the negative tonality share by party to test whether the negative bias is directed against the Republican party due to the relatively left-leaning political position of each network in our study.

Measuring temperature. Weather data come from PRISM Climate Group, which combines climate observations from multiple monitoring networks, ensures quality control, and produces high-definition spatial climate datasets. We use weather data at the 800x800-meter grid level,

[1] The tone indicates how the journalist (or another source) is talking about a politician or the political party in a topical context.

[2] We omitted the observations when only one party was covered in the news to ensure the comparability of the tones between the partys' coverages. Including those observations does not significantly affect the results.

which allows us to obtain daily minimum, average, and maximum temperature measurements within New York City for the location of each headquarters. We focus on maximum temperature (MAX T) as our hypothesis is based on the effect of excessive heat on human behavior, but we still use minimum and mean temperature as placebo specifications to rule out alternative explanations related to any unobserved factors correlated with average temperature deviations.

The headquarters of the three networks are situated in Manhattan in a 2-kilometer range. Within this distance, there is relevant temperature variation. In the appendix, Figure A1, we show that the maximum within-day difference between MAX T's in headquarters locations equaled 0.17°C (0.31°F) on average and could reach up to about 1°C (1.8°F). Figure A2 provides temperature deviations from mean summer temperatures in the vicinity of the news stations.

Empirical Strategy

To account for common within-day factors and channel-specific seasonality, we employ a two-way fixed estimation design with time and channel-month fixed effects (similar to Heyes and Saberian, 2019). We estimate the following linear regression:

$$MediaBias_{it} = a + \beta\ MAX\ T_{it} + \sum_{j\in\{0;12\}} c_{it} + v_{it} + \varepsilon_{it}, \qquad (1)$$

where *i* and *t* indicate channel and day, respectively; $MediaBias_{it}$ is the absolute difference in average negative tone between Republican- and Democratic-affiliated news; $MAX\ T_{it}$ is the maximum temperature during day *t* at location *i*; $\sum_{j\in\{0;12\}} c_{it}$ is a set of channel-month fixed effects; v_{it} represents time-fixed effects; and ε_{it} is an error term.[3] For robustness tests, we run

[3] Standard errors are robust to heteroskedasticity. Clustering standard errors by channel-year or channel-month yields very similar results.

separate regression (placebo tests) by replacing $MAX\ T_{it}$ with mean ($MEAN\ T_{it}$) and minimum temperature ($MIN\ T_{it}$) at the location.

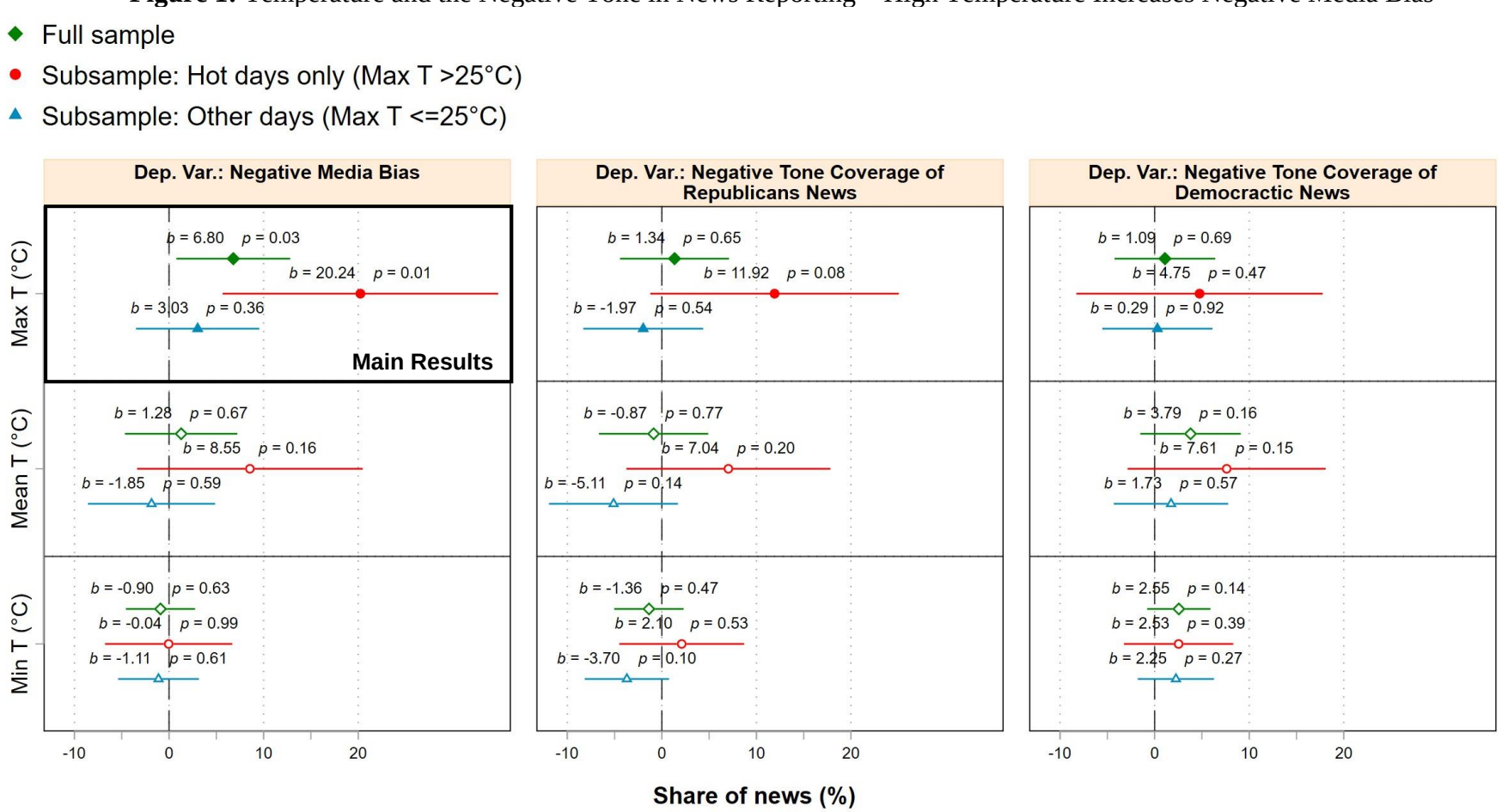
III. RESULTS

We report our results in Figure 1. The increment in maximum temperature is associated with an increase in the absolute difference of average negative news coverage on the Republicans and the Democrats (upper left panel, entitled „main results"), but this effect is driven only by a subsample of the hot days when the maximum temperature exceeds 25°C. No similar association is observed for mean or minimum temperatures (middle and lower left panel), suggesting that the effect is heat-specific.

In the middle and right panels, we look at the effect of heat on the share of negative tone news about each party separately and find that only the share of negative coverage about Republicans increases as a result of the additional heat. This is consistent with the left-leaning political position of the three TV networks. When we look at the shares of positive news or positive media bias (see Appendix, Figure A3), we do not observe any differences due to the temperatures, in line with empirical evidence from Noelke et al. (2016) that higher temperatures cause only negative (but not positive) emotional affect.

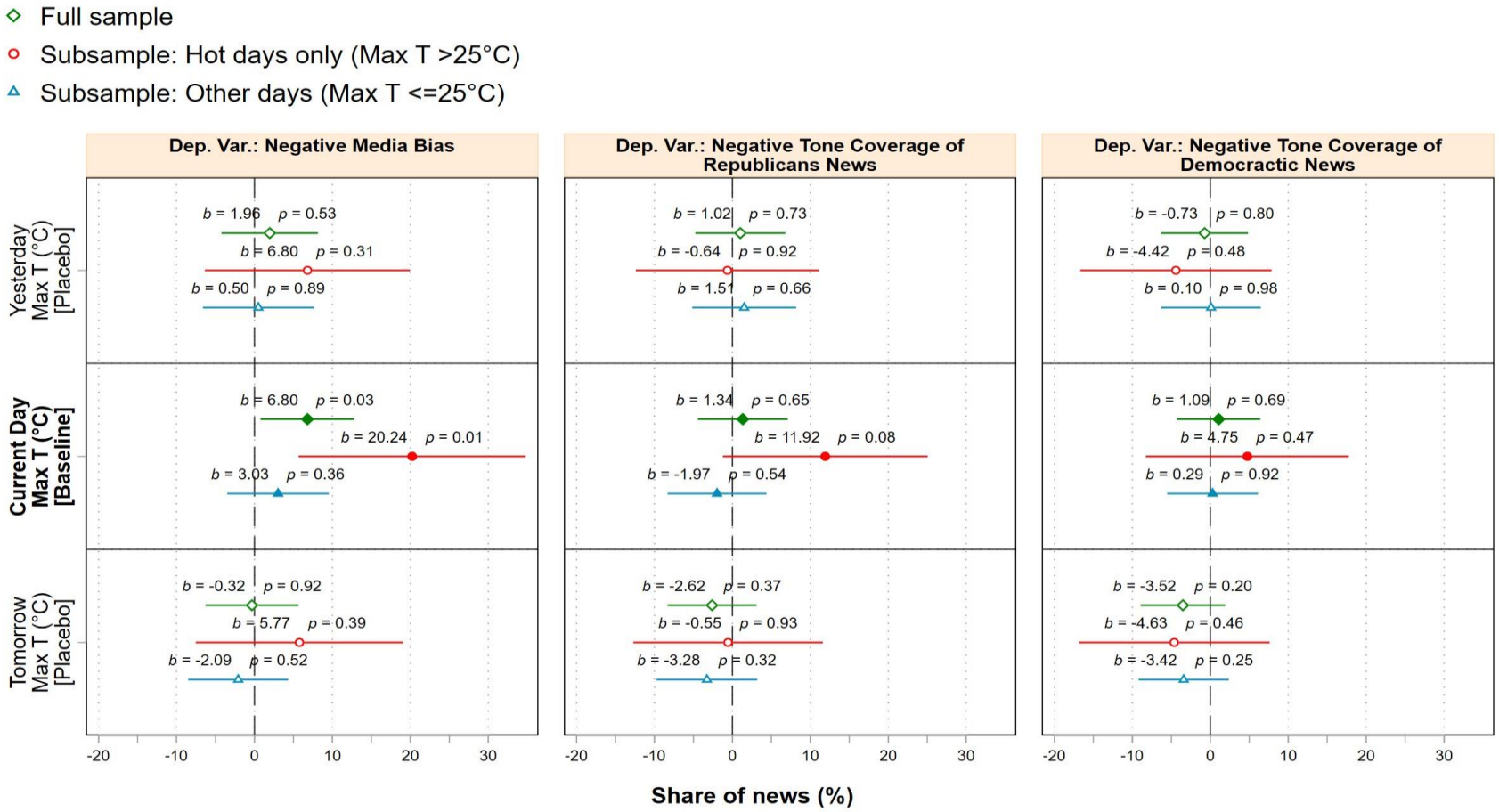
We perform placebo tests using past and future temperatures to show that spurious correlations are not driving the results. Figure 2 shows the estimation of Equation 1 by swapping the current day's temperatures with those of either the day before or the day after. The baseline estimate is shown for reference. Past and future temperatures do not predict changes in media distortion, unlike the simultaneous maximum temperature on a hot day.

Figure 1: Temperature and the Negative Tone in News Reporting – High Temperature Increases Negative Media Bias



Notes: OLS, 95% CI; each coefficient represents a separate regression. All regressions include channel-month and time fixed effects. Unit of observation is a day-channel: three TV networks (ABC, NBS, CBS) over 2001-2012.

Figure 2: Placebo Tests Using Past and Future Temperatures



Notes: OLS, 95% CI; each coefficient represents a separate regression. All regressions include channel-month and time fixed effects. Unit of observation is a day-channel: three TV channels (ABC, NBS, CBS) over 2001-2012.

IV. CONCLUSIONS

We examine the impact of outdoor temperatures on partisan media bias, highlighting temperature as an ecological factor previously overlooked in the literature. Building on established links between higher temperatures, negative affect, and reduced cognitive function, we posit that hot weather induces cognitive load that pushes journalists toward habitual negative biases, especially when covering a party less aligned with their own views.

Using a comprehensive dataset spanning 2001-2012 and including over 424,000 news stories which we merge with granular, geospatial weather data, our analysis focuses on political coverage of the Democratic and Republican parties by major U.S. news networks. The results show a notable effect on hot days: When the temperature exceeds 25°C, each additional degree increases the negative-tonality gap in the news between Republicans and Democrats. The magnitude of the temperature-induced partisan media bias is of statistical, social, and political significance. Overall, our results suggest that despite journalistic ideals of impartiality, modern mass media retain a pervasive bias influenced by the ecological factor of temperature. This is particularly relevant in times of climate change and global warming.

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SUPPORTING INFORMATION
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Figure A1: Variation in Temperature Between Locations of U.S. News Networks on the Same Day

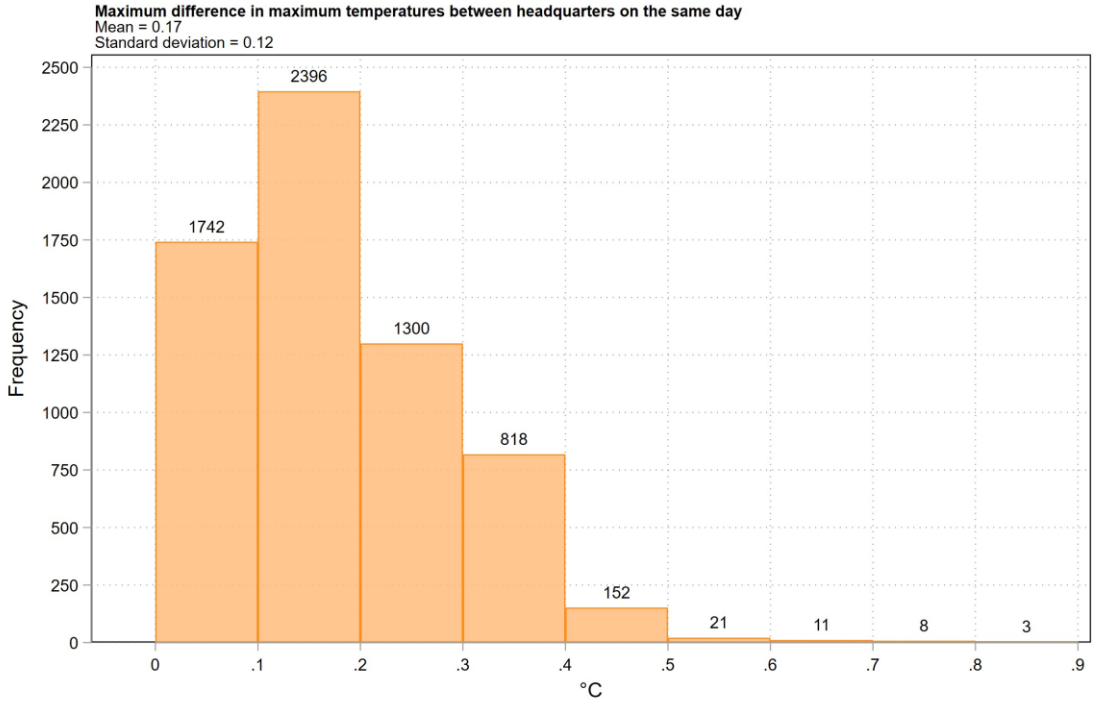
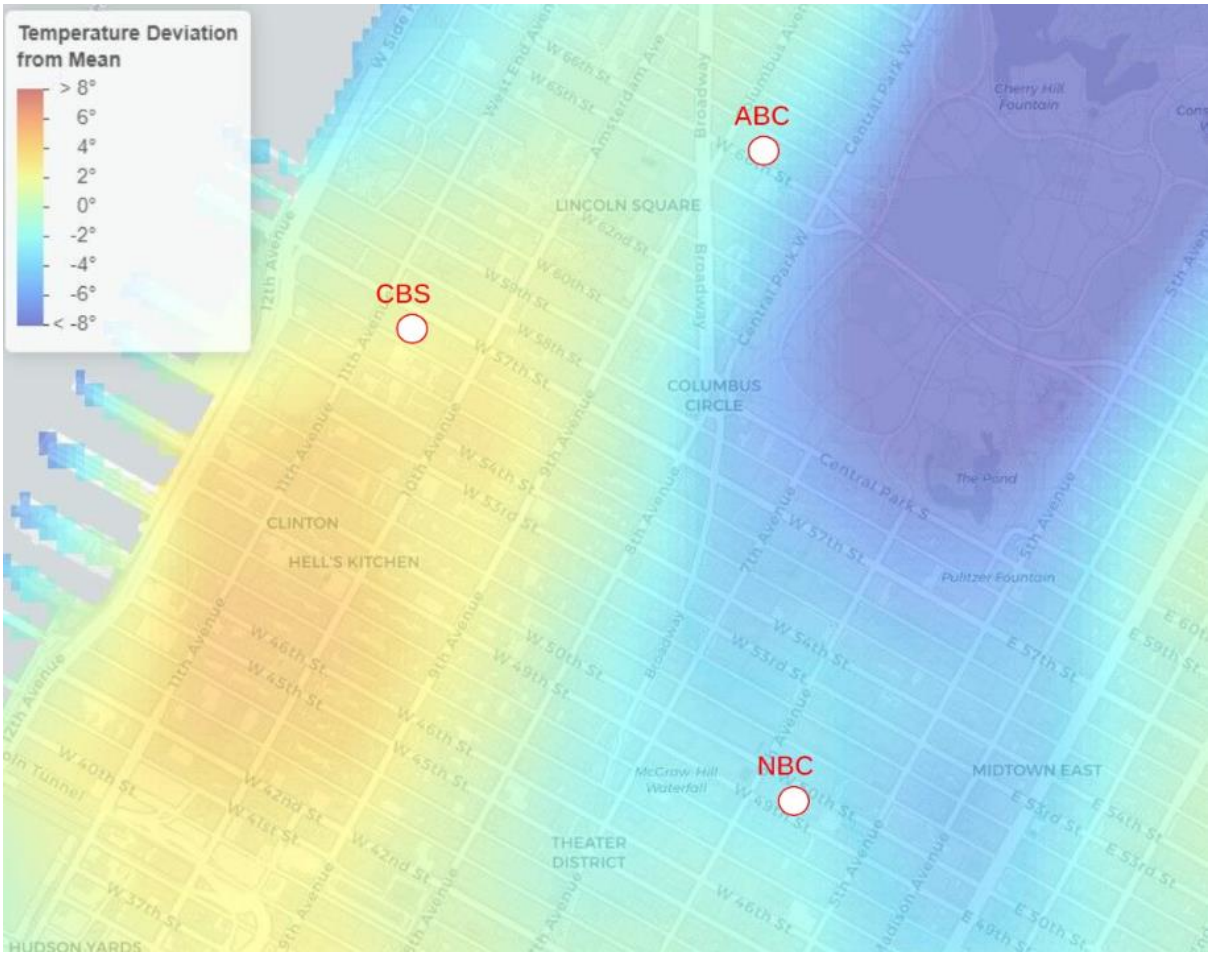
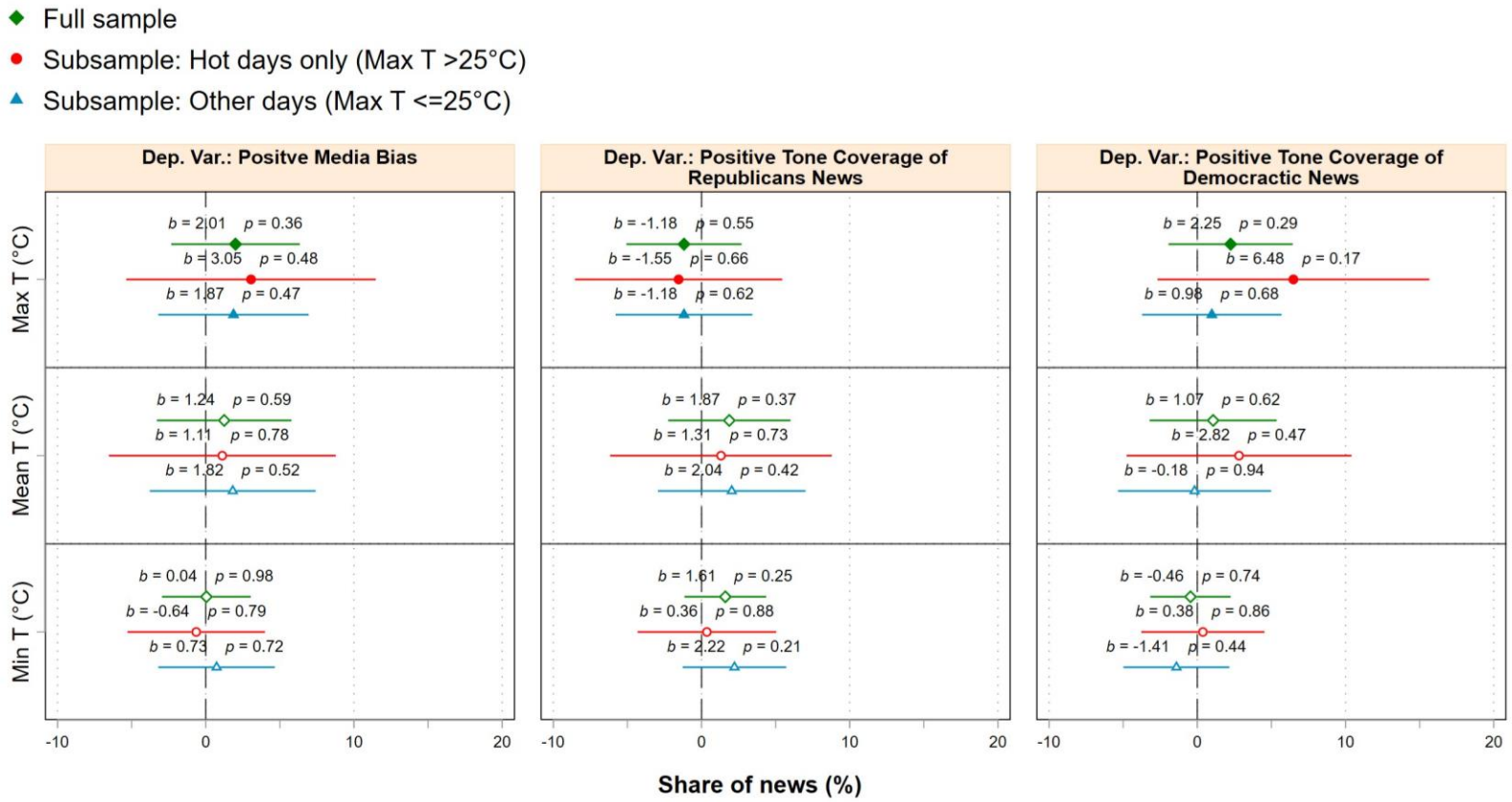


Figure A2: Temperature Deviation from Mean Summer Temperatures for Locations of U.S. News Networks.



Source: New York City Council, Mapping Heat Inequality in NYC

Figure A3: Temperature and the Positive Tone in News Reporting – No Statistically Significant Effects Emerge for Positive Tone



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