Supplemental Information for “Pollution and the Public: How Information Accessibility Conditions the Public’s Responsiveness to Policy and Outcomes”

For Online Publication

Contents

A Summary Statistics

Table A.1: Summary Statistics

	Mean	S.D.	Min	Max
Search (6 terms)$_t$	13.42125	8.570568	0	61.75
Search (6 terms)$_{t\text{-}1}$	13.54951	8.181953	0	58.83333
Search (5 terms)$_t$	18.34895	11.55776	0	81.75
Search (5 terms)$_{t\text{-}1}$	19.28071	11.42113	0	77.66667
NO2$_t$	254.8604	122.0554	19.72583	993.6047
NO2$_{t\text{-}1}$	259.7608	130.0932	19.72583	1090.651
PM2.5$_t$	7.658345	2.376851	1.139318	16.39213
PM2.5$_{t\text{-}1}$	7.882776	2.477994	0.9180887	16.39213
ΔNO2$_t$	-4.900423	35.01619	-217.497	188.6296
ΔNO2$_{t\text{-}1}$	-6.622212	37.37517	-222.7452	188.6296
ΔNO2 (statewide)$_t$	-4.199219	24.36292	-96.56178	75.25637
ΔNO2 (statewide)$_{t\text{-}1}$	-6.176621	26.55953	-152.0546	75.25637
ΔPM2.5$_t$	-0.2244304	1.26376	-4.982957	5.132811
ΔPM2.5$_{t\text{-}1}$	-0.08542054	1.179103	-4.982957	5.132811
ΔPM2.5 (statewide)$_t$	-0.2263526	1.141958	-4.258056	2.713528
ΔPM2.5 (statewide)$_{t\text{-}1}$	-0.08800817	1.042167	-4.258056	2.713528
Enforce$_t$	0.5822171	3.019115	-0.8488506	55.75604
Enforce$_{t\text{-}1}$	0.5809895	3.031916	-0.4525793	55.75604
Enforce (statewide)$_t$	0.9675231	1.955453	-0.6971679	7.765754
Enforce (statewide)$_{t\text{-}1}$	0.960239	1.923436	-0.6987592	7.765754
ΔEnforce$_t$	0.001227588	0.7714145	-13.39603	12.54947
ΔEnforce$_{t\text{-}1}$	-0.009743018	0.832896	-13.39603	19.91786
ΔEnforce (statewide)$_t$	0.007284082	0.5304317	-1.825608	3.048172
ΔEnforce (statewide)$_{t\text{-}1}$	0.001668211	0.5426521	-1.825608	3.048172
ΔGRP$_t$	34.8879	264.227	-4006.127	5713.728
Dem vote share$_t$	0.4263156	0.1204684	0.115477	0.8038521

The ΔGRP values are divided by 10 for the SEM's. The variable's summary statistics are transformed accordingly.

B OLS Models

Table B.1: OLS Regressions with NO2 (5 search terms)

(a)

	(1)	(2)	(3)
DV: Search$_t$			
Search$_{t-1}$	0.590***	0.576***	0.581***
	(0.013)	(0.013)	(0.013)
ΔNO2$_t$	0.011***		0.008*
	(0.002)		(0.003)
ΔEnforce$_t$	0.058		0.189*
	(0.080)		(0.085)
ΔNO2$_t$ (statewide)		0.013***	0.005
		(0.003)	(0.005)
ΔEnforce$_t$ (statewide)		-0.589***	-0.735***
		(0.162)	(0.174)
F Statistic	557.83	567.80	541.09
Resid. Std. Error	4.06	4.03	4.04
R^2	0.91	0.91	0.91
N	2818	2889	2818

(b)

	(1)	(2)	(3)
DV: Enforce$_t$			
Enforce$_{t-1}$	1.028***	1.027***	1.028***
	(0.005)	(0.004)	(0.005)
ΔSearch$_{t-1}$	-0.005		-0.006
	(0.003)		(0.003)
ΔNO2$_{t-1}$	0.000		0.002*
	(0.001)		(0.001)
ΔSearch$_{t-1}$ (statewide)		0.010*	0.011**
		(0.004)	(0.004)
ΔNO2$_{t-1}$ (statewide)		-0.001	-0.003**
		(0.001)	(0.001)
F Statistic	1102.63	1118.03	1065.52
Resid. Std. Error	0.97	0.96	0.97
R^2	0.95	0.95	0.95
N	3130	3230	3130

(c)

	(1)	(2)	(3)
DV: NO2$_t$			
NO2$_{t-1}$	0.867***	0.866***	0.865***
	(0.010)	(0.010)	(0.010)
ΔGRP$_t$	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
ΔSearch$_{t-1}$	-0.244*		-0.266*
	(0.111)		(0.111)
ΔEnforce$_{t-1}$	-2.512***		-1.291*
	(0.609)		(0.645)
ΔSearch$_{t-1}$ (statewide)		-0.193	-0.174
		(0.138)	(0.138)
ΔEnforce$_{t-1}$ (statewide)		-7.825***	-7.074***
F Statistic	652.26	658.00	635.67
Resid. Std. Error	31.46	31.33	31.29
R^2	0.92	0.93	0.93
N	2818	2818	2818

Note: All models include state fixed effects. The models in subtable *a* control for each locality's average Democratic vote share in presidential elections for this time period. $^\dagger p< 0.1$; $^*p<0.05$; $^{**}p<0.01$; $^{***}p<0.001$.

Table B.2: OLS Regressions with NO2 (6 search terms)

(a)

	(1)	(2)	(3)
DV: Search$_t$			
Search$_{t-1}$	0.559***	0.550***	0.555***
	(0.015)	(0.014)	(0.015)
ΔNO2$_t$	0.011***		0.011***
	(0.002)		(0.003)
ΔEnforce$_t$	0.061		0.156*
	(0.068)		(0.072)
ΔNO2$_t$ (statewide)		0.011***	0.000
		(0.003)	(0.004)
ΔEnforce$_t$ (statewide)		-0.423**	-0.546***
		(0.137)	(0.147)
F Statistic	431.14	437.17	417.24
Resid. Std. Error	3.43	3.41	3.43
R^2	0.89	0.89	0.89
N	2818	2889	2818

(b)

	(1)	(2)	(3)
DV: Enforce$_t$			
Enforce$_{t-1}$	1.028***	1.027***	1.028***
	(0.005)	(0.005)	(0.005)
ΔSearch$_{t-1}$	-0.006		-0.008†
	(0.004)		(0.004)
ΔNO2$_{t-1}$	0.000		0.002*
	(0.001)		(0.001)
ΔSearch$_{t-1}$ (statewide)		0.003	0.006
		(0.005)	(0.006)
ΔNO2$_{t-1}$ (statewide)		-0.001	-0.003**
		(0.001)	(0.001)
F Statistic	1102.81	1115.76	1063.42
Resid. Std. Error	0.97	0.96	0.97
R^2	0.95	0.95	0.95
N	3130	3230	3130

(c)

	(1)	(2)	(3)
DV: NO2$_t$			
NO2$_{t-1}$	0.868***	0.866***	0.865***
	(0.010)	(0.010)	(0.010)
ΔGRP$_t$	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
ΔSearch$_{t-1}$	-0.638***		-0.629***
	(0.138)		(0.142)
ΔEnforce$_{t-1}$	-2.433***		-1.208†
	(0.607)		(0.643)
ΔSearch$_{t-1}$ (statewide)		-0.330†	-0.129
		(0.177)	(0.183)
ΔEnforce$_{t-1}$ (statewide)		-7.895***	-7.200***
		(1.235)	(1.311)
F Statistic	656.44	658.39	639.45
Resid. Std. Error	31.37	31.32	31.20
R^2	0.93	0.93	0.93
N	2818	2818	2818

Note: All models include state fixed effects. The models in subtable *a* control for each locality's average Democratic vote share in presidential elections for this time period. †p< 0.1; *p<0.05; **p<0.01; ***p<0.001.

C Statewide Models

Table C.1: Statewide NO_2

	(1)	(2)	(3)
DV: $NO2_t$ (statewide)			
$NO2_{t\text{-}1}$ (statewide)	0.648***	0.624***	0.624***
	(0.026)	(0.026)	(0.026)
ΔGRP_t (statewide)	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)
$\Delta Search_{t\text{-}1}$	-0.080		-0.104
	(0.081)		(0.080)
$\Delta Enforce_{t\text{-}1}$	-1.703***		-0.195
	(0.448)		(0.469)
$\Delta Search_{t\text{-}1}$ (statewide)		-0.294**	-0.286**
		(0.099)	(0.100)
$\Delta Enforce_{t\text{-}1}$ (statewide)		-8.818***	-8.743***
		(0.913)	(0.974)
F Statistic	974.29	1008.54	971.87
Resid. Std. Error	23.28	22.90	22.91
R^2	0.95	0.95	0.95
N	2907	2907	2907

Note: Estimator: OLS. State fixed effects included. $^{\dagger}p< 0.1$; $^{*}p<0.05$; $^{**}p<0.01$; $^{***}p<0.001$.

D Controlling for Statewide NO_2

Table D.1: Controlling for Statewide NO2 (5 terms)

	(1)	(2)	(3)
DV: $NO2_t$			
$NO2_{t\text{-}1}$	0.812***	0.814***	0.812***
	(0.008)	(0.008)	(0.008)
$NO2_t$ (statewide)	0.752***	0.758***	0.758***
	(0.018)	(0.019)	(0.019)
ΔGRP_t	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
$\Delta Search_{t\text{-}1}$	-0.177*		-0.182*
	(0.088)		(0.088)
$\Delta Enforce_{t\text{-}1}$	-1.305**		-1.457**
	(0.482)		(0.512)
$\Delta Search_{t\text{-}1}$ (statewide)		0.168	0.179
		(0.110)	(0.110)
$\Delta Enforce_{t\text{-}1}$ (statewide)		-0.098	0.812
		(1.007)	(1.071)
F Statistic	1056.62	1052.93	1018.83
Resid. Std. Error	24.86	24.90	24.85
R^2	0.95	0.95	0.95
N	2818	2818	2818

Note: Estimator: OLS. $^{\dagger}p<0.1$; $^{*}p<0.05$; $^{**}p<0.01$; $^{***}p<0.001$.

E PM2.5 Models

Table E.1: Local PM2.5 (5 terms)

	(1)	(2)	(3)
DV: PM2.5$_t$			
PM2.5$_{t\text{-}1}$	0.457***	0.456***	0.453***
	(0.021)	(0.021)	(0.021)
ΔGRP$_t$	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
ΔSearch$_{t\text{-}1}$	-0.010*		-0.010*
	(0.004)		(0.004)
ΔEnforce$_{t\text{-}1}$	0.024		0.011
	(0.027)		(0.029)
ΔSearch$_{t\text{-}1}$ (statewide)		0.007	0.008
		(0.005)	(0.006)
ΔEnforce$_{t\text{-}1}$ (statewide)		0.086	0.072
		(0.059)	(0.063)
F Statistic	112.25	112.18	108.32
Resid. Std. Error	1.21	1.21	1.21
R^2	0.73	0.73	0.73
N	2261	2261	2261

Note: Estimator: OLS. $^{\dagger}p< 0.1$; $^{*}p<0.05$; $^{**}p<0.01$; $^{***}p<0.001$.

F Air Pollution Data

The DOMINO grids for NO_2 have a resolution of 0.125 by 0.125 degrees (around 12.5 by 12.5 km at the equator). Most metro areas straddle multiple grid spaces, so I calculate municipal NO_2 concentrations as the weighted means of the grid spaces each MSA occupies. To calculate the weighted means, I up-sample the monthly grids to 0.0125 by 0.0125 degrees using bilinear interpolation[1] and take the mean of all grid squares that are partially or entirely within each MSA's boundary.

To increase the spatial coverage of the NO_2 data, I supplement the DOMINO data with grids from the TM4NO2A dataset. The TM4NO2A data have near-total spatial coverage, but only a quarter of the resolution of DOMINO. I therefore use DOMINO as my primary data source and use TM4NO2A to fill in its holes. I do this by up-sampling the TM4NO2A grids to 0.0125 by 0.0125 degrees and rescaling its values with a linear function so that they better correspond to the DOMINO data. The function is derived from the relationship between the values where DOMINO and TM4NO2A overlap. The grids I use are for the monthly means, not the daily overpass values. Air pollution varies substantially by season, but its time series within season is stationary (Wang and Lu 2006); one can ignore missing days but not missing months to calculate an accurate annual average.

[1] Bilinear interpolation treats the values associated with the original grid spaces as points at the exact center of each grid square and then calculates the values for the smaller 0.0125 by 0.0125 degree squares as averages of the four closest points weighted by inverse distance. I use this interpolation method because it is conservative; it does not introduce values outside the range of the original data and makes no assumptions about the presence of geographic boundaries (such as mountain ranges) or prevailing winds.

G Alternate Public Concern–Pollution Mechanisms

In general, public concern's effect on individual-level behaviors that affect air pollution levels is negligible over the course of a single decade. The individual-level behaviors that are most sensitive to concern center on reducing immediate exposure to air pollution by, for example, rescheduling travel to days with less smog. Such changes have virtually no net effect on an area's average pollution levels over the course of a year (see Welch, Gu, and Kramer 2005). Some studies have found evidence of public concern leading to durable decreases in pollution-generating activities like driving, but even these only find very small substantive effects over a single decade (e.g., Tribby et al. 2013).

Environmental activism is, of course, driven by public concern. In principle, it is possible that activists could use mechanisms that are completely independent of the political system to drive away polluters (boycotts or vandalism, for example). In practice, however, environmental activism focuses to a very large extent on pressuring various governing authorities to take action in some way (see Basu and Devaraj 2014; Lubell et al. 2006).

Public concern with air pollution can affect economic activities through non-policy mechanisms. In particular, public concern may lead people to migrate from high pollution areas (Chen, Oliva, and Zhang 2018), and industries may relocate in the face of mounting public criticism. The resulting changes in the economic activities that emit pollution are controlled for with a variable for year-on-year change in a locality's economic output.

References

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