

Supplementary Material

Manuscript: An Analytical Framework for Measuring Inequality in the Public Opinions on Policing – Assessing the impacts of COVID-19 Pandemic using Twitter Data

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1. ‘Observation’ Table:

The observation table show the computed opinion scores based on the observed and expected tweet documents (i.e. OSD and ESD). The ‘Mean Opinion score_ESD’ is the average score over 999 replications. See the source code on how to generate the table.

PFA	Negative OSD	Positive OSD	Opinion scores OSD	Negative ESD	Positive ESD	Mean Opinion scores ESD	Time Steps	Region
Cheshire	55.93	44.07	-11.86	56.24	43.76	-12.48	t1	North West
Cheshire	55.15	44.85	-10.30	54.79	45.21	-9.58	t2	North West
Cheshire	54.35	45.65	-8.70	54.17	45.83	-8.33	t3	North West
Cumbria	62.13	37.87	-24.26	62.32	37.68	-24.64	t1	North West
Cumbria	66.63	33.37	-33.26	66.47	33.53	-32.93	t2	North West
Cumbria	63.83	36.17	-27.66	63.85	36.15	-27.70	t3	North West
Greater.Manchester	65.55	34.45	-31.10	65.30	34.70	-30.59	t1	North West
Greater.Manchester	61.97	38.03	-23.94	61.96	38.04	-23.92	t2	North West
Greater.Manchester	64.72	35.28	-29.44	64.64	35.36	-29.28	t3	North West
Lancashire	63.14	36.86	-26.28	63.29	36.71	-26.58	t1	North West
Lancashire	64.65	35.35	-29.30	63.86	36.14	-27.72	t2	North West
Lancashire	63.02	36.98	-26.04	63.14	36.86	-26.28	t3	North West
Merseyside	64.58	35.42	-29.16	64.73	35.27	-29.47	t1	North West
Merseyside	63.90	36.10	-27.80	64.19	35.81	-28.38	t2	North West
Merseyside	62.77	37.23	-25.54	62.77	37.23	-25.54	t3	North West
Cleveland	57.89	42.11	-15.78	57.40	42.60	-14.80	t1	North East
Cleveland	61.51	38.49	-23.02	62.25	37.75	-24.51	t2	North East
Cleveland	56.31	43.69	-12.62	55.71	44.29	-11.43	t3	North East
Durham	62.30	37.70	-24.60	61.66	38.34	-23.33	t1	North East
Durham	64.04	35.96	-28.08	63.98	36.02	-27.97	t2	North East
Durham	62.68	37.32	-25.36	62.24	37.76	-24.47	t3	North East
Northumbria	61.14	38.86	-22.28	61.24	38.76	-22.48	t1	North East
Northumbria	59.78	40.22	-19.56	60.54	39.46	-21.08	t2	North East
Northumbria	63.32	36.68	-26.64	62.17	37.83	-24.33	t3	North East
Humberside	62.84	37.16	-25.68	61.84	38.16	-23.68	t1	Yorkshire and the Humber
Humberside	68.60	31.40	-37.20	69.54	30.46	-39.08	t2	Yorkshire and the Humber
Humberside	60.11	39.89	-20.22	60.27	39.73	-20.54	t3	Yorkshire and the Humber
North.Yorkshire	64.35	35.65	-28.70	63.29	36.71	-26.57	t1	Yorkshire and the Humber
North.Yorkshire	61.87	38.13	-23.74	61.59	38.41	-23.18	t2	Yorkshire and the Humber

North.Yorkshire	60.94	39.06	-21.88	60.32	39.68	-20.63	t3	Yorkshire and the Humber
South.Yorkshire	64.74	35.26	-29.48	64.15	35.85	-28.31	t1	Yorkshire and the Humber
South.Yorkshire	65.79	34.21	-31.58	66.16	33.84	-32.31	t2	Yorkshire and the Humber
South.Yorkshire	62.42	37.58	-24.84	62.58	37.42	-25.17	t3	Yorkshire and the Humber
West.Yorkshire	62.31	37.69	-24.62	64.11	35.89	-28.23	t1	Yorkshire and the Humber
West.Yorkshire	62.76	37.24	-25.52	63.21	36.79	-26.42	t2	Yorkshire and the Humber
West.Yorkshire	61.59	38.41	-23.18	61.47	38.53	-22.93	t3	Yorkshire and the Humber
Staffordshire	84.75	15.25	-69.50	75.54	24.46	-51.09	t1	West Midlands
Staffordshire	87.13	12.87	-74.26	75.83	24.17	-51.66	t2	West Midlands
Staffordshire	78.65	21.35	-57.30	68.95	31.05	-37.91	t3	West Midlands
Warwickshire	66.77	33.23	-33.54	68.55	31.45	-37.11	t1	West Midlands
Warwickshire	67.11	32.89	-34.22	68.14	31.86	-36.28	t2	West Midlands
Warwickshire	59.96	40.04	-19.92	59.94	40.06	-19.88	t3	West Midlands
West.Mercia	63.19	36.81	-26.38	63.04	36.96	-26.07	t1	West Midlands
West.Mercia	61.54	38.46	-23.08	61.77	38.23	-23.53	t2	West Midlands
West.Mercia	62.37	37.63	-24.74	62.46	37.54	-24.91	t3	West Midlands
West.Midlands	60.77	39.23	-21.54	60.75	39.25	-21.49	t1	West Midlands
West.Midlands	63.06	36.94	-26.12	62.61	37.39	-25.23	t2	West Midlands
West.Midlands	60.88	39.12	-21.76	61.29	38.71	-22.58	t3	West Midlands
Derbyshire	60.22	39.78	-20.44	60.23	39.77	-20.46	t1	East Midlands
Derbyshire	61.94	38.06	-23.88	60.75	39.25	-21.51	t2	East Midlands
Derbyshire	60.84	39.16	-21.68	60.01	39.99	-20.01	t3	East Midlands
Leicestershire	61.93	38.07	-23.86	62.11	37.89	-24.21	t1	East Midlands
Leicestershire	66.58	33.42	-33.16	66.60	33.40	-33.20	t2	East Midlands
Leicestershire	64.97	35.03	-29.94	65.46	34.54	-30.92	t3	East Midlands
Lincolnshire	60.39	39.61	-20.78	60.21	39.79	-20.43	t1	East Midlands
Lincolnshire	63.96	36.04	-27.92	64.23	35.77	-28.45	t2	East Midlands
Lincolnshire	63.30	36.70	-26.60	63.92	36.08	-27.84	t3	East Midlands
Northamptonshire	55.33	44.67	-10.66	54.54	45.46	-9.07	t1	East Midlands
Northamptonshire	54.39	45.61	-8.78	54.22	45.78	-8.44	t2	East Midlands
Northamptonshire	57.59	42.41	-15.18	57.06	42.94	-14.12	t3	East Midlands
Nottinghamshire	59.28	40.72	-18.56	58.62	41.38	-17.25	t1	East Midlands
Nottinghamshire	59.66	40.34	-19.32	59.42	40.58	-18.85	t2	East Midlands
Nottinghamshire	59.97	40.03	-19.94	60.53	39.47	-21.06	t3	East Midlands
Bedfordshire	60.19	39.81	-20.38	59.51	40.49	-19.03	t1	Eastern

Bedfordshire	54.49	45.51	-8.98	54.39	45.61	-8.78	t2	Eastern
Bedfordshire	59.67	40.33	-19.34	59.43	40.57	-18.86	t3	Eastern
Cambridgeshire	66.27	33.73	-32.54	66.58	33.42	-33.17	t1	Eastern
Cambridgeshire	64.26	35.74	-28.52	64.17	35.83	-28.35	t2	Eastern
Cambridgeshire	63.43	36.57	-26.86	63.90	36.10	-27.79	t3	Eastern
Essex	64.43	35.57	-28.86	64.72	35.28	-29.44	t1	Eastern
Essex	61.24	38.76	-22.48	61.40	38.60	-22.80	t2	Eastern
Essex	62.88	37.12	-25.76	64.22	35.78	-28.44	t3	Eastern
Hertfordshire	61.89	38.11	-23.78	61.88	38.12	-23.76	t1	Eastern
Hertfordshire	60.30	39.70	-20.60	59.96	40.04	-19.92	t2	Eastern
Hertfordshire	61.25	38.75	-22.50	61.40	38.60	-22.79	t3	Eastern
Norfolk	65.83	34.17	-31.66	65.28	34.72	-30.55	t1	Eastern
Norfolk	63.87	36.13	-27.74	64.57	35.43	-29.13	t2	Eastern
Norfolk	62.74	37.26	-25.48	63.08	36.92	-26.16	t3	Eastern
Suffolk	64.44	35.56	-28.88	64.55	35.45	-29.11	t1	Eastern
Suffolk	62.30	37.70	-24.60	63.29	36.71	-26.58	t2	Eastern
Suffolk	63.18	36.82	-26.36	63.05	36.95	-26.11	t3	Eastern
Dyfed.Powys	63.84	36.16	-27.68	64.81	35.19	-29.61	t1	Wales
Dyfed.Powys	62.78	37.22	-25.56	62.53	37.47	-25.07	t2	Wales
Dyfed.Powys	59.75	40.25	-19.50	59.18	40.82	-18.36	t3	Wales
Gwent	58.04	41.96	-16.08	57.53	42.47	-15.06	t1	Wales
Gwent	61.34	38.66	-22.68	61.07	38.93	-22.13	t2	Wales
Gwent	61.14	38.86	-22.28	61.24	38.76	-22.48	t3	Wales
North.Wales	83.24	16.76	-66.48	73.97	26.03	-47.93	t1	Wales
North.Wales	86.44	13.56	-72.88	75.28	24.72	-50.56	t2	Wales
North.Wales	77.38	22.62	-54.76	67.66	32.34	-35.33	t3	Wales
South.Wales	66.82	33.18	-33.64	66.99	33.01	-33.98	t1	Wales
South.Wales	62.15	37.85	-24.30	62.13	37.87	-24.26	t2	Wales
South.Wales	62.38	37.62	-24.76	62.68	37.32	-25.37	t3	Wales
Avon.and.Somerset	64.63	35.37	-29.26	64.36	35.64	-28.73	t1	South West
Avon.and.Somerset	63.12	36.88	-26.24	63.14	36.86	-26.28	t2	South West
Avon.and.Somerset	61.98	38.02	-23.96	62.36	37.64	-24.72	t3	South West
Devon.and.Cornwall	62.17	37.83	-24.34	62.23	37.77	-24.47	t1	South West
Devon.and.Cornwall	61.71	38.29	-23.42	61.15	38.85	-22.30	t2	South West
Devon.and.Cornwall	58.82	41.18	-17.64	58.43	41.57	-16.86	t3	South West
Dorset	66.96	33.04	-33.92	67.15	32.85	-34.29	t1	South West
Dorset	64.68	35.32	-29.36	64.56	35.44	-29.12	t2	South West
Dorset	62.80	37.20	-25.60	62.81	37.19	-25.63	t3	South West
Gloucestershire	65.64	34.36	-31.28	65.85	34.15	-31.71	t1	South West
Gloucestershire	59.32	40.68	-18.64	59.30	40.70	-18.60	t2	South West
Gloucestershire	62.83	37.17	-25.66	62.60	37.40	-25.20	t3	South West
Wiltshire	64.30	35.70	-28.60	65.10	34.90	-30.20	t1	South West
Wiltshire	64.57	35.43	-29.14	65.15	34.85	-30.29	t2	South West
Wiltshire	62.57	37.43	-25.14	62.52	37.48	-25.04	t3	South West
Metropolitan.Police	65.96	34.04	-31.92	66.16	33.84	-32.32	t1	South East

Metropolitan.Police	65.59	34.41	-31.18	65.80	34.20	-31.59	t2	South East
Metropolitan.Police	65.62	34.38	-31.24	65.89	34.11	-31.79	t3	South East
Hampshire	62.92	37.08	-25.84	63.74	36.26	-27.48	t1	South East
Hampshire	62.64	37.36	-25.28	61.71	38.29	-23.42	t2	South East
Hampshire	57.94	42.06	-15.88	58.45	41.55	-16.90	t3	South East
Kent	64.10	35.90	-28.20	64.71	35.29	-29.42	t1	South East
Kent	63.17	36.83	-26.34	62.88	37.12	-25.76	t2	South East
Kent	61.96	38.04	-23.92	61.81	38.19	-23.61	t3	South East
Surrey	62.56	37.44	-25.12	61.80	38.20	-23.61	t1	South East
Surrey	60.99	39.01	-21.98	61.55	38.45	-23.11	t2	South East
Surrey	58.98	41.02	-17.96	58.63	41.37	-17.27	t3	South East
Sussex	58.02	41.98	-16.04	57.13	42.87	-14.26	t1	South East
Sussex	57.74	42.26	-15.48	56.99	43.01	-13.98	t2	South East
Sussex	56.87	43.13	-13.74	56.62	43.38	-13.24	t3	South East
Thames.Valley	88.25	11.75	-76.50	79.52	20.48	-59.05	t1	South East
Thames.Valley	90.26	9.74	-80.52	80.54	19.46	-61.08	t2	South East
Thames.Valley	83.27	16.73	-66.54	73.32	26.68	-46.65	t3	South East

2. 'P-values' and 'Position' Tables (Combined)

The table below shows the statistical significant values of observed opinion scores (columns 2 - 4), as well as the position of the observed opinion scores (columns 5 - 7) in relation to the mean of the '999' expected opinion scores computed. A position value is set as 'TRUE' if the observed opinion score is greater than the mean expectation, and "0" if less or equal to the mean expectation.

PFA	p_value t1	p_value t2	p_value t3	Position t1	Position t2	Position t3	Region
Cheshire	0.268	0.079	0.31	TRUE	0	0	North West
Cumbria	0.32	0.328	0.452	TRUE	0	TRUE	North West
Greater Manchester	0.204	0.475	0.373	0	0	0	North West
Lancashire	0.337	0.009	0.336	TRUE	0	TRUE	North West
Merseyside	0.323	0.125	0.467	TRUE	TRUE	TRUE	North West
Cleveland	0.281	0.16	0.221	0	TRUE	0	North East
Durham	0.164	0.417	0.196	0	0	0	North East
Northumbria	0.377	0.085	0.047	TRUE	TRUE	0	North East
Humberside	0.088	0.046	0.379	0	TRUE	TRUE	Yorkshire and the Humber
North Yorkshire	0.006	0.188	0.045	0	0	0	Yorkshire and the Humber
South Yorkshire	0.041	0.083	0.285	0	TRUE	TRUE	Yorkshire and the Humber
West Yorkshire	0.001	0.043	0.326	TRUE	TRUE	0	Yorkshire and the Humber
Staffordshire	0.001	0.001	0.001	0	0	0	West Midlands
Warwickshire	0.006	0.01	0.436	TRUE	TRUE	0	West Midlands
West Mercia	0.305	0.226	0.366	0	TRUE	TRUE	West Midlands
West Midlands	0.442	0.032	0.071	0	0	TRUE	West Midlands
Derbyshire	0.444	0.007	0.062	TRUE	0	0	East Midlands
Leicestershire	0.285	0.456	0.036	TRUE	TRUE	TRUE	East Midlands
Lincolnshire	0.309	0.162	0.015	0	TRUE	TRUE	East Midlands
Northamptonshire	0.111	0.346	0.156	0	0	0	East Midlands
Nottinghamshire	0.091	0.231	0.077	0	0	TRUE	East Midlands
Bedfordshire	0.137	0.375	0.317	0	0	0	Eastern
Cambridgeshire	0.244	0.366	0.145	TRUE	0	TRUE	Eastern
Essex	0.204	0.326	0.006	TRUE	TRUE	TRUE	Eastern
Hertfordshire	0.43	0.24	0.336	0	0	TRUE	Eastern
Norfolk	0.118	0.07	0.24	0	TRUE	TRUE	Eastern
Suffolk	0.369	0.036	0.367	TRUE	TRUE	0	Eastern
Dyfed-Powys	0.138	0.307	0.198	TRUE	0	0	Wales
Gwent	0.189	0.338	0.394	0	0	TRUE	Wales
North Wales	0.001	0.001	0.001	0	0	0	Wales
South Wales	0.325	0.45	0.224	TRUE	0	TRUE	Wales
Avon and Somerset	0.206	0.42	0.107	0	TRUE	TRUE	South West
Devon and Cornwall	0.389	0.01	0.076	TRUE	0	0	South West
Dorset	0.314	0.371	0.467	TRUE	0	TRUE	South West
Gloucestershire	0.257	0.454	0.251	TRUE	0	0	South West

Wiltshire	0.065	0.097	0.413	TRUE	TRUE	0	South West
Metropolitan Police	0.105	0.073	0.037	TRUE	TRUE	TRUE	South East
Hampshire	0.034	0.012	0.114	TRUE	0	TRUE	South East
Kent	0.074	0.196	0.345	TRUE	0	0	South East
Surrey	0.098	0.128	0.274	0	TRUE	0	South East
Sussex	0.013	0.019	0.241	0	0	0	South East
Thames Valley	0.001	0.001	0.001	0	0	0	South East