Technical explanation of the statistical technique used

We first fit a null model (Model 1A) which specifies the outcome variable and a random intercept, allowing mean trust in the police to vary by social strata. The model can be written as:

Level 1: $y_{ij} = \beta_{0j} + e_{ij}$

Level 2: $\beta_{0j} = \beta_0 + u_j$

or as a combined equation: $y_{ij} = \beta_0 + u_j + e_{ij}$

where $u_j \sim N(0, \sigma^2_u)$

$e_{ij} \sim N(0, \sigma^2_e)$

In this model, y_{ij} denotes the trust in the police score for individual i ($i = 1,\ldots,n_j$) in stratum j ($j = 1, .., J$). β_{0j} is the mean trust in the police score specific to stratum j, and is decomposed into an overall mean β_0 (the precision weighted grand mean or overall average value of trust in the police score) and a stratum random effect u_j, which measures how different the mean trust in the police score in stratum j is from the overall mean. The u_j is assumed to be normally distributed with mean of 0 and variance σ^2_u. The residual e_{ij} measures the deviation of the trust in the police score for individual i in stratum j from their stratum mean, and is also assumed to be normally distributed with mean of 0 and variance σ^2_e.

We fit Model 1A to estimate individual and stratum-level variances and particularly the Variance Partition Coefficient (VPC). The VPC is defined as the proportion of total individual variance in y_{ij} ($\sigma^2_u + \sigma^2_e$) that lies between strata: $VPC = \sigma^2_u / (\sigma^2_u + \sigma^2_e)$. VPC values can range from 0 to 1 (but often re-calculated as percentages by multiplying the original value by 100) and the higher the values, the greater the practical significance (Evans

et al., 2024). The VPC indicates how strata context influences understanding individual disparities in trust in the police. It measures the intra-stratum correlation or the clustering of individuals' trust in the police within these strata. A high VPC suggests that individuals within the same stratum have very similar trust in the police scores, which differ significantly from those in other strata. If the VPC were hypothetically 100%, knowing the average trust score for a stratum would reveal each individual's trust score within it. Conversely, a VPC of 0% would mean all strata are indistinguishable in terms of trust in the police, rendering stratum membership irrelevant for predicting individual trust. In this scenario, no General Contextual Effect (GCE) of the examined intersectional strata exists (Merlo et al., 2018).

We then fit an additive main effects model (Model 1B) to estimate interaction effects for the strata. We add social strata variables as fixed level 2 predictor variables:

$$y_{ij} = \beta_0 + \beta_1 X_{1j} + \ldots + \beta_p X_{pj} + u_j + e_{ij}$$

$$u_j \sim N(0, \sigma^2_u)$$

$$e_{ij} \sim N(0, \sigma^2_e)$$

where $x_{1j},\ldots,x_{pj}$ denote the p dummy variables and $\beta_1,\ldots, \beta_p$ are their associated regression coefficients of our categorical variables. The summation $\beta_0 + \beta_1 X_{1j} + \ldots + \beta_p X_{pj}$ gives the predicted trust in the police score for stratum j based on the additive main effects alone. Critically, Model 1B does not include any fixed interaction parameters. Instead, the stratum random effect u_j captures the entirety of the interaction effect for stratum j. As in Model 1A, the u_j is assumed to be normally distributed with mean of 0 and between-stratum variance σ^2_u, which now describes the remaining between-stratum variance after additive effects are controlled for. The residual e_{ij} has the same interpretation as in Model 1A.

In addition to VPC, we investigate the relative contribution of additive and interaction effects by calculating the Proportional Change in Variance (PCV): (σ^2_u (Model 1A) - σ^2_u (Model

1B)) / σ^2_u (Model 1A). The PCV captures the extent to which the between-stratum variance reduces between Models 1A and 1B. If we subtract the PCV from 1 (1 – PCV), the resulting value represents the between-stratum variance that remains unexplained after adjusting for additive effects, thus attributing it to interaction effects. Typically, the PCV is multiplied by 100 to be expressed as a percentage. A PCV significantly less than 100% suggests that interaction effects are crucial for accurately describing the observed disparities between strata (Evans et al., 2024). Data management and statistical analysis were conducted using R (version 4.2.3).

Appendix Table 1: Strata variable details and data for figures

			Figure 1			Figure 2			Rank
				95% CI			95% CI		
Stratum ID	Stratum label	n	Mean	Lower	Upper	Mean	Lower	Upper	Fig 2
22141	Female_Non-White_18-24_DE_London	7	-0.089	-0.375	0.197	3.245	2.871	3.593	1
12241	Male_Non-White_25-49_DE_London	16	-0.068	-0.342	0.206	3.292	2.944	3.630	2
12141	Male_Non-White_18-24_DE_London	12	0.036	-0.282	0.354	3.342	2.964	3.677	3
22241	Female_Non-White_25-49_DE_London	34	-0.020	-0.294	0.254	3.361	3.044	3.690	4
22142	Female_Non-White_18-24_DE_Outside London	31	-0.062	-0.321	0.197	3.375	3.059	3.691	5
12142	Male_Non-White_18-24_DE_Outside London	15	-0.033	-0.311	0.245	3.393	3.050	3.723	6
11242	Male_White_25-49_DE_Outside London	276	-0.294	-0.500	-0.088	3.414	3.217	3.622	7
11141	Male_White_18-24_DE_London	4	-0.075	-0.396	0.246	3.477	3.111	3.818	8
12242	Male_Non-White_25-49_DE_Outside London	42	0.020	-0.241	0.281	3.489	3.194	3.770	9
21141	Female_White_18-24_DE_London	4	-0.026	-0.324	0.272	3.531	3.165	3.906	10
22121	Female_Non-White_18-24_C1_London	17	-0.061	-0.373	0.251	3.537	3.182	3.852	11
22221	Female_Non-White_25-49_C1_London	52	-0.100	-0.355	0.155	3.548	3.240	3.828	12
22231	Female_Non-White_25-49_C2_London	18	-0.101	-0.391	0.189	3.552	3.220	3.908	13
22342	Female_Non-White_50 plus_DE_Outside London	28	-0.118	-0.385	0.149	3.563	3.243	3.878	14
11241	Male_White_25-49_DE_London	16	-0.019	-0.305	0.267	3.570	3.261	3.910	15
22211	Female_Non-White_25-49_AB_London	63	-0.128	-0.389	0.133	3.575	3.296	3.845	16
22341	Female_Non-White_50 plus_DE_London	18	0.017	-0.248	0.282	3.578	3.228	3.936	17
12341	Male_Non-White_50 plus_DE_London	10	0.043	-0.227	0.313	3.599	3.246	3.936	18
22242	Female_Non-White_25-49_DE_Outside London	52	0.139	-0.106	0.384	3.611	3.318	3.926	19
22122	Female_Non-White_18-24_C1_Outside London	55	-0.058	-0.315	0.199	3.622	3.319	3.912	20
12221	Male_Non-White_25-49_C1_London	53	-0.010	-0.271	0.251	3.624	3.321	3.926	21
22131	Female_Non-White_18-24_C2_London	8	0.006	-0.280	0.292	3.629	3.284	4.000	22
12342	Male_Non-White_50 plus_DE_Outside London	20	-0.007	-0.297	0.283	3.639	3.322	3.990	23
21241	Female_White_25-49_DE_London	20	0.031	-0.249	0.311	3.646	3.296	3.956	24
12122	Male_Non-White_18-24_C1_Outside London	34	-0.026	-0.283	0.231	3.651	3.321	3.951	25

12232	Male_Non-White_25-49_C2_Outside London	48	-0.116	-0.379	0.147	3.652	3.369	3.984	26
11142	Male_White_18-24_DE_Outside London	36	0.038	-0.232	0.308	3.660	3.361	3.989	27
22111	Female_Non-White_18-24_AB_London	17	0.007	-0.299	0.313	3.672	3.325	3.996	28
12121	Male_Non-White_18-24_C1_London	26	0.114	-0.162	0.390	3.673	3.355	4.015	29
12231	Male_Non-White_25-49_C2_London	21	0.034	-0.278	0.346	3.674	3.348	4.025	30
11341	Male_White_50 plus_DE_London	43	-0.055	-0.300	0.190	3.697	3.370	4.016	31
12132	Male_Non-White_18-24_C2_Outside London	14	0.002	-0.288	0.292	3.704	3.373	4.067	32
22222	Female_Non-White_25-49_C1_Outside London	108	-0.051	-0.276	0.174	3.709	3.441	3.969	33
11232	Male_White_25-49_C2_Outside London	235	-0.280	-0.482	-0.078	3.709	3.474	3.958	34
12131	Male_Non-White_18-24_C2_London	14	0.124	-0.180	0.428	3.710	3.367	4.075	35
12111	Male_Non-White_18-24_AB_London	16	0.108	-0.172	0.388	3.747	3.391	4.077	36
21121	Female_White_18-24_C1_London	16	-0.070	-0.358	0.218	3.747	3.409	4.094	37
21221	Female_White_25-49_C1_London	54	-0.109	-0.366	0.148	3.749	3.442	4.060	38
22132	Female_Non-White_18-24_C2_Outside London	19	0.029	-0.240	0.298	3.761	3.421	4.092	39
22112	Female_Non-White_18-24_AB_Outside London	31	0.000	-0.261	0.261	3.762	3.442	4.077	40
12321	Male_Non-White_50 plus_C1_London	15	-0.031	-0.321	0.259	3.792	3.465	4.113	41
12331	Male_Non-White_50 plus_C2_London	4	-0.042	-0.350	0.266	3.798	3.449	4.182	42
21122	Female_White_18-24_C1_Outside London	148	-0.121	-0.317	0.075	3.801	3.562	4.045	43
11121	Male_White_18-24_C1_London	12	0.012	-0.268	0.292	3.805	3.488	4.163	44
22321	Female_Non-White_50 plus_C1_London	12	-0.032	-0.297	0.233	3.809	3.460	4.153	45
21142	Female_White_18-24_DE_Outside London	63	0.145	-0.118	0.408	3.811	3.505	4.108	46
11342	Male_White_50 plus_DE_Outside London	568	-0.077	-0.267	0.113	3.814	3.623	4.003	47
11231	Male_White_25-49_C2_London	20	-0.071	-0.361	0.219	3.816	3.459	4.143	48
22232	Female_Non-White_25-49_C2_Outside London	61	0.010	-0.245	0.265	3.818	3.492	4.116	49
21242	Female_White_25-49_DE_Outside London	379	0.110	-0.066	0.286	3.823	3.616	4.033	50
11111	Male_White_18-24_AB_London	25	-0.036	-0.316	0.244	3.832	3.498	4.174	51
12112	Male_Non-White_18-24_AB_Outside London	36	0.105	-0.169	0.379	3.842	3.546	4.158	52
12212	Male_Non-White_25-49_AB_Outside London	69	0.056	-0.201	0.313	3.843	3.571	4.119	53
12311	Male_Non-White_50 plus_AB_London	23	-0.030	-0.291	0.231	3.846	3.506	4.168	54
21111	Female_White_18-24_AB_London	22	-0.022	-0.320	0.276	3.851	3.546	4.214	55

21131	Female_White_18-24_C2_London	10	-0.001	-0.291	0.289	3.854	3.498	4.227	56
22322	Female_Non-White_50 plus_C1_Outside London	39	-0.063	-0.333	0.207	3.863	3.550	4.186	57
21211	Female_White_25-49_AB_London	94	-0.062	-0.301	0.177	3.870	3.596	4.165	58
12211	Male_Non-White_25-49_AB_London	47	0.163	-0.100	0.426	3.877	3.544	4.184	59
11211	Male_White_25-49_AB_London	89	-0.035	-0.266	0.196	3.877	3.591	4.176	60
12222	Male_Non-White_25-49_C1_Outside London	68	0.156	-0.085	0.397	3.882	3.597	4.159	61
22331	Female_Non-White_50 plus_C2_London	5	0.015	-0.283	0.313	3.886	3.537	4.253	62
21112	Female_White_18-24_AB_Outside London	77	-0.107	-0.368	0.154	3.888	3.613	4.182	63
22311	Female_Non-White_50 plus_AB_London	26	-0.010	-0.279	0.259	3.895	3.584	4.208	64
12312	Male_Non-White_50 plus_AB_Outside London	37	-0.105	-0.375	0.165	3.897	3.586	4.226	65
11122	Male_White_18-24_C1_Outside London	106	-0.011	-0.229	0.207	3.904	3.648	4.162	66
21341	Female_White_50 plus_DE_London	56	0.132	-0.115	0.379	3.921	3.614	4.218	67
21132	Female_White_18-24_C2_Outside London	66	-0.028	-0.265	0.209	3.922	3.634	4.207	68
11132	Male_White_18-24_C2_Outside London	35	0.010	-0.260	0.280	3.926	3.618	4.263	69
12322	Male_Non-White_50 plus_C1_Outside London	24	0.007	-0.265	0.279	3.933	3.623	4.264	70
22332	Female_Non-White_50 plus_C2_Outside London	26	-0.041	-0.333	0.251	3.937	3.620	4.273	71
11131	Male_White_18-24_C2_London	6	0.101	-0.162	0.364	3.938	3.587	4.286	72
22212	Female_Non-White_25-49_AB_Outside London	107	0.120	-0.111	0.351	3.942	3.668	4.192	73
11221	Male_White_25-49_C1_London	56	0.096	-0.149	0.341	3.944	3.663	4.207	74
21231	Female_White_25-49_C2_London	15	0.055	-0.239	0.349	3.961	3.635	4.316	75
11112	Male_White_18-24_AB_Outside London	67	-0.006	-0.247	0.235	3.964	3.671	4.227	76
12332	Male_Non-White_50 plus_C2_Outside London	14	0.023	-0.289	0.335	3.998	3.665	4.328	77
22312	Female_Non-White_50 plus_AB_Outside London	44	0.027	-0.242	0.296	4.021	3.738	4.328	78
11222	Male_White_25-49_C1_Outside London	532	0.079	-0.090	0.248	4.038	3.855	4.219	79
21311	Female_White_50 plus_AB_London	70	-0.061	-0.302	0.180	4.069	3.770	4.335	80
11212	Male_White_25-49_AB_Outside London	434	0.061	-0.117	0.239	4.082	3.887	4.278	81
11332	Male_White_50 plus_C2_Outside London	453	-0.095	-0.279	0.089	4.085	3.896	4.279	82
21232	Female_White_25-49_C2_Outside London	390	0.080	-0.094	0.254	4.090	3.885	4.315	83
21321	Female_White_50 plus_C1_London	53	0.032	-0.223	0.287	4.107	3.796	4.417	84
11312	Male_White_50 plus_AB_Outside London	821	-0.092	-0.241	0.057	4.110	3.942	4.296	85

11322	Male_White_50 plus_C1_Outside London	569	-0.044	-0.211	0.123	4.113	3.911	4.294	86
11311	Male_White_50 plus_AB_London	91	-0.015	-0.258	0.228	4.114	3.838	4.393	87
11321	Male_White_50 plus_C1_London	41	0.078	-0.192	0.348	4.119	3.833	4.428	88
21342	Female_White_50 plus_DE_Outside London	753	0.222	0.050	0.394	4.127	3.942	4.315	89
21222	Female_White_25-49_C1_Outside London	594	0.148	-0.021	0.317	4.128	3.950	4.301	90
21212	Female_White_25-49_AB_Outside London	598	0.101	-0.064	0.266	4.134	3.965	4.322	91
21331	Female_White_50 plus_C2_London	30	0.070	-0.234	0.374	4.182	3.869	4.521	92
21312	Female_White_50 plus_AB_Outside London	735	-0.049	-0.208	0.110	4.185	4.014	4.361	93
11331	Male_White_50 plus_C2_London	30	0.163	-0.107	0.433	4.247	3.931	4.573	94
21322	Female_White_50 plus_C1_Outside London	713	0.100	-0.069	0.269	4.270	4.081	4.443	95
21332	Female_White_50 plus_C2_Outside London	528	0.072	-0.099	0.243	4.274	4.073	4.444	96