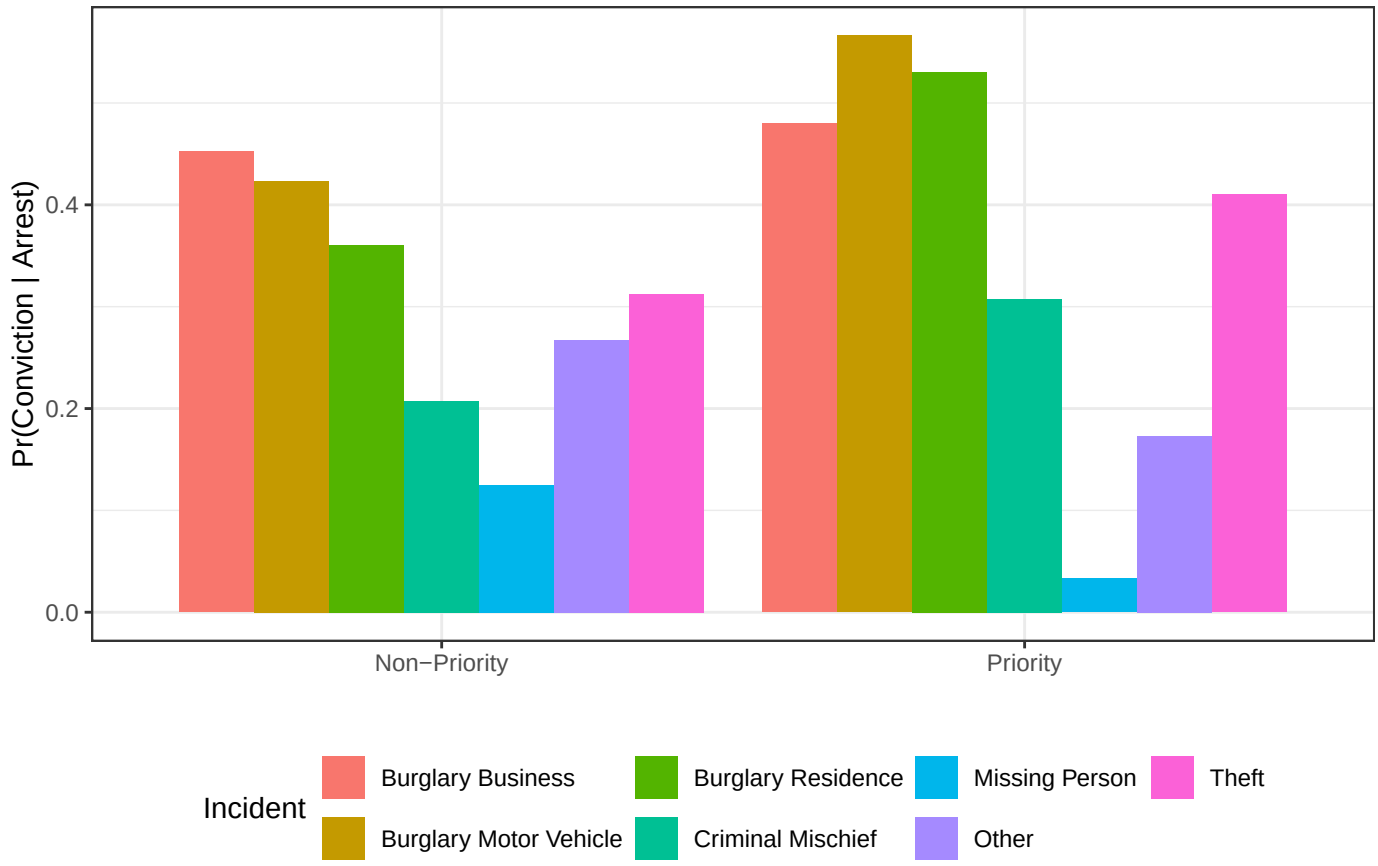
Supplementary Appendix for 'Who You Gonna Call?': 911 Call Takers and Police Discretion

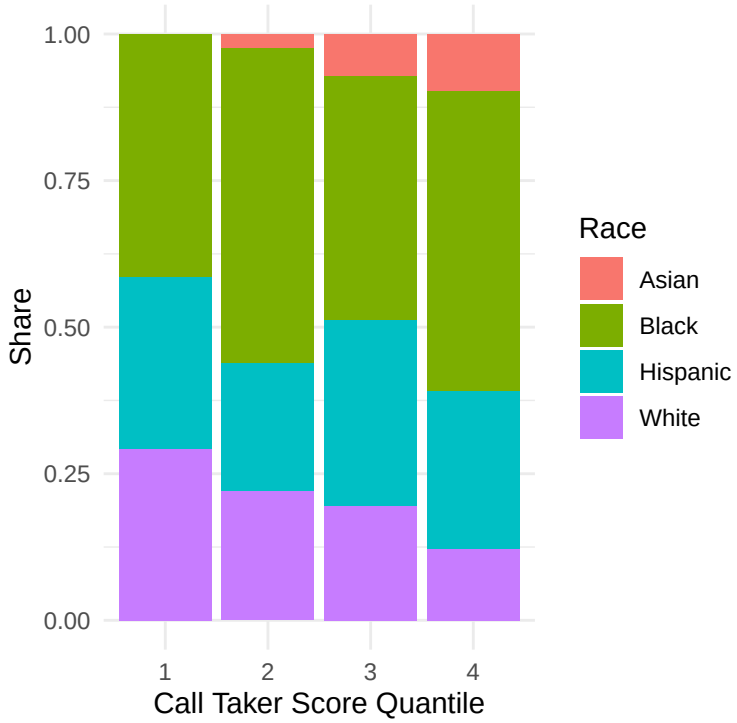
A Supplementary Tables and Figures

Figure A1: Arrest Conviction Rates by Priority



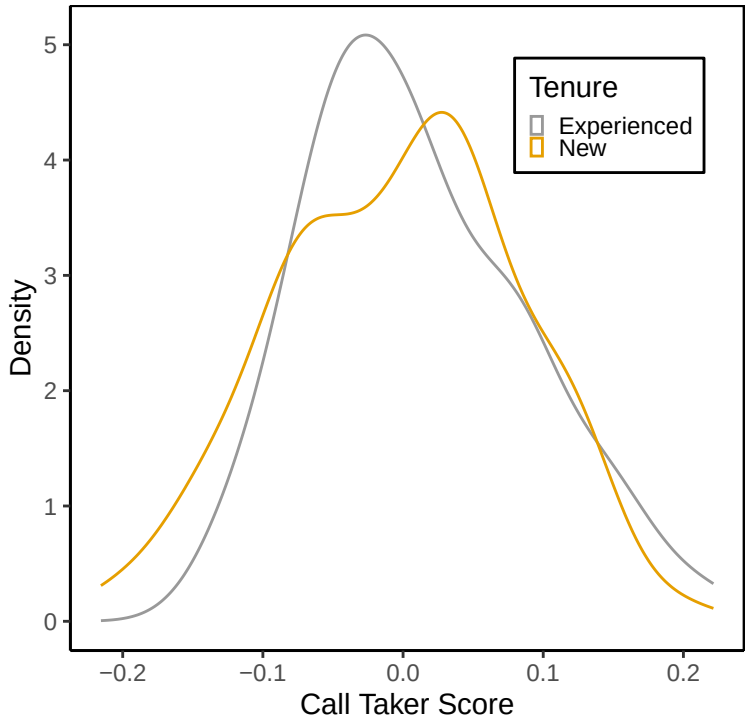
Notes: This figure depicts conviction rates for arrests made at calls that are classified under each of the 7 incident types included in the analysis sample, separated by Priority classification of the call. Conviction is calculated by merging arrest records to Dallas County DA court records.

Figure A2: Call Taker Demographics



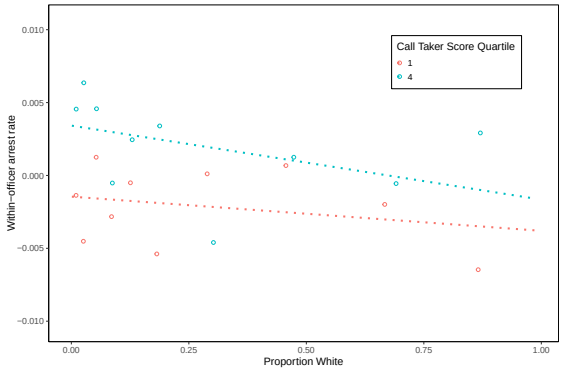
Notes: This figure depicts the racial/ethnic demographics of call takers by quintile of Call Taker Score. Each colored section within a bar represents the percent of call takers within that quintile of Call Taker Score who are of the race/ethnicity identified by the color of the section. Race/ethnicites are identified using the Rethnicity package in R, which uses the full name of the call taker to predict their race/ethnicity, using a machine learning algorithm that is trained with Florida voter registration data.

Figure A3: Call Taker Score by Experience

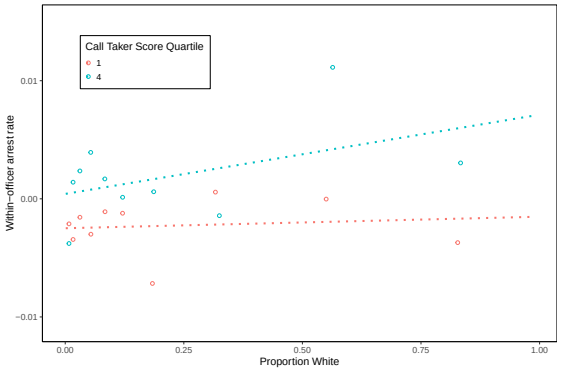


Notes: This figure depicts empirical densities of Call Taker Score, separately for Experienced and New call takers. A call taker is classified as Experienced if their first in-sample call is observed in the first month of the sample, and new otherwise; 45% of call takers are considered Experienced under this classification. The average Call Taker Score is .0104 for Experienced and -.0033 for New. The median is -.0046 for Experienced and .00219 for New.

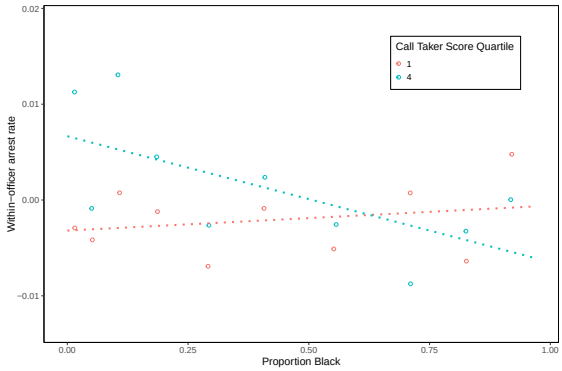
Figure A4: Triple Differences Intuition



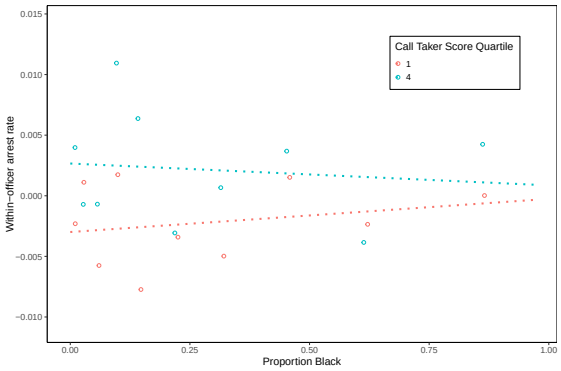
(a) White Officers



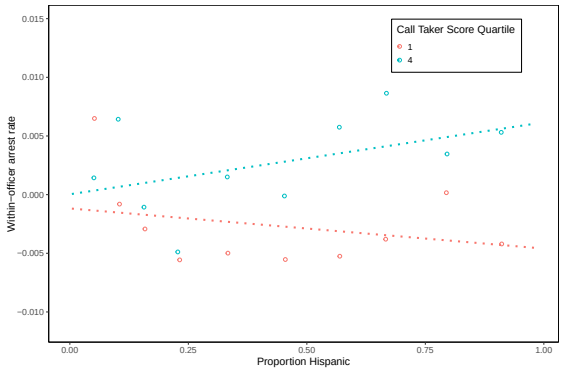
(b) Non-White Officers



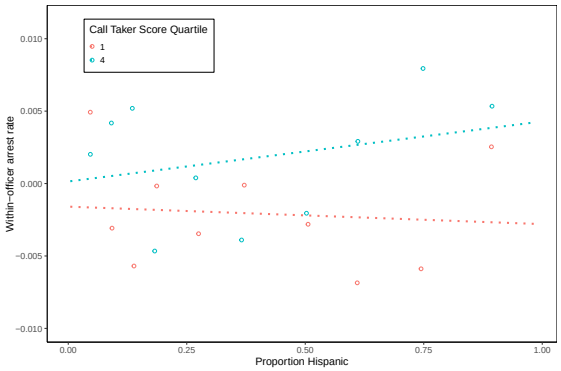
(c) Black Officers



(d) Non-Black Officers



(e) Hispanic Officers



(f) Non-Hispanic Officers

Notes: In every panel, the y-axis measures the likelihood of an arrest relative to an officer's average arrest rate in the sample. In panels a and b, the x-axis is the proportion of the call Census Block Group that is non-Hispanic white. In panels c and d, the x-axis is the proportion of the call Census Block Group that is non-Hispanic Black. In panels e and f, the x-axis is the proportion of the call Census Block Group that is Hispanic. The panel titles reflect the subset of officers for which the data is used to build the figures. Observations are grouped so that each point includes an equal number of calls. The fitted lines are linear fits across each of the plotted call taker score quartiles.

Table A1: Top In-Sample Arrest Offenses

	Offense	Proportion of Arrests	Proportion Priority	Proportion Non-Priority
1	WARRANT	0.30	0.62	0.38
2	DISORDERLY CONDUCT	0.21	0.83	0.17
3	NARCOTICS & DRUGS	0.11	0.67	0.33
4	TRESPASS	0.07	0.25	0.75
5	PUBLIC INTOXCIATION	0.07	0.85	0.15
6	ASSAULT	0.04	0.82	0.18
7	DWI	0.03	0.96	0.04
8	OTHER-MISDEMEANOR	0.02	0.55	0.45
9	THEFT-OTHER	0.02	0.64	0.36
10	FAIL TO ID	0.02	0.60	0.40
11	FORGE/COUNTERFEIT	0.01	0.92	0.08
12	WEAPONS	0.01	0.75	0.25
13	FRAUD	0.01	0.79	0.21
14	RESIST ARREST	0.01	0.65	0.35
15	BURGLARY	0.01	0.62	0.38
16	BURGLARY-VEHICLE	0.01	0.78	0.22
17	EVADING	0.01	0.55	0.45
18	TRAFFIC	0.01	0.81	0.19
19	THEFT-RETAIL	0.01	0.65	0.35
20	AGG ASSAULT	0.01	0.86	0.14

Notes: This table lists the 20 most frequent arrest charges among the 7 types of incidents used for the analysis sample, as described in Section 3.1, in order of their frequency. The 2nd named column reports the proportion of all arrests which are accounted for by that charge. The 3rd and 4th named columns report the proportion of those arrests that are Priority and Non-Priority, respectively.

Table A2: Call Taker Summary Statistics

Variable	N	Mean	Std. Dev.	Min	Pctl. 25	Pctl. 75	Max
Calls Answered	164	3646	3264	456	1227	4882	14486
Priority Rate	164	0.4	0.095	0.21	0.33	0.46	0.66
Pr(Arrest)	164	0.031	0.0089	0.015	0.025	0.035	0.056
Conviction Rate	164	0.2	0.055	0.061	0.17	0.23	0.38
Days in Sample	164	769	524	152	361	1098	1666
Transfer Rate	164	0.035	0.0057	0.016	0.032	0.039	0.051
Race	164						
... Asian	8	5%					
... Black	77	47%					
... Hispanic	45	27%					
... White	34	21%					

Notes: This table presents summary statistics from the 911 analysis sample at the level of the assigned 911 call taker. Days in sample is calculated as the number of days between the call taker's earliest and latest call in the sample. Transfer rate is calculated as the proportion of all 911 calls handled by that call taker that are transferred to another call taker. Race is determined using call takers' first and last names with the Rethnicity package.

Table A3: First Stage and Reduced Form

Dependent Variables:	Priority	Arrest
Model:	(1)	(2)
Variables		
Call Taker Score	0.9983***	0.0151***
	(0.0046)	(0.0043)
Fit statistics		
Observations	597,973	597,973
R^2	0.04447	0.00548
Y mean	0.38260	0.02862
KP F-stat	13382.8083	

Notes: This table contains first stage and reduced form estimates for the baseline specification. Each regression includes month-by-year, day of week-by-hour, and Division fixed effects, an indicator for whether the call taker is Hispanic, and Census Block Group controls for proportion minority, proportion no high school degree, proportion unemployed, and log per capita income. Standard errors are clustered at the call taker level. KP F-stat denotes the Kleibergen-Paap Robust F-Statistic from the first-stage regression. $^{***}p < 0.01,^{**}p < 0.05,^{*}p < 0.1$.

Table A4: First Stage by Subsamples

	Subsample	Estimate	SE
1	Division - Central	1.01	0.03
2	Division - North Central	0.97	0.03
3	Division - South Central	1.01	0.03
4	Division - Northwest	0.95	0.03
5	Division - Northeast	1.01	0.02
6	Division - Southeast	1.03	0.02
7	Division - Southwest	0.98	0.02
8	>50% Minority	1.00	0.01
9	<50% Minority	0.99	0.02
10	Overnight Shift	0.94	0.03
11	Day Shift	0.94	0.03
12	Evening Shift	0.92	0.02

Notes: This table presents estimates and standard errors for the coefficient on priority in first-stage regressions using different subsamples of the data. Each regression includes the full set of controls and fixed effects from the baseline regression, excluding the fixed effect or control that is used to generate the subsample. Standard errors are clustered at the call taker level. KP F-stat denotes the Kleibergen-Paap Robust F-Statistic from the first-stage regression.

Table A5: Balance Test: Full Call Sample

Dependent Variable:	Call Taker Score
Model:	(1)
Variables	
1{In Sample}	-0.0005
	(0.0008)
Proportion Minority	-0.0004
	(0.0005)
Proportion No Degree	-0.0002
	(0.0015)
Proportion Unemployed	0.0008
	(0.0009)
Log(Income per Capita)	-0.0002
	(0.0002)
Division - North Central	-0.0002
	(0.0004)
Division - Northeast	-0.0002
	(0.0003)
Division - Northwest	0.0000
	(0.0003)
Division - South Central	-0.0002
	(0.0003)
Division - Southeast	0.0000
	(0.0003)
Division - Southwest	-0.0002
	(0.0003)
Fit statistics	
Observations	1,907,202
Incremental R^2	1.38×10^{-5}
F Stat	0.47792
p-value	0.91808

This table reports results from a balance test that uses the full sample of 911 calls, including call types not in the analysis sample. Call Taker Score is assigned to non-sample calls as average Call Taker Score across all of the call taker's calls. The variable 1{In Sample} is an indicator for whether the call is included in the sample. Incremental R^2 reports the R^2 added to the regression for just the variables with reported estimates. The regression includes month-by-year and day of week-by-hour fixed effects, and an indicator for whether the call taker is Hispanic. Standard errors are clustered at the call taker level. $^{***}p < 0.01,^{**}p < 0.05,^{*}p < 0.1$.

Table A6: Effect of Priority by Arrest Type

Dependent Variables:	Index Arrest	Non-Index Arrest	Unclassified Arrest
Model:	(1)	(2)	(3)
Variables			
Priority	0.0005	0.0096***	0.0047**
	(0.0007)	(0.0033)	(0.0019)
Fit statistics			
Observations	597,973	597,973	597,973
R^2	0.00075	0.00988	0.00431
Dependent variable mean	0.00111	0.01919	0.00816

Notes: This table presents results for the baseline specification using index, non-index, and unclassified arrests as separate outcomes. Index arrests are for the index offenses tracked by the FBI: murder, rape, aggravated assault, burglary, robbery, theft, and arson. Non-index arrests are those arrests for which non-index charges are made. Unclassified arrests do not have formal charges in DPD data, either because they are for outstanding warrants or because they are non-criminal apprehensions. Each regression includes month-by-year, day of week-by-hour, and Division fixed effects, an indicator for whether the call taker is Hispanic, and Census Block Group controls for proportion minority, proportion no high school degree, proportion unemployed, and log per capita income. Standard errors are clustered at the call taker level. $^{***}p < 0.01,^{**} p < 0.05,^{*} p < 0.1$.

Table A7: Effect of Priority on Use of Force

Dependent Variable:	Use of Force
Model:	(1)
Variables	
Priority	0.00007
	(0.00056)
Fit statistics	
Observations	597,973
R^2	0.00066
Dependent variable mean	0.00087

Notes: This table presents results from the baseline specification, using a dummy for use of force as the outcome variable. Use of force equals one if any use of force report was generated that can be linked to the call. Call Taker Score is used as the IV for Priority in Column 1. The regression includes month-by-year, day of week-by-hour, and Division fixed effects, an indicator for whether the call taker is Hispanic, and Census Block Group controls for proportion minority, proportion no high school degree, proportion unemployed, and log per capita income. Standard errors are clustered at the call taker level. $^{***}p < 0.01,^{**} p < 0.05,^{*} p < 0.1$.

Table A8: Effect of Priority on Conviction

Dependent Variable:	Conviction	
Model:	Misdemeanor	Felony
	(1)	(2)
Variables		
Priority	-0.162483**	-0.169952
	(0.072522)	(0.134847)
Fit statistics		
Observations	7,938	2,107
R^2	0.10818	0.13951
Dependent variable mean	0.30665	0.69722
KP F-stat	155.6922	53.9379

Notes: This table presents results for two regressions of conviction on priority, conditional on an arrest being made. Column 1 uses the sample of arrests from the analysis data that are misdemeanors. Column 2 uses the sample of arrests from the analysis data that are misdemeanors. Estimations are performed using 2SLS, with Call Taker Score as the instrument for priority. Each regression includes month-by-year, day of week-by-hour, and Division fixed effects, an indicator for whether the call taker is Hispanic, and Census Block Group controls for proportion minority, proportion no high school degree, proportion unemployed, and log per capita income. Standard errors are clustered at the call taker level. $^{***}p < 0.01,^{**} p < 0.05,^{*} p < 0.1$.

Table A9: Diff-in-Diff Robustness

Dependent Variable:	Arrest	
Model:	(1)	(2)
Variables		
Priority * Proportion Same Race	-0.0169**	
	(0.0072)	
Priority * Years of Experience		-0.0009***
		(0.0003)
Fixed Effects	Beat-by-Time	Beat-by-Time
Fit statistics		
Observations	1,170,500	1,170,500
R^2	0.06576	0.06602
Dependent variable mean	0.02862	0.02862

Notes: This table includes results for alternative specifications of the equations used to produce column 1 in Table 4 and Table 5. The only difference between the specifications in this table and the main body specifications are that month-by-year, day of week-by-hour, and Division fixed effects have been placed with a high-dimensional call beat-by-time fixed effect. Specifically, the specifications include beat-by-shift-by-day of week-by-year fixed effects. For the sake of brevity, additional interaction terms have been omitted. As in the specification from the main text, each regression also includes an indicator for whether the call taker is Hispanic, and Census Block Group controls for proportion minority, proportion no high school degree, proportion unemployed, and log per capita income. Standard errors are clustered at the call taker level. $^{***}p < 0.01,^{**} p < 0.05,^{*} p < 0.1$.

B Response Time Effects

Mechanically, marginally upgraded calls receive much faster police responses. In Table B1, I report results from IV regressions that substitute arrest in the baseline specification for response time, time to dispatch, and time taken to drive to the incident.[1] Calls with priority signals receive officers 42 minutes quicker than similar calls without these signals. This represents a 75% reduction on the average response time of 56 minutes. This effect is driven entirely by quicker assignment (dispatch) time; there is no effect on the amount of time it takes officers to travel to the call once they've been assigned.

To the extent that response times increase the likelihood that police are able to apprehend a suspect, the significant reductions that result from a call being upgraded to priority status likely increase arrests. Even though the calls in my sample are predominantly low-level incidents where arrests may not be necessary, long waits may lead to natural dissipation of the incident that leads suspects or witnesses to leave the scene. Relatedly, Vidal and Kirchmaier (2018) provide evidence on a few of the mechanisms through which quicker response times increase the likelihood that police are able to solve a crime. These include increasing the chances that a cooperative witness is present to name a suspect and enhancing the possibility that police are able to arrest the suspect at the scene before they have fled. I examine each of these mechanisms in order to assess the importance of the response time effect.

First, I estimate the baseline specification using indicators for call dispositions of "No Complainant" and "No Police Action" as outcome variables in the baseline IV specification. The "No Complainant" disposition serves as a proxy for the presence of witnesses. Officers would only use this disposition in the case that they arrive to a call and they cannot locate the person who wants to make a criminal complaint. The "No Police Action" disposition is

[1] Due to inconsistencies in the reporting of officer arrival times, I perform these regressions on a truncated sample which includes only calls for which arrival times are recorded. In Supplementary Appendix Table B3, I demonstrate that this sample produces equivalent results for the baseline regression specification. The likelihood of arrest in the truncated sample is .02537, similar to that in the analysis sample.

more broad and applies to cases when the officer identifies the complainant but determines that police action is not required in the situation. This may happen because the officer determines that the complainant's issue is not a crime, but also because the suspect has left the scene and the complainant no longer wishes to make a crime report.

Supplementary Appendix Table B4 reports the result of these regressions. There is insufficient evidence to suggest that marginal priority calls are less likely to be marked as having no complainant present, as the coefficient on priority is imprecisely estimated as a 5% reduction on the mean. However, I estimate a statistically significant reduction of 4.5pp (11% on the mean) in the likelihood that the responding officers report that the call did not require police action. I cannot determine how much this can be attributed to suspects being at the scene when officers arrive versus officers' assessments being different, so this test provides inconclusive results.

As a secondary test of the role of response times, I use the timestamp within the arrest report to estimate the effect of priority on the speed of arrest. Specifically, I use arrests made within 15 minutes as a proxy for arrests made "on-sight," as in Vidal and Kirchmaier (2018), since these arrests are likely to be driven by presence of the suspect at the scene. In Supplementary Appendix Table B2, I report regression results where I use an indicator for whether arrests occurred within a certain amount of time after officer arrival as the outcome. I find that there is a relatively large increase in arrests within 15 minutes of arrival. I estimate that priority signals increase the likelihood of these immediate arrests by .6pp, a 60% increase on the average. However, I also estimate large, positive, and statistically significant effects of priority on arrests made 15-30 minutes and 45-60 minutes after the arrival. For arrests made 45-60 minutes after arrival, the effect of priority is nearly double the mean. I interpret these results as evidence that priority signals affect officer decisions through their mechanical impacts on police response, in addition to their established impacts on officer information.

Table B1: Effect of Priority on Response Time

Dependent Variables:	Total Response Time (mins)	Dispatch Time (mins)	Driving Time (mins)
Model:	(1)	(2)	(3)
Variables			
Priority	-42.52***	-42.37***	-0.1439
	(2.937)	(2.880)	(0.2002)
Fit statistics			
Observations	522,660	522,660	522,660
R^2	0.17036	0.17200	0.02295
Dependent variable mean	56.232	46.819	9.4124
KP F-Stat, Priority	11,652.5	11,652.5	11,652.5

Notes: This table contains results for regressions of the same form as in Table 3, but replacing the dependent variable of arrest with Response Time in column 1, Dispatch Time in column 2, and Drive Time in column 3. The coefficients on Priority are estimated using the Call Taker Score IV. All times are measured in minutes. Response Time measures the difference between the time of the call and the time of the arrival of the first officer. Dispatch Time measures the difference between the time of the call and the time of the first officer being assigned. Drive Time measures the difference between the time of the first officer being assigned and the time they arrive at the call. Each regression includes month-by-year, day of week-by-hour, and Division fixed effects, an indicator for whether the call taker is Hispanic, and Census Block Group controls for proportion minority, proportion no high school degree, proportion unemployed, and log per capita income. Standard errors are clustered at the call taker level. $^{***}p < 0.01,^{**}p < 0.05,^{*}p < 0.1$.

Table B2: Effect of Priority on Arrest Timing

	Arrest				
Time to Arrest:	15 Minutes or Less	15 to 30 Minutes	30 to 45 Minutes	45 to 60 Minutes	Over an Hour
Variables					
Priority	0.0060**	0.0032**	0.0014	0.0026***	-0.0005
	(0.0024)	(0.0015)	(0.0011)	(0.0008)	(0.0011)
Fit statistics					
Observations	522,660	522,660	522,660	522,660	522,660
R^2	0.00678	0.00365	0.00185	0.00152	0.00036
Dependent variable mean	0.01159	0.00616	0.00293	0.00146	0.00309
KP F-Stat, Priority	11,652.5	11,652.5	11,652.5	11,652.5	11,652.5

Notes: This table depicts results for regressions with the same right-hand side as those used to estimate Table 3, but replacing the dependent variable with an indicator for whether an arrest was made in the time frame listed at the top of each column. The Call Taker Score measure is used as an instrument for priority. The regressions are performed on the sample of calls for which the officer arrival timestamp is available. Each regression includes month-by-year, day of week-by-hour, and Division fixed effects, an indicator for whether the call taker is Hispanic, and Census Block Group controls for proportion minority, proportion no high school degree, proportion unemployed, and log per capita income. Standard errors are clustered at the call taker level. $^{***}p < 0.01,^{**}p < 0.05,^{*}p < 0.1$.

Table B3: IV Results: Timestamp sample

Dependent Variable:	Arrest
Model:	(1)
Variables	
Priority	0.0129***
	(0.0042)
Fit statistics	
Observations	522,660
R^2	0.01227
Dependent variable mean	0.02537
KP F-Stat, Priority	11,652.5

Notes: This table contains IV results for the baseline estimation of equation (1) on the subample of the data for which arrival timestamps are available. The table demonstrates that this subsample is similar to the analysis sample. The regression includes month-by-year, day of week-by-hour, and Division fixed effects, an indicator for whether the call taker is Hispanic, and Census Block Group controls for proportion minority, proportion no high school degree, proportion unemployed, and log per capita income. Standard errors are clustered at the call taker level. $^{***}p < 0.01,^{**}p < 0.05,^{*}p < 0.1$.

Table B4: Effects of Priority on Unit Dispositions

Dependent Variables:	No Complainant	No Police Action Required
Model:	(1)	(2)
Variables		
Priority	-0.0057	-0.0453*
	(0.0104)	(0.0249)
Fit statistics		
Observations	597,972	597,972
R^2	0.00915	0.01211
Dependent variable mean	0.10586	0.40341
KP F-Stat, Priority	13,074.9	13,074.9

Notes: This table reports IV regression results equivalent to those in Table 3, but with disposition outcomes as the dependent variables. In Column 1, the outcome is a dummy for whether the reporting unit indicated that the complainant was not present upon arrival. In Column 2, the outcome is a dummy for whether the reporting unit determined that no police action was required. Each regression includes month-by-year, day of week-by-hour, and Division fixed effects, an indicator for whether the call taker is Hispanic, and Census Block Group controls for proportion minority, proportion no high school degree, proportion unemployed, and log per capita income. KP F-stat denotes the Kleibergen-Paap Robust F-Statistic from the first-stage regression. Standard errors are clustered at the call taker level. $^{***}p < 0.01,^{**}p < 0.05,^{*}p < 0.1$.

References

Vidal, J. B. I. and Kirchmaier, T. (2018). The effect of police response time on crime clearance rates. *Review of Economic Studies*, 85:855–891.