


ARTICLE

# Policing neighborhood boundaries and the racialized social control of spaces

Roland Neil<sup>1</sup>  and Joscha Legewie<sup>2</sup>

<sup>1</sup>Departments of Economics, Sociology, and Statistics, RAND, Santa Monica, CA, USA and <sup>2</sup>Department of Sociology, Harvard University, Cambridge, MA, USA

**Corresponding author:** Roland Neil; Email: [rneil@rand.org](mailto:rneil@rand.org)

(Received 17 October 2022; revised 11 July 2023; accepted 12 October 2023)

## Abstract

Prior scholarship has established that controlling space is central to policing, while highlighting various ways in which this form of social control can be racialized. Extending this work, we advance a theory on the racialized control of space that predicts a higher level of police stops and lower standards of suspicion along neighborhood racial boundaries, the areas where racial composition changes between adjacent neighborhoods. Our theoretical argument sheds light on the selective enforcement of law and order in these transitional spaces, which is a form of racialized spatial social control. Integrating data from New York City's Stop, Question, and Frisk program from 2008 to 2012 with extensive neighborhood measures, our analyses reveal that White neighborhoods along boundaries experienced substantially elevated levels of police stops even after conditioning on a wide array of potential confounders. This relationship is partially mediated by elevated crime along neighborhood racial boundaries. Still, a sizable direct effect persists, indicative of the racialized social control of spaces. Further, the police tended to require less suspicion before deciding to conduct stops in White neighborhoods along racial boundaries, but only for Black and Hispanic suspects. Implications for the study of race and policing, law and society, and urban and racial inequality are discussed.

**Keywords:** ethnicity; neighborhoods; policing; race; spatial boundaries

Making sense of racial inequality in policing and the role of law in perpetuating such disparities is a topic of great interest among academics and the wider public. Central to the policing function is the legal authority to control who is allowed to occupy certain spaces – a practice that is deeply racialized. Law and society research elucidates how legal instruments and policing strategies intersect to enforce spatial social control, particularly through legal mechanisms that facilitate the exclusion of individuals from spaces (Beckett and Herbert 2009; 2010), target racialized minorities perceived as “out of place” (Carroll and Gonzalez 2014; Werthman and Piliavin 1967), and contribute to the intensive surveillance of racially segregated neighborhoods (Fagan et al. 2010). Additionally, this scholarship examines the various ways in which spatial divisions

such as jurisdictional lines and injunctions are constructed and policed (Gordon 2022; Muñiz 2015). Scholarship on the policing of space has long invoked the concept of neighborhood boundaries or borders to describe the policing of large, adjacent areas (Meehan and Ponder 2002); the policing of out-of-place Black individuals in White neighborhoods (Bell 2020; Werthman and Piliavin 1967, 78); and related processes (e.g., Desmond and Valdez 2013; Faber and Kalbfeld 2019; Irwin 1985). Building on this work, we advance a theoretical model that focuses on policing in the actual spaces that divide differently raced neighborhoods, that is, in the areas in which one neighborhood transitions to the next. Our theory leads us to predict higher levels of police stops and lower standards of suspicion at these neighborhood racial boundaries, independent of crime rates. Thus, we investigate: how do neighborhood racial boundaries influence police stopping patterns? To answer this research question, we combine extensive measures on New York City's neighborhoods and their boundaries with data on stops from the height of the New York City Police Department's (NYPD) program of Stop, Question, and Frisk (SQF) from 2008 to 2012. We define neighborhood racial boundaries as geographic areas where racial composition changes between adjacent neighborhoods and focus on the boundaries between White and Black or Hispanic neighborhoods. We operationalize neighborhoods as Census block groups so that we may detect these boundaries at fine spatial resolutions.

Results indicate that police stops are more common along boundaries between White and Black or Hispanic neighborhoods, increasing monotonically such that the sharpest boundaries have the highest stop counts. This effect persists on the White side of neighborhood racial boundaries after conditioning on a wide set of potential confounders, indicating that stops are higher because these neighborhoods border Black or Hispanic areas. While this relationship is partially mediated by crime, stop levels are higher along these boundaries even after accounting for crime. In additional analysis, we break down these results across racial groups by focusing on the standards of suspicion that police typically require before deciding to make stops – as estimated with hit rates. The findings show that the standards of suspicion are lower along the White side of neighborhood racial boundaries, but only for Black and Hispanic individuals.

Our research contributes to law and society scholarship on how legal authority is exerted by the police, and against whom (e.g., Beckett and Herbert 2009; Bell 2020; Gordon 2022; Muñiz 2015), by illustrating the influence of neighborhood racial boundaries. The proximity to these boundaries is significant in influencing the application of social control, not merely the presence within segregated spaces. Further, these findings suggest a way in which legal authority influences societal interactions and reinforces racial stratification.

Expanding upon existing research, our study underscores how formal mechanisms of social control operate in conjunction with, and at times extend beyond, the dynamics of conflict and informal social regulation traditionally examined in urban sociology and studies of racial and ethnic stratification. This observation resonates with Muñiz's (2014; 2015) study on gang injunctions, which illustrates how the state and citizens collaboratively produce enforcement regimes that restrict the movement and behavior of Black youth. These insights provide empirical grounding for theoretical debates within the law and society field about the roles of legal institutions and agents in shaping racialized experiences in urban landscapes. Through this lens, our findings engage

with critical questions about how law materializes in everyday spatial practices and its implications for social equity and justice.

### Prior work on race and space in policing

A rich research tradition on how the police exercise social control in society has established that creating and maintaining spatial divisions as to who can access different spaces and under what conditions is central to policing as an institution (Herbert 1997). Importantly, the police's control of space can be racialized. Scholars have documented multiple, overlapping ways in which race and space can combine to influence patterns of policing (e.g., Holmes 2000; Holmes and Smith 2008; Muñiz 2014; 2015; Smith 1986; Worden 1996).

For one, segregated neighborhoods themselves may be subject to elevated social control (Bell 2020). For example, racial threat theory is a descendent of canonical sociological theories of intergroup conflict (Blalock 1967; Blumer 1958), and maintains that the police are used to control populations that pose a threat to the dominant racial order. Supporting this, minority residential composition is often found to be positively related to enforcement levels (Fagan et al. 2010; Ferrandino 2015; Geller and Fagan 2010; Kane et al. 2013; Lautenschlager and Omori 2019; Levchak 2017; Morrow et al. 2018; Zhao et al. 2019).

Desmond and Valdez (2013) argue that non-Black residents are most likely to call the police on Black residents in racially mixed neighborhoods because of their proximity to this group, of which they are often fearful. Also, recent research has found that gentrifying neighborhoods may experience elevated policing levels (Beck 2020; Lanfear et al. 2018), something which has been connected to the racial dynamics of gentrifiers exerting and demanding control in areas into which they expand.

The “out-of-place” hypothesis focuses on how the police use environmental cues as to who belongs and who doesn't to form suspicion. It maintains that the police view and treat people as particularly suspicious when their race does not match the racial characteristics of the areas they are encountered, especially Black and Hispanic individuals in White neighborhoods (Bell 2020; Carroll and Gonzalez 2014; Gelman et al. 2007; Meehan and Ponder 2002; Werthman and Piliavin 1967). Relatedly, Beckett and Herbert (2009; 2010) describe the growing use of techniques used to legally exclude people from spaces – what they call banishment – such as trespass enforcement and park exclusion orders, which appear to be particularly targeted at marginalized populations such as homeless people, who are disproportionately racialized minorities.

At a larger spatial scale, several studies show differences in policing between large sections of cities or jurisdictions that border each other. Meehan and Ponder (2002) document substantial racial profiling in a White suburban area located adjacent to a mainly Black community and describe this pattern as police enforcement of racial segregation. Epp and colleagues (2014) similarly describe police-enforced “segregation of neighborhoods” and document elevated stops of minorities in wealthy White areas adjacent to the downtown core. Focusing on a marginalized Black community in a predominantly White suburb, Boyles (2015) examines similar processes in an suburban setting and explores how racial profiling and discriminatory policing practices shape the interactions between law enforcement and suburban residents.

Gordon (2020; 2022) shows how a redistricting of police service areas mapped onto segregation boundaries, which in turn allowed for diverging policing styles to emerge in differently raced areas. Finally, through a detailed analysis of archive documents and qualitative interviews, Muñiz (2014; 2015) shows how the implementation of a gang injunction in Los Angeles was influenced by changing neighborhood demographics that threatened race and class boundaries. The injunction, in turn, restricted the movement and behavior of Black youth and young adults who were perceived as threatening for racial and class boundaries.

Clearly, there are many ways through which race and space can combine to impact patterns of policing and the application of the law. It is common in these studies for scholars to describe these processes as involving the policing of neighborhood racial boundaries or borders (Boyles 2015; Desmond and Valdez 2013; Epp et al. 2014; Faber and Kalbfeld 2019; Irwin 1985; Meehan and Ponder 2002; Muñiz 2015). Notably, except for Muñiz (2014; 2015), what these studies call boundary policing pertains to processes that may play out far away from the actual neighborhood racial boundaries. For example, Meehan and Ponder (2002) invoke the policing of borders but empirically focus on large, adjacent areas. Similarly, when Bell (2020) describes the patrolling of borders and Werthman and Piliavin (1967, 78) commented that “the police are... stringent about preventing boys from crossing boundaries of a higher status or a different color,” both are describing out-of-place policing of Black individuals in White neighborhoods. These are all, in a sense, instances of the policing of boundaries. Our focus on neighborhood racial boundaries, however, is distinct. Building on this research tradition, we argue that the policing of spaces that divide differently raced neighborhoods is another way in which racialized social control is exerted.

### Theories on the policing of neighborhood racial boundaries

We theorize that policing differs not just across large bordering areas but also along the very boundaries in which differently raced neighborhoods transition into each other. In addition to policing theories, especially racial threat and the out-of-place hypothesis, our argument is informed by non-policing scholarship on community conflict and informal social control. One is defended neighborhoods theory, which highlights the importance of out-group shares and out-group in-migration but focuses on informal social control, maintaining that residents of neighborhoods will behave defensively given an influx of minority members, in an attempt to preserve their way of life (Suttles 1972). Suttles’ (1972) ethnographic study of White urban neighborhoods showcases that residents share a sense of community identity that is partly based on the exclusion of minority groups. Though not developed as a policing theory, using the police against these racialized minorities is likely a form of defensive behavior.

Other, more recent scholarship on neighborhood racial boundaries focuses on informal social control and highlights the importance of citizen-initiated complaints. Legewie and Schaeffer (2016) demonstrate that neighborhood social conflict is especially high at contested boundaries, that is, areas where there is a gradual spatial transition between neighborhoods of differing racial compositions. They theorize that contested boundaries produce ethnoracial tensions through a combination of group threat, defended neighborhoods and ambiguities about social rank, which increase

the number of complaints about neighbors initiated through the non-emergency hotline 311. Earlier research focused on racial uprisings during the early twentieth century also highlights the importance of conflict around neighborhood racial boundaries (Bergesen and Herman 1998; Grimshaw 1960), though the focus was not on the implications of such boundaries for policing.

White residents of neighborhoods that are immediately exposed to a large community of racialized minorities may feel especially threatened by minority members in their own community, and may act more defensively as a result, compared to those in areas surrounded by other White neighborhoods. In this context, proximate and highly concentrated minority groups may be harder to ignore and easier to construct as part of a larger pattern of threatening “Others” on one’s proverbial doorstep. The work of Legewie and Schaeffer (2016) and Suttles (1972) in particular suggest that citizen-initiated complaints are a bottom-up process through which policing may be particularly aggressive along neighborhood racial boundaries. By responding to citizen-initiated complaints and neighborhood conflict more broadly, policing patterns may follow demands of White communities along boundaries. Alternatively, boundaries may be policed more aggressively due to top-down processes such as racial threat, in which a major function of policing – as a coercive arm of the state – is to protect the dominant racial order, or through officers using their discretionary powers and contextual cues to form suspicion. This combination of state and citizens-initiated processes resonates with Muñiz’s work (2014; 2015) on gang injunctions in California. Based on a detailed analysis of archive documents and qualitative interviews, she outlines the process by which gang injunctions in Los Angeles restrict the movement and behavior of Black youth and young adults who are perceived as threatening for racial and class boundaries and separation. This work highlights how state and citizen actions may coalesce to enforce racial neighborhood boundaries in response to fears of Black men.

Racial threat theory and the out-of-place hypothesis are particularly relevant for the policing of neighborhood racial boundaries, even though this is not how prior research has used these ideas. Insofar as policing reflects a response to racial threat or, relatedly, a segregation maintenance function, policing may be particularly aggressive at the spaces where racial boundaries can or do shift, since it is there that segregation most stands to unravel. As for the out-of-place hypothesis, even though racialized minorities likely seem less out of place in areas abutting where they tend to reside, it is at such places where the salience of race may be most elevated if there is ambiguity or insecurity over just whose place it is. Importantly, the out-of-place hypothesis, and also defended neighborhoods theory, leads us to expect that it is the White side of neighborhood racial boundaries where enforcement is likely most elevated, especially against Black and Hispanic suspects.

These varying theoretical processes highlight that policing may be elevated at neighborhood racial boundaries due to group threat and conflict, suspicion, fear, defensiveness and territoriality on the part of these several actors and organizations. Given these processes, we hypothesize that the White side of neighborhood racial boundaries are subject to elevated levels of racialized social control, particularly a higher number of police stops and a lower standard of suspicion for stops of minority individuals.

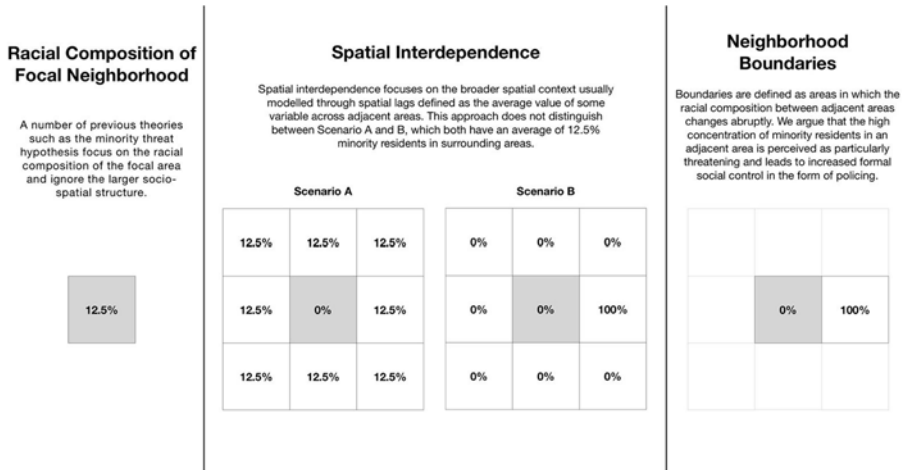


Figure 1. Contrasting approaches in the study of race, space and policing.

### Neighborhood racial boundaries versus other forms of spatial interdependence

A growing literature on spatial interdependence examines whether an outcome of interest is affected by the characteristics of nearby areas. Some such policing-focused studies exist (Beck 2020; Ingram 2007; Laniyonu 2018; Lautenschlager and Omori 2019), and many studies examine related processes such as crime (e.g., Mears and Bhati 2006; Messner et al. 1999). Typically, this work focuses on the average value of some variable across adjacent areas. While we share a concern with spatial interdependence, our theoretical perspective implies that neighborhood racial boundary processes are distinct from the average influence of all adjacent areas. Figure 1 illustrates this distinction and highlights how a focus on neighborhood racial boundaries differs from work based solely on neighborhoods’ own racial context or on spatial interdependence.

### Crime at neighborhood racial boundaries as an alternative explanation

Though we focus on racialized social control, crime is an alternative explanation that might account for higher levels of policing at neighborhood racial boundaries. Several studies have shown that crime is elevated along these boundaries (Dean et al. 2019; Kim and Hipp 2021; Legewie 2018). Because neighborhood racial boundaries likely demarcate different communities, made up of different racial groups, they may be areas of particularly low levels of social ties, cohesion or cooperation (Kim and Hipp 2021; Legewie 2018). Following from social disorganization theory and the concept of collective efficacy (Sampson et al. 1997), such areas are likely to have lower levels of informal social control. While ethnic heterogeneity within neighborhoods has long been seen as a key influence on social disorganization (Sampson and Byron Groves 1989; Shaw and McKay 1942), the boundaries that divide ethnically homogenous neighborhoods likely similarly face elevated levels of disorganization. Elevated levels of crime at neighborhood racial boundaries could lead to increased policing, which might account for higher levels of policing at neighborhood racial boundaries. However, we hypothesize that policing is higher at neighborhood racial boundaries even conditional on crime rates.

## Methods

### Data

Our analysis draws on neighborhood data from various sources. First, we use data from the NYPD's SQF program to measure police stops from 2008 to 2012. The years 2008 to 2012 are the focus of this article because this period was the height of the SQF program and when stops were most reliably reported. Second, we use the 2000 and 2010 Censuses and the 2008–2012 American Community Survey (ACS) block-group level estimates for information on neighborhood socioeconomic and demographic features. Third, we use data from the Census Bureau's 2010 TIGER/Line shapefiles, the New York City Department of City Planning and the New York City Housing Authority for information on physical features, land use and the built environment. Fourth, we use NYPD crime complaint data from 2008 to 2012 to measure crime. Official crime data are particularly useful when studying police behavior given that the police cannot respond to crime they don't know happened.

We operationalize neighborhoods as census block groups. While block groups are smaller than alternative, more conventional definitions of neighborhoods (e.g., Greenwich Village is made up of over a dozen block groups), this is preferable given the focus on neighborhood racial boundaries. Block groups allow for precise measurement of where racial composition changes and align most closely with the theoretical aims of this study.

Of the 6,334 block groups in New York City, our analysis includes 4,604 (72.7%). We exclude block groups if they had a population of less than 100 (131 block groups, which are mostly large parks) or if there was missing data (18 block groups). Missing data indicate that these block groups are not conventional neighborhoods but rather places like Rikers Island Jail and JFK Airport. In addition, we exclude a block group that is mostly a prison barge and another that is an island. For reasons explained below, we exclude the bottom quartile of the remaining block groups on a measure of combined Hispanic, Black and White populations (i.e., block groups where these groups make up less than 81% of residents). These excluded neighborhoods are overwhelmingly inhabited by Asian residents. Results are similar, and lead to the same conclusions, when including these neighborhoods. Finally, 33 neighborhoods are excluded because they bordered none of the remaining neighborhoods.

### Variables

#### Outcome

The outcome variable in the first two parts of our analyses is the total number of pedestrian *police stops* that occurred during the period of study in each neighborhood. The third part of our analysis focuses on the rate at which stops uncovered evidence of wrongdoing. These "hit rates" are a way of understanding how the typical standards of suspicion applied by police vary by features such as suspect race and place. To assist with clarity, we discuss details about this outcome and additional control variables used for the hit rate analysis just before those results are presented.

#### Racial composition and boundaries

Our analyses focus on the proportion of residents who are Black and/or Hispanic as the key measure of *racial composition* and to construct neighborhood racial boundaries.

We focus on neighborhood boundaries between White and Black/Hispanic areas for several reasons. First, Black and Hispanic individuals were the focus of SQF, constituting 85% of all stops. Relatedly, Black/Hispanic neighborhoods experience particularly high levels of aggressive policing (Fagan et al. 2010). Second, our theoretical argument suggests that policing is higher at neighborhood racial boundaries where White residents are exposed to a proximate minority community that is perceived as threatening. Black and Hispanic residents are both stereotyped as threatening and crime-prone (Devine and Elliot 1995; Quillian and Pager 2001; Sampson and Raudenbush 2004; Welch et al. 2011), meaning that our theoretical argument analogously applies to both.<sup>1</sup> Third, combining Black and/or Hispanic neighborhoods increases statistical power. In supplementary analyses we separately model Black–White and Hispanic–White boundaries; doing so leaves all major conclusions intact.<sup>2</sup> Finally, White–Asian, Black–Hispanic and other types of boundaries are uncommon in New York City, with a very limited range of values, making it impossible to reliably conduct the analyses presented here. Our theoretical and empirical focus is not meant to diminish the potential importance of other types of boundaries, particularly in other settings.

We define *neighborhood racial boundaries* as the areas along which racial composition transitions from White to Black and/or Hispanic. This conceptualization of boundaries as zones of transition reflects that policing is more likely responsive to social processes in such areas as opposed to on sharp lines that cut between neighborhoods, which are unlikely to be consistently perceived in the same place and may not even exist. We measure neighborhood racial boundaries using areal wombling (Legewie 2018; Logan et al. 2011; Spielman and Logan 2013), which provides a direct operationalization of this concept. With areal wombling, boundary values are defined as the difference between some response variable for adjacent areas, in this case neighborhoods. Formally, this method defines an adjacency matrix  $A$  where  $a_{ij} = 1$  if  $i$  and  $j$  are adjacent, and 0 if not. Each pair of adjacent areas has a *boundary value* calculated as  $D_{ij} = |Y_i - Y_j|$ , where  $Y$  is the response variable, in this case the proportion of residents who are Black and/or Hispanic. Higher values indicate larger differences in the racial composition of adjacent neighborhoods, which is to say sharper boundaries. At the other extreme, a value of 0 indicates no difference in racial composition between bordering areas. Because neighborhoods can border multiple other neighborhoods, we define the racial boundary of a given neighborhood as the maximum boundary value with any other neighborhood.

### Control variables

We measure six sets of control variables, tapping into various types of differences that could exist along neighborhood racial boundaries. First, we use three measures of neighborhood demographics. These include residential *population*, which is important to measure if police conduct more stops in places where there are more people, and the extent to which neighborhoods are made up of *youth* and *males*, as police generally target younger and male individuals when making proactive police stops.

Second, five variables measure the social structure of neighborhoods. These include average *household size*, *vacancy rates*, *homeownership rates*, *residential mobility* and *population change* from 2000 to 2010. Together, these variables are indicative of the extent and nature of social organization, cohesion and informal social control, which could influence the extent to which the police step in to handle problems that arise.



Third, we measure *concentrated disadvantage*, as policing may be more aggressive in disadvantaged neighborhoods (Fagan and Davies 2000). The first component of a principal component analysis that combined the proportion of households that were female headed, using Supplemental Security Income, the proportion of adults with less than a high school education, that with at least a college degree, the unemployment rate, the family poverty rate and median household income is used as our index of concentrated disadvantage.

Fourth, we use 11 indicators of the built environment and land use. A measure of *land area* adjusts for the fact that bigger areas could have more stops solely due to their size, whereas a measure of typical *building height* captures whether policing differs in areas that are literally more built up, as such areas could create more or different demands on police services. Three measures are used for the extent to which areas are zoned for *commercial*, *light manufacturing* and *medium/heavy manufacturing*, and a further five variables indicate the fraction of each neighborhood's area taken up by *educational uses*, *cemeteries*, *parks and recreational spaces*, *public housing developments* and *commercial overlays* (typically, lots in residentially zoned areas that allow for street-front commercial uses). Finally, a variable of *mixed land use* is defined using a Herfindahl–Hirschman Index, to capture the extent to which neighborhoods are mixed in their use of residential, commercial, manufacturing, park or other uses as opposed to dominated by one or a few categories. It is important to measure differences in land use as they are plausible along neighborhood racial boundaries and police may deploy different types and numbers of officers with different priorities depending on how areas are used. For example, the NYPD has dedicated public housing units and a major component of SQF was “vertical sweeps” of NYCHA developments, which produced large numbers of stops, often for trespassing (Carlis 2009).

Fifth, and closely related, we use three measures of physical boundaries. These measures include indicator variable that capture whether neighborhoods abut a *railroad*, a *river or stream* or a *major road* (a highway or main artery). Social boundaries may overlap with physical boundaries (Kramer 2017), and it could be the latter that influences policing rather than the former (Kim and Hipp 2021; Legewie 2018).

Sixth, we measure a neighborhoods' racial *diversity* based on the Herfindahl–Hirschman Index. This measure indicates the extent to which neighborhoods' residents are a mix of White, Black, Hispanic, Asian or other races as opposed to dominated by one or a few of these groups.

Supplementary analyses extend our model with a spatial lag for the share of Black/Hispanic residents. This allows us to examine the role of neighborhood racial boundaries above and beyond spatial lags, a common measure of spatial interdependence. However, the analysis should be interpreted with caution because of high collinearity between the spatial lag and the share of Black/Hispanic residents. The spatial lag  $L$  for each neighborhood  $i$  is defined as  $L_i = \sum_{j=1}^J W_{ij} * \text{Racial Composition}_j$ .  $W$  is a weights matrix based on the inverse distance between each neighborhood  $i$  and the set of block groups  $J$  within 4 km, and therefore describes the spatial relationship between neighborhoods. As such, the spatial lag measures the racial composition of areas surrounding the focal block group, weighted such that closer neighborhoods carry greater influence.

### Crime

We measure neighborhood crime as the number of *violent felonies* the number of *property felonies* and the number of *shootings*. Shootings are measured separately given the centrality of gun crime in motivating SQF (Bellin 2014) even though they partly overlap with violent felonies. We use the number of these crimes rather than their population-adjusted rates because police generally do not engage in such benchmarking when responding to crimes. Thus, insofar as crime impacts policing, we would expect it to be the absolute levels to which they are most sensitive.

### Analytic strategy and models

Our analysis proceeds in three steps. First, we examine the relationship between neighborhood racial boundaries and police stops, including how this association varies by racial composition, using generalized linear models (GLMs). Specifically, we use negative binomial models given that the outcome is a count variable and due to the presence of overdispersion. The models take the general form:

$$\text{Stops}_i \sim \text{NegBin}(\lambda_i, \alpha), \quad (1)$$

$$\lambda_i = \exp(\beta_0 + \beta_1 \text{Racial Boundary}_i + \beta_2 \text{Racial Composition}_i + \beta_3 \text{Racial Boundary}_i * \text{Racial Composition}_i + \pi \cdot X_i),$$

where NegBin is the negative binomial stochastic component, with overdispersion parameter  $\alpha$ . The mean  $\lambda$  for each neighborhood  $i$  is modeled with a link function, an intercept, the interaction of its racial boundary and racial composition values, as well as  $X$ , a vector of covariates that corresponds to  $\pi$ , a vector of coefficients. The interaction term between racial boundaries and composition allows us to examine on which side of a boundary policing is more pronounced. We first use a descriptive version of this approach (Model 1) in which there are no covariates beyond racial boundaries and composition. We then move to a conditional version (Model 2) that includes a wide array of covariates to examine the extent to which these patterns are confounded by other processes. The appendix presents additional specifications of this model with census tract fixed effects and a spatial lag to verify that our conclusions do not reflect previously unmodeled spatial or place-based processes.

Second, we use mediation analyses to determine the extent to which the effect of boundaries on stops is explained by neighborhood crime patterns, as opposed to direct effects not explained by crime. Finally, we conduct a hit rate analysis to examine how the typical standards of suspicion required before making a stop varies by the intersection of suspect race, neighborhood racial composition and neighborhood racial boundaries. The hit rate analysis complements the earlier analyses by testing the same major hypotheses with a distinct empirical approach, while extending them by incorporating the theoretically salient role of suspects' race in relation to boundary processes. For clarity, the details of the mediation and hit rate analyses are presented in their respective results section. In every model, we use robust standard errors clustered at the tract level to account for potential dependence in the error terms that could arise between neighboring block groups.

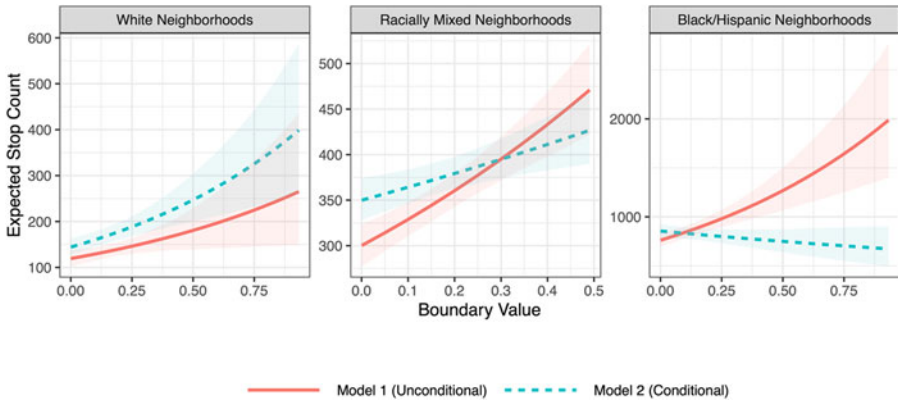


Figure 2. The relationship between racial boundaries and number of stops by neighborhood racial composition.

## Results

### *The relationship between stop numbers and neighborhood racial boundaries*

We begin by examining the descriptive association between neighborhood racial boundaries and police stops. Model 1 is a GLM that interacts neighborhood racial boundary values with racial composition, with no additional covariates. By letting the relationship between boundaries and stops vary by neighborhood racial composition, the interaction term reveals on which side of boundaries policing is more pronounced. The solid red lines in Figure 2 visualize the results and tabular regression output is found in Table 2. There is a positive relationship between neighborhood racial boundary values, the extent to which neighborhoods are Black/Hispanic and the expected number of police stops. The different panels in Figure 2 are estimates of the boundary effects at specific values of Black/Hispanic composition: the minimum (0%), midpoint (50%) and maximum (100%) observed values, corresponding respectively to White neighborhoods, racially mixed neighborhoods and Black/Hispanic neighborhoods. The solid red lines of Figure 2 make two patterns apparent. First, at any value of racial composition – which is to say, in each panel – the expected number of stops increase with higher boundary values. Second, at any boundary value, neighborhoods with more Black/Hispanic residents experience more stops, as is made particularly clear when looking at the y-axes across the panels.<sup>3</sup>

Predominantly White neighborhoods without Black/Hispanic boundaries experienced on average of 119 police stops between 2008 and 2012. However, a neighborhood with the same racial composition along a sharp boundary experienced an average of 256 police stops. In contrast, a neighborhood whose residents are entirely Black/Hispanic surrounded by similar neighborhoods could expect 761 police stops, whereas a neighborhood with the same racial composition at a sharp boundary could expect 1,962 police stops. These findings reveal that, descriptively, stop levels tend to be higher along boundaries between White and Black or Hispanic neighborhoods. This relationship is largely linear without evidence supporting the idea that contested boundaries have the highest level of police stops as suggested by the contested boundaries hypothesis, a finding that is not an artifact of functional form assumptions.

However, contested boundaries still experience an elevated level of police stops compared to non-boundaries.

Model 2 adds in six sets of covariates to assess whether the results reported in Model 1 are confounded (see Table 1 for a list of variables in the model). The coefficients for the covariates of interest are presented in Table 2 (Table A1 presents the full regression table). The positive main effect of neighborhood racial boundaries and racial composition persist after the addition of controls. Notably, however, Model 2 has a large, negative interaction term. To help with the interpretation of this complex relationship, Figure 2 visualizes predicted values from Model 2 as dotted blue lines. Each curve shows the expected stop count across the range of boundary values for neighborhoods of a given racial composition. Control values are held at observed levels and the resulting estimates from these predictions are averaged (Hanmer and Kalkan 2013).

Comparing the solid red lines of Model 1 to the dotted blue lines of Model 2 in Figure 2 yields three main findings. First, the boundary effect in White neighborhoods persists with the addition of controls. In fact, the positive effect of neighborhood racial boundaries on police stops is even stronger than in the unconditional Model 1 estimates. White neighborhoods without boundaries can expect 144 stops compared to 399 stops in White neighborhoods that border Black/Hispanic areas, a substantial effect size. Supplementary analyses presented in Figure A1 confirm this pattern for White–Black and White–Hispanic neighborhood boundaries. The number of expected police stops increased substantially in White areas that border both Black and Hispanic areas. Second, in racially mixed neighborhoods – plotted up to boundary values of 0.5 to avoid extrapolation because they cannot have sharp boundaries – adding controls substantially attenuates but does not fully remove the positive relationship between neighborhood racial boundaries and stop levels.

Finally, the boundary effect weakens in Black/Hispanic neighborhoods with a potential small, negative relationship that indicates fewer stops at sharp boundaries.<sup>4</sup> Indeed, the negative value of the interaction ( $-1.344$ ) is larger in absolute terms than the positive effect of neighborhood racial boundaries ( $1.078$ ). This pattern might indicate that racial boundaries have a negative association with stops in neighborhoods with the highest proportion of Black/Hispanic residents. However, this negative relationship between boundaries and police stops in minority neighborhoods is small, statistically insignificant and does not hold up in alternative model specifications.

These supplementary analyses are presented in Table A2. Model 3 includes Census tract fixed effects so that the analysis focuses on variation across block groups, within census tracts in New York City. Model 4 further adds a spatial lag for the proportion of Black/Hispanic residents in surrounding areas to the model. The results confirm a large and positive effect of neighborhood racial boundaries on police stops in White neighborhoods. As indicated by the negative interaction term, the size of this boundary effect decreases as the share of Black/Hispanic residents in an area increases. In contrast to the results from Model 2, however, this model does not indicate a negative relationship between neighborhood racial boundaries and police stops in minority areas.

**Table 1.** Description of variables used in analyses

Variable	Description	Data source
Stops	Outcome. The number of pedestrian stops from 2008 to 2012.	NYPD
Racial Boundary	Focal Independent Variable. Sharpness of transition to/from Black/Hispanic neighborhood (higher = sharper boundary).	Census 2010
Proportion Black/Hispanic	Proportion of residents who are Black and/or Hispanic.	Census 2010
Racial diversity	HHI using the proportion of population that is NH Black, NH White, NH Asian, NH other, and Hispanic.	Census 2010
Population	Residential population.	Census 2010
Population change	Change in residential population from 2000 to 2010.	Census 2000, 2010
Proportion male	Proportion of population that is male.	Census 2010
Proportion young	Proportion of population that is less than 18.	Census 2010
Household size	Average household size.	Census 2010
Vacancy rate	Proportion of housing units that are vacant.	Census 2010
Proportion owner occupied	Proportion of housing units that are owner occupied.	Census 2010
Residential stability	Proportion of households living in same house as 1 year prior.	ACS
Concentrated disadvantage	Index created using: proportion of households that were female headed; using SSI (welfare); proportion adults with <HS education; that with at least college degree; unemployment rate; family poverty rate; and median household income.	ACS, Census 2010
Building height	Average height of buildings, measured in floors.	DCP
Commercial zone	Proportion of area that is zoned for commercial use.	DCP
Light manufacturing zone	Proportion of area that is zoned for light manufacturing.	DCP
Medium/heavy manufacturing zone	Proportion of area that is zoned for medium or heavy manufacturing.	DCP
Commercial overlay land use	Proportion of area that is residential but allows for commercial use (usually along street front).	DCP

*(Continued)*

Table 1. (Continued.)

Variable	Description	Data source
Parks/recreation land use	Proportion of area that is covered in parks or other recreational spaces.	DCP
Cemetery land use	Proportion of area that is covered in cemeteries.	DCP
Education land use	Proportion of area covered in educational buildings.	DCP
Mixed land use	HHI using the proportion of land use that is commercial, residential, manufacturing, parks or other.	DCP
Public housing land use	The proportion of area taken up by NYCHA housing developments in 2011.	NYCHA
Land area	Land area in (US survey) square feet.	TIGER/Line
Major road	Whether a major road (highway/main artery) abuts block group.	TIGER/Line
River	Whether a stream/river abuts block group.	TIGER/Line
Railroad	Whether a railroad abuts block group.	TIGER/Line
Shootings	Number of shootings recorded by police. Studied as a mediator, rather than as a control in Model 2.	NYPD
Violent crime	Number of felonies for homicide, robbery, assault, and arson recorded by police. Studied as a mediator, rather than as a control in Model 2.	NYPD
Property crime	Number of felonies for burglary, larceny, motor vehicle theft, fraud, and forgery recorded by police. Studied as a mediator, rather than as a control in Model 2.	NYPD

Note: HHI: Herfindahl–Hirschman Index; ACS: 2008–2012 Block-Group Level American Community Survey; NYPD: New York City Police Department; DCP: New York City Department of City Planning; NYCHA: New York City Housing Authority. All variables are measured at block-group level. All area calculations are based on the block groups' land area.

### Alternative explanation: Crime at neighborhood racial boundaries

While our focus is on racialized social control, crime is an alternative mechanism through which neighborhood racial boundaries could lead to the elevated policing documented in the previous section. To examine this possibility, we use causal mediation analysis and three measures of crime: the number of *violent felonies*, the number of *property felonies* and the number of *shootings*. We restrict the mediation analysis to neighborhoods with 0–44.7% of Black/Hispanic residents (the first two quintiles) because we observe a positive relationship between boundaries and police stops only in these types of neighborhoods. In this subset of the sample, the total effect of neighborhood racial boundaries on police stops is 0.823 ( $p < 0.001$ ), compared to  $-0.133$  ( $p = 0.772$ ) in the remaining neighborhoods.<sup>5</sup> Table A3 presents the results for the

**Table 2.** Negative binomial regressions of police stops on racial boundaries

	Model (1)	Model (2)
Boundary value	0.822** (0.358)	1.078*** (0.255)
Prop. Black/Hispanic	1.861*** (0.100)	1.786*** (0.086)
Prop. Black/Hispanic × Boundary value	0.195 (0.491)	-1.344*** (0.353)
Constant	4.773*** (0.078)	2.686*** (0.393)
Neighborhood-level control variables		✓
Observations	4,604	4,604
Log likelihood	-32,177.210	-31,178.400

Note: Coefficients are expressed as changes in the log of the expected count. Cluster-robust standard errors in parentheses. See Table 1 and text for a description of neighborhood-level control variables controls in Model 2. Table A1 shows the full regression output for Model 2.

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$  (two-tailed tests).

larger set of 4,604 block groups, finding substantively similar results but lower point estimates for the total and controlled direct effects (CDE).

Causal mediation analysis allows us to assess whether the increased level of police stops at neighborhood racial boundaries is explained by higher crime levels. Further, a sizeable direct effect of neighborhood racial boundaries on police stops after accounting for crime would suggest that racialized processes of social control are an important explanation of the observed pattern. Mediation analyses rest on strong, often untestable assumptions. To alleviate some of these concerns, the following analysis focuses on CDE (Acharya et al. 2016). The Online Supplement provides further details including a discussion of the key assumptions. In addition, we present natural direct (NDE) and natural indirect effects (NIE) for interested readers (NDE and NIE), which involve additional assumptions about unmeasured confounders.

Table 3 presents the total, NDE, NIE and CDE of neighborhood racial boundaries on police stops for the three mediators: violent felonies, property felonies and shootings. The CDE remains large and significant for all three mediators ( $p < 0.001$ ), indicating that crime is not the only mechanism explaining the effect of neighborhood racial boundaries on policing. The reduced effect size for the CDE compared to the total effect when using violent felonies as a mediator (0.451 compared to 0.823) indicates that violent crime is nonetheless a major mechanism explaining why neighborhood racial boundaries face elevated stop levels. This finding is also reflected in the NDE and NIE for violent felonies as a mediator, which suggests that 43.1% of the total effect of neighborhood racial boundaries is explained by violent crime. The effect of neighborhood racial boundaries on police stops is thus partially mediated by elevated crime. However, a sizeable direct effect persists, in support of theories on the racialized social control of spaces.<sup>6</sup>

**Table 3.** Mediation analysis: Total, direct and controlled direct effect of neighborhood boundaries on police stops

	Mediator		
	Violent felonies	Property felonies	Shootings
Total effect	0.823*** (0.125)	1.042*** (0.154)	1.013*** (0.161)
Natural direct effect	0.547*** (0.126)	0.841*** (0.130)	0.891*** (0.140)
Natural indirect effect	0.276*** (0.073)	0.201* (0.098)	0.122 (0.064)
Proportion mediated	0.431*** (0.096)	0.282* (0.112)	0.181* (0.082)
Controlled direct effect	0.451*** (0.117)	0.863*** (0.125)	0.898*** (0.138)

Note: All models include the same control variables as Model 2 in Table 2. The number of observations is 1,841. The table reports the pure natural direct effect and the total natural indirect effect so that the interaction between the treatment and mediator is absorbed into the indirect effect. Standard errors are in parentheses.

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$  (two-tailed tests).

### Hit rate analysis

In our final analysis, we move away from modeling stop numbers to model hit rates. Analyzing the rate at which stops uncovered evidence of wrongdoing is a way of understanding how the typical standards of suspicion applied by police vary by features such as suspect race and place. Lower hit rates along neighborhood racial boundaries than elsewhere, for instance, would indicate that the police typically require less suspicion before deciding to stop people at those boundaries. This type of analysis offers two distinct advantages. First, it is a different way of testing the same theoretical propositions, one which uses modeling decisions and assumptions that differ from our prior analyses. For example, our neighborhood-level analyses could suffer from supply-side problems if there were more suspicious people or more ambient street life along neighborhood racial boundaries and our controls failed to adequately account for such things. Yet hit rates, in contrast, do not require assumptions about the supply of potential targets (sometimes referred to as the “denominator”), including how many people, of what races and the extent to which people were engaged in genuinely suspicious behaviors.

Second, our earlier analyses were limited in what they could reveal about the role of suspects’ race vis-à-vis neighborhood racial boundaries and policing. Yet, drawing on perspectives such as defended neighborhoods and out-of-place policing, we hypothesize that it is specifically Black and Hispanic individuals who are implicated in the aggressive policing of the White side of neighborhood racial boundaries. With a hit rate analysis, this can be tested by examining how suspect race, neighborhood racial composition and neighborhood racial boundaries combine to structure the police’s typical standards of suspicion.

The observations in this analysis are stop incidents; the analytical dataset comprises the 648,262 weapon stops that occurred from 2008 to 2012 for which there



is complete data (97% of eligible stops). The specific outcome – or hit – modeled is whether a stop uncovered a weapon. This measure has several virtues: whether a weapon is found depends less on officer biases than more discretionary outcomes such as arrest; and it has a direct link to the stated purpose of the stop (Goel et al. 2016). Hit rates thus offer to reveal when officers were genuinely acting on suspicions of weapon possession (i.e., high hit rates) as opposed to when they were acting on false perceptions of suspicion (e.g., inaccurate stereotypes) or attempting to justify stops that had little or nothing to do with suspicion (i.e., low hit rates).

Hit rates across race may be confounded, which makes it important to control for pertinent differences (Neil and Winship 2019). Our hit rate analysis uses the same neighborhood-level independent variables as Model 2. In addition, we incorporate incident- and individual-level data as reported on the UF-250 form. This includes suspect demographics such as *race*, *age*, *height*, *weight* and *build*, and stop characteristics such as whether stops resulted from a *radio run*, the *time period* during which stops occurred, as well as *year* fixed effects. Finally, we incorporate 19 binary variables that measure whether officers reported any of 10 *reasons for suspicion* or nine *additional stop circumstances* (see Table A4 for further information on these variables).<sup>7</sup> Together, this data allows for an examination of how hit rates vary by suspect race, racial composition and racial context, while adjusting for potential confounders at the incident-, individual- and neighborhood-levels. To estimate how the effect of neighborhood racial boundaries varies by the side of the divide and by individual race, our model includes three-way interaction terms between each suspect race dummy variable, neighborhood racial composition and neighborhood racial boundaries.

The results from this model are reported in Figure 3, which reveals several important patterns. First, the hit rates of White suspects – shown in the left panel – do not vary meaningfully by racial context. For any racial composition and boundary values, Whites typically have hit rates of about 5%.<sup>8</sup> Second, comparing the two panels of Figure 3 reveals that for no combination of racial composition and boundary values do the hit rates of Black and Hispanic suspects reach 5%. Thus, for neighborhoods with any given racial composition and boundary value, the hit rates of Whites are higher than those of Blacks or Hispanics, meaning that White suspects are treated preferentially in all racial contexts.

Third, Figure 3 indicates that the hit rates of Black and Hispanic suspects strongly depend on neighborhood racial boundaries and composition. Looking at the right panel – which shows hit rates for Black and Hispanic suspects – we see that hit rates in Black and Hispanic neighborhoods (represented by the dotted blue line) are especially low: between 2.7% and 3%, varying minimally by neighborhood racial boundary value.<sup>9</sup> In contrast, hit rates for Black and Hispanic suspects in White neighborhoods that are not boundaries are 4.2%. While lower than the 5% hit rate of Whites, Black and Hispanic hit rates are substantially higher in such neighborhoods compared to Black/Hispanic neighborhoods.

The downward slope of the solid red line in the right panel of Figure 3 represents that Black and Hispanic individuals face lower hit rates – indicative of more aggressive policing – along the White side of neighborhood racial boundaries. The effect is so strong that the hit rates for Black and Hispanic individuals in White areas along sharp boundaries are the same as the hit rates in segregated, Black and Hispanic neighborhoods. The standards of suspicion that police typically applied in deciding to make a

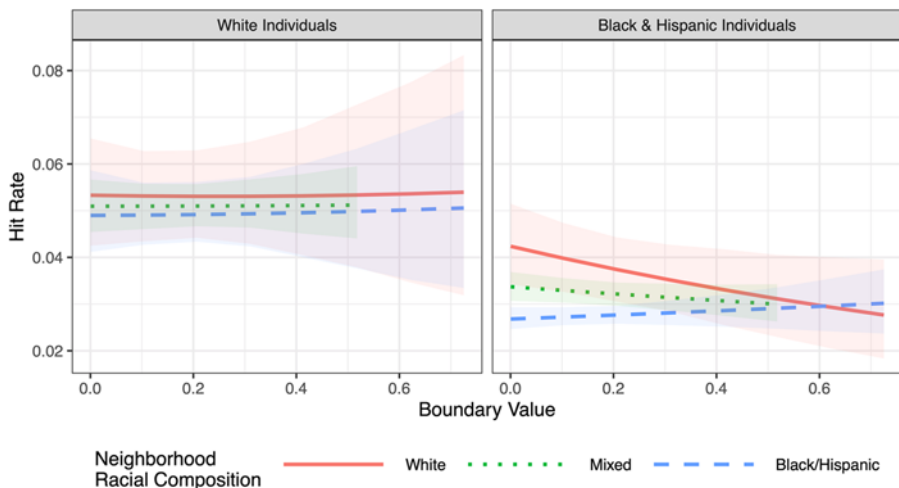


Figure 3. The interactive effects of racial boundaries, racial composition and suspects’ race on hit rates.

stop thus vary not just by suspects’ race, and not just by neighborhood racial composition but also according to whether they were found along neighborhood racial boundaries. Consistent with the racialized control of space, Black and Hispanic individuals were policed particularly aggressively along the White side of neighborhood racial boundaries.<sup>10</sup>

**Discussion**

Scholars have long observed how legal instruments and policing strategies intersect to enforce spatial social control, and have detailed several ways in which this control is racialized in nature. This study establishes the policing of neighborhood racial boundaries as another, important way in which racial inequality in policing is the result of the police’s exertion of control over space. Specifically, drawing on and extending prior perspectives from urban sociological, law and society, and policing scholarship, this study advanced a theoretical model that predicts policing is more aggressive along neighborhood racial boundaries, reflecting racialized social control at these spaces.

Using data from the NYPD’s SQF program, we tested the influence of neighborhood racial boundaries on policing. Results indicated that neighborhoods along racial boundaries experienced both elevated levels of police stops and a lower standard of suspicion even after conditioning on an array of possible confounders. The magnitude of the boundary effect indicates that it is substantively important. This relationship only persisted on the White side of boundaries and is only partially mediated by elevated crime levels along neighborhood racial boundaries. An analysis of hit rates – which measures the standards of suspicion typically required before making stops – similarly indicated that policing is more aggressive in White neighborhoods that border Black and Hispanic areas. This analysis revealed that this pattern is unique to Black and Hispanic suspects, consistent with our theoretical expectation

that it would be these populations who are subject to elevated social control along neighborhood racial boundaries.

That crime levels were found to be higher along neighborhood racial boundaries is consistent with earlier work (Dean et al. 2019; Kim and Hipp 2021; Legewie 2018). This study reveals a consequence of this pattern: more crime means more formal social control along neighborhood racial boundaries. The NYPD's SQF was both intensely crime focused and spatial in its orientation, reflecting (and partially inspiring) larger shifts in proactive policing strategies (Bellin 2014; National Academy of Sciences 2018). One implication is that spatial processes that impact crime should be important determinants of police behavior, and this is indeed what we found.

Importantly, crime does not fully explain the observed boundary policing effect. The implication is that racialized social control was also at play in structuring the spatial distribution of police stops that resulted from the NYPD's SQF program. Our findings do not contradict the role of processes that result in elevated policing in segregated, minority-dominant neighborhoods (Fagan et al. 2010; Ferrandino 2015; Lautenschlager and Omori 2019; Levchak 2017). Indeed, we found that Black and Hispanic neighborhoods face the highest stop levels and lowest hit rates, a sign that police require less suspicion before making stops there. At the same time, our findings highlight another dimension of racialized social control: the level of policing is elevated and hit rates are lower in White areas bordering Black or Hispanic neighborhoods. This pattern persists after accounting for crime, indicating that it does not simply reflect the police responding to more crimes or citizen reports of crimes and instead might be driven by some combination of top-down organizational policing practices and citizen demands for police activity at neighborhood racial boundaries.

Consistent with a long line of law and society scholarship, our findings indicate that to understand the behavior of law and patterns of formal social control it is necessary to consider how policing is influenced by the socio-spatial structures of cities. Put differently, exerting control over spaces is central to the institution of policing, and this is racialized in nature, as police selectively impose law and order for and against specific social groups in specific spaces. Yet, despite often invoking neighborhood boundaries, prior work has overwhelmingly focused on the control of people in spaces that are likely far from actual neighborhood racial boundaries, such as the surveillance or banishment of individuals in places where they are deemed not to belong (Beckett and Herbert 2009; 2010; Carroll and Gonzalez 2014; Epp et al. 2014; Meehan and Ponder 2002), or the use of heavy-handed social control in segregated spaces (Fagan et al. 2010; Lautenschlager and Omori 2019). Our finding of more aggressive policing of minority individuals in proximity to neighborhood racial boundaries indicates that these boundaries are subject to racialized policing. Neighborhood racial boundaries not only carry social meaning, but they do so in ways that are substantively important for understanding police behavior. This represents an overlooked way in which the police enact racialized social control of space. Prior research often claims that the racialized social control often amounts to the enforcement of segregation (Bell 2020; Epp et al. 2014), our findings indicate this insight extends to the very dividing lines demarcating segregated spaces.

This study has implications that extend beyond race, policing and the functioning of the criminal legal system in society. One involves relationship between racial and ethnic stratification and spatial processes. Prior sociological scholarship has drawn

attention to the fact that racial and ethnic minorities must navigate White space, and that doing so carries implications for how they are seen and treated (Anderson 2015). The meaning and consequences of being a particular race or ethnicity depends on the space in which one is located. Our findings reinforce this argument, while drawing attention to an added, crucial detail: it is not solely whether a place is White that carries significance, but its location in the broader socio-spatial structure of the city. The dividing lines between differently raced neighborhoods can and do carry significance for what it means to exist as an individual of a given race in that space. Scholars ought to consider the importance of neighborhood racial boundaries for broader patterns of urban inequality and racial and ethnic stratification.

Further, prior sociological research on neighborhood racial boundaries has emphasized outcomes that are community or citizen driven, such as crime, conflict and the operation of informal social control (Dean et al. 2019; Kim and Hipp 2021; Legewie 2018; Legewie and Schaeffer 2016). Our results indicate that the role of neighborhood racial boundaries extend beyond these to impact the actions of the state. Because boundary processes implicate patterns of formal social control, they carry wider sets of consequences than has been previously acknowledged. Boundary processes may entail the harms brought about by more aggressive policing, particularly for minority groups. Police encounters themselves may be harmful, and they may spur deeper involvement with the criminal justice system, lower educational outcomes and detrimental health effects. Thus, neighborhood racial boundaries not only carry more consequences than has been previously identified but also consequences that – because they implicate formal social control – are of a different nature.

This study is limited to one outcome – proactive pedestrian stops – made by one department, in a city unlike many others, over a 5-year period.<sup>11</sup> The findings may not generalize to other contexts.<sup>12</sup> However, proactive policing practices similar to SQF have become more common owing in part to the NYPD's influence, and similar patterns may extend to those. Further, despite New York's uniqueness, there is nothing about the theories advanced that suggests they will not apply in other contexts. Still, even in New York stop patterns have since fallen immensely while neighborhood racial boundaries have hardly changed – driving home that neighborhood racial boundary effects may be moderated by larger city-level processes and organizational context. We did not measure the extent to which boundary policing reflects residents' demands for services versus top-down policing strategies. Indeed, our work only theorizes but does not observe the various mechanisms that might explain the relation between neighborhood racial boundaries and policing. While both residents' demands for services and top-down policing strategies are consistent with our framework, this is a consequential theoretical distinction that we could not investigate owing to a lack of 911 call data for New York City. While data on 311 calls is available, they account for a relatively small portion of police activity and are not a suitable proxy for 911 calls given their different purposes. Thus, our results should not be taken as the final word. That the results are so pronounced, however, serves as a call for scholars of race, policing and the use of law in society to examine boundary processes more closely.

**Supplementary material.** The supplementary material for this article can be found at <https://doi.org/10.1017/lr.2024.6>.

**Acknowledgements.** For helpful comments and advice, we thank Robert Sampson, Merlin Schaeffer, Christopher Winship, and participants of the Urban Data Lab at the Harvard sociology department. The views expressed in this article do not necessarily reflect those of RAND or its clients.

## Notes

1. Such stereotypes are not exclusively held by Whites, and so likely impact policing even in places and situations where everyone involved is Black or Hispanic. Yet, we have detailed several reasons that these stereotypes are likely particularly salient along the White side of neighborhood racial boundaries.
2. For these analyses, we define boundary measures as the product of the Black and White or Hispanic and White boundary values. While major conclusions are left intact, the most notable difference is the hit rate results for White individuals: the flat line for those stopped in Black/Hispanic areas (see Figure 3) is not replicated. Instead, the lines trend upward for the Black–White analysis, and downward for the Hispanic–White analysis. However, these estimates are very imprecise, likely because so few White residents are stopped in these areas.
3. These same patterns are found when using a generalized additive model (GAM) instead of a GLM. We specified the relationship between racial composition, racial boundaries and stops using a multidimensional thin plate regression spline (Wood 2017). This allows for nonlinear functional forms for the neighborhood racial boundaries, racial composition and their interaction. The similarity between these models allays concerns that our main specification is inadequately flexible.
4. All three main findings are found when modeling stops of Blacks and Hispanics as the outcome instead of all stops. This is unsurprising insofar as they make up 87.6% of all stopped individuals in the neighborhoods studied.
5. The total effect reported here differs from the prior estimates presented in Table 2 mainly because they allow for an interaction term between the treatment and mediator.
6. By conditioning on crime, our results may understate the role of racialized social control. This is because much crime is reported by citizens, who may disproportionately call the police along neighborhood racial boundaries due to the theoretical processes we are advancing. Our focus on felonies likely reduces the extent to which this occurs; nonetheless, our estimates may be overly conservative.
7. Officers may have been disingenuous when filling out these reasons, to justify their behaviors, but this needs to be weighed against the concern that omitting such information leads to fundamentally different stop incidents being compared. As such, we include the measures, though we might be masking some racial bias by doing so.
8. To aid with interpretability, Figure 3 only presents results to a maximum boundary value of 0.75. Less than 1% of stops happened at boundary values greater than this, and so the confidence intervals become very large.
9. In a model check, we estimated hit rates for Black and Hispanic suspects separately. Results were largely unchanged, though Black hit rates tended to be slightly lower than Hispanic hit rates. Also, Hispanic hit rates rose slightly more at higher boundary values in Black/Hispanic neighborhoods than what is seen in Figure 3.
10. We estimated another version of this model that also accounts for crime, using the same crime measures as in the mediation analysis. Results were virtually unchanged with one exception: the hit rates of White suspects varied by racial composition by at most 1.5 percentage points.
11. The hit rate analysis is more limited still: to stops in which weapon possession was the suspected crime. Because of the close correspondence with our other types of analyses, we believe the insights generalize beyond weapon stops, though this is a reasoned assumption.
12. The findings generalize to other NYPD behaviors during this period: fitting models analogous to Model 2 but using total arrests or criminal summons as the outcomes reveals the same general pattern of racial composition and boundary effects.

## References

- Acharya, Avidit, Matthew Blackwell and Maya Sen. 2016. “Explaining Causal Findings without Bias: Detecting and Assessing Direct Effects.” *American Political Science Rev.* 110 (3): 512–29.

- Anderson, Elijah. 2015. "The White Space." *Sociology of Race and Ethnicity* 1 (1): 10–21.
- Beck, Brenden. 2020. "Policing Gentrification: Stops and Low-Level Arrests during Demographic Change and Real Estate Reinvestment." *City & Community* 19 (1): 245–72.
- Beckett, Katherine and Steve Herbert. 2009. *Banished: The New Social Control In Urban America*. New York: Oxford University Press.
- Beckett, Katherine and Steve Herbert. 2010. "Penal Boundaries: Banishment and the Expansion of Punishment." *Law & Social Inquiry* 35 (1): 1–38.
- Bell, Monica C. 2020. "Anti-Segregation Policing." *New York University Law Rev.* 95: 650.
- Bellin, Jeffrey. 2014. "The Inverse Relationship between the Constitutionality and Effectiveness of New York City Stop and Frisk." *Boston University Law Rev.* 94: 1495.
- Bergesen, Albert and Max Herman. 1998. "Immigration, Race, and Riot: The 1992 Los Angeles Uprising." *American Sociological Rev.* 63 (1): 39–54.
- Blalock, Hubert M. 1967. *Toward a Theory of Minority-Group Relations*. New York: Wiley.
- Blumer, Herbert. 1958. "Race Prejudice as a Sense of Group Position." *Pacific Sociological Rev.* 1 (1): 3–7.
- Boyles, Andrea S. 2015. *Race, Place, and Suburban Policing: Too Close for Comfort*. Oakland: Univ of California Press.
- Carlis, Adam. 2009. "The Illegality of Vertical Patrols." *Columbia Law Rev.* 109: 2002.
- Carroll, Leo and M. Lilliana Gonzalez. 2014. "Out of Place: Racial Stereotypes and the Ecology of Frisks and Searches following Traffic Stops." *J. of Research in Crime and Delinquency* 51 (5): 559–84.
- Dean, Nema, Guanpeng Dong, Aneta Piekut and Gwilym Pryce. 2019. "Frontiers in Residential Segregation: Understanding Neighbourhood Boundaries and Their Impacts." *Tijdschrift Voor Economische En Sociale Geografie* 110 (3): 271–88.
- Desmond, Matthew and Nicol Valdez. 2013. "Unpolicing the Urban Poor: Consequences of Third-Party Policing for Inner-City Women." *American Sociological Rev.* 78 (1): 117–41.
- Devine, Patricia G. and Andrew J. Elliot. 1995. "Are Racial Stereotypes Really Fading? The Princeton Trilogies Revisited." *Personality and Social Psychology Bulletin* 21 (11): 1139–50.
- Epp, Charles R., Steven Maynard-Moody and Donald P. Haider-Markel. 2014. *Pulled Over: How Police Stops Define Race and Citizenship*. Chicago: University of Chicago Press.
- Faber, Jacob William and Jessica Rose Kalbfeld. 2019. "Complaining while Black: Racial Disparities in the Adjudication of Complaints against the Police." *City & Community* 18 (3): 1028–67.
- Fagan, Jeffrey and Garth Davies. 2000. "Street Stops and Broken Windows: Terry, Race, and Disorder in New York City." *Fordham Urban Law J.* 28: 457–504.
- Fagan, Jeffrey, Amanda Geller, Garth Davies and Valerie West. 2010. "Street Stops and Broken Windows Revisited: The Demography and Logic of Proactive Policing in a Safe and Changing City." In *Race, Ethnicity, and Policing: New and Essential Readings*, edited by Stephen K. Rice and Michael D. White, 309–48. New York: New York University Press.
- Ferrandino, Joseph. 2015. "Minority Threat Hypothesis and NYPD Stop and Frisk Policy." *Criminal Justice Rev.* 40 (2): 209–29.
- Geller, Amanda and Jeffrey Fagan. 2010. "Pot as Pretext: Marijuana, Race, and the New Disorder in New York City Street Policing." *J. of Empirical Legal Studies* 7 (4): 591–633.
- Gelman, Andrew, Jeffrey Fagan and Alex Kiss. 2007. "An Analysis of the New York City Police Department's 'Stop-and-Frisk' Policy in the Context of Claims of Racial Bias." *J. of the American Statistical Association* 102 (479): 813–23.
- Goel, Sharad, Justin M. Rao and Ravi Shroff. 2016. "Precinct or Prejudice? Understanding Racial Disparities in New York City's Stop-and-Frisk Policy." *The Annals of Applied Statistics* 10 (1): 365–94.
- Gordon, Daanika. 2020. "The Police as Place-Consolidators: The Organizational Amplification of Urban Inequality." *Law & Social Inquiry* 45 (1): 1–27.
- Gordon, Daanika. 2022. *Policing the Racial Divide: Urban Growth Politics and the Remaking of Segregation*. New York: NYU Press.
- Grimshaw, Allen D. 1960. "Urban Racial Violence in the United States Changing Ecological Considerations." *American J. of Sociology* 66 (2): 109–19.
- Hanmer, Michael J. and Kerem Ozan Kalkan. 2013. "Behind the Curve: Clarifying the Best Approach to Calculating Predicted Probabilities and Marginal Effects from Limited Dependent Variable Models." *American J. of Political Science* 57 (1): 263–77.

- Herbert, Steve. 1997. *Policing Space: Territoriality and the Los Angeles Police Department*. Minneapolis: U of Minnesota Press.
- Holmes, Malcolm D. 2000. "Minority Threat and Police Brutality: Determinants of Civil Rights Criminal Complaints in U.S. Municipalities." *Criminology* 38 (2): 343–68.
- Holmes, Malcolm D. and Brad W. Smith. 2008. *Race and Police Brutality: Roots of an Urban Dilemma*. SUNY Series in Deviance and Social Control. Albany: State University of New York Press.
- Ingram, Jason R. 2007. "The Effect of Neighborhood Characteristics on Traffic Citation Practices of the Police." *Police Quarterly* 10 (4): 371–93.
- Irwin, John. 1985. *The Jail: Managing the Underclass in American Society*. Berkeley: University of California Press.
- Kane, Robert J., Joseph L. Gustafson and Christopher Bruell. 2013. "Racial Encroachment and the Formal Control of Space: Minority Group-Threat and Misdemeanor Arrests in Urban Communities." *Justice Quarterly* 30 (6): 957–82.
- Kim, Young-An and John R. Hipp. 2021. "Both Sides of the Street: Introducing Measures of Physical and Social Boundaries Based on Differences across Sides of the Street, and Consequences for Crime." *J. of Quantitative Criminology* 38: 75–103.
- Kramer, Rory. 2017. "Defensible Spaces in Philadelphia: Exploring Neighborhood Boundaries through Spatial Analysis." *RSF: The Russell Sage Foundation J. of the Social Sciences* 3 (2): 81–101.
- Lanfear, Charles C., Lindsey R. Beach and Timothy A. Thomas. 2018. "Formal Social Control in Changing Neighborhoods: Racial Implications of Neighborhood Context on Reactive Policing." *City & Community* 17 (4): 1075–99
- Laniyonu, Ayobami. 2018. "Coffee Shops and Street Stops: Policing Practices in Gentrifying Neighborhoods." *Urban Affairs Rev.* 54 (5): 898–930.
- Lautenschlager, Rachel and Marisa Omori. 2019. "Racial Threat, Social (Dis)organization, and the Ecology of Police: Towards a Macro-Level Understanding of Police Use-of-Force in Communities of Color." *Justice Quarterly* 36 (6): 1050–71.
- Legewie, Joscha. 2018. "Living on the Edge: Neighborhood Boundaries and the Spatial Dynamics of Violent Crime." *Demography* 55 (5): 1957–77.
- Legewie, Joscha and Merlin Schaeffer. 2016. "Contested Boundaries: Explaining Where Ethnoracial Diversity Provokes Neighborhood Conflict." *American J. of Sociology* 122 (1): 125–61
- Levchak, Philip J. 2017. "Do Precinct Characteristics Influence Stop-and-Frisk in New York City? A Multi-Level Analysis of Post-Stop Outcomes." *Justice Quarterly* 34 (3): 377–406.
- Logan, John R., Seth Spielman, Hongwei Xu and Philip N. Klein. 2011. "Identifying and Bounding Ethnic Neighborhoods." *Urban Geography* 32 (3): 334–59.
- Mears, Daniel P. and Avinash S. Bhati. 2006. "No Community Is an Island: The Effects of Resource Deprivation on Urban Violence in Spatially and Socially Proximate Communities." *Criminology* 44 (3): 509–48
- Meehan, Albert J. and Michael C. Ponder. 2002. "Race and Place: The Ecology of Racial Profiling African American Motorists." *Justice Quarterly* 19 (3): 399–430.
- Messner, Steven F., Luc Anselin, Robert D. Baller, Darnell F. Hawkins, Glenn Deane and Stewart E. Tolnay. 1999. "The Spatial Patterning of County Homicide Rates: An Application of Exploratory Spatial Data Analysis." *J. of Quantitative Criminology* 15 (4): 423–50.
- Morrow, Weston J., Emily R. Berthelot and Samuel G. Vickovic. 2018. "Police Use of Force: An Examination of the Minority Threat Perspective." *Criminal Justice Studies* 31 (4): 368–87.
- Muñiz, Ana. 2014. "Maintaining Racial Boundaries: Criminalization, Neighborhood Context, and the Origins of Gang Injunctions." *Social Problems* 61 (2): 216–36.
- Muñiz, Ana. 2015. *Police, Power, and the Production of Racial Boundaries*. New Brunswick: Rutgers University Press.
- National Academy of Sciences. 2018. *Proactive Policing: Effects on Crime and Communities*. Washington, DC: The National Academies Press.
- Neil, Roland and Christopher Winship. 2019. "Methodological Challenges and Opportunities in Testing for Racial Discrimination in Policing." *Annual Rev. of Criminology* 2: 73–98.
- Quillian, Lincoln and Devah Pager. 2001. "Black Neighbors, Higher Crime? the Role of Racial Stereotypes in Evaluations of Neighborhood Crime." *American J. of Sociology* 107 (3): 717–67.

- Sampson, Robert J. and W. Byron Groves. 1989. "Community Structure and Crime: Testing Social-Disorganization Theory." *American J. of Sociology* 94 (4): 774–802.
- Sampson, Robert J. and Stephen W. Raudenbush. 2004. "Seeing Disorder: Neighborhood Stigma and the Social Construction of 'Broken Windows.'" *Social Psychology Quarterly* 67 (4): 319–42.
- Sampson, Robert J., Stephen W. Raudenbush and Felton Earls. 1997. "Neighborhoods and Violent Crime: A Multilevel Study of Collective Efficacy." *Science* 277 (5328): 918–24.
- Shaw, C. R. and H. D. McKay. 1942. *Juvenile Delinquency and Urban Areas*. *Juvenile Delinquency and Urban Areas*. Chicago, IL: University of Chicago Press.
- Smith, Douglas A. 1986. "The Neighborhood Context of Police Behavior." *Crime and Justice* 8 (January): 313–41
- Spielman, Seth E. and John R. Logan. 2013. "Using High-Resolution Population Data to Identify Neighborhoods and Establish Their Boundaries." *Annals of the Association of American Geographers* 103 (1): 67–84.
- Suttles, Gerald D. 1972. *The Social Construction of Communities*. *Studies of Urban Society*. Chicago: University of Chicago Press.
- Welch, Kelly, Allison Ann Payne, Ted Chiricos and Marc Gertz. 2011. "The Typification of Hispanics as Criminals and Support for Punitive Crime Control Policies." *Social Science Research* 40 (3): 822–40
- Werthman, Carl and Irving Piliavin. 1967. "Gang Members and the Police." In *The Police: Six Sociological Essays*, edited by David J Bordua, 56–98. New York: John Wiley and Sons.
- Wood, Simon N. 2017. *Generalized Additive Models: An Introduction with R, Second Edition*. Boca Raton: CRC Press.
- Worden, R. E. 1996. "The Causes of Police Brutality: Theory and Evidence on the Police Use of Force." In *Understanding and Controlling Police Abuse of Force*, edited by William A. Geller and Hans Toch, 23–51. New Haven, CT: Yale University Press.
- Zhao, Yunhan, Tse-Chuan Yang and Steven F. Messner. 2019. "Segregation and Racial Disparities in Post-Stop Outcomes: Insights from New York City." *J. of Crime and Justice* 42 (4): 365–81.

**Roland Neil** is a behavioral and social scientist at RAND. His research focuses on topics such as policing, life course criminology, and risk prediction. It has been published in outlets such as the *American Journal of Sociology*, *Criminology & Public Policy*, and the *Proceedings of the National Academy of Sciences*. He holds a Ph.D. in sociology from Harvard University.