NEIGHBORHOOD CONTEXT
AND POLICE USE OF FORCE

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Explanations of police coercion have been traditionally embedded within sociological, psychological, and organizational theoretical frameworks. Largely absent from the research are examinations exploring the role of neighborhood context on police use-of-force practices. Using data collected as part of a systematic social observation study of police in Indianapolis, Indiana, and St. Petersburg, Florida, this research examines the influence of neighborhood context on the level of force police exercise during police-suspect encounters using hierarchical linear modeling techniques. The authors found police officers are significantly more likely to use higher levels of force when suspects are encountered in disadvantaged neighborhoods and those with higher homicide rates, net of situational factors (e.g., suspect resistance) and officer-based determinants (e.g., age, education, and training). Also found is that the effect of the suspect's race is mediated by neighborhood context. The results reaffirm Smith's 1986 conclusion that police officers "act differently in different neighborhood contexts."

Force lies at the core of the police function (Bittner 1970). It is no surprise, then, that this form of police behavior has long been a primary focus among those who study the police (Bayley and Garofalo 1989; Bittner 1970; Black 1980; Brown 1981; Chevigny 1969; Friedrich 1977; Fyfe 1988; Garner et al. 1995; Klinger 1995; Muir 1977; Reiss 1968; Slovak 1986; Smith 1984, 1986; Sykes and Brent 1983; Terrill 2001; Toch 1969; Westley 1953; Wilson 1968; Worden 1995). A considerable portion of this research centers on why officers resort to force. Much of this work focuses on situationally based deter-

minants and officer attributes inherent in police-citizen encounters. To a lesser extent, researchers have also sought to investigate the influence of organizational factors on police use of force. With but a few notable exceptions (see Slovak 1986 and Smith 1986), multivariate examinations of the role of neighborhood context on police use of force practices are noticeably absent.

Using data collected as part of a systematic social observation study of the police in Indianapolis, Indiana, and St. Petersburg, Florida, the research reported here examines the degree to which forceful authority toward suspects is influenced by the type of neighborhood in which police-suspect encounters occur. Our objective is to determine the effect of neighborhood context on the day-to-day exercise of force by patrol officers. Do officers exercise force differently in some neighborhoods as opposed to others?

We begin by reviewing the most common approaches to explaining use-of-force behavior. By doing so, we identify several variables that have been shown to significantly influence police use of force. Many of these variables will be included in our multivariate models to guard against spuriousness. Next, we consider the role of neighborhood context in explaining variation in police use of force and review the relevant empirical research. Finally, we present an analysis using systematic social observations, census data, police officers interviews, and police crime data to estimate a series of multivariate models.

EXPLANATIONS OF POLICE USE OF FORCE

For more than three decades, researchers have expended considerable effort to explain the causes of police use of force. These efforts generally have been framed within three broad perspectives. Two in particular, sociological and psychological, have guided a majority of prior systematic inquires. Within the sociological (or situational) domain, researchers have assessed the influence of social status on punitive police behavior (Chevigny 1969; Friedrich 1977; Reiss 1968; Terrill 2001; Toch 1969; Westley 1953; Worden 1995). For example, Black (1976) posited that the application of punishment by legal agents can be explained in terms of various types of social space in which the subjects of control are located. Black (1976) hypothesized that the police will be more punitive (e.g., forceful) toward suspects with lower economic or marginal cultural status, such as the poor, minorities, and the young. Furthermore, those who are under the influence of drugs and/or alcohol, mentally deranged, disrespectful, resistant, or filled with anger are placed in a negative normative space. These suspects are said to offend society's—and the police officer's—standards of appropriate behavior, or they appear to lack self-control. In either case, these suspects are viewed by the police as more

deserving of control and punishment (Herbert 1998; Manning 1989; Muir 1977; Van Maanen 1974; Worden 1989).

A second perspective is framed within a psychological (or individual) orientation. According to this approach, officer characteristics, experiences, views, and outlooks are posited to effect police behavior (Brown 1981; Muir 1977; White 1972; Worden 1995). Simply stated, is there something about particular officers that help explain why they use force? This explanation rests on the assumption that officers with certain traits, experiences, or attitudes will respond differently in similar situations. Muir's (1977) theoretical orientation may best illustrate the role of the individual. Muir (1977) was primarily interested in characterizing "good" versus "bad" police officers. He constructed a fourfold typology into which officers could be grouped depending on the following two dimensions: their view of human nature and their attitude toward the use of coercive authority.

A third approach involves examining the role of the organization in use-of-force practices. Different variants of organization theory have been proposed that emphasize formal and informal features of the organization (Blau and Scott 1962:2–8). For example, Wilson (1968) posited that the formal structure of an organization and the political environment within which it operates create predictable patterns of police behavior. More specifically, Wilson presumed that styles of policing reflect organizational rules, regulations, standard operating procedures, incentives and disincentives, and administrative direction. In other words, a common vision becomes part of each officer's mindset of how to handle the everyday aspects of police work. Accordingly, individual officers will handle similar incidents that occur at the street-level in a consistent manner. A different perspective looks to the affect of the informal structure (e.g., police culture) rather than the formal structure (Brown 1981). According to this framework, the police culture serves to protect and isolate officers from internal and external scrutiny more than it does to forge a particular style of policing. Instead, operating through the protection of one another, officers are able to develop their own unique styles.

Although these conceptual frameworks have contributed to our understanding of police use of force, several limitations are apparent. Perhaps most important, each of these perspectives fail to take into account the possibility that police use of force varies according to the broader context concerning where the encounter takes place. Given the likelihood that aggressive police tactics are not evenly distributed across urban neighborhoods (Smith 1986), the potential for spurious findings at the encounter level is a real possibility. To better understand the dynamics of police use of force, a rigorous empirical assessment, which entails the estimation of a well-specified multilevel model, is needed.

THE ECOLOGY OF POLICE FORCE

In the Chicago School's tradition of neighborhood ecology (Shaw and McKay 1942), police researchers have begun to focus on the effects of neighborhood context on police behavior (Klinger 1997; Mastrofski, Reisig, and McCluskey 2002; Smith 1986). Nevertheless, research in this area remains sparse. Concerning the link between police behavior and neighborhood context, Slovak (1986) noted,

> there is no solid lead to follow from the research of others in this regard, for almost no serious efforts to tie ecological variations within a city to police patterns in particular or to social control efforts in general have yet appeared. (P. 144)

Ten years later, Klinger (1997) echoed Slovak's observation, stating, "A few studies have considered the possibility that police action might vary across urban neighborhoods . . . but none contains any systematic theory linking police activity to the ecological contexts in which it occurs" (p. 278). Clouding matters further, the literature dealing specifically with police use of force in this regard is even more remote. However, despite the lack of a logically ordered set of propositions that explain and predict use of force across neighborhoods, the literature does provide some guidance.

Although a few scholars previously speculated on the relationship between neighborhood context and police behavior (Westley 1953; Whyte 1943), it was not until the 1960s when researchers began to seriously consider the issue. One of the most illuminating studies was conducted by Werthman and Piliavin (1967), who observed and interviewed Oakland and San Francisco, California, patrol officers. The authors concluded that officers tend to associate neighborhoods with the degree to which they encountered suspicious persons. Officers not only rely on various cues to define a so-called suspicious person (e.g., running from police, appearing to conceal a weapon or contraband, and previous arrests) but also define geographic areas as suspicious places. To illustrate this point, Werthman and Piliavin (1967) stated that

> past experience leads them [officers] to conclude that more crimes are committed in the poorer sections of town than in the wealthier areas, that Negroes are more likely to cause public disturbances than Whites, and that adolescents in certain areas are a greater source of trouble than other categories of the citizenry. (P. 75)

Werthman and Piliavin (1967) referred to this process as "ecological contamination" whereby everyone encountered in designated "bad" neighborhoods assume moral liability. In effect, the socioeconomic character of the area in which the police encounter the suspect may attach to the individual suspect, independent of the suspect's personal characteristics or behavioral manifestations.

Bayley and Mendelsohn (1969) also picked up on the neighborhood-police behavior nexus arguing that police are more aggressive (e.g., stopping citizens and using force) and punitive (e.g., making arrests) when operating in lower class and high-crime neighborhoods. In these neighborhoods, the authors argued, greater social distance exists between police officers and citizens. Consistent to Werthman and Piliavin's (1967) ecological contamination hypothesis, Bayley and Mendelsohn (1969) posited that a suspect's mere presence in a bad neighborhood increases the likelihood that the suspect will be the recipient of police aggression.

Perhaps the most rigorous study exploring the effect of neighborhood context on police behavior was conducted by Smith (1986), using data from the Police Services Study. Smith examined the effect of a number of different community characteristics (e.g., crime rate and socioeconomic factors) on different forms of police behavior (e.g., arrest, coercive authority, and filing official reports). One of his primary conclusions was strikingly similar to Werthman and Piliavin's (1967) ecological contamination hypothesis. At the encounter level, officers were significantly more likely to use force on Black suspects, but this effect was mediated when neighborhood context was considered. Smith (1986) concluded that the "propensity of police to exercise coercive authority is not influenced by the race of the individual suspect per se but rather the racial composition of the area in which the encounter occurs" (p. 332). Furthermore, he found that citizens encountered in low status areas ran three times the risk of arrest. To date, however, empirical support for Smith's (1986) findings remain elusive. For example, Slovak's (1986) examination of organizational and environmental characteristics in three medium-sized cities led to his conclusion that police aggressiveness is "generally similar across the neighborhoods of a given city" (p. 178).

More recently, an ecological theory has been articulated to account specifically for variations in the vigor with which formal police authority is applied. Klinger (1997) referred to vigor as a form of "legal authority in encounters with citizens by making arrests, taking reports, conducting investigations, and so on" (p. 279). Drawing on Durkheim and other social theorists, Klinger (1997) postulated that formal police efforts are less vigorous in districts in which deviance levels are high. Levels of deviance affect workload and resource constraints for dealing with crime and disorder, as well as officers' understanding of what constitutes so-called normal crime, how to

define deserving victims, and cynicism about the effectiveness of the department's and the justice system's efforts to control deviance. Like other community-level explanations, Klinger's (1997) perspective might be adapted to explain police force according to the social and economic character of the neighborhood where police encounter criminal suspects.

One of the difficulties with using Klinger's (1997) theory as a conceptual guide to model police use of force is determining the direction of the influence of neighborhood context. For example, a loose definition of police force would include all forms of legal authority (e.g., not just arrest), and we might hypothesize that police use less force in disadvantaged, high-crime neighborhoods. Klinger (1997) noted that, unlike arrests, police use of force does not always entail a high level of vigor. For example, physically restraining a suspect or using chemical mace without making an arrest may actually constitute less vigor. Complicating matters more with respect to the study at hand, Klinger's (1997) theory is directed at a unit of analysis (e.g., police district) much larger than the individual neighborhood. Whether Klinger's (1997) theory predicts less or more coercive policing in disadvantaged and high crime neighborhoods remains open to debate.

Other police scholars have also communicated a certain reluctance to support the notion that police officers are more aggressive in poor, crime-ridden neighborhoods. For example, after examining police practices in one depressed neighborhood, Goldstein (1960) reported that police rarely took an official report or made an arrest in serious assault cases. Similarly, Reiss and Bordua (1967) noted that although officers act more aggressively in depressed neighborhoods in certain situations, officers were reluctant to intervene in others (also see Niederhoffer 1967; Stark 1987). In combination, these studies suggest that as levels of deviance and socioeconomic distress increase in a given area, a number of factors, such as those mentioned by Klinger (1997) (e.g., workload, the regularity of crime, cynicism, attached worth given to the victim), will also influence officers' use of coercive authority unless the incident in question is of a serious nature (e.g., homicide incident).

Where does this leave us? There are clearly similarities and differences found in the literature with respect to the role of neighborhood context. One of the difficulties with comparing extant research concerns the variation in methodological approaches (e.g., ethnography and official records), as well as the ambiguity of conceptual definitions, such as police aggressiveness and vigor. Nevertheless, with the exception of Slovak's (1986) study, a consistent theme has emerged: Police behavior is patterned territorially. Police officers come to readily compartmentalize various geographic areas, within which the potential exists to behave in accordance to the environment as opposed to the suspect's characteristics. This may result in suspects encountered in

disadvantaged and high-crime neighborhoods being subjected to higher levels of force. It may also result, however, in less forceful behavior. Moreover, we must also consider that suspect behavior also varies across neighborhoods. For example, McCluskey and colleagues (1999) found that criminal suspects encountered by police in neighborhoods characterized by comparatively higher levels of concentrated disadvantage were significantly more likely to display disrespect toward the police. Most studies have found that suspect behavior is a significant determinant of police use of force (see, e.g., Black 1980; Terrill and Mastrofski 2002; Worden 1995). Accordingly, we might expect to observe higher levels of police use of force in disadvantaged neighborhoods.

We seek to inform this line of inquiry using recently collected data and statistical modeling techniques designed specifically for nested data. We examine the role of neighborhood context after adjusting our models for a host of encounter-level and officer-based determinants of police use of force. Uncovering patterns of police use of force is challenging because of the degree of sensitivity such a topic presents. Systematic observational inquiry provides a rare opportunity to experience firsthand forceful police practices as they occur on the street, a picture difficult to obtain using other methodologies. Official records, police surveys, and citizen complaints are common data sources used to study police use of force, but in each instance, the party responsible for detailing the circumstances has a stake in the reporting. In contrast, systematic field observations rely on disinterested third parties, trained to remove themselves from the target of observation.[1] In sum, we seek to advance the police use-of-force literature by using systematic social observational data, which is well suited for the task at hand.

We also seek to contribute to the research literature by addressing various technical shortcomings that may have been present in previous attempts to better understand the role of neighborhood context. For example, previous endeavors have relied on multivariate statistical techniques not specifically designed to model data with a nested structure (e.g., police-suspect encounters nested within neighborhoods). Relying on such techniques (e.g., ordinary least squares regression) raises several important issues (see Bryk and Raudenbush 1992:2–3, 83–4).

METHODS

Data

This study uses the following four sources of data originally collected by the Project on Policing Neighborhoods (POPN): systematic social

observations, census data, police crime records, and in-person interviews with police officers. Twelve beats in each city (Indianapolis and St. Petersburg) were selected as study beats, and observers were assigned to ride with the officers assigned to these beats. The study beats from each site were selected to closely match the degree of socioeconomic distress (i.e., the sum of percentage of poverty, percentage of female-headed families, percentage unemployed). Omitted in the sampling design were police beats with the lowest levels of socioeconomic distress (i.e., the most affluent districts). In other words, observers were assigned to officers patrolling areas in which police-citizens encounters were expected to be more frequent. Nonetheless, because of the nature of workload requirements (e.g., calls for service), officers often interacted with citizens in nonstudy beats as well. Hence, systematic observations were recorded in 97 of the 98 total beats (50 in Indianapolis and 48 in St. Petersburg).[2] Each site drew beat boundaries to reflect as closely as possible existing neighborhood boundaries; hereafter, these aggregates are referred to as neighborhoods.[3]

In the summer months of 1996 and 1997, trained graduate and honor undergraduate students served as field observers.[4] Field observers accompanied officers assigned to selected neighborhoods throughout a matched sample of work shifts. Observation sessions oversampled busier days and shifts. During their time with officers, observers took notes and spent the following day transcribing their notes into detailed accounts and coding them according to a predefined protocol. Approximately 240 hours of observation were carried out for officers assigned to each neighborhood. Officer identities were protected throughout the observations periods, and the researchers were granted limited protection from legal process under federal statute. A police-citizen encounter was defined as a face-to-face communication between officers and citizens that was more than a passing greeting. In all, 6,500 citizen encounters were observed in Indianapolis and 5,500 in St. Petersburg. The length of police-citizen encounters ranged from less than a minute to several hours. Among the citizens included crime victims, witnesses, a variety of service recipients, and criminal suspects. The analysis presented here focuses on police-suspect encounters.

Suspects were defined as wrongdoers, peace disturbers, or persons for whom a complaint was received. More specifically, individuals were considered suspects by observers if any of the following criteria were met: police identified the citizen as a suspect, interrogated, searched, issued threats or warning, used force to prevent or stop wrongdoing, arrested or cited the citizen, or if the citizen admitted wrongdoing. This presents a somewhat difficult problem in that part of the inclusion criteria for becoming a suspect involves the dependent measure (i.e., force), which is akin to partially sampling on the dependent variable. In the present case, however, this is unavoidable. The

alternative would have been to exclude such cases, which clearly would present a much greater problem—the fact that there would be no way to analyze any of the force cases because there would be none. Furthermore, there were several cases in which the officer used force on citizens not labeled as suspects (e.g., victims requiring restraint after being told their partner was killed in an automobile accident). Observers were instructed not to regard the inclusion criteria in such strict terms so as to skew or alter the overall meaning of the word *suspect*. Overall, 3,544 police-suspect encounters involving 305 officers were observed.

Two factors resulted in reducing the size of the original data file. First, we were unable to geocode 136 police-suspect encounters, thus it was not possible to nest these cases within neighborhoods. Second, 18 neighborhoods (total of 78 encounters) were excluded because too few encounters were observed (less than 10) to estimate reliable hierarchical models (Mok and Flynn 1998:413).[5] Overall, the analysis file consists of 3,330 police-suspect encounters nested within 80 neighborhoods. The average number of encounters per neighborhood was 41.63 (range = 11 to 132). Neighborhood sizes ranged from .14 to 4.62 square miles (average = 1.39), and the number of residents per neighborhood ranged from 685 to 19,808 (average = 6,154).

Dependent Variable

Extant research demonstrates that, in any given police-citizen encounter, officers can and do apply numerous forms of both physical and nonphysical force (e.g., verbal threats) (Klinger 1995; McLaughlin 1992; Sykes and Brent 1983; Terrill 2001). To capture this variation, we define police force as acts that threaten or inflict physical harm on suspects. This definition is based on the National Academy of Science's (NAS) definition of violence and has been applied in previous studies of police use of force (Terrill 2001; Terrill and Mastrofski 2002).[6] Traditionally, researchers have focused on physical forms of force, especially actions that are above and beyond simple restraint techniques (i.e., excluding pat downs and handcuffing). Doing so seems fairly reasonable given that researchers have often been interested in excessive force, which usually entails more extreme forms of physical force. Nonetheless, such a conventional or traditional definition of force has often carried over to additional studies that have not focused on excessive force. This is somewhat puzzling given that the mere definition of physical force involves exactly that—physical force, which indeed involves pat downs and handcuffs. Failure to include such forceful acts within a measure of force would be misleading at best and wholly inappropriate at worst. Clearly, the act of physically restraining a suspect, either through a pat down search or the use of handcuffs, constitutes a degree of harm consistent with how the NAS

defines violence and how previous researchers have conceptualized forceful police behavior (see Alpert and Dunham 1997; Klinger 1995; Muir 1977; Terrill 2001; Terrill and Mastrofski 2002).[7]

In addition, researchers have generally not considered verbal forms of force (commands and threats) in their definition of force. In recent years, however, researchers have come to recognize the importance of adopting a broader definition of force. For instance, several scholars (Alpert and Dunham 1997; Garner et al. 1995; Klinger 1995) have called on researchers to consider commands and threats in the universe of behaviors considered force because of the coercive nature of these acts. In the case of commands, the threat to do harm is implicit, whereas a threat is explicit. Garner et al. (1995), Klinger (1995), and Alpert and Dunham (1997) all recognized that verbal force does not have to include an explicit threat outright. For example, Garner and colleagues (1995) considered verbal force to include instances when "officers shouted or used a command voice" (p. 158). Klinger (1995) defined verbal force as "verbal orders that officers issue to citizens" (p. 173). Alpert and Dunham (1997) placed verbal force in their minimal force classification, which includes "strong directive language" (p. 3).

Within this context, our dependent variable includes forceful police behavior that captures a variety of behaviors located throughout the force continuum—both physical and verbal manifestations. More specifically, the highest level of force reflects the severity of force imposed on suspects and placed along a continuum ranging from least to most severe harm (for similar approaches, see Alpert and Dunham 1997; Connor 1991; Desmedt 1984; Garner et al. 1995; Klinger 1995; McLaughlin 1992; Terrill 2001). Force was ranked in the following manner: none, verbal (commands and threats), physical restraint (pat downs, firm grip, handcuffing), and impact methods (pain compliance techniques, takedown maneuvers, strikes with the body, and strikes with external mechanisms).[8] Coded observations ranged along a four-point scale, from 1 (*no force*) to 2 (*verbal force*), 3 (*restraint techniques*), and 4 (*impact methods*) at the encounter level (mean = 1.81, SD = .81). The percentage of encounters in which each form of force represented the highest level of force used by officers is as follows: verbal (37%), restraint techniques (19%), and impact methods (2%). In 42% of police-suspect encounters, no force was used. Because the distribution of our dependent variable, Level of Force, was positively skewed (i.e., toward the right of the mode frequencies taper off), we used a natural log transformation so as to better approximate a normal distribution (mean = .49, SD = .45).

It is important to note that police sometimes use more than one level of force on a given suspect. However, for this analysis, interest lies only in the highest level used. The dependent measure does not reflect attempts by officers to use lower levels, either before or after the highest level was applied.

Accordingly, we do not attempt to distinguish officers who began with low levels of force, such as commands or threats, escalating only to higher levels of physical force when lower levels failed to achieve their objectives. Although the dynamics of force within an encounter are worthy of inquiry for exploring the evolution of police tactics during encounters, such an analysis is beyond the scope of the present research. The focus here is on how much force was ultimately applied so as to judge the affect of the various determinants on force generally and neighborhood factors specifically. In addition, only the force used by the officer selected for observation was coded. Force applied by other officers who were present were not attributed to the observed officer, which would introduce error when attempting to associate characteristics of the officer with the decisions he or she made.

Finally, we do not attempt to distinguish whether the application of force satisfied a particular standard (e.g., excessive vs. not excessive). Although certainly worthwhile, that is an entirely different enterprise. By limiting our analysis in this way, we cannot judge whether police overused or underused force in any instance. We can, however, characterize patterns in the distribution of force and speak to questions about economy in the use of force, which Bittner (1970) noted as the defining value of contemporary Western society for good policing.

Independent Variables

Neighborhood-level variables. We operationalized neighborhood structure using 1990 census data. Concentrated Disadvantage is a weighted factor score that includes the following census items: percentage poverty, percentage unemployed, percentage female-headed families, and percentage African American (eigenvalue = 3.07, factor loadings > .80). Extant theory and research suggests that this measure represents racially segregated, economic disadvantage (Sampson, Raudenbush, and Earls 1997; Sampson and Wilson 1995; Wilson 1987). Descriptive statistics revealed that the distribution of concentrated disadvantage was skewed. To correct for this, we added a constant (1.5) to the term, thus eliminating negative values, and adjusted the distribution using a natural log transformation (see Morenoff, Sampson, and Raudenbush 2001:538).

To capture variations in crime, a second neighborhood-level variable, Homicide Rate, was included in the analysis. We selected homicide because it is widely considered by criminologists to be the most reliable measure of crime that is least sensitive to underreporting (see Sampson and Raudenbush 1999:621). Homicide rate was the rate of police-recorded homicides per 1,000 neighborhood residents. Data from the calendar year 1995 were used

for Indianapolis neighborhoods (number of homicides = 93), and 1996 data were used for neighborhoods located in St. Petersburg (number of homicides = 23). Because the distribution was skewed, we analyzed the natural log.

Encounter-level variables. We included an array of variables at the encounter level. Among these factors are suspect sociodemographic characteristics, such as male, minority, age, and wealth. Given our interest in the association between sociodemographic variables and police use of force, and the potential mediating effects of neighborhood context, the estimates for these variables at the encounter level are reported in the multivariate tables that follow. We also included a number of additional variable clusters at the encounter level, consistent with previous theory as noted earlier (e.g., sociological and psychological) including suspect presentation (e.g., suspect resistance, alcohol use, and mental impairment), officer characteristics (e.g., sex, race, education, and training), officer attitudes (e.g., crime-fighting orientation), and additional measures used as statistical controls (e.g., citizen audience), in some of the multivariate models. Variable descriptions and coding schemes, as well as bivariate associations for the encounter-level variables used in the analysis are presented in the appendixes.

Finally, citizen behaviors must have occurred prior to the highest level of force. Studies that seek to explain or predict use of force decisions often look at the police-citizen encounter as if it were a single discrete event, without noting the developmental nature over time within that event. Nonobservational studies in particular are often lacking in this regard because reconstruction of when during the encounter various citizen actions occur cannot usually be determined. Researchers are left to speculate or assume that certain actions occurred prior to the use of police force. Nonetheless, even studies based on observational data can be limited to some extent. For instance, Worden (1995) in his analysis, found that antagonistic citizens were significantly more likely to be on the receiving end of some type of physical force. However, we do not know whether the citizen's antagonistic behavior preceded or followed an officer's forceful behavior. Unless careful attention is given to when various behaviors occur, one cannot establish a causal relationship. As a result, five of the predictor variables (e.g., suspect disrespect, suspect resistance, arrest, weapon, and citizen conflict) used in the present inquiry are referred to as timing variables, meaning that they needed to be coded according to when they occurred during the encounter. Unlike a static variable (e.g., citizen gender), which cannot change during the course of the encounter, timing variables can. Hence, these five timing variables are coded to ensure a causal relationship (e.g., occurred prior to the highest level of force).

RESULTS

We now turn our attention to the multivariate analyses. Our primary interest concerns the effects of neighborhood context on the level of force police use during encounters with criminal suspects. Table 1 presents three different multivariate models for level of force.[9] Model 1 reports estimates derived from a weighted least squares (WLS) regression model. Here, the outcome measure is the neighborhood mean for level of police force ($N = 80$). Descriptive statistics revealed that a few high-end outliers existed. To reduce the skewing effect, we analyze a square-root transformation of Level of Force. Bivariate associations and descriptive statistics for the variables used in model 1 are provided in Appendix D. Unlike traditional ordinary least squares regression, WLS allowed us to give more weight to neighborhoods where more observations of police-suspect encounters were recorded. Each case was weighted by the square root of the number of police-suspect encounters per neighborhood. The results suggest that Concentrated Disadvantage and Homicide Rate are both linked to Level of Force. In terms of relative importance, the magnitude of the coefficients appear similar ($\beta = .23$ and $.27$, respectively). Overall, model 1 shows that higher levels of force were significantly more likely to be used against suspects encountered in crime-ridden and disadvantaged neighborhoods.[10] Because these effects were observed in the absence of encounter-level statistical control variables, this represents a relatively lenient test of the effects of neighborhood context on level of police force.

Model 2 in Table 1 is an encounter-level ordinary least squares regression equation ($N = 3,330$).[11] In this model, we seek to determine whether the suspects' sociodemographic characteristics influence the level of force used by police. The results show that male, minority, youthful, and lower income suspects were more likely to be on the receiving end of higher levels of police force, net of encounter-level statistical controls.[12] These results support our contention that a true test concerning the effects of neighborhood context on level of force should include a host of encounter-level variables, such as suspect sociodemographic characteristics, to control for within-neighborhood variance in observed instances of police use of force.

To stage a more rigorous test of the effects of neighborhood context, which would adjust for encounter-level covariates, we proceeded to simultaneously regress Level of Force on both neighborhood- and encounter-level variables using hierarchical linear modeling techniques. We began by first estimating a one-way ANOVA model for Level of Force at the encounter level (see Bryk and Raudenbush 1992:17–28). Doing so provided us with several descriptive statistics to determine whether hierarchical modeling is appropriate for these data. First, we assessed the neighborhood reliability of

TABLE 1: Multivariate Models for Level of Force

Item	Model 1			Model 2[a]			Model 3[a]		
	b	β	t Ratio	b	β	t Ratio	b	β	t Ratio
Constant	1.35 (.01)	—	124.51***	.31 (.08)	—	4.08***	.48 (.01)	—	39.06***
Male	—	—	—	.09 (.02)	.09	6.03***	.09 (.02)	.09	5.48***
Minority	—	—	—	.04 (.02)	.04	2.33*	.02 (.02)	.02	1.37
Age	—	—	—	−.03 (.01)	−.10	−6.17***	−.03 (.00)	−.10	−6.13***
Wealth	—	—	—	−.05 (.01)	−.06	−4.07***	−.03 (.01)	−.04	−2.55*
Concentrated disadvantage	.02 (.01)	.23	2.14*	—	—	—	.03 (.01)	.21	2.01*
Homicide rate	.03[b] (.00)	.27	2.53*	—	—	—	.04[b] (.00)	.26	2.65**
F ratio		7.38***		38.60***				—	
Within-neighborhood explained variance		—			.23[c]			.22	
Between-neighborhood explained variance		.14[c]			—			.08	
Chi-square		—			—		217.08***		

NOTE: Standard error in parentheses.
a. Estimates control for encounter-level variables reported in Appendix B.
b. Multiplied by 10.
c. Coefficient of determination (adjusted).
*$p < .05$. **$p < .01$. ***$p < .001$ (two-tailed test).

the outcome measure at the neighborhood level. We calculated the reliability (λ) of the sample mean, β_{0j}, as the average of neighborhood-specific reliabilities across the set of neighborhoods, j, using the following formula: $\lambda_j = \Sigma \, (\tau_{00} / [\tau_{00} + \sigma^2 / N_j]) / j$, where τ_{00} is the between-neighborhood variance, σ^2 is the within-neighborhood variance, and N equals the sample size in each of j neighborhoods. The reliability estimate for Level of Force ($\lambda = .58$) indicated that the sample mean was a reliable indicator of the true neighborhood mean. In other words, we concluded that we would be able to model neighborhood-level effects with an acceptable degree of precision.

Next, we calculated an intraclass correlation coefficient (ρ) for the outcome measure: $\rho = \tau_{00} / (\tau_{00} + \sigma^2)$. The intraclass correlation (ICC) reveals the proportion of variance between neighborhoods in the outcome variable. The ICC for Level of Force was .04, which indicates that approximately 4 percent of the variance in Level of Force was between neighborhoods. Stated differently, the amount of variation within neighborhoods plus variation attributable to measurement error for Level of Force was approximately 96 percent. Prior researchers using multilevel models have reported similar results (Reisig and Parks 2000:619; Sampson and Jeglum-Bartusch 1998:796; Taylor 1997:68; Welsh, Greene, and Jenkins 1999:97; also see Duncan and Raudenbush 1999). The question remains, however, whether enough variation in Level of Force exists between neighborhoods to model as a function of contextual factors. To address this question, we turn to the chi-square value for between-neighborhood variance. The chi-square statistic is statistically significant ($\chi^2 = 203.70, p < .001$). We can therefore reject the null hypothesis that no differences in Level of Force exist across neighborhoods. Overall, the neighborhood reliability, ICC, and chi-square indicate that the data were suitable for estimating hierarchical linear models.

Model 3 in Table 1 is a fixed-effects hierarchical regression model.[13] Using the fixed-effects model allows us to constrain the encounter-level slopes, thus not allowing them to vary as a function of neighborhood-level conditions. This adjustment is consistent with the objective of the analysis— to test the effects of neighborhood-level predictors, not to investigate the potential for multilevel interactions. The constant, β_{0j}, was allowed to vary across neighborhoods and is modeled as a function of neighborhood-level conditions (e.g., concentrated disadvantage). The neighborhood-level model took the following form:

$$\beta_{0j} = \gamma_{00} + \gamma_{01} \, (\text{Concentrated Disadvantage}) + \gamma_{02} \, (\text{Homicide Rate}) + u_{0j}.$$

In the neighborhood-level model, β_{0j} is the neighborhood mean for Level of Force. The model is also specified with a random error term (u_{0j}), which rep-

resents the variability remaining once the neighborhood-level predictors are controlled. The neighborhood-level variables were centered on the grand mean, and encounter-level variables were centered around the group mean (see Bryk and Raudenbush 1992:25–9).

The neighborhood effects observed in model 1 persist in model 3. In other words, both Concentrated Disadvantage and Homicide Rate are related to Level of Force in the expected direction, net of 26 encounter-level variables. Simply put, police are significantly more likely to use higher levels of force when encountering criminal suspects in high-crime areas and neighborhoods with high levels of concentrated disadvantage independent of suspect behavior, officer characteristics, and other statistical controls. When comparing model 1 to model 3 in Table 1, an interesting finding emerges. The effect of minority diminished below statistical significance in the hierarchical model ($p = .17$). More specifically, the standardized coefficient (β) for minority was reduced by 50 percent (from .04 to .02). In sum, it appears that race is confounded by neighborhood context: Minority suspects are more likely to be recipients of higher levels of police force because they are disproportionately encountered in disadvantaged and high-crime neighborhoods. It is also worth noting that the effects of male, age, and wealth persist once neighborhood contextual variables are entered into the equation. The standardized regression coefficients indicate that age and male are stronger predictors (–.10 and .09, respectively) when compared to wealth. The magnitude of these effects, however, are relatively modest when compared to Homicide Rate ($\beta = .26$) and Concentrated Disadvantage ($\beta = .21$).

Further Tests

In a recent review of contemporary urban poverty research, Small and Newman (2001) noted that the use of poverty-related indexes, such as Concentrated Disadvantage, "do not help us discern which neighborhood characteristics affect people and which do not" (p. 31). We adopted the use of Concentrated Disadvantage for the following three reasons: first, the use of a composite poverty index is parsimonious; second, the census items used to construct concentrated disadvantage are highly correlated with one another; and third, we were interested in the level of force police used during encounters with criminal suspects in neighborhoods characterized by the conditions described by Wilson (1987; Sampson and Wilson 1995). Nevertheless, we do find merit in Small and Newman's observation, and the bivariate relationships between the four census items used to construct Concentrated Disadvantage and the outcome variable of interest (i.e., level of force aggregated to the neighborhood level) are provided in Table 2. The economic variables (i.e., poverty and unemployment) were, in relative terms, more strongly correlated

TABLE 2: Additional Bivariate Statistics at the Neighborhood Level

Item	1	2	3	4	5
1 Level of force	1.0				
2 Percentage poverty	.23*	1.0			
3 Percentage unemployed	.18	.77**	1.0		
4 Percentage female-headed families	.11	.81**	.65**	1.0	
5 Percentage African American	.13	.61**	.58**	.71**	1.0
Mean	.48	22.92	9.13	18.42	42.63
Standard deviation	.13	13.60	5.12	10.87	37.66
Minimum	.15	4.47	1.15	2.68	.00
Maximum	.90	66.25	23.75	60.24	100.00

*$p < .05$. **$p < .01$ (two-tailed test).

with level of force. Family structure and race were more modestly associated with neighborhood levels of police force. It should be noted that these four bivariate relationships were weaker when compared to the association between neighborhood Level of Force and Concentrated Disadvantage ($r = .27$). The high intercorrelations between the items used to construct concentrated disadvantage (from .58 to .81) precludes the estimation of a multivariate model. Although the results reported in Table 2 are informative, it appears that grouping these measures into a weighted index, which reflects racially segregated economic disadvantage, provides a more parsimonious and powerful indicator of neighborhood context that can also be used when estimating multivariate models.

DISCUSSION

The findings presented here support Werthman and Piliavin's (1967) "ecological contamination" hypothesis. We find that officers are significantly more likely to use higher levels of force when encountering criminal suspects in high-crime areas and neighborhoods with high levels of concentrated disadvantage independent of suspect behavior and other statistical controls. There are a number of plausible interpretations that might explain such behavior. First, based on previous experience, officers may come to know or identify certain places as problem places just as they may come to know certain persons as problem persons. Within the framework of police work, this often involves a certain degree of perceived danger (Skolnick 1994). Problem places correspond to dangerous places and dangerous places correspond to officer safety. As noted by Herbert (1998), "incidents are considered especially dangerous depending upon their geographic location . . .

considerations of safety, in other words, lead officers to define particular areas as laden with danger, and they respond accordingly" (p. 358). Hence, when officers operate in areas of heightened danger (characterized by high levels of distress and crime), they may be more likely to apply higher levels of force.

A second explanation may result from the perception that force is seen as an acceptable mechanism of conflict management in an environment in which force by forceful means is more the norm (Kania and Mackey 1977). Officers may simply be more likely to resort to force because this is the manner in which conflict is resolved in these types of neighborhoods. As noted by Fyfe (1978), one might readily expect more police violence where there is more crime and violence in the community. More specifically, the use of force may be seen as a more acceptable way of doing business. In addition, officers may feel isolated from external consequences in such neighborhoods. Commenting on varying police practices across physical space, Sherman (1986) noted,

> Such variation is a joint product of what police expect will be the consequences of their differing behaviors in different neighborhoods and of what the political power of the different neighborhoods will let them get away with. A neighborhood that objects to police behavior may or may not be able to generate sufficient political pressure to change that behavior. (P. 346)

So-called getting away with using force in distressed and high-crime neighborhoods might be seen as easier than if applied in other types of neighborhoods. In essence, the resulting consequences are not great. Relatedly, it may also help explain why residents of such areas generally view the police less favorably (Weitzer 1999).

Yet another explanation might be characterized as the so-called dirtbag syndrome. Reiss and Bordua (1967) observed that police officers tend to place people into one of two categories—those who deserve to be punished and those who do not. Those falling in the latter category are often informally (and derogatorily) referred to by police as "dirtbags." This type of dichotomy may spill over and attach to locations just as it does to people. Numerous scholars have noted the cynical nature of police officers (Niederhoffer 1967; Regoli and Poole 1978). Such cynicism may translate into the perception that those occupying certain neighborhoods must be up to something, which translates into more coercive patterns of behavior. If the suspect is from the area, the officer may believe this person is involved in some deviant behavior by the very fact that he or she lives in this environment. If the suspect is not from the area, the degree of suspicion may be enhanced even further. Why else would this person come to this part of town? Officers may reason that this

person must be here to score his or her next high or to meet with someone in the area engaged in some form of illegal behavior.

Embedded within each of these potential explanations is the influence of key sociodemographic variables such as race, class, gender, and age. As the results show, when these factors are considered at the encounter level, they are significant. However, the race (i.e., minority) effect is mediated by neighborhood context. Perhaps officers do not simply label minority suspects according to what Skolnick (1994) termed "symbolic assailants," as much as they label distressed socioeconomic neighborhoods as potential sources of conflict. If, as noted by Skolnick (1994), officers tend to view minorities as individuals associated with an increased likelihood of violence, it may also be that officers apply a similar, and even more powerful, perceptual framework around geographic space. Within this context, the influence of so-called symbolic neighborhoods outweighs the perception of individual symbolic assailants with respect to how the police go about applying coercive forms of control. Interestingly, however, the other key sociodemographic variables are not mediated by neighborhood context. That is, officers are more likely to use higher levels of police force on male, young, and lower class suspects irrespective of neighborhood context, countering a symbolic neighborhood explanation with respect to these characteristics.

Given the fact that officers are more forceful in areas characterized by high levels of disadvantage and crime—irrespective of suspect behavior at the police-suspect encounter level—suggest the need for emphasizing departmental values and initiating open discussions on the importance of accountability to the law. When the police act as a mechanism to distribute force disproportionately to those located in so-called bad neighborhoods, legitimacy is undermined. Ultimately, progress is difficult to achieve unless force is rooted within legal justifications for its use.

Future research should continue to examine the role of neighborhood context on police use of force. Such an effort might begin with a better understanding of officers' views toward neighborhoods and how such views may prompt their decision-making behavior. We have laid out three potential interpretations for why officers were more likely to use force in areas characterized by concentrated disadvantage. At this stage, they are nothing more than post hoc interpretations. Future work that incorporates officers' views of neighborhood context may enable researchers to draw a more explicit theoretical framework, which will then permit additional empirical testing.

Researchers might also consider the level of activity emanating from community groups in each neighborhood. One might posit that where community groups are active, the use of police force will be substantially higher (or lower) than where they are not. A more sophisticated approach might look at what community groups in each neighborhood are mobilized to do, or what

they request of the police. Perhaps officers are more forceful in certain areas simply because the citizens in such areas are asking for stepped-up enforcement. Finally, research identifying additional neighborhood factors, beyond concentrated disadvantage, will help to better understand forceful police behavior.

APPENDIX A
Descriptions for Selected Variables

Variable	Description
Suspect variables	
Wealth	Observers placed suspects into one of the following four categories: chronic poverty (i.e., someone who appeared not to have a domicile that could shelter from the elements), low wealth (i.e., someone who has regular food, shelter, and clothing but can provide these things only at a very modest level or only slightly above subsistence), middle wealth (i.e., someone with a job above minimum wage or otherwise able to support themselves and their families), and above middle wealth (i.e., someone whose appearance and possessions suggest the capacity to afford many luxury items). In cases in which observers were presented with conflicting information (e.g., shabby appearance but an occupation or home suggesting greater wealth), they were instructed to take the totality of cues into account and select the category that best seemed to fit overall.
Intoxicated	The suspect showed behavioral effects of drugs and/or alcohol, such as smell of alcohol, slurred speech, impaired motor skills, or unconsciousness.
Mentally impaired	The suspect behavioral effects of mental impairment, such as inability to perceive situations as a reasonable person would or to control one's emotions and actions.
Heightened emotion	The suspect displayed a heightened state of emotion as manifested in terms of fear or anger.
Disrespect	The suspect was disrespectful to police in language or gesture, including a variety of verbal statements (i.e., calling the officer names, making derogatory statements about the officer or his family, making disparaging or belittling remarks, slurs [racial, sexual, lifestyle], flipping the bird [displaying the middle finger in the direction of the police], obscene gestures, spitting in the presence of an officer [even if not in the direction of the officer]).

(continued)

APPENDIX A (continued)

Variable	*Description*
Resistance	Suspect resistance was defined as acts that thwart, obstruct, or impede an officer's attempt to elicit information; failure to re-spond or responding negatively to an officer's commands or threats; and any physical act, proactive or reactive, against an officer's attempt to control the suspect.
Conflict	Conflict was defined as instances when the suspect involved in the encounter was in conflict with another citizen on scene. To be coded as a citizen safety issue, the conflict must have been immediate in the sense that the conflicting disputants must have been in the same general area. A suspect who was in conflict with a neighbor across the street in a house and out of any possible contact with this citizen was not coded as a citizen safety issue because there was none. A suspect and citizen in the front of a house yelling at each other was coded as citizen conflict.
Weapon	The suspect had weapon (e.g., gun, knife, hammer, and so forth) on his or her person or within so-called jump and reach (e.g., in the suspect's car, on a table in the suspects' house, and so forth).
Evidence	The evidence of the target's or requester's violation of the law ranging from 0 (*no evidence*) to 7 (*considerable evidence*). Items and values used to construct this variable include the following: officer observed citizen perform an illegal act (value = 3), citizen gave officer a full confession (value = 2), citizen gave officer a partial confession (value = 1), officer observed physical evidence implicating citizen (value = 1), and officer heard testimony from other citizens implicating the citizen (value = 1).
Arrest	The suspect was arrested (i.e., taking a suspect into custody for the purpose of charging him or her with a criminal offense).
Officer variables	
Training	Officer training in verbal mediation in the past three years.
Crimefighting orientation	A single item from the officer survey that read, "Enforcing the law is by far a patrol officer's most important responsibility."
Distrust	A single item from the officer survey that read, "Police officers have reason to be distrustful of most citizens."
Legal restraints	A single item from the officer survey that read, "In order to do their jobs, patrol officers must sometimes overlook search and seizure laws and other legal guidelines."

APPENDIX A (continued)

Variable	Description
Additional control variables	
Officer audience	Square root for the number of officers on scene.
Citizen audience	Square root for the number of citizen bystanders on scene.
Violence anticipated	Violence was anticipated based on reports from dispatcher, other officers, or officer's knowledge.
Proactive encounter	Officer initiated the encounter.
Potentially violent situation	Problem involves a dispute, traffic incident, or suspicious person.

APPENDIX B
Descriptive Statistics for Encounter-Level Variables

Variable	Category	Value	N	M	SD
Suspect sociodemographic characteristics					
Male	Female	0	939	.72	.45
	Male	1	2,391		
Minority	Caucasian	0	1,224	.63	.48
	Minority	1	2,106		
Age (in years)	5 or less	1	6	5.21	1.36
	6 to 12	2	87		
	13 to 17	3	413		
	18 to 20	4	344		
	21 to 29	5	829		
	30 to 44	6	1,233		
	45 to 59	7	319		
	60 and over	8	99		
Wealth	Chronic poverty	1	124	2.36	.56
	Low wealth	2	1,886		
	Middle wealth	3	1,303		
	Above middle wealth	4	17		
Suspect presentation					
Intoxicated	No	0	2,624	.21	.41
	Yes	1	706		

(continued)

APPENDIX B (continued)

Variable	Category	Value	N	M	SD
Mentally impaired	No	0	108	.03	.18
	Yes	1	3,222		
Heightened emotion	No	0	2,253	.32	.47
	Yes	1	1,077		
Disrespect	No	0	3,006	.10	.30
	Yes	1	324		
Resistance	None	1	2,957	1.21	.65
	Passive	2	144		
	Verbal	3	148		
	Defensive	4	66		
	Active	5	15		
Conflict	No conflict	1	3,134	1.13	.56
	Calm verbal	2	31		
	Agitated verbal	3	108		
	Threatened assault	4	37		
	Assault	5	20		
Weapon	No	0	3,279	.02	.12
	Yes	1	51		
Evidence[a]	No evidence	0	1,650	1.34	1.70
		1	537		
		2	287		
		3	379		
		4	271		
		5	127		
		6	72		
	Considerable evidence	7	7		
Arrest	No	0	2,961	.11	.31
	Yes	1	369		
Officer characteristics					
Male	No	0	497	.85	.36
	Yes	1	2,833		
Minority	No	0	2,659	.20	.40
	Yes	1	671		
Experience	Length of tenure (in years)		3,330	7.25	5.98
Education	< High school	1	63	4.58	1.66
	High school graduate	2	401		
	Some college	3	726		
	Associate's degree	4	152		
	> Two years college	5	550		
	Bachelor's degree	6	1,237		
	Some graduate work	7	193		
	Graduate degree	8	8		
Training	None	1	1,926	1.80	1.13
	< One day	2	593		

(continued)

APPENDIX B (continued)

Variable	Category	Value	N	M	SD
	One or two days	3	471		
	Three to five days	4	218		
	< Five days	5	122		
Officer attitudes					
Crimefighting-orientation	Disagree strongly	1	100	3.15	.74
	Disagree somewhat	2	400		
	Agree somewhat	3	1,724		
	Agree strongly	4	1,106		
Distrust	Disagree strongly	1	928	2.03	.79
	Disagree somewhat	2	1,465		
	Agree somewhat	3	861		
	Agree strongly	4	76		
Legal restraints	Disagree strongly	1	2,120	1.59	.87
	Disagree somewhat	2	562		
	Agree somewhat	3	548		
	Agree strongly	4	100		
Additional control variables					
Officer audience	Number of officers on scene (square root)		3,330	1.42	.44
Citizen audience	Number of citizens on scene (square root)		3,330	1.85	.89
Violence anticipated	No	0	3,027	.09	.29
	Yes	1	303		
Proactive encounter	No	0	1,818	.45	.50
	Yes	1	1,512		
Potentially violent situation	No	0	1,749	.48	.50
	Yes	1	1,581		

a. Evidence is determined on an eight-point Likert-type scale, from 0 (*no evidence*) to 7 (*considerable evidence*).

APPENDIX C
Correlation Matrix for Encounter-Level Variables ($N = 3,330$)

Item		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Male[a]	1	1.0																										
Minority[a]	2	.08	1.0																									
Age[a]	3	−.04	−.11	1.0																								
Wealth[a]	4	−.04	−.00	−.09	1.0																							
Intoxicated[b]	5	.07	−.07	.22	−.18	1.0																						
Mentally impaired[b]	6	−.03	−.07	.12	−.11	.08	1.0																					
Heightened emotion[b]	7	−.10	.05	.02	−.03	.08	.07	1.0																				
Disrespect[b]	8	−.05	.01	.01	−.06	.11	.11	.32	1.0																			
Resistance[b]	9	.03	.06	.01	−.09	.18	.11	.23	.36	1.0																		
Conflict[b]	10	−.10	.05	.03	−.03	.07	.05	.24	.14	.21	1.0																	
Weapon[b]	11	.01	−.01	.03	.01	.03	.05	.03	.03	.05	.00	1.0																
Evidence[b]	12	.06	−.01	−.06	.06	.07	−.02	−.02	.03	.09	−.04	.01	1.0															
Arrest[b]	13	.06	.04	−.02	−.09	.15	.01	.10	.12	.23	.02	.02	.18	1.0														
Male[c]	14	.05	.02	.02	.01	.05	.01	.00	.01	.01	−.01	−.00	.01	.02	1.0													
Minority[c]	15	−.01	.10	.04	−.00	.00	−.01	.01	−.04	.01	.07	−.01	−.03	−.04	−.15	1.0												
Experience[c]	16	.00	−.14	.06	−.02	.00	.04	−.03	.01	−.02	−.01	−.02	−.01	−.01	−.02		1.0											
Education[c]	17	−.02	.06	−.02	.01	−.01	−.05	−.04	−.03	−.02	−.04	−.04	.03	−.02	.09	−.01	−.33	1.0										
Training[c]	18	.03	.11	−.05	−.01	.00	−.03	−.06	−.03	.03	.03	.01	−.04	−.00	−.01	.20	−.15	−.01	1.0									
Crimefighting orientation[d]	19	.00	−.06	−.01	−.02	.01	.02	−.00	.03	−.03	.00	.01	.03	.02	.11	−.06	−.14	−.01	.04	1.0								
Distrust[d]	20	.00	−.01	−.03	.05	−.03	.01	−.04	.02	−.01	.00	.01	−.04	−.01	.00	−.05	−.03	.02	−.00	.18	1.0							
Legal restraints[d]	21	−.01	.05	−.02	−.03	.00	−.01	−.05	−.03	.03	.04	.01	−.02	.02	.12	−.02	−.02	.02	.11	−.02	.06	1.0						
Officer audience[e]	22	.08	.10	−.08	−.09	.11	−.01	.15	.06	.18	.05	.01	.00	.25	.01	.00	−.04	−.01	.02	.00	−.04	.01	1.0					
Citizen audience[e]	23	.01	.05	−.22	−.04	.03	−.02	.12	.09	.13	.13	−.02	−.02	.10	−.05	.03	.01	−.02	.02	−.05	−.03	.01	.40	1.0				
Violence anticipated[e]	24	−.03	.04	−.01	−.01	.01	.03	.15	.09	.12	.15	.09	−.05	.10	−.01	.03	−.00	−.04	.00	−.02	.00	.04	.22	.23	1.0			
Proactive encounter[e]	25	.04	.03	−.04	.06	−.09	−.10	−.17	−.09	−.09	−.15	−.01	.18	−.04	.01	.00	−.11	.09	.03	−.03	.03	.03	−.20	−.23	−.19	1.0		
Potentially violent situation[e]	26	−.04	.05	.05	.05	−.02	−.06	.09	.01	.01	.13	.00	−.06	−.03	.06	.05	−.10	.03	.09	.05	.03	.06	.00	.03	.13	−.01	1.0	
Level of force	27	.14	.09	−.10	−.11	.18	.00	.08	.10	.27	.09	.08	.18	.35	.03	.02	−.09	−.01	.08	.01	.01	.03	.17	.08	.05	.06	.01	1.0

a. Suspect sociodemographic characteristics.
b. Suspect presentation.
c. Officer characteristics.
d. Officer attitudes.
e. Additional control variables.

APPENDIX D
Bivariate Correlations, Means, and Standard Deviations
for Variables Used in the WLS Regression

	1	2	3
1 Concentrated Disadvantage	1.0		
2 Homicide Rate	.23*	1.0	
3 Level of Force	.27*	.30**	1.0
Mean	.00	−5.85	.48
Standard deviation	.95	7.27	.13
Minimum	−2.87	−13.82	.15
Maximum	1.46	2.30	.90

*$p < .05$. **$p < .01$ (two-tailed test).

NOTES

1. In this study, only about one half of one percent of the officers' encounters with the public did observers detect evidence suggesting that officers had changed their behavior because of the researcher's presence. Furthermore, observers characteristically reported cordial relations with officers during ride-alongs. Observers reported that only 12 percent of their observation sessions began with the officer having a negative attitude about the observer's presence, and this dropped to only 2 percent of the officers demonstrating that view by the end of the observation session. Field observers noted many instances of police behavior that could have been cause for disciplinary action, a phenomenon noted in previous field studies of patrol officers (Reiss 1971). Finally, a great deal of effort was placed on preparing each department for this study. A site director was sent to each city six months prior to data collection in an attempt to broker a relationship with management and patrol officers. This individual conducted numerous ride-alongs with all the observed officers. In total, no patrol officer refused to be observed during the course of the study.

2. Although the beats selected represent a range of service conditions, the explicit selection bias means that the findings are not intended to be nor likely to be typical of what occurs in all parts of the Indianapolis or St. Petersburg police services districts or of activity by all patrol officers. Please see Parks et al. (1999:491–5) for further description.

3. Previous researchers have used police-drawn geographic boundaries, such as beats and districts, as neighborhood proxies (see, e.g., Mastrofski et al. 2002; Skogan and Hartnett 1997; Smith 1986:317). Ultimately, the proper definition of neighborhood is contingent on the theoretical questions of interest (see Bursik and Grasmick 1993:11). Our focus here is on whether police pattern their behavior according to preconceived notions concerning certain areas. Accordingly, police beats, which were drawn by each department to conform as closely as possible to existing neighborhood boundaries, are viewed as the appropriate unit of analysis.

4. Prior to beginning fieldwork, a team of observers (field researchers) underwent an intensive four-month training program on how to conduct systematic social observation (SSO) of police (for a detailed description, see Mastrofski et al., 1998). Observers were a combination of undergraduate and graduate students from Michigan State University and the State University of New York at Albany who took a semester-long class specifically on SSO protocol. Observers were criminal justice majors, none of whom were former law enforcement officers. During the classroom portion (a total of 45 hours) of the training phase, each student was trained on the specifics of SSO. Observers also pretested the protocol in the field while conducting five training

rides with a local department willing to permit observation. In addition to the training received at the home universities, observers conducted a training ride once arriving on site to acclimate them to the city, beat boundaries, and the organizational structure of the department.

5. We expected that the neighborhoods that were deleted from this analysis because of too few observations were not evenly distributed across the socioeconomic spectrum. To investigate the matter, we placed neighborhoods into three equally sized groups that reflected the level of concentrated disadvantage (see Independent Variables section for operationalization). We found that 10 of the deleted neighborhoods were classified as low disadvantage, 5 neighborhoods were from the medium disadvantage group, and the 3 remaining neighborhoods were from the high disadvantage group. Although the sample of neighborhoods included in the analysis file cannot be said to represent the conditions of all neighborhoods across urban America, it does appear as though these 80 neighborhoods capture a wide range of variation in terms of socioeconomic status, family structure, and racial composition. At the encounter level, we compared the sociodemographic characteristics of suspects for the 214 encounters that were deleted with those of the 3,330 encounters included in the analysis. We found that the deleted encounters did not differ significantly in terms of the suspect's sex, age, and wealth. However, the racial makeup of deleted encounters was more heterogenous (51% minority vs. 63% minority). Given these similarities and the fact that the proportion of encounters that were deleted relative to the encounters included in the analysis file was small (approximately 6%), we are confident that systematic bias due to missing data (if any) is minimal.

6. Support for the NAS definition can be found in the police force literature. For example, Garner et al. (1995:152) argued that although there is no "explicit definition of the meaning of 'force' in the police literature," the NAS definition, which includes "threats, attempts, and actual physical force, adequately captures what the research literature on police use of force typically means by 'force.' "

7. Note that only 11 percent of the total number of cases involved an arrest, whereby officers were required to pat down and handcuff the suspect (although there were numerous cases in which officers did not). Hence, in nearly 90 percent of the cases, officers had discretionary authority with respect to the use of pat downs or handcuffs.

8. In terms of verbal force, a command was defined as a statement by an officer that was in the form of an order (e.g., "wait right here," "drop the knife," "leave now," and the like); threats involved a command followed by an explicit or implicit intended consequence for not complying (e.g., "drop the knife or you are going to get maced," "if I have to tell you again you are going in," and so forth). For physical restraint, pat downs were defined as instances when an officer physically touched a suspect as part of a cursory search; a firm grip included an officer grabbing a suspect in a forceful manner with a tight grip; and handcuffing involved placing restraints on a suspect's wrists. Finally, for impact methods, pain compliance techniques were defined as holds that cause pain to a specific body part (e.g., hammerlock, wristlock, finger grip, carotid control, and bar arm control); takedown maneuvers included instances when suspects were thrown, pushed, or shoved to the ground, against a wall, against a car or any other surface (leg sweeps also included); strikes with the body included hitting a suspect with the hands, fists, feet, legs, or any other part of the body (e.g., slapping, punching, and kicking); and strikes with an external weapon included the use of any item that was not part of the body (e.g., flashlights, batons, police radios, stun guns, and macing).

9. Preferably, one would investigate the effects of officer characteristics by nesting suspects' encounters within specific officers and subsequently using hierarchical modeling techniques. However, the structure of these data did not permit an analysis of this type. Although the mean number of suspects per officer was almost 12, too many officers (181 of 305, 59.3 percent) had an insufficient number (< 10) to adequately allow for the nesting of situational factors within individual officers.

10. One of the anonymous reviewers commented that the variation in both size and population of the neighborhoods included in the sample might be associated with neighborhood context and may interact with the contextual measures on the dependent variable. We explored this possibility. First, we looked at the bivariate associations between population density (persons per square mile) and the neighborhood-level measures. The observed correlations were as follows: .24 for Concentrated Disadvantage and .12 for Homicide Rate. Next, we reestimated model 1 in Table 1 but included an interaction term (Population Density × Concentrated Disadvantage). The interaction term failed to reach statistical significance ($p > .50$).

11. Given the ordinal nature of level of force, a multivariate model designed for ordinal level data, such as ordered probit or logit model, would be preferred (see Terrill and Mastrofski 2002). Because our interest was in comparing coefficients across models, however, we selected ordinary least squares regression.

12. Although not presented in Table 1, the encounter-level control variables behaved in a manner (i.e., sign and significance) similar to previous reports using these data (see Terrill and Mastrofski 2002).

13. It is fairly common in hierarchical modeling to consider whether variability exists across aggregates for level-1 units (e.g., encounters). Where variability is observed, it is said to be a product of aggregate-level factors (e.g., concentrated poverty) (Rountree, Land, and Miethe 1994). Various limitations in these data did not allow for such an exploration. Perhaps most notably, the low number of observed encounters in some neighborhoods resulted in a lack of variation in many of the encounter-level variables (e.g., minority, citizen disrespect). HLM version 5.04 is unable to model variation in encounter-level variables across aggregate units where variation does not exist. Because of this limitation, and because the prevalence of multilevel interactions was beyond the scope of the study at hand, we opted to estimate fixed-effects models.

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