UC Irvine
UC Irvine Previously Published Works

Title

A typological approach to studying policing

Permalink

Journal

ISSN

Authors

Simpson, Rylan
Hipp, John R

Publication Date

DOI

A Typological Approach to Studying Policing

Rylan Simpson (corresponding author)
PhD Student
Department of Criminology, Law and Society
University of California, Irvine
2340 Social Ecology II
Irvine, CA 92697
E-mail: simpson@uci.edu
Phone: 949-629-5728

John R. Hipp
Professor
Departments of Criminology, Law and Society, and Sociology
University of California, Irvine
3311 Social Ecology II
Irvine, CA 92697
E-mail: john.hipp@uci.edu
Phone: 949-824-8247

Word count (main text, footnotes, references and tables): 7,812
Running head: A Typological Approach to Studying Policing

Abstract

Policing in the United States has experienced immense change throughout the past quarter-century. Although police agencies have shared their goals of preserving life and protecting property, their philosophies and practices for achieving these goals have differed. The present research, therefore, explores patterns in policing via a novel, typological approach. Using six waves of data (1993, 1997, 2000, 2003, 2007, and 2013) from the Law Enforcement Management and Administrative Statistics (LEMAS) data series, we first employ factor analyses to generate indices for six important policing dimensions: (1) officer diversity, (2) community policing, (3) patrol strategy diversity, (4) militancy, (5) technology, and (6) staffing rigor. Using these indices, we then employ latent class analyses to construct typologies of police agencies, and examine the distribution of such typologies across space at various points in time. Our results reveal several key findings. We detect consistent patterns in typologies across time, including classes with high militancy, high diversity, or low staffing rigor (among others). Within these sets of classes, we also detect micro-heterogeneity amongst patterns of index values: for example, subsets of classes which all score high on one dimension but score high versus low on other dimensions. Finally, we find evidence to suggest spatial convergence of typologies in one large geographic region: Southern California. By offering a multidimensional classification scheme over a 20-year period, we contribute to the policing literature by highlighting the importance and implications of studying multiple policing dimensions simultaneously.

Word count: 238

Keywords: Policing, police organizations, spatial analysis, temporal analysis

A Typological Approach to Studying Policing

There is considerable heterogeneity across police agencies. Although their goals of preserving life and protecting property may be similar, their philosophies and practices for achieving these goals differ. Such differences, furthermore, are not static. In addition to cross-sectional variation, police agencies also exhibit immense temporal variation. For example, there is little doubt that police agencies are more diverse and technologically advanced today than in 1993. However, even today, not all police agencies are equally diverse or equally advanced. Whereas some agencies now utilize sophisticated facial recognition techniques to solve crime, other agencies still rely on more primitive technologies, like visual analysis of raw video surveillance.

Police agencies have also changed along other dimensions. For example, there is little doubt that police agencies are more community policing orientated today than in 1993. At the same time, police agencies are arguably more militarized as well. Alongside the rise of new community policing practices, like 'Coffee with a Cop', 'Shop with a Cop', and citizen academies, has been the rise of militaristic practices, like the use of drones and assault rifles in patrol. Police agencies can thus be characterized along multiple dimensions, which continuously evolve and transform to shape their orientations. Indeed, it may be possible that agencies can emerge as rather contradictory in their orientations, for example by scoring high on both community policing and militarization, and so their position along *all* dimensions must be considered. No longer should agencies be necessarily thought of as *just* 'community policing orientated' or 'diverse' or 'militarized', but instead 'community policing orientated' *and/or* 'diverse' *and/or* 'militarized', and so on.

The present research, therefore, seeks to construct police typologies and explore the

characteristics of these typologies across space (e.g., patterns in Eastern versus Western states) at various points in time (e.g., patterns in 1993 versus 2013). We use six important policing dimensions that have significant relevance to policy and practice (as described below) to form these typologies: (1) officer diversity, (2) community policing, (3) patrol strategy diversity, (4) militancy, (5) technology, and (6) staffing rigor. By constructing typologies, we complement existing literature which has generally examined the aforementioned six dimensions in isolation (e.g., effect of dimension X on variable Y) and advance the literature's understanding of policing more generally. Indeed, we believe that our novel, typological approach to studying policing will be particularly useful for understanding the historical, current, and future antecedents and correlates of policing in the United States.

In the following sections, we briefly[1] describe our six dimensions of interest. Following that, we discuss our data and research methods. We then present our results, with specific attention to the formation and diffusion of police typologies across space and time. Finally, we conclude with our implications and directions for future research.

LITERATURE REVIEW

OFFICER DIVERSITY

One of the most politicized transformations in policing in recent years has been the diversification of the occupation (e.g., Barrick et al. 2014; Gustafson 2013; Jordan et al. 2009; Schuck 2014; Smith 2003). In response to rising concerns regarding its stagnant nature (e.g., predominately White, male officers), police departments have increasingly sought to diversify the composition of their membership, primarily by increasing the number of female and/or non-White officers. Police departments' success in recruiting (and then retaining) minority officers,

---

[1] Note that we do not intend these reviews to be exhaustive. Instead, we hope that these reviews will highlight the prominence of these topics within the broader policing literature and situate our research amongst this literature.

however, remains relatively limited: male officers still represent approximately 85%, and White officers still represent roughly 70%, of all officers in the United States (LEMAS 2013). Although this transformation has thus far been slow, pressures to diversify continue to persist, and questions regarding the effects and correlates of such diversification continue to emerge. For example, scholars have examined the effects of police diversification on a number of outcomes, including violence against police (Barrick et al. 2014), homicides by police (Smith 2003), and departmental relations (Hur 2012). Scholars have also examined predictors of minority recruitment, including accreditation, recruitment practices, and community policing orientation (Schuck 2014), representation of minorities in public office and/or police leadership (Gustafson 2013), and salaries and recruiting budgets (Jordan et al. 2009). The diversification of officers may therefore be important for an array of policing policies, practices, and outcomes.

COMMUNITY POLICING

> "*Community policing is the most important development in policing in the*
>
> *past quarter century*" (Skogan and Roth 2004, p. xvii).

Parallel to the push for officer diversification in the United States has been the push for community policing. Dating back to the 1990s, community policing has taken law enforcement by storm. Indeed, it has become the most popular (and widely cited) policing reform in the country (e.g., Maguire 1997; Mastrofski et al. 2007; Rosenbaum and Lurigio 1994; Skogan 2006; Skogan and Roth 2004): with 91% of respondents in one national survey reporting that it was a major or moderate part of their agency's organization and operations (Mastrofski et al. 2007). Defined as a "process rather than a product" (p. 5), community policing has been characterized by three features[2]: (1) administrative decentralization (e.g., delegation to individual officers, sergeants, and localized policing teams), (2) community engagement (e.g., partnerships

---

[2] Although definitions and measures of community policing have varied as a function of time and study.

3

with community groups, community meetings, community surveys, etc.), and (3) proactive problem solving techniques (e.g., community-driven crime prevention activities; Skogan 2006). Although its implementation has been challenging, and its fidelity has arguably been limited, the ideals of community policing continue to thrive amongst the practitioner community (Mastrofski et al. 2007).

PATROL STRATEGY DIVERSITY

A plethora of research has examined the use, and associated effectiveness, of different police patrol strategies. Studies of this genre typically examine the deterrent effects of general patrol strategies, such as vehicle, foot, and/or bicycle patrol (e.g., Esbensen 1987; Kelling et al. 1974; Menton 2008; Piza and O'Hara 2014; Ratcliffe et al. 2011), or more applied patrol strategies, such as hot spot policing (e.g., Braga and Bond 2008; Groff et al. 2015; Koper 1995; Sherman and Weisburd 1995), on crime or related outcomes. These studies have typically observed that patrol strategies are most effective for reducing crime when they are tailored to characteristics of space and/or employed at precise units of analysis. These findings suggest that agencies that employ greater varieties of patrol strategies may experience crime control benefits relative to agencies that employ fewer patrol strategies, given that the former are better able to patrol different types of locations with different types of strategies.

MILITANCY

Recent events involving mass causalities have spurred much discussion regarding the police's ability to effectively handle large-scale violent events, such as terrorist attacks on domestic soil. This has led to a presumed increase in police militancy (e.g., see Rizer and Hartman 2011). Although it may seem intuitive what is meant by 'militancy', defining it has posed a challenge for scholars in the field (e.g., see Bieler 2016). Similar to community policing,

militarization is not neatly defined. Instead, scholars have used an array of variables to measure it. For example, Kraska (2007) provided one definition, whereby he described four dimensions upon which the police can be militarized: (1) material (e.g., martial weaponry, equipment, and technology; Phillips 2016[3]), (2) cultural (e.g., martial language and values; Kraska 1996), (3) operational (e.g., use of SWAT-like teams; Kraska and Kappeler 1997), and (4) organizational (e.g., martial arrangements like 'command and control' structures; see Bittner 1970). Although all dimensions are of potential interest in the militancy debate, the material element has arguably received the most attention in public discourse, given the public's interest in police weaponry and related tactical equipment.

The functions and outcomes of police militarization also remain contested. Themes of safety versus control and efficiency versus legitimacy continue to operate in contradiction to one another (e.g., see Bieler 2016). With that being said, the mere frequency of these debates surrounding militancy itself warrants further research to define, describe, and evaluate its effects on contemporary policing. Considering the current political climate, and rising concerns from practitioners about the accessibility and availability of sophisticated weaponry, militarization will likely continue to remain a highly discussed topic (especially given its alleged contradiction to community policing principles).

TECHNOLOGY

In addition to concerns of being 'outgunned', police practitioners have also cited concerns of being "out-tech'd" (Nunn 2001, p. 12). Past research has highlighted the semantic race[4] between "police and criminals to use technology to outdo the other" (Nuth 2008, p. 443). Thus, although technology has always been an important part of policing (e.g., see Baber et al.

---

[3] Phillips (2016) cited the use of patrol rifles by street-level police officers as evidence of militarization.
[4] Whereas police often use technology to minimize criminal activities, offenders often use technology to maximize such activities (Nuth 2008).

2009; Custers 2012; Nunn 2001), police agencies' access, reliance, and use of technology has generally increased over time (Nuth 2008). Indeed, advanced technologies, which were originally developed for use by the military, are increasingly being adopted for use by domestic police agencies to control crime, facilitate investigative processes, and promote departmental communication (Nunn 2001; Nuth 2008). Examples of these new technologies include biometric processing, thermal and/or digital imaging, facial recognition, and remote monitoring and/or surveillance (Nunn 2001). The advent, and introduction, of these technologies has ultimately reduced the role of human processing (e.g., less emphasis on personal observation) and enhanced the role of autonomous processing (e.g., more emphasis on algorithms) to augment the policing of space (Nunn 2001). These technological advances have produced a variety of benefits for police. For example, new technologies have increased investigative efficiency (Baber et al. 2009), facilitated data analysis, and even fostered the development of community policing initiatives (Nuth 2008). With that being said, these new technologies have also given rise to legal and organizational concerns, such as misuse and privacy violations.

STAFFING RIGOR

Relative to the aforementioned dimensions, staffing rigor encompasses a wider array of policing policies and practices. Topics like hiring, training, retaining, educating, and incentivizing officers all fall broadly under this dimension, which some may term 'professionalization'. The potential effects of this dimension are equally broad, although much emphasis has been placed on examining the effects of education and training on officer misconduct and/or violence. For example, Fridell and colleagues (2009) evaluated the impact of a variety of policies and practices, including training hours, dispatch policies, and use of force reviews (among others), on violence against the police. Shjarback and White (2016) also

assessed the effects of departmental professionalism, measured via education, hiring standards, and training hours (among others), on violence and complaints against the police (Cao and Huang (2000) used similar measures to predict citizen complaints as well). Other research has also examined the effects of collective bargaining policies on supplemental pay benefits (e.g., hazardous duty, shift differential, education incentive, and merit pay; Briggs et al. 2008) and innovation practices (Morabito 2014). Staffing principles are thus important elements of the police organization equation, and therefore research must account for the diversity in such principles when describing agencies' orientations.

DO TYPOLOGIES OF POLICE AGENCIES EXIST?

Our aforementioned review describes six policing dimensions which are important for both policy and practice: (1) officer diversity, (2) community policing, (3) patrol strategy diversity, (4) militancy, (5) technology, and (6) staffing rigor. Our review also highlights how each of these six dimensions is often assumed to be independent of the others: researchers examining these dimensions typically examine issues related to their specific dimension (e.g., militancy) absent explicit considerations of other dimensions (e.g., staffing rigor). For example, a study may examine police agencies' officer *or* patrol strategy diversity, but rarely agencies' different types of diversity *simultaneously*. As a result, the question of whether agencies can be effectively classified into typologies using information from *multiple* different dimensions remains open to empirical investigation (and hence one we focus on here).[5] Given that these dimensions all coexist and operate simultaneously within agencies, understanding the relationships among them, and the variation between them, is important for understanding the implications *of* them: dimensions operate as *bundles* (i.e., collections of dimensions that are

---

[5] As Maguire and colleagues (2003) described, "Police organizations are capable of experiencing change in many dimensions: in culture, leadership, management, programs, and operations, just to name a few" (p. 271).

observed simultaneously in an agency) in practice and therefore should be studied as bundles in classification-orientated research. Thus, we combine information from all six dimensions to derive, and then describe, a comprehensive classification scheme of police agencies in the United States. Examining the effects of these dimensions, which are all hypothesized to impact policing at least individually, simultaneously, may yield fruitful insight into their broader impacts on policy and practice.

OVERVIEW OF THE PRESENT RESEARCH

The present research utilizes data from the Law Enforcement Management and Administrative Statistics (LEMAS) data series to empirically investigate patterns in policing in the United States. Considering the immense number of police agencies across the country, identifying and describing patterns in orientations is particularly fruitful for associated macro-level analyses. Indeed, structural contingency and institutional theories (e.g., see King 2009; Wilson 1968; Zhao and Hassell 2005) would suggest that similar types of agencies may coexist across the nation, given the arguably contagious environment in which they operate. For example, from the former perspective, agencies may adopt others' policies and practices because of the perceived effectiveness and efficiency of those policies and practices. From the latter perspective, agencies may adopt others' policies and practices because of political factors, such as the desire to "look good to important members of their environment" (King 2009, p. 219). Regardless of the underlying process, however, it is difficult to study similarities and/or differences among agencies without rigorous analyses of their policies and practices (hence our research's contribution to the literature).

In addition to describing patterns in policing at one point in time, the present research also identifies variation in such patterns at various points in time using a combination of factor

and latent class analyses. In doing so, we provide the first known multidimensional classification scheme of police agencies in the country and the first known comprehensive examination of changes in such schemes in recent history. Understanding these transformations in policing is critical to studying policing more broadly.

DATA AND METHODS

DATA

The present research utilizes organizational data from the following six waves of the LEMAS data series: 1993, 1997, 2000, 2003, 2007, and 2013.[6] This series "collects data from over 3,000 general purpose state and local law enforcement agencies, including all those that employ 100 or more sworn officers and a nationally representative sample of smaller agencies" (Bureau of Justice Statistics, 2015). These data provide descriptive information regarding agencies' demographics, policies, practices, procedures, and equipment (for a review of studies that have utilized these data, see Matusiak et al. 2014). Given that we are interested in municipal policing practices, we limited our analyses to agencies that identified as municipal police departments. We also only retained data for the largest agency (based on the total number of sworn officers) within each city in each year (given that this is typically the municipality's *main* police agency) to ensure better continuity across our years of data. See Table 1 for the descriptive statistics for the agencies included in each year of data.

<<<Table 1 about here>>>

VARIABLES

Using a four-step process, we generated six indices to represent the following policing dimensions: (1) officer diversity, (2) community policing, (3) patrol strategy diversity, (4)

---

[6] Note that although we examined six waves of data, we did not have data for all agencies in all waves due to the LEMAS' sampling strategy.

militancy, (5) technology, and (6) staffing rigor (note that not all indices exist in all years due to missing items in associated years of data). First, we identified variables in each year that pertained to the aforementioned dimensions. Note that many of the survey items varied by year, and therefore the composition of our indices sometimes varied by year[7] as well, and our selection of survey items for each of our indices generally aligned with previous studies' indices (as highlighted in the literature review section). Next, we cleaned the data for each of our identified variables to ensure consistent coding schemes across all years of data. For ordinal variables, higher values indicate greater propensity or magnitude of that measure. For dichotomous variables, 0 indicates the absence of the measure and 1 indicates the presence of the measure. Once we recoded all of our variables (as necessary), we then employed confirmatory factor analyses to predict individual departments' scores on each index. Finally, we standardized the resulting factor score variables to facilitate within-year comparisons of departments. In the next section, we describe each of our six indices in detail. See Appendix Table A1 for the full list of variables included in each index in each year.

Officer Diversity

     First, we generated an index to represent *officer diversity*. This index includes a series of proportion variables that pertain to the demographic composition of officers in a department (e.g., proportion of female officers, non-White officers, etc.). In many years, this index also includes some diversity practice variables, including whether or not police departments provide their officers bilingual pay and/or have policies specific to racial profiling. Higher scores on this index represent greater officer diversity. This index is available in all six years of data.

---

[7] For example, LEMAS only assessed police agencies' use of social media in 2013. Although these variables are not present in any of the earlier years of data, and thus could arguably be excluded from the index, we believed that it was important to tailor each index in each year to time-relevant variables. Given that our analyses are cross-sectional, variation in items between years also did not necessarily impact agencies' relative placement along continuums within years.

Community Policing

Second, we generated an index to represent *community policing*. This index includes a

series of variables that pertain to community policing practices and philosophies. For example,

practice variables include whether or not police departments host citizen academies, partner with

community groups, and/or provide community policing training to their officers. Philosophy

variables include whether or not police departments include community policing in their mission

statements, possess community policing plans, and/or encourage problem solving projects in

their evaluations of officers. Higher scores on this index represent greater community policing

orientations. This index is available in five of our six years of data (not in 1993).

Patrol Strategy Diversity

Third, we generated an index to represent *patrol strategy diversity*. This index includes a

series of dichotomous variables that indicate whether or not departments employ certain patrol

strategies (e.g., bicycle patrol, motorcycle patrol, foot patrol, etc.) on a regular basis. Higher

scores on this index represent greater patrol strategy diversity. This index is available in only

four of our six years of data (not in 1993 or 2013).

Militancy

Fourth, we generated an index to represent *militancy*. This index includes a series of

variables that pertain to equipment and/or practices that involve force or the potential threat/use

of force. Equipment variables include items related to the types of weapons authorized for use by

a department and/or the number of weapons owned by a department. For example, authorization

variables include whether or not departments authorize their officers to use assault weapons, tear

gas, and/or flashbangs. Count variables include the number of militant-style equipment, such as

armored vehicles, aerial drones, and helicopters, owned by departments. Higher scores on this

index represent greater militancy. This index is available in all six years of data.

Technology

Fifth, we generated an index to represent police departments' access to *technology*. This index includes a series of variables that pertain to practices and equipment. For example, practice variables include whether or not police departments can receive and/or distribute electronic crime reports via e-mail. Equipment variables include whether or not police departments use license plate readers, infrared imaging, facial recognition, and/or video cameras in their patrol cars, public areas, and/or on their officers and/or weapons. Higher scores on this index represent greater access to technology. This index is available in only five of our six years of data (not in 1993).

Staffing Rigor

Sixth, and finally, we generated an index to represent police departments' *staffing rigor*. This index includes a series of variables that relate to staffing-specific policies, practices, and training which are not captured by any of the aforementioned five dimensions. For example, policy variables include whether or not police departments have written policies for using deadly force and/or dealing with homeless and/or mentally-ill persons. Practice variables include whether or not police departments provide education incentive and/or merit pay, tuition reimbursement, and/or collective bargaining rights to their officers. Training variables include the number of training hours required for officers and/or the number of steps/phases in departments' hiring processes for new officers. Higher scores on this index represent more rigorous staffing practices. This index is available in all six years of data.

ANALYTIC STRATEGY

Once we constructed, and then standardized, our factor score variables, we next

conducted latent class analyses in Mplus to form our typologies. To minimize the possibility of obtaining a local solution rather than the global one, we followed the suggestions of Hipp and Bauer (2006) and used 100 randomized start values for 10 iterations each, then took the 10 with the best likelihood ratio at that point, iterated to complete solutions, and then selected the optimal solution. In order to select the best fitting class solution for each of our years of data, we analyzed the Bayesian Information Criterion (BIC), entropy, and class summaries produced by Mplus, with particular attention to when models did not terminate normally and/or when class solutions involved classes with less than 1% of cases. Once we selected our optimal class solutions (see Table 2), we then graphed each of these solutions to identify patterns in index values. We also analyzed these data by region to identify potential spatial patterns. [8]

<<<Table 2 about here>>>

RESULTS

In this section, we explore patterns in police typologies across space at various points in time via our latent class analyses. We discuss each of these analyses in the subsequent six sections: one section for each year of data. We then conclude by describing the diffusion of two particular typologies across space and time in Southern California. These latter analyses highlight the potentially 'contagious effect' of typologies across our 20-year period.

POLICE TYPOLOGIES IN 1993

In 1993, there were only three indices available in the data, and we found that the optimal solution contained eight classes (as shown in Figure 1a). Although many of these classes exhibit a similar trend of near average values on all three indices (with Class 6 (15% of observations in

---

[8] We used a three-step process to identify state-level spatial patterns. First, we determined the proportion of cities in any given class within each of the states in each year of data. Next, we determined the class with the highest proportion in a state in a given year. Finally, we mapped these states onto the United States' regional classifications.

13

this class[9]) exhibiting the seemingly most-average pattern), we note four classes of particular

interest: 1, 4, 7, and 8. First, Class 1 (5%) represents police departments that exhibit the *highest*

officer diversity, but the *lowest* militancy and staffing rigor. In contrast, Class 4 (8%) represents

police departments that exhibit some of the *lowest* officer diversity, but some of the *highest*

militancy and staffing rigor. Thus, these two classes of departments emerge as rather

contradictory in their orientation. While Class 1 departments can be thought as of particularly

diverse but lenient, Class 4 departments can be thought of as less diverse, more stringent, and

highly militant. Departments in these classes also differ in their structural characteristics.

Whereas Class 1 departments tend to be very small (averaging less than five officers) and cluster

in the Midwest, Class 4 departments tend to be quite large (averaging roughly 320 officers) and

cluster in the West.

<<<Figure 1a about here>>>

Continuing with the theme of militancy, Class 8 (3%) represents police departments that

score the highest on militancy, but also score high on the remaining indices as well. These

departments tend to generally cluster in the Mountain states. Finally, whereas Class 8 represents

the most highly militant police departments (and also some of the largest departments, averaging

nearly 2,800 officers), Class 7 (3%) represents police departments with high militancy and

officer diversity, but low staffing rigor. These departments tend to be much smaller in size,

averaging 160 officers, and cluster most strongly in Mississippi and New Mexico.

POLICE TYPOLOGIES IN 1997

The optimal solution for 1997 was a three-class solution (as shown in Figure 1b). These

three classes exhibit relatively divergent patterns in their orientation. Although Classes 1 and 2

---

[9] Throughout the results, the values in parentheses denote the percentage of observations contained within a given class.

share similarities in the stability of their patterns, Class 1 (42%) represents departments with the *lowest* values on all six indices and Class 2 (32%) represents departments with the *highest* values on all six indices (with the exception of patrol strategy diversity). Relative to Class 2 and 3 departments, Class 1 departments are generally the smallest departments (averaging 20 officers) and cluster broadly in the Midwest and South. Class 2 departments, on the other hand, are the largest departments (averaging nearly 400 officers) and cluster in the West and Florida. While departments in Class 3 (26%) generally follow the same pattern for officer diversity, community policing, technology, and staffing rigor as Class 2 (albeit with lower values), they diverge in their militancy: whereas Class 2 has the highest militancy values, Class 3 has low militancy values (which approach Class 1's values). Class 3 departments rank as the second largest in size (averaging roughly 60 officers) and cluster in New England.

<<<Figure 1b about here>>>

POLICE TYPOLOGIES IN 2000

The optimal solution for 2000 was a six-class solution (as shown in Figure 1c). Class 2 (17%) and Class 3 (31%) both represent police departments that score similarly on all six indices, but score higher on community policing and patrol strategy diversity than the remaining indices (although the absolute values of these indices generally decrease in the order presented). With that being said, Class 2 departments tend to be much larger (averaging 700 officers) than Class 3 departments (averaging 110 officers). Class 2 departments also tend to cluster more in the West, whereas Class 3 departments tend to cluster in New England.

Departments that are classified as Class 1 (11%) or Class 6 (23%) also score similarly on all six indices (although Class 1 departments score particularly high on patrol strategy diversity relative to the other indices) and tend to be small departments (averaging less than 35 officers).

Although Class 6 departments do not show any clear spatial patterning, Class 1 departments tend to cluster in New England. Finally, Class 5 (9%) represents departments with some of the *highest* officer diversity values, but some of the *lowest* militancy values, and near average community policing values. These departments tend to be relatively small (averaging 60 officers) and cluster broadly in the South.

<<<Figure 1c about here>>>

POLICE TYPOLOGIES IN 2003

The optimal solution for 2003 was a seven-class solution (as shown in Figure 1d). Similar to 1993, many of the classes in this year exhibited similar trends: near average values on all six indices, with Class 6 (24%) exhibiting the most-average pattern. Nonetheless, we note three classes of particular interest: 2, 5, and 7. First, Class 2 (4%) departments score below average on all indices, but score particularly low (i.e., the lowest of any class) on staffing rigor. Class 5 (4%) departments show similar patterns as Class 2 departments for community policing, technology, patrol strategy diversity, militancy, and staffing rigor, but score particularly high on officer diversity. Thus, although these classes share similar patterns for most indices, they diverge in their officers' diversity. Moreover, they also diverge in their size and location: whereas Class 2 departments average six officers and cluster strongly in the West North Central region, Class 5 departments average 20 officers and cluster broadly in the South.

In contrast to Classes 2 and 5, which tend to be smaller agencies that score below average on all indices, Class 7 (6%) departments tend to be large agencies (averaging 1,600 officers) which score high on all six indices, with particularly high scores on patrol strategy diversity and militancy. These departments tend to cluster in the West.

<<<Figure 1d about here>>>

16

POLICE TYPOLOGIES IN 2007

Like 2003, the optimal solution for 2007 was a seven-class solution (as shown in Figure 1e). Indeed, the patterns in 2007 generally mirror the patterns in 2003. For example, most classes exhibit near average values on all six indices, with Class 4 (24%) exhibiting the most average pattern. Class 3 (14%) and Class 5 (13%) exhibit similar patterns in values as Class 4, although Class 3 departments (clustering in New England) tend to exhibit below average values and Class 5 departments (clustering in the West) tend to exhibit above average values. Despite varying spatially, both sets of departments tend to be smaller in size (averaging between 40 and 150 officers).

Class 1 (12%) and Class 2 (9%) departments score similarly low on all indices, however Class 2 departments score higher on staffing rigor than Class 1 departments. Both of these classes tend to comprise the smallest police agencies: averaging between 10 and 25 officers. Class 7 (6%) departments represent outliers in orientation, given their high values on all indices, but particularly high values on patrol strategy diversity and militancy. These agencies also tend to be the largest agencies (averaging approximately 1,600 officers) and cluster in the South Atlantic and West.

<<<Figure 1e about here>>>

POLICE TYPOLOGIES IN 2013

In 2013, there were only five indices available in the data, and we found that the optimal solution contained four classes (as shown in Figure 1f). Similar to previous years, most of the classes in this year exhibited similar patterns in index values. With that being said, the relative magnitude of these values varies dramatically: whereas Class 1 (19%) departments exhibit the *lowest* values on all six indices, Class 3 (28%) departments exhibit the *highest* values on five of

17

the six indices (i.e., second highest for officer diversity), with a peak in values for community

policing. In this sense, Classes 1 and 3 emerge as rather contradictory in their orientation. These

classes also emerge as rather contradictory in their composition: whereas Class 1 departments

tend to be very small, averaging roughly 10 officers, Class 3 departments tend to be quite large,

averaging nearly 420 officers. Moreover, while Class 2 (16%) departments share their seemingly

low values on community policing, technology, militancy, and staffing rigor with Class 1

departments, they vary dramatically in their officer diversity values: officers in Class 1

departments tend to be non-diverse, but officers in Class 2 departments (which average 70

officers) tend to be highly diverse.

<<<Figure 1f about here>>>

Finally, Class 4 (37%) departments tend to score near the average on *all* six indices,

with a slight dip in officer diversity and a slight peak in staffing rigor. These departments

average 50 officers. Thus, although Classes 1, 3, and 4 all score similarly on all indices, the

magnitude of their similar scores increases as a function of class (i.e., the pattern of the line

remains similar, but the location of the line on the y-axis shifts). We are unable to detect clear

spatial patterns in the locations of these typologies in 2013.

ARE TYPOLOGIES CONTAGIOUS? SOUTHERN CALIFORNIA AS A CASE STUDY

The aforementioned results provide interesting insight into the spatial distribution of

police typologies at given points in time. However, due to the nature of cross-sectional analyses,

these results do not provide much specific insight into how these typologies may have actually

diffused *across* space *and* time. As a result, we use Southern California as a case study to

examine how two sets of classes, (1) those with the highest values on all indices and (2) those

with the lowest values on all indices, spatially diffused across the region from 1993 to 2013.[10] In

doing so, we describe what could be termed the 'contagious effect' of police typologies. We

chose Southern California to study given its large number of cities with data in multiple years.

Note that in order to increase the visual utility of our maps (see Figure 2), we collapsed classes

with similar patterns in index values.

<center><<<Figure 2 about here>>></center>

No consistent spatial patterns existed in typologies in Southern California in 1993,

although there were some loose clusters of typologies in certain counties (e.g., neighboring cities

of Anaheim, Fullerton, and Brea in Orange County all exhibited classes with the lowest values

on all indices). Policing in the region at this time was therefore rather mixed: with a spread of

departments scoring high, low, and neither high nor low on all indices. A much stronger pattern,

however, emerged in 1997. Effective 1997, most departments in the region exhibited high values

on all six indices, suggesting that departments which scored either low or neither high nor low on

the indices in 1993 (e.g., Anaheim, Fullerton, and Brea) transformed into departments which

scored high on these indices in 1997. With that being said, some outlying cities remained in the

region. For example, El Monte (in Los Angeles County) continued to score low on all indices

and Culver City (also in Los Angeles County) continued to score neither high nor low on all

indices.

By 2000, however, almost all departments in the Southern California region scored high

on all indices (even El Monte and Irwindale, which scored lowest on all indices in 1997, scored

highest on all indices in this year): with the high-scoring class transforming from a minority class

to a majority class in a matter of seven years. Indeed, Culver City, which exhibited a class with

---

[10] Note that although the absolute values for scores on these indices may have fluctuated throughout our 20-year
period, the scores' relative position within the broader class solution remained consistent (i.e., regardless of absolute
values, these classes were still generally the highest and/or the lowest within each year).

neither highest nor lowest values on all six indices, remained the only outlier in the region in this year. The region's policing transformation from 1993 to 2000 thus provides fruitful evidence to suggest that police typologies may be contagious: as agencies in the region adopted this high-scoring typology, surrounding agencies in geographic proximity of transforming agencies followed-suit in their adoption of such typology as well.

But as economic uncertainty increased in the 2000s, departments began to diverge in their seemingly uniform typologies. Many departments that had scored highest on all indices in preceding years now exhibited typologies with neither all high nor all low values: producing a rather erratic map with no clear spatial patterning (although the variance in typologies remained smaller in 2003 than in 1993, given the absence of low scoring agencies in the region in 2003). But as time progressed, the contagion effect seemed to resurface as departments transformed back to high-scoring classes. For example, Glendale (in Los Angeles County) and Costa Mesa (in Orange County) both transitioned to high-scoring classes, like their neighboring-cities Pasadena and Los Angeles and Santa Ana and Newport Beach, respectively, by 2007. This pattern continued from 2007 to 2013, when almost all cities in the region again scored highest on all indices.

DISCUSSION

This paper has proposed that multidimensional typologies are useful for studying policing. By using data collected over a 20-year period from a large, national sample of police agencies, we were able to identify spatial patterns in police typologies at various points in time. Moreover, by using a clustering technique to identify typologies of agencies at *multiple* time points, we were able to descriptively track temporal changes in these patterns. In doing so, we captured differentiation among agencies that may have otherwise appeared relatively

20

homogenous if, for example, only a single dimension (e.g., community policing *or* militancy *or* officer diversity) was analyzed. As such, we complement the organizational policing literature (e.g., for a review, see Maguire 2014) by offering a multidimensional classification scheme of police departments in the United States over an extended period of time. We highlight a few of our key findings.

First, we found that it is important to consider multiple dimensions *simultaneously* when studying policing. It is not always enough to simply focus on the level of one particular dimension—such as community policing or militarization—but rather it is useful to consider how these dimensions operate as a *bundle*. Indeed, police agencies are sophisticated entities: tasked with expanding roles and responsibilities that often extend beyond crime control (Bittner 1970). The extent, however, to which agencies have adapted to changes in their roles has varied. Moreover, the pressures for agencies to modernize their philosophies have varied as well (e.g., Maguire et al. 2003; Wilson 1968; Zhao and Hassell 2005). As Maguire and colleagues (2003) argued, "Like police organizations, the casual environments in which they are immersed are also changing rapidly … environmental features are important as well" (p. 272). Police agencies are not monolithic, or singular in orientation, making comprehensive approaches to examining policing issues particularly important. For example, although many agencies now practice some degree of community policing, not all agencies that practice community policing *also* exhibit militant and/or rigorous staffing practices. Moreover, while many agencies appear to have increased their diversity over time, not all agencies that have become more diverse have also become more technologically advanced. While subsets of agencies may share their community policing or technological orientations, they may still diverge widely on other important policing dimensions, as highlighted throughout the results section.

Second, and building upon the aforementioned discussion, we detected a few consistencies in typologies across time. For example, one consistency we detected was a class of agencies that scored relatively high on militarization. Nonetheless, the broader characteristics of this type of agency changed over time. In 1993, just 3% of agencies were classified as a type that was highly militarized (and they had *very* high levels); whereas in 1997, such an explicitly militarized class was not detected. Instead, a larger number of agencies (about one-third) all had high levels of militarization, but *also* high levels of other dimensions, such as staffing rigor and community policing. Moreover, such militaristic agencies also exhibited some structural, spatial, and temporal variation. Thus, although there has traditionally always been a subset of agencies which have exhibited militaristic orientations, the degree of such militarization, and its co-existence with other dimensions, has varied as a function of space and time. And police agencies can exhibit seemingly contradictory orientations, for example, by scoring high on both militarization *and* community policing (e.g., as we saw in 1997 and 2000).

Another class of agency that we consistently observed over time was one with low values of staffing rigor. In all years, these agencies were typically quite small. However, whereas these agencies in the earliest years had relatively low values on militarization, they were closer to the mean on militarization in later years, suggesting a degree of change in their overall characteristics. In the most recent year (2013), agencies low on staffing rigor split into two categories: one with very high levels of officer diversity and one with very low levels of officer diversity. Moreover, these categories of classes also varied in their structural characteristics: with the former low rigor/high diversity class averaging 10 officers and the latter low rigor/low diversity class averaging 70 officers. These findings provide further justification for the use of multidimensional classification schemes when studying policing. Staffing rigor is an important

variable in the broader police organization equation; but, failing to consider it in the context of other dimensions, like officer diversity, minimizes its potential utility in understanding more *general* policing characteristics. Even agencies with similar staffing rigor can exhibit variation in other important characteristics.

A third class of agencies of particular interest shared relatively high levels of officer diversity. With that being said, these classes diverged in their relationships with other dimensions. For example, one class of agencies had high levels of diversity, but also *high* levels of other dimensions, including militarization. Another class of agencies (which emerged beginning in 2000) had high levels of diversity but only *average* levels of other dimensions: in 2000 and 2003 these agencies tended to be small and in the South, whereas in 2007 they tended to be midsize and in the West. Again, this highlights that simply focusing on one dimension—in this case officer diversity—may not provide a complete picture of what these agencies look like in practice. And for future analyses testing the relationship between these typologies and levels of crime—something that is outside the scope of the present paper—these distinctions may be important.

IMPLICATIONS

As described throughout this paper, applying a typological approach to the study of policing offers several benefits for understanding policing processes, correlates, and outcomes. Such an approach has several important implications for future work and practice. We discuss three particularly important implications in the paragraphs that follow.

First, typologies may help to explain at least some of the variance in the effectiveness of policing programs, practices, and strategies across space. Interventions that are found to be effective in one particular region are not always found to be effective in other regions.

Although it may seem intuitive to argue that the intervention is not universally effective, it is important to also consider the contextual dynamics of the agencies employing the intervention, and how such dynamics may impact its success. For example, body cameras may have more pronounced impact when utilized by certain types of police agencies, such as those with poorer staffing practices, which cluster in certain regions, than other types of agencies, such as those with better staffing practices, which cluster in different regions. Thus, spatial variation in the clustering of typologies may spatially pattern the alleged effectiveness of seemingly aspatial interventions.

Second, and relatedly, typologies may help to shed insight into the potential philosophies of police agencies. If, as we argue, typologies are a reflection of agencies' orientations, then interpreting them provides some indication of agencies' self-perceived roles in their communities (e.g., see Wilson 1968). For example, if agencies perceive their role to align more with the traditional attributes of law enforcement, one would expect them to be classified into classes with higher militancy and lower community policing values. In contrast, if agencies perceive their role to align more with the liberalized values of social service, one would expect them to be classified into classes with higher community policing and lower militancy values. And, if agencies value diversity among their rank-and-file, one would expect them to be classed with other high diversity agencies, etc. The role of the police is diverse, and correspondingly, typologies are diverse too: identifying an agency's typology may provide some insight into its policing philosophy and vice versa. Longitudinal analyses of such typologies can, then, offer descriptive insight into how perceived roles vary over time, both within agencies and across the policing landscape.

Third, and as implied throughout the results section, typologies may help to explain

how and why policing practices spread across space and time. Specifically, they may offer

insight into why some agencies exhibit lesser/greater contagion power than others: agencies

across the nation are constantly implementing change, from the inclusion of new technology

(e.g., body cameras) to the exclusion of problematic practices (e.g., use of force techniques),

however not all change washes across the country, and not all change persists across time and

turnover in leadership. For example, it is possible that progressive, innovative departments may

elicit stronger contagion effects than conservative, stale departments. It is also possible that

larger, progressive, innovative departments may spur *faster* and/or *more persistent* change than

smaller, progressive, innovative departments. Interpreting typologies may thus offer a twist on

traditional diffusion of benefit analyses: behavior in one agency may diffuse, or spill, into

surrounding agencies, which may then spill into further surrounding agencies (i.e., spatial

diffusion), depending upon the typology of the root agency. Moreover, behavior exhibited by

officers in an agency today, may diffuse, or spill, into the behavior of new officers tomorrow,

and so on (i.e., temporal diffusion).

LIMITATIONS

We acknowledge that this research has limitations. First, our approach was pooled-cross-

sectional analysis, and therefore we cannot make longitudinal inferences. In part, this was an

analytic choice, and we leave explicit longitudinal analyses to future research. Second, the actual

number of latent classes in each of our years has an arbitrary component to it (Bauer and Curran

2003). We used extensive randomization of the start values to minimize this possibility, but this

should be kept in mind when interpreting the results. Third, our indices remain open to further

empirical validation. Although we used both literature and theoretical definitions to guide the

construction of our indices, the definitions of some of the associated dimensions remain

contested. Fourth, our unit of analysis remained at the organizational-level. In addition to between-organization heterogeneity, there may also be (unexplored) within-organization heterogeneity. However, given our macro-level focus, we believe that these data were well-suited for our analyses. Fifth, and finally, we were unable to measure specific mechanisms underlying the diffusion of typologies across space and time. This was largely a consequence of our descriptive orientation: considering the novelty of our research question, we were primarily interested in identifying and describing typologies rather than analyzing change mechanisms for such typologies. It is possible that mechanisms like institutional isomorphism (e.g., see Burruss and Giblin 2014; King 2009; Morabito 2014) may be driving these processes, however we leave these questions for future research. Indeed, future research would benefit from analyses of these change dynamics from the perspectives of structural contingency and/or institutional theories.

CONCLUSION

In conclusion, the present research has highlighted the importance of considering a range of dimensions when constructing typologies of police agencies. We believe that such an approach is a useful addition to the policing literature because it raises the question of why agencies adopt various *bundles* of attributes, and why they may vary across space (e.g., Eastern versus Western states) and time (e.g., 1993 versus 2013). Although the question of *how* agencies change over time was outside the scope of this research, it was illustrative that the agencies in the Southern California region showed evidence of spatial convergence, implying that researchers may wish to explore this possibility more carefully by employing longitudinal models. Using these typologies may prove to be particularly useful when considering contextual predictors of police agencies' characteristics, and the efficacy of their crime control strategies, which should be foci of future research. Policing is dynamic, and policies and practices are arguably

contagious: the time is ripe for scholars to further unravel these spatial and temporal processes using more longitudinal analyses.

References

Baber, C., Smith, P., Butler, M., Cross, J., and Hunter, J., 2009. Mobile technology for crime scene examination. *International journal of human-computer studies, 67*, 464-474.

Barrick, K., Hickman, M. J., and Strom, K. J., 2014. Representative policing and violence towards the police. *Policing, 8*, 193-204.

Bauer, D. J., and Curran, P. J., 2003. Distributional assumptions of growth mixture models: implications for over-extraction of latent trajectory classes. *Psychological methods, 8*, 338-363.

Bieler, S., 2016. Police militarization in the USA: the state of the field. *Policing: an international journal of police strategies & management, 39*, 586-600.

Bittner, E., 1970. *The functions of the police in modern society.* Chevy Chase, MD: National Institute of Mental Health.

Braga, A. A., and Bond, B. J., 2008. Policing crime and disorder hot spots: a randomized controlled trial. *Criminology, 46*, 577-607.

Briggs, S. J., Zhao, J. S., Wilson, S., and Ren, L., 2008. The effect of collective bargaining on large police agency supplemental compensation policies: 1990-2000. *Police practice and research, 9*, 227-238.

Bureau of Justice Statistics, 1996. *Law enforcement management and administrative statistics (LEMAS), 1993.* ICPSR06708-v3. http://doi.org/10.3886/ICPSR06708.v3

Bureau of Justice Statistics, 1999. *Law enforcement management and administrative statistics (LEMAS): 1997 sample survey of law enforcement agencies.* ICPSR02700-v1. http://doi.org/10.3886/ICPSR02700.v1

Bureau of Justice Statistics, 2003. *Law enforcement management and administrative statistics*

(LEMAS): 2000 sample survey of law enforcement agencies. ICPSR03565-v2.

http://doi.org/10.3886/ICPSR03565.v2

Bureau of Justice Statistics, 2006. *Law enforcement management and administrative statistics*

(LEMAS): 2003 sample survey of law enforcement agencies. ICPSR04411-v1.

http://doi.org/10.3886/ICPSR04411.v1

Bureau of Justice Statistics, 2011. *Law enforcement management and administrative statistics*

(LEMAS), 2007. ICPSR31161-v1. http://doi.org/10.3886/ICPSR31161.v1

Bureau of Justice Statistics, 2015. *Law enforcement management and administrative statistics*

(LEMAS), 2013. ICPSR36164-v2. http://doi.org/10.3886/ICPSR36164.v2

Burruss, G. W., and Giblin, M. J., 2014. Modeling isomorphism on policing innovation: the role

of institutional pressures in adopting community-oriented policing. *Crime & delinquency,*

60, 331-355.

Cao, L., and Huang, B., 2000. Determinants of citizen complaints against police abuse of power.

Journal of criminal justice, 28, 203-213.

Custers, B., 2012. Technology in policing: experiences, obstacles and police needs. *Computer*

law & security review, 28, 62-68.

Esbensen, F-A., 1987. Foot patrols: of what value? *American journal of police, 6*, 45-65.

Fridell, L., Faggiani, D., Taylor, B., Brito, C. S., and Kubu, B., 2009. The impact of agency context,

policies, and practices on violence against police. *Journal of criminal justice, 37*, 542-552.

Groff, E. R., Ratcliffe, J. H., Haberman, C. P., Sorg, E. T., Joyce, N. M., and Taylor, R. B., 2015.

Does what police do at hot spots matter? The Philadelphia policing tactics experiment.

Criminology, 53, 23-53.

Gustafson, J., 2013. Diversity in municipal police agencies: a national examination of minority

hiring and promotion. *Policing: an international journal of police strategies & management, 36*, 719-736.

Hipp, J. R., and Bauer, D. J., 2006. Local solutions in the estimation of growth mixture models. *Psychological methods, 11*, 36-53.

Hur, Y., 2012. Racial diversity, is it a blessing to an organization? Examining its organizational consequences in municipal police departments. *International review of administrative sciences, 79*, 149-164.

Jordan, W. T., Fridell, L., Faggiani, D., and Kubu, B., 2009. Attracting females and racial/ethnic minorities to law enforcement. *Journal of criminal justice, 37*, 333-341.

Kelling, G. L., Pate, T., Dieckman, D., and Brown, C. E., 1974. *The Kansas City preventative patrol experiment: a summary report.* Washington, DC: Police Foundation.

King, W. R., 2009. Toward a life-course perspective of police organizations. *Journal of research in crime and delinquency, 46*, 213-244.

Koper, C. S., 1995. Just enough police presence: reducing crime and disorderly behavior by optimizing patrol time in crime hotspots. *Justice quarterly, 12*, 649-672.

Kraska, P. B., 1996. Enjoying militarism: political/personal dilemmas in studying U.S. police paramilitary units. *Justice quarterly, 13*, 405-429.

Kraska, P. B., 2007. Militarization and policing–its relevance to 21st century police. *Policing: a journal of policy and practice, 1*, 501-513.

Kraska, P. B., and Kappeler, V. E., 1997. Militarizing American police: the rise and normalization of paramilitary units. *Social problems, 44*, 1-18.

Maguire, E. R., 1997. Structural change in large municipal policing organizations during the community policing era. *Justice quarterly, 14*, 547-576.

Maguire, E. R., 2014. Police organizations and the iron cage of rationality. *In*: M. D. Reisig and R. J. Kane, eds. *The Oxford handbook of police and policing*. New York, NY: Oxford University Press.

Maguire, E. R., Shin, Y., Zhao, J. S., and Hassell, K. D., 2003. Structural change in large police agencies during the 1990s. *Policing: an international journal of police strategies & management, 26*, 251-275.

Mastrofski, S. D., Willis, J. J., and Kochel, T. R., 2007. The challenges of implementing community policing in the United States. *Policing: a journal of policy and practice, 1*, 223-234.

Matusiak, M. C., Campbell, B. A., and King, W. R., 2014. The legacy of LEMAS: effects on police scholarship of a federally administered, multi-wave establishment survey. *Policing: an international journal of police strategies & management, 37*, 630-648.

Menton, C., 2008. Bicycle patrols: An underutilized resource. *Policing: an international journal of police strategies & management, 31*, 93-108.

Morabito, M., 2014. American police unions: a hindrance or help to innovation? *International journal of public administration, 37*, 773-780.

Nunn, S., 2001. Police technology in cities: changes and challenges. *Technology in society, 23*, 11-27.

Nuth, M. S., 2008. Taking advantage of new technologies: for and against crime. *Computer law & security report, 24*, 437-446.

Phillips, S. W., 2016. Myths, militarism and the police patrol rifle. *Policing and society: an international journal of research and policy, 26*, 185-196.

Piza, E. L., and O'Hara, B. A., 2014. Saturation foot-patrol in a high-violence area: a quasi-experimental evaluation. *Justice quarterly, 31*, 693-718.

Ratcliffe, J. H., Taniguchi, T., Groff, E. R., and Wood, J. D., 2011. The Philadelphia foot patrol experiment: a randomized controlled trial of police patrol effectiveness in violent crime hotspots. *Criminology, 49*, 795-831.

Rizer, A., and Hartman, J., 2011. How the war on terror has militarized the police. *The Atlantic, 7 November.*

Rosenbaum, D. P., and Lurigio, A. J., 1994. An inside look at community policing reform: definitions, organizational changes, and evaluation findings. *Crime & delinquency, 40*, 299-314.

Schuck, A. M., 2014. Female representation in law enforcement: the influence of screening, unions, incentives, community policing, CALEA, and size. *Police quarterly, 17*, 54-78.

Sherman, L. W., and Weisburd, D., 1995. General deterrent effects of police patrol in crime "hot spots": a randomized controlled trial. *Justice quarterly, 12*, 625-648.

Shjarback, J. A., and White, M. D., 2016. Departmental professionalism and its impacts on indicators of violence in police-citizen encounters. *Police quarterly, 19*, 32-62.

Skogan, W. G., 2006. *Police and community in Chicago: a tale of three cities.* New York, NY: Oxford University Press.

Skogan, W. G., and Roth, J. A., 2004. Introduction. *In*: W. Skogan, ed. *Community policing: can it work.* Belmont, CA: Wadsworth/Thomsom Publishing.

Smith, B. W., 2003. The impact of police officer diversity on police-caused homicides. *Policy studies journal, 31*, 147-162.

Wilson, J. Q., 1968. *Varieties of police behavior.* New York, NY: Harvard University Press.

Zhao, J. S., and Hassell, K. D., 2005. Policing styles and organizational priorities: retesting Wilson's theory of local political culture. *Police quarterly, 8*, 411-430.

Table 1. Descriptive statistics for the police agencies included in each year of data.

Year	# Agencies	Population			# Police Officers		
		Mean	Std. Dev.	Max.	Mean	Std. Dev.	Max.
1993	1,645	50,124	236,542	7,322,564	124	838	28,079
1997	1,888	54,109	226,134	7,380,906	140	1,016	38,328
2000	1,623	63,960	261,070	8,008,278	163	1,136	40,435
2003	1,834	61,018	247,772	8,085,742	149	978	35,973
2007	1,830	68,664	262,037	8,220,196	158	967	35,216
2013	1,974	67,217	258,200	8,336,697	149	916	34,454

Table 2. Latent class summaries for each year of data.

Year	Class Solution	BIC	Entropy
1993	8	4,692	0.75
1997	3	20,171	0.88
2000	6	18,810	0.83
2003	7	17,789	0.89
2007	7	14,239	0.81
2013	4	23,911	0.76

Figure 1a
Eight-class solution for 1993

Figure 1b
Three-class solution for 1997

Figure 1c
Six-class solution for 2000

Figure 1d
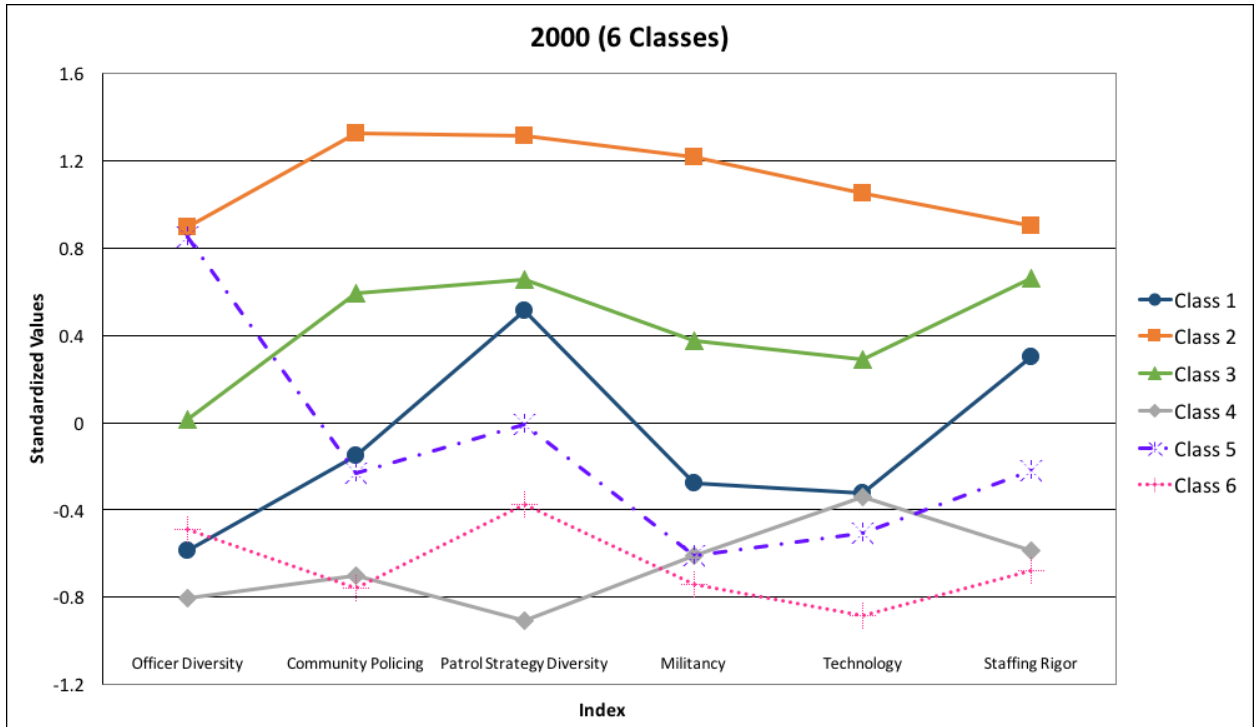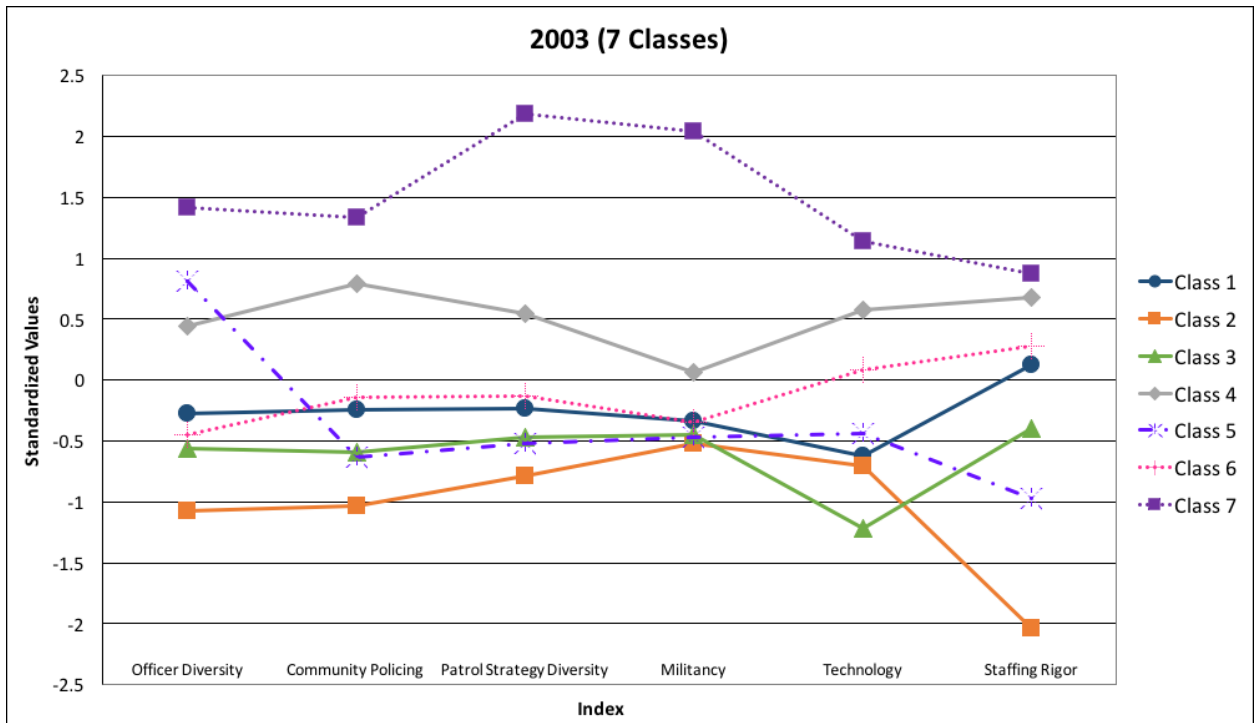Seven-class solution for 2003

Figure 1e
Seven-class solution for 2007

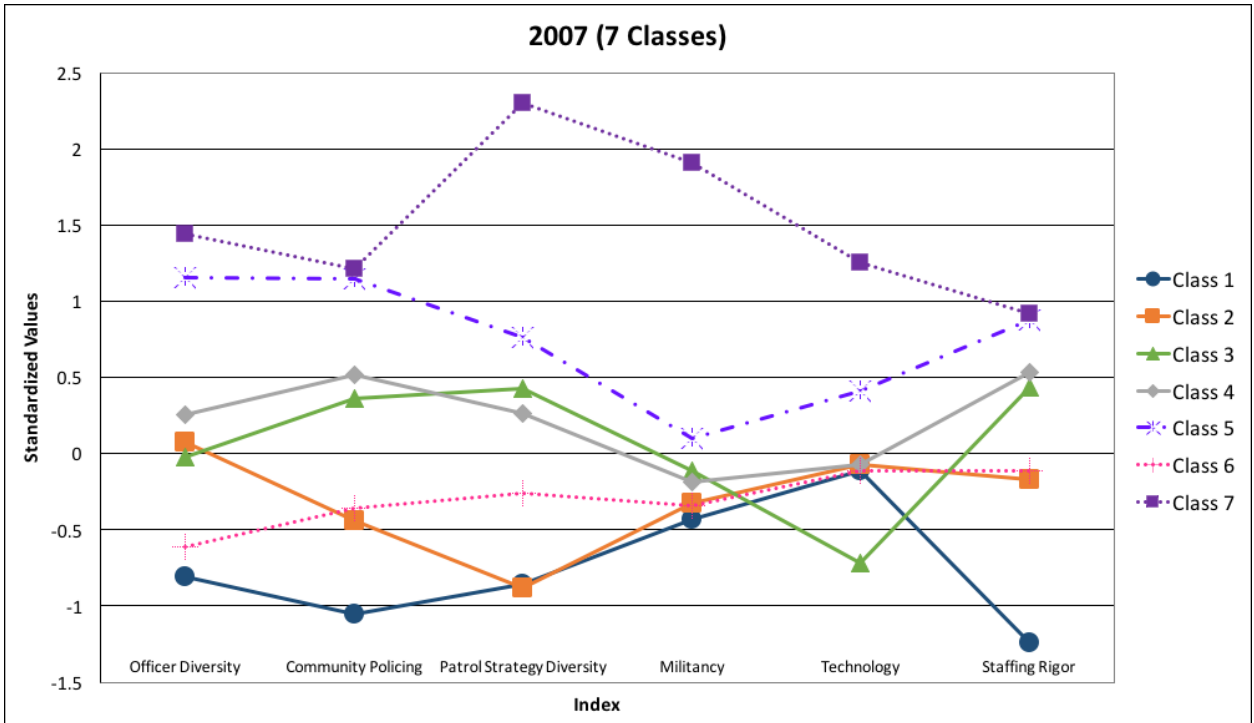**Figure 1f**
Four-class solution for 2013

Figure 2
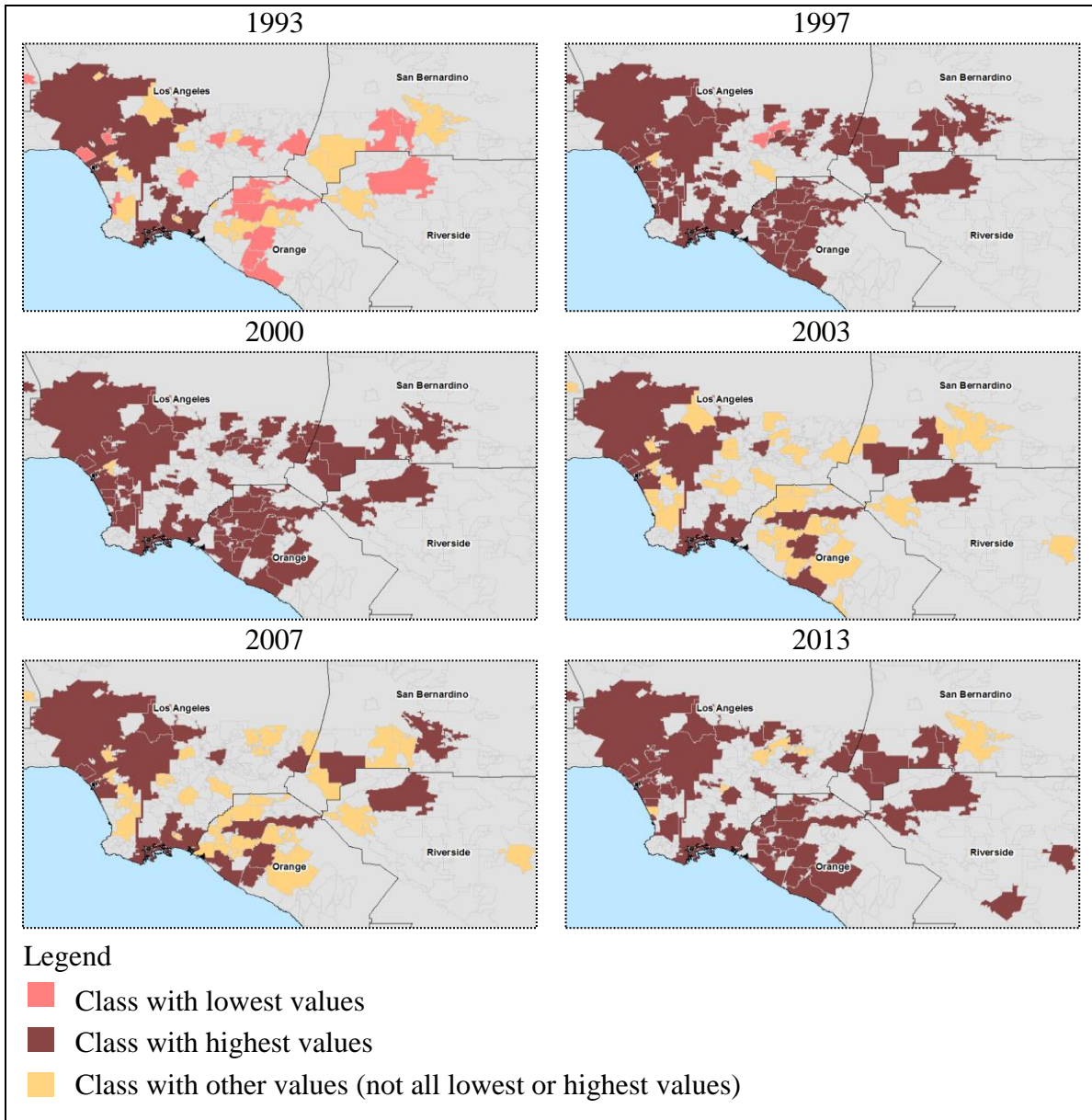High and low classes in the Southern California region from 1993 to 2013

1993   1997

2000   2003

2007   2013

Legend

▮ Class with lowest values

▮ Class with highest values

▮ Class with other values (not all lowest or highest values)

Appendix

Table A1. Description of variables included in each index in each year of data.

Index	1993	1997	2000	2003	2007	2013
Police Officer Diversity						
% Female officers	X	X	X	X	X	X
% Non-white officers	X	X	X	X	X	X
% Certified bilingual officers (sworn)					X	
% Certified bilingual officers (non-sworn)					X	
Bilingual ability pay				X	X	X
Second language test during selection process (SP)			X	X	X	
Assessment of diverse cultural populations during SP					X	
Written policy for dealing with racial profiling				X	X	
Written policy for dealing with persons with limited English proficiency					X	
Community Policing (CP)						
% CP officers		X	X	X	X	
Agency has crime prevention unit		X	X	X	X	
Proportion of new officers with >= 8hrs CP training		X	X	X	X	X
Proportion of continuing officers with >= 8hrs CP training		X	X	X	X	X
Proportion of civilians with >= 8hrs CP training		X	X	X		
CP in mission statement				X	X	X
Agency encourages SARA projects		X	X	X	X	X
Agency hosts citizen academy			X	X	X	
Agency has a CP plan		X	X	X	X	
Agency uses geographic policing		X	X	X	X	X
Agency evaluates problem solving abilities		X	X	X	X	X
Agency conducts community analysis of problems			X	X	X	
Agency surveys public		X	X	X	X	X
Website						
Ask questions?					X	
Access crime maps?					X	X
Access crime stats?		X			X	X
Partnerships						
Advocacy groups		X	X	X	X	
Business groups		X	X	X	X	
Domestic violence groups			X			
Faith-based groups		X	X	X	X	
Local government agencies			X	X	X	X
Neighborhood associations		X	X	X	X	
Senior citizen groups			X	X	X	
School groups		X	X	X	X	
Youth service groups		X	X	X	X	
Tenant groups		X	X			

# of bicycles		X				
Social Media						
Twitter						X
Facebook						X
Blogs						X
YouTube						X
Mass notification						X
Patrol Strategy Diversity (agency uses XX on a regular basis)						
Automobile patrol		X	X	X	X	
Motorcycle patrol		X	X	X	X	
Foot patrol		X	X	X	X	
Aviation patrol				X	X	
Marine patrol		X	X	X	X	
Horse patrol		X	X	X	X	
Bicycle patrol		X	X	X	X	
Segway patrol					X	
Militancy						
Weapons authorized for patrol						
Assault weapon					X	
Shotgun					X	X
Carbine					X	
Rifle					X	X
Traditional baton	X	X	X	X	X	X
PR-24 baton	X	X	X	X	X	
Collapsible baton	X	X	X	X	X	
Soft projectile device	X	X	X	X	X	X
Blackjack/slapjack			X	X	X	
Rubber bullet device	X	X	X	X	X	
Conducted energy weapon					X	X
OC spray	X	X	X	X	X	X
Tear gas	X	X	X			
Flashbang	X	X	X			
Electrical device	X	X	X	X		
Hold/neck restraint		X	X	X	X	X
Capture net	X	X	X			
Leg hobble						X
Officers required to wear body armor?	X	X	X	X	X	X
# of helicopters	X	X	X	X	X	X
# of fixed-wing aircrafts	X	X	X	X	X	X
# of ATVs	X	X				X
# of armored vehicles	X	X				
# of unmanned aerial drones						X
# of police horses	X	X	X	X	X	
# of police dogs	X	X	X	X	X	

% Unmarked police vehicles	X	X	X	X	X	X
Technology (agency has access to XX)						
Fingerprint technology		X	X	X	X	
Facial recognition technology				X	X	
Infrared imaging		X	X	X	X	
Image intensifiers		X	X	X	X	
License plate readers					X	X
Smartphones						X
Laser range finders		X	X	X	X	
Electrical/engine disruption		X	X	X	X	
Tire deflation devices		X	X	X	X	
Stolen vehicle tracking		X	X	X	X	
Video cameras on patrol officers						X
Video cameras in patrol cars		X	X	X	X	X
Video cameras on weapons						X
Mobile surveillance		X	X	X	X	
Fixed-site surveillance in public areas		X	X	X	X	X
Citizens can receive crime reports via e-mail					X	X
Electronic crime reporting available					X	X
Staffing Rigor						
Agency offers education incentive pay	X	X	X	X	X	X
Agency offers merit/performance pay	X	X	X	X	X	X
Agency offers tuition reimbursement			X	X	X	X
Agency offers collective bargaining rights	X	X	X	X	X	X
Agency has written policies for dealing with						
Deadly force	X	X	X	X	X	
Less lethal force		X	X	X	X	
Conduct and appearance	X	X	X	X	X	
Off-duty conduct				X	X	
Mentally-ill persons	X	X		X	X	
Homeless persons	X	X		X	X	
Domestic disputes	X	X	X	X	X	
Juveniles	X	X		X	X	
Citizen complaints	X	X		X	X	
Discretionary arrests		X				
As part of selection process, agency conducts						
Minimum education requirement	X	X	X	X	X	X
Background investigation		X	X	X	X	
Criminal history check		X	X	X	X	
Credit history check			X	X	X	
Personal interview		X	X	X	X	
Personality inventory			X	X	X	
Polygraph examination		X	X	X	X	
Voice stress analysis		X	X	X	X	
Written aptitude test		X	X	X	X	

41

Physical agility test		X	X	X	X
Drug test	X	X	X	X	X
Psychological evaluation		X	X	X	X
Problem-solving ability assessment				X	X
Mediation/conflict management skills assessment				X	X
Volunteer history check			X	X	X
Training					
Academy training hours (new officer)	X	X	X	X	X
Field training hours (new officer)	X	X	X	X	X
In-service training hours (continuing officer)		X	X	X	X