Towards a Collaborative Model of Law Enforcement

Measuring Community Policing Implementation in the U.S. and Abroad

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Abstract

The body of research on community-oriented policing (COP) has identified numerous dimensions of community policing. Academic consensus on this definition has thus far failed to emerge, resulting in methodological barriers to measuring and comparing COP implementation across police agencies. This paper seeks to develop a consolidated and flexible measurement scheme by building on the dimensions of community policing proposed by Skogan and Hartnett (1997). The measurement scheme is then applied to 1,119 American police agencies using quantitative data from the 2016 United States Law Enforcement Management and Administrative Statistics (LEMAS) survey to identify patterns of COP implementation in the United States. International comparisons are then made by applying the scheme to policing agencies in the United Kingdom, France, and New Zealand using unstandardized qualitative data. Measurement validity is shown by comparing U.S. scores with responses to direct community-policing questions in LEMAS and by exploring case studies of COP implementation in international jurisdictions.

Introduction

Heightened public scrutiny of policing practices following several high-profile policing incidents in the United States has prompted discussions of police reform to resurface, with community-oriented policing (COP) taking centre stage (Hermann, Nirappil, & Jouvenal, 2020). Community policing models are premised on the perceived failure of traditional approaches to policing, gaining popularity as a means of repairing relations between American police forces and racial minorities in the late 1960s (Wilson, 2006; Williams & Murphy, 1990). As of 2016, 82.4% of U.S. local, county, or regional police departments and sheriff's offices claimed to have a community policing component in their mission statement (LEMAS, 2016). In the same year, an additional 46.8% of these agencies claimed to have a specific written community policing plan.

In COP models, police officers and citizens collaborate in creative ways to solve crime-related problems within the local community (Trojanowicz, Kappeler, Gaines, & Bucqueroux, 1998). Common methods include assigning patrols to particular beats, increasing the use of foot or bike patrols, forming problem-solving partnerships with community organizations, and establishing thorough measures for being accountable to civilians. Academic definitions of COP have identified numerous ways to synthesize these policies into key dimensions to capture the essence of community policing, with no universally agreed-upon conception emerging (Maguire & Mastrofski, 2000). For instance, Skogan and Hartnett (1997) contend that the four central principles of COP are communication and information-sharing between the police and the public, a broad commitment to problem-oriented policing, police consideration of community issues and priorities in tactic development, and police commitment to assisting communities to solve problems on their own. Bayley (1996) also identified four dimensions of COP: consultation, adaptation, mobilization, and problem-solving. Another concept of community policing, “the three p’s”: partnership, problem-solving, and prevention is proposed by Bratton (1996).

In an attempt to consolidate these proposed dimensions, Maguire and Mastrofski (2000) used exploratory factor analysis on the questions asked in four community policing surveys sent to U.S. policing agencies. They identified five factors: general community policing programs and activities, patrol officer activities, citizen activities, mid-level management, and organizational structure. These dimensions, while possessing a strong empirical basis, lack the interpretability and theoretical basis of the top-down factors proposed by other authors (Wilson, 2006).

The lack of consensus on the key dimensions of community policing has contributed to difficulties in measuring levels of COP implementation across different police agencies (Wilson, 2006). There is a clear need for a measurement scheme that can consolidate proposed COP dimensions and enable community policing implementation to be quantified and compared across different jurisdictions. Though many standardized surveys such as LEMAS collect information on agencies’ written commitments to COP, this alone is insufficient to understand the actual degree to which community policing policies have been implemented within these agencies (LEMAS, 2016).

Extant measurement methods have attempted to improve on this by identifying and combining criteria associated with COP into a scale (Wilson, 2006). For example, Maguire (1997) constructed an index thirty-one activities such as COP training for citizens and officers, writing a COP plan, utilizing walking and bike patrols. Zhao (1996) similarly used indexes to measure COP "external" activities for reorienting policing towards crime prevention and COP "internal" activities for community-minded restructuring of police management.

Despite the presence of several proposed measurement schemes that would facilitate empirical comparisons between police agencies, most research into COP continues to rely on case studies (Wilson, 2006). This may stem from the lack of theoretical integration of extant measures. In particular, index-based measures such as those proposed by Maguire (1997) and Zhao (1996) have generally measured COP implementation based on a checklist list of specific COP-related policies, with limited reference to key dimensions of community policing. Such a focus on specific policies limits the generalizability of the measurement scheme, as practices that correspond to a key dimension of COP but are not listed by the index may fail to be accounted for. This is especially true in cases where limited quantitative data is available. An improved measurement scheme would need to be grounded in a broad understanding of the key dimensions of community policing, enabling variation in the specific policies that count towards the final score. Such a scheme would improve the ability to make cross-jurisdictional comparisons in COP practices.

As public pressure for policing reform mounts, policy researchers have a legitimate interest in measuring the degree to which COP practices are implemented across police agencies. Most saliently, quantifiable measures of COP implementation would improve the ability to identify correlations between community policing and its proposed benefits. To do this, it is necessary to have a mechanism for measuring COP implementation across a wide range of jurisdictions. Implementation scores for different jurisdictions could then be compared with incidences of fatal police encounters, complaints of excessive use of force, accounts of racial profiling, or any other police outcome of interest to determine if there is a verifiable empirical benefit of COP practices. The ability to quantify COP implementation would also help to identify patterns in community policing practices. For example, different scores could be used to explore trends in community policing by region, service population, and racial demographics — among many others. Scores could also be used to identify U.S. police agencies with the highest orientation towards COP practices, as well as those with the least COP-friendly policies. This could help to identify areas and agencies that have the highest potential for furthering their use of community policing policies.

This paper seeks to develop a measurement scheme for COP implementation that addresses the concerns with the extant index-based assessments. By grounding the proposed measurement scheme in the key dimensions of community policing, it is possible to measure COP practices across a wide range of jurisdictions that approach community policing in idiosyncratic ways. The flexibility of this measure is shown by applying the measurement scheme to 1,119 American police agencies using quantitative data from the 2016 United States Law Enforcement Management and Administrative Statistics (LEMAS) survey. The resulting patterns of COP implementation across the

U.S. are then discussed. International comparisons are also made by applying the scheme to agencies in the United Kingdom, France, and New Zealand using unstandardized qualitative data. Measurement validity is shown by comparing U.S. scores with responses to direct community-policing questions in LEMAS and by exploring case studies of COP implementation in the international jurisdictions.

Methodology

Using Maguire and Mastrofski's (2000) overview of proposed COP dimensions, categorization of community policing policies can be consolidated. Of all the categories identified, most can fit under the four dimensions proposed by Skogan and Hartnett (1997): communication and information-sharing between the police and the public, a broad commitment to problem-oriented policing, police consideration of community issues and priorities in tactic development, and police commitment to assisting communities to solve problems on their own. These criteria seem to capture the essence of community policing that all other proposed dimensions can be grouped under. For the purposes of this paper, these categories will be referred to respectively as communication, problem-solving, community consideration, and community support. By grouping agency policies under these four categories, a flexible measure can be established.

A core feature of a flexible measurement scheme is the ability to be applied in jurisdictions of varying demographics, geographies, and sizes. For this reason, the 2016 LEMAS survey offers a highly useful selection of questions related to the COP policies that a given agency might implement. Due to the variation within police agencies in the U.S., the LEMAS questions span a wide array of police options such that agencies of all sizes and geographic locations are represented. For example, a core component of community policing is utilizing foot or bike patrols to increase face-to-face interactions with the public. However, using bikes is not possible in all climates. In Alaska for example, officers might use snowmobiles to achieve the same effect. As LEMAS offers a well-rounded sample of agencies that vary profoundly in all dimensions of community policing, differences such as this are accounted for, and questions are asked that reflect the idiosyncratic COP policies that agencies in a wide range of circumstances might implement.

It must also be the case that the measurement scheme is not biased towards larger agencies with more resources. In particular, it should not be the case that it is only possible that large agencies with the ability to invest in COP strategies can achieve high scores. While it is certainly the case that implementing COP is easier in well-funded police agencies, the measurement scheme should also be able to differentiate between COP implementation within the same agencies of the same size and funding ability. To ensure that smaller jurisdictions with less resources do not always receive lower scores, there must be multiple paths for achieving full points in the measurement scheme. For example, it should not be required that a given agency form problem-solving partnerships with every type of community organization possible. This would be an obvious barrier attaining full points for agencies that do not have access to certain organizations, such as universities or research groups. Instead, the scoring mechanism should provide a list of

organizations, with full points being awarded for achieving partnerships with a minimum number of any organizations. This allows for variation in organization capacity.

With these considerations in mind, all questions in LEMAS relating to community policing were identified from the 471 questions asked in the 2016 survey, totalling 65 questions. These were then grouped into the four COP dimensions proposed by Skogan and Hartnett (1997): communication, problem-solving, community consideration, and community support. The questions that corresponded to each dimension were then organized based on the broader community policing policy subcategory that they belonged to. For instance, questions about using foot, bike, horse, human transporter, golf cart, or snowmobiles — all modes of transport associated with increased face-to-face interactions and community policing — for patrols were grouped under the subcategory of "patrol accessibility." For communication, the subcategories were community personnel, officer representativeness, patrol accessibility, website accessibility, and social media use. For problem-solving, the subcategories were education requirements, officer screening, officer training, technology use, and community partnerships. For community consideration, the subcategories were survey use, key issue policies, and civilian complaints. For community support, the subcategories were educational campaigns, victim assistance, and crime prevention.

Each of the four key dimensions were given a weight of 25 points, reflecting the equal importance of each dimension to community policing and summing to a maximum score of 100. Subcategories were then weighted based on their relative importance to the COP model, as described in the various definitions reviewed by Maguire and Mastrofski (2000). For example, victim assistance and crime prevention were scored out of ten points, while social media use could only gain an agency a single point. Careful consideration was made to ensure that there were multiple pathways by which a given police agency could attain full points, even if lacking in resources relative to other agencies. Criteria for awarding points based on quantitative scores was determined by examining the distribution of responses for that particular question in the 2016 LEMAS data and identifying which thresholds were reasonable given the responses of U.S. police agencies.

Table 1.1 Communication Measurement Scheme

Community Personnel 10 Points	Percent sworn personnel designated for community policing activities	1 point for each additional 20%, up to 5 points at 100%
	Percent sworn personnel with assigned to patrol specific areas	1 point if at least 50%, 2 points if at least 75%
	Percent sworn personnel that regularly respond to citizen requests	1 point if at least 80%, 2 points if 100%
	Percent sworn personnel whose primary duties are related to school safety	1 point if any at least 20%
	Percent sworn personnel whose were bi- or multilingual	
Officer Representativeness 5 Points	Racial representativeness of sworn personnel new hires	1 point if either difference less than 20%
	Gender representativeness of sworn personnel new hires	
	Racial representativeness of sworn personnel	1 point if difference less than 20%, 2 points if less than 10%
	Gender representativeness of sworn personnel	1 point if difference less than 20%, 2 points if less than 10%
Patrol Accessibility 5 Points	Uses foot patrol as a type of patrol	1 point if used as needed, 3 points if used regularly
	Uses horses as a type of patrol	2 points if at least one used regularly
	Uses bicycles as a type of patrol	
	Uses human transporters as a type of patrol	
	Uses golf carts as a type of patrol	
	Uses snowmobiles as a type of patrol	

Website Accessibility 4 Points	Maintained a website for enabling citizens to report crimes or problems	1 point
	Maintained a website for enabling citizens to ask questions or give feedback	1 point
	Maintained a website for enabling citizens to file complains	1 point
	Maintained a website for providing direct access to crime statistics or data	1 point if at least one
	Maintained a website for providing direct access to stop statistics or data	
	Maintained a website for providing direct access to arrest statistics or data	
Social Media Use 1 Point	Agency used twitter as a social media channel	1 point if at least one
	Agency used Facebook, Google+, or a similar service as a social media channel	
	Agency used blogs as a social media channel	
	Agency used YouTube or similar sharing service as a social media channel	
	Agency used mass communication system as a social media channel	

Table 1.2 Problem-Solving Measurement Scheme

Education Requirements 5 Points	Minimum education requirement for new officer recruits	4 points if four-year degree, 3 points if two-year degree
	No military service as an exception to minimum education requirement	1 point
Officer Screening 3 Points	Uses personality or psychological inventory for screening new officer recruits	1 point each, up to a maximum of 3 points
	Uses psychological interview for screening new officer recruits	
	Uses problem-solving assessment for screening new officer recruits	
	Uses cultural understanding assessment for screening new officer recruits	
Officer Training 5 Points	Proportion of sworn personnel with 8 hours of community policing training	2 points if some, 3 points if all
	Percent sworn patrol personnel encouraged to problem-solve	1 point if at least 25%, 2 points if at least 50%
Technology Use 2 Points	Uses technology to support the analysis of community problems	2 points
Community Partnerships 10 Points	Problem-solving partnership or written agreement with advocacy groups	Two points for each, up to a maximum of ten points
	Problem-solving partnership or written agreement with business groups	
	Problem-solving partnership or written agreement with neighbourhoods	
	Problem-solving partnership or written agreement with university groups	
	Problem-solving partnership or written agreement with schools or boards	
	Problem-solving partnership or written agreement with faith organizations	
	Problem-solving partnership or written agreement with health/social services	
	Problem-solving partnership or written agreement with community groups	

Table 1.3 Community Consideration Measurement Scheme

Survey Use 5 Points	Agency conducts survey of local residents on crime or police satisfaction	3 points
	Uses information from survey to prioritize crime or disorder problems	1 point for each, up to a maximum of 2 points
	Uses information from survey for allocating resources to neighbourhoods	
	Uses information from survey for evaluating officer or agency performance	
	Uses information from survey for training development	
	Uses information from survey for informing agency policies and procedures	
Key Issue Policies 5 Points	Agency has written policy or procedural directives on mentally ill persons	1 point for each, up to a maximum of 5 points
	Agency has written policy or procedural directives on homeless persons	
	Agency has written policy or procedural directives on domestic disputes	
	Agency has written policy or procedural directives on juveniles	
	Agency has written policy or procedural directives on racial profiling or bias	
	Agency has written policy or procedural directives on civilian complaints	
	Agency has written policy or procedural directives on reporting use of force	
	Agency has written policy or procedural directives on cultural training	
Civilian Complaints 10 Points	Has civilian complaint review board that review complaints against officers	3 points
	Civilian complaint review board has independent investigative authority	2 points if at least one
	Agency has written policy requiring independent use of force investigation	
	Agency maintains computerized files with information on civilian complains	5 points

Table 1.4 Community Support Measurement Scheme

Educational Campaigns 5 Points	Agency conducted a citizen police academy	2 points
	Agency addresses drug education in schools	1 point if addresses, 2 points if personnel, 3 points if unit
Victim Assistance 10 Points	Agency addresses victim assistance	1 point if addresses, 2 points if personnel, 3 points if unit
Crime Prevention 10 Points	Agency addresses crime prevention	1 point if addresses, 2 points if personnel, 3 points if unit

A final key feature of a flexible measurement scheme must be the ability to function even in the absence of standardized, quantitative data such as that provided by LEMAS. For this reason, the criteria also allow for scoring to be based on purely qualitative assessments. This is key for enabling jurisdictional comparisons in circumstances where standardized data is not available, as will often be the case. The same scoring mechanism was thus applied to policing agencies in the United Kingdom, France, and New Zealand, illustrating the flexibility of applying the scoring mechanism to agencies where only unstandardized, qualitative data is available.

Measuring COP Implementation in the United States

The scoring mechanism was first applied to data from the 2016 LEMAS survey — the Law Enforcement Management and Administrative Statistics distributed by the United States Department of Justice nationally representative sample of general-purpose agencies (i.e. local and county police departments, sheriffs' offices, and primary state police agencies) on a biannual basis. The survey is sent to 3,499 general purpose law enforcement agencies, including 2,640 local and county police departments, 810 sheriffs' offices, and the 49 primary state police departments. Of these, 2,784 provided responses 2016. The survey asks a total of 471 questions, mostly focusing on policy initiatives and policy outcomes. Data was accessed online from the Department of Justice website and analyzed with R (R Core Team, 2017).

When applying the scoring mechanism, the sample of agencies was reduced to just local, county, or regional police departments and sheriff's offices, excluding responses from primary state or highway patrol departments. This is because the former have the capacity to implement COP policies, while patrol departments focus almost exclusively on traffic enforcement. Scores were computed for each category using the measurement scheme detailed in the above table. Any agency that failed to answer one of the 65 questions being assessed was dropped from the sample. Future studies may wish to explore the use of data imputation to replace missing values and broaden the sample size even further. It might also be desirable to code missing answers as zeroes in certain cases, such as when the question is asking whether or not a specific policy was implemented However, these decisions would require further research before being taken. For the purposes of this paper, rows with missing values were removed. This resulted in a final sample size of 1,119 agencies, meaning that 1,665 rows were removed due to missing information in at least one of the 65 survey questions used in the measurement schema. Though this seems like a large number, it is important to note that many of these agencies did not provide answers to particular questions as they did not apply to the agency For example, the agency may have lacked specific operations

branches that would be necessary to complete community policing-related activities. Removing such agencies from the final sample thus potentially removed some confounds that would result from different organizational capacity between police agencies.

All calculations were straightforward save the two metrics relating to officer racial and gender representativeness. Racial representativeness was calculated by merging data with Census data on county-level demographics based on the Federal Information Processing Standard Code (FIPS) assigned to each agency in the LEMAS dataset. Differences in the proportion of each racial group were calculated by taking the difference between the racial composition of the police agency and the country as an absolute value. For example, an agency where 10% of its full-time sworn officers are black located in a county with a black population of 20% would have a difference in representativeness of 10% for black officers. The process would then be repeated for every racial category, then summed to achieve the final representativeness score. Lower scores indicated a lesser difference in representativeness, with zero being perfectly representative of the civilian population The gender representativeness score was calculated by subtracting the percent of female officers from 50%, as a general approximation of the female population in the United States.

Scores were summed for each of the four key dimensions: communication, problem-solving, community consideration, and community support. The final score was computed by summing the totals for those four key dimensions, resulting in a score out of 100 points.

Measuring COP Implementation Abroad

While the data collected from the U.S. jurisdictions was gathered from a standardized quantitative set from the LEMAS survey, data from the UK, France and New Zealand follows more of a qualitative methodology. To ensure that similar information was collected from jurisdictions other than the U.S., the LEMAS categories that compose community policing were utilized as a guide to establish direction and consistency for research findings. Each variable that creates the conception of community policing was individually researched and analyzed based on available data provided within scholarly literature, government databases, news reports, statistic entities, and directly from policing bodies and their related agencies. Coupled with the LEAS evaluation, the research design follows a mixed-methods approach wherein quantitative data was compared to qualitative data collected from jurisdictions outside of the U.S. LEMAS measurements. This included community policing information pertaining to the UK, France and New Zealand.

Although similar dimensions included in the U.S. jurisdictions through LEAS were employed among other nations of interest, there were a number of challenges related to conducting a comparative analysis of diversity in police forces across multiple countries including the availability of data. This challenge was particularly evident regarding the collection of racial data that is included in the representativeness of officers subcategory of communication. Among nations that were analyzed, it was found that racial data is not widely collected cross-nationally, thus proving to be a hindrance towards data collection within the dimension of representativeness. More specifically, when viewing the nations of France, the UK, and New Zealand, only the UK and New Zealand

provided race-based statistics on police and population representativeness. In the case of the UK, the government compiles and provides data on the percentage of police officers, and percentage of the overall population by ethnicity through their census data. Although this provided more data for comparison amongst U.S. jurisdictions, an implication with the race-based data collected in the UK was the fact that the most recent Census conducted was in 2011. This translated into an approximate nine year gap in comparing more recent racial compositions of police force data relative to the broader population in 2011.

As mentioned previously, however, while not all variables that compose community policing according to the U.S. LEMAS survey were available at the international level, any gaps in data were mitigated by collecting data from alternative sources. Even so, the absence of data nonetheless presents areas in which community policing can be improved upon and better compared cross-nationally. Shedding light on these deficiencies can provide policing bodies and their related agencies incentives to not only collect information on these variables but as well further explore their relevance to effective community policing.

Results

Patterns of COP Implementation in the United States

Applying the COP implementation scoring mechanism to the 1,119 police agencies in the 2016 LEMAS dataset revealed a mean score of 44.3% and a median of 44.0%. Standard deviation was 11.0%. Notably, as can be seen in Figure 2.1, the distribution of scores resembled a normal distribution, with no skewness or multi-modality. This fact provides useful statistical properties should correlations be explored using this measurement scheme in the future. The highest score obtained out of all the American police agencies was 74%, and the lowest score was 11%. Though the low maximum score may appear to indicate an improbability of any agency achieving a perfect score under the proposed measurement scheme, validation testing revealed that at least one U.S. agency received full marks on every individual question — supporting the claim that achieving full marks on every question is indeed possible. This too is a useful finding, as ideally the schema should make it such that it is possible to obtain a perfect score. The low maximum score in the sample dataset may instead result from the failure of any U.S. police agency to fully commit to COP.

The scores in the four dimensions of community policing that were previously identified from Skogan and Hartnett (1997)'s work — communication, problem-solving, community consideration, and community support — also provide interesting information about the sample. For communication, the mean score was 7.5/25 and the median score was 7.0/25, with a standard deviation of 2.9/25. The maximum score was 19/25 and the minimum score was 1/25. Scores in problem-solving were distributed similarly. The mean score was 6.9/25 and the median score was 7.0/25, with a standard deviation of 2.9/25. The maximum score was 15/25 and the minimum score was 0/25. Community consideration scores were distributed tri-modally, likely due to the clustering nature of the questions, where affirmative answers to one question were likely to be associated with

affirmative answers to other questions in the same subcategory. The mean score was 14.2/25 and the median score was 15.0/25, with a standard deviation of 4.3/25. The maximum score was 25/25 and the minimum score was 0/25. Finally, scores for community support also spanned the entire possible range of outputs. This dimension had a mean score of 11.6/25 and a median score of 11.0/25, with a standard deviation of 6.8/25. Its maximum score was 25/25 and its minimum score was 0/25. Distributions for all four dimensions are shown in Figure 2.2.

Figure 2.1 COP Implementation Scores of U.S. Police Agencies (N=1,119)

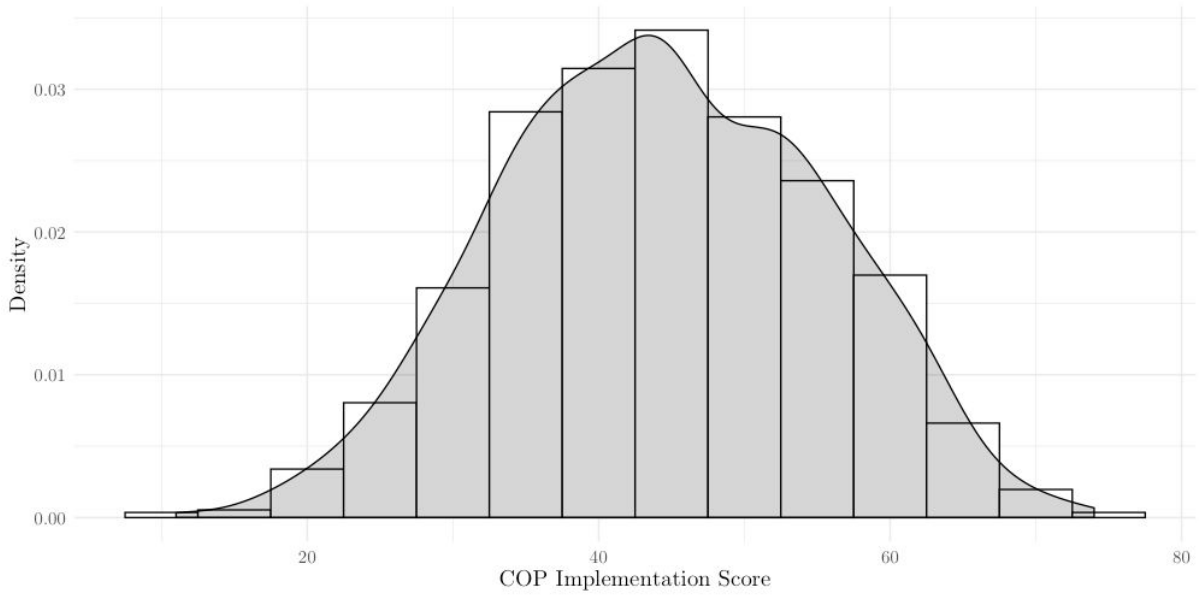
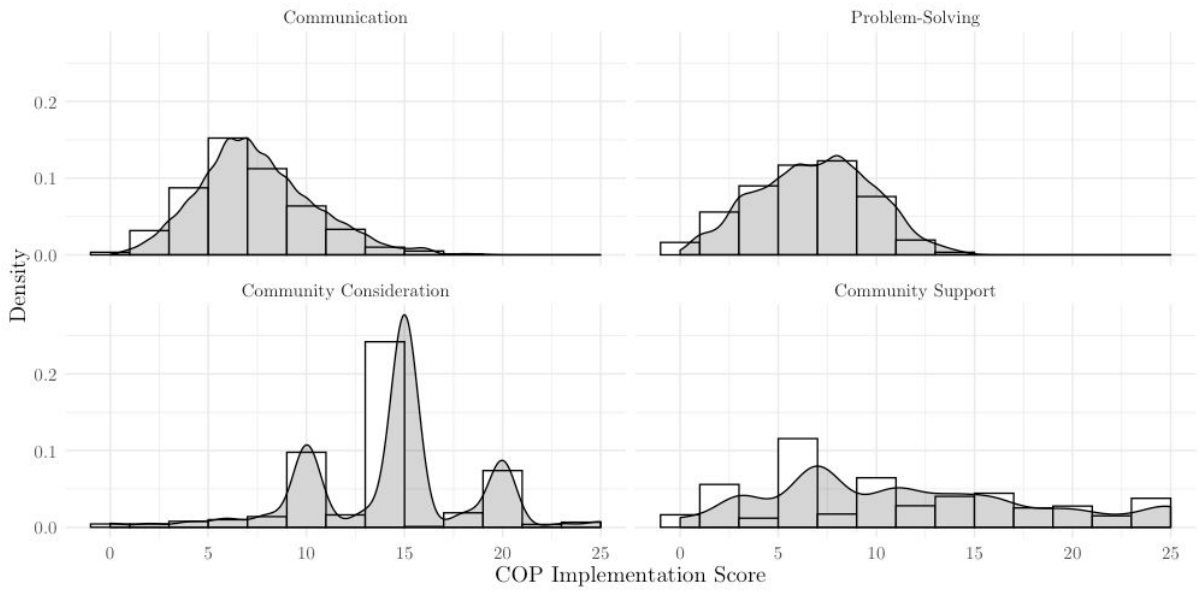


Figure 2.1 COP Implementation Scores of U.S. Police Agencies by Dimension (N=1,119)



The top ten jurisdictions in the same can be extracted to understand the data on a more case-based level. These are shown in Table 2.1, though it should be noted that because agencies were dropped from the sample if any response was missing from the 65 questions included in the scoring, this table might miss key jurisdictions that would otherwise be noteworthy inclusions. Looking at the Roanoke County Police Department for example, it can be seen that the agency had perfect scores for community consideration and community support, but lost points for communication and problem-solving. In particular, the Roanoke County Police Department had relatively low scores for community personnel, officer representativeness, and education requirements — which were weighted relatively heavily due to their importance to COP. However, the agency still had perfect or nearly perfect scores for patrol accessibility, website accessibility, social media use, officer screening, officer training, technology use, and community partnerships.

Table 2.1 Top Ten U.S. Police Agencies by COP Implementation Score

Rank	Agency	State	Pop. Served	Score
#1	Roanoke County Police Department	Virginia	85,846	74%
#2	Boulder Police Department	Colorado	108,090	73%
#3	Broward Police Department	Florida	1,909,632	72%
#3	Denver Police Department	Colorado	260,999	70%
#5	Saint Petersburg Police Department	Florida	260,999	70%
#5	Riverside Police Department	California	324,722	70%
#5	Laurel Police	Maryland	25,853	70%
#8	Charlotte-Mecklenburg Police Department	North Carolina	892,705	69%
#8	Sarasota Police Department	Florida	56,610	69%
#10	Mobile Police Department	Alabama	192,904	68%
#10	Laredo Police Department	Texas	257,156	68%
#10	Flagstaff Police Department	Arizona	71,459	68%
#10	Cedar Rapids Police Department	Iowa	131,127	68%

The ten jurisdictions with the lowest scores are also shown in Table 2.2. Of note is the higher proportion of sheriff's offices, potentially indicating a discrepancy between the municipally-managed police departments and the elected sheriff's offices. This is something that could be investigated in future, when missing data problems are better dealt with.

Table 2.2 Bottom Ten U.S. Police Agencies by COP Implementation Score

Rank	Agency	State	Pop. Served	Score
#1	Lake County Sheriff's Department	Indiana	485,846	11%
#2	LaSalle County Sheriff's Office	Illinois	110,642	12%
#3	Lynchburg Police Department	Ohio	1,482	16%

#3	Millington Police Department	Tennessee	10,974	16%
#5	Newbern Police Department	Tennessee	3,284	17%
#6	Okeechobee Police Department	Florida	5,691	18%
#6	East Peoria Police Department	Illinois	19,276	18%
#6	Cassopolis Police Department	Michigan	1,725	18%
#6	Carthage Police Department	Texas	6,756	18%
#10	Kearny County Sheriff's Office	Nebraska	6,552	19%

Scoring U.S. police agencies in this manner enables making comparisons between different groupings of jurisdictions, as illustrated in Figure 2.3. Comparing different geographic regions shows that the West has the highest average COP implementation score (46.5%) while the Midwest has the lowest (42.7%). This significance of this small difference is verified by a one-way ANOVA test (p = 0.002). As expected, there is a large discrepancy between agencies with highly populated (48.6%) and less populated (35.7%) service populations — roughly corresponding to the urban-rural divide. Again, this difference is confirmed with a t-test ($p < 0.001$). Finally, scores for agencies that serve communities with the highest percentage of Black people (44.7%) with those that serve communities with the lowest percentage of Black people (42.5%) reveals that COP implementation is slightly higher in communities with higher percentages of Black people. Though the difference is very small, it is statistically significant (p = 0.037). Identifying such patterns in community policing implementation can help to explain trends in police-civilian interactions, as well as inform policy decisions for funding areas to improve on their community policing work.

Figure 2.3 COP Implementation Scores of U.S. Police Agencies by Key Groups (N=1,119)

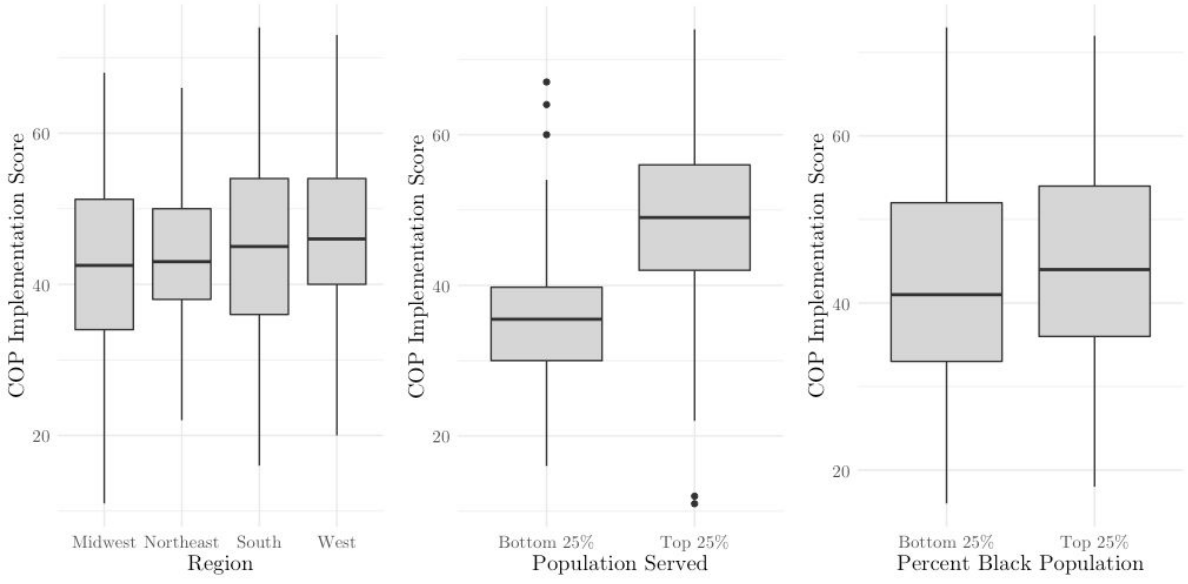
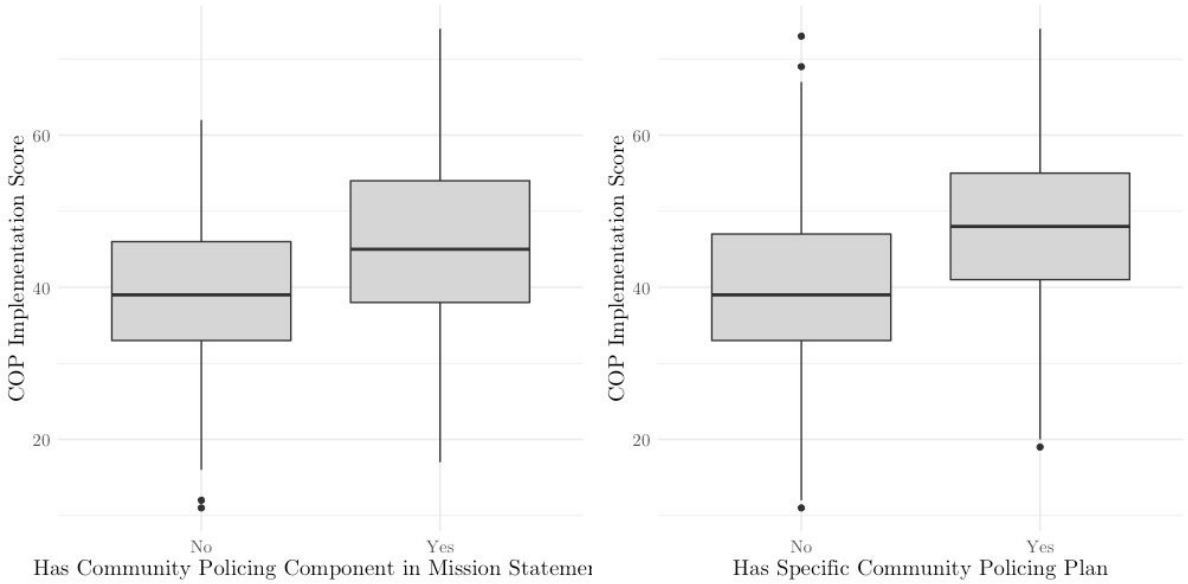


Figure 2.4 COP Implementation Scores of U.S. Police Agencies by Commitments (N=1,119)



The LEMAS dataset also provides direct questions on commitments to COP that can be used to assess the validity of the proposed measurement scheme. Of the U.S. police agencies that claimed to have a community-policing component in their mission statement, COP implementation scores were significantly higher (45.8%) than those that did not (39.3%; $p < 0.001$). Similarly, agencies with a written community policing plan had scores that were much higher (48.2%) than those that did not (40.0%; $p < 0.001$). Though the difference between these groups is not astronomically large, the higher COP implementation scores for agencies that claimed to be community-focused supports the validity of the measurement. The fact that this difference is not larger is to be expected, as an agency's written commitments do not necessarily mean that COP policies have actually been implemented. Indeed, this is one of the main motivations for attempting to develop a measurement scheme. The presence of a correlation can be taken to indicate that the measure is indeed effective in assessing the level of COP implementation across U.S. police agencies.

COP Implementation in the United Kingdom

Table 3.1 COP Implementation Scores in The United Kingdom

Communication	18
Problem-Solving	17
Community Consideration	25
Community Support	10
Total	70

Using the established scoring methodology, the United Kingdom (excluding Northern Ireland) received a higher overall score of 70. This score was based on 4 variables including

communication, problem solving, community considerations and community support, each having a maximum attainable score of 25. For communication, England and Wales gained a score of 18, primarily based on research pointing to a vast amount of communication outlets used by police; adequate gender representation; and community patrolling. Communication subcategories reported lower scores for inadequate representation of enthnic minorities and limited data on community personnel. Problem solving retained a score of 17. A large proportion of this score was achieved through a wide-range of community partnerships efforts that diversified pathways to crime-solving and trust building between forces and local neighbourhoods. Scores were poor for problem solving subcategories including education and officer training, due to limited emphasis on COP training measures in England and Wales. Community consideration retained a complete score of 25, due to policy-based actions demanding better police treatment of minorities, homeless people and mentally-ill individuals. In addition, use of surveys and a complaints assessment commission, enables the public to voice their concerns regarding the policing. Finally, community support received a score of 10. Community support subcategories including victim assistance and crime prevention revealed lower scores due to limited evidence on support for victims and COP-based crime prevention strategies. There was also no evidence of citizen police academies but few programs did emphasize drug education in schools, sponsored by police forces.

The United States and the United Kingdom police systems are thought to be guided by three principles: maintaining peace, preventing crime, and using the law to punish offenders (Dougherty, 2015). While sharing several institutional similarities and differences, analyzing the significance of COP in the United Kingdom can help us to understand the variation in implementation of these principles. In addition, this comparative framework can not only distinguish the splinters in practice but also how viability of COP varies between these regions. Local policing in the United Kingdom is to be sorted into 4 categories including: neighbourhood policing; incident (response) management; specialist community liaison; and local policing command team (United Kingdom Government, 2019). In the following case analysis, neighbourhood policing practices will be examined to understand the rationale behind the overall score for the United Kingdom. Firstly, when considering community personal assignments in the United Kingdom, policing data for England and Wales reveal that in 2020, 59, 176 officers were employed for local policing functions, which allocates to roughly 50.2 % of the total police force (United Kingdom Government, 2020). These hirings were also dispersed to specific locations throughout England and Wales. A close examination of officer representativeness in England and Wales show that women represented 61% of non-uniform support staff and 45% of community support officers (UK Government, 2020). While women's representation did not seem problematic, minority and ethnic representation raised issues for concern. In March of 2019, minorities comprised 7% of the total work force - only 3% increase from 2007 (United Kingdom Government, 2020). Proportional representation of ethnic groups is an issue in the United Kingdom and all forty-three police forces are now under formal government directive to increase hiring rates of ethnic minorities in the coming years (Bhugowandeen, 2013). Targets vary from region to region, but a comprehensive strategy is underway to meet the national target. Future

strategies will seek to address some of barriers that limit diverse hiring including limited marketing to minorities, urban segregation, low-wages, poor benefit packages etc (Bhugowandeen, 2013).

Another facet of community policing analyzed in this paper includes patrolling in communities. Historically, police in urban regions of England and Wales carry out community patrolling on foot (Chapman, 1954). Primarily, this is thought to facilitate relationship building with local communities, and encourage public trust in police forces. Foot patrol constables have helped resolve small scale violence or crime related disputes in neighbourhoods (Chapman, 1954). Furthermore, constables have been known to patrol in large groups or 'beats' on pedal cycles or horses (Chapman, 1954). As methods of vehicular transportation have advanced in the last 50 years, car and golf-carts have become more commonly used for patrolling (Police Foundation, 2016).

With rapid expansion of social media outlets and web-related infrastructure, reporting crime, disseminating crime-related information and taking public consultations has become much easier for enforcement agencies. According to the proposed scoring criteria, communication via social media outlets can highlight novel pathways to community policing efforts. England and Wales police forces utilize Twitter, Facebook, Google + and mass cell phone notification systems to maintain rapidly responsive communication outlets with communities and pass-on information about local and national community emergencies to the public (Fernandez & Dickinson, 2017). In addition, crime reporting via online websites are also part of the UK's digital policing strategy and statistical data on police workforces, crime incidents, and arrests are made available to the public through these websites (Fernandez & Dickinson, 2017).

Problem-solving indicators that measure initiatives for community policing can be diversified into educational attainments; officer training and screening processes; technology use; and community partnerships. The United Kingdom recruitment process is outlined to recruit through three avenues including an apprenticeship program; post-degree program or a pre-join degree (College of Policing, 2017). Although education does hold value , by no means is it compulsory to join an enforcement agency, it simply generates a more competitive application package. As for screening processes, testing centres utilize competency-based structured interviews, numerical ability tests, verbal ability tests and four non–policing interactive exercises to test a candidates competency and physical attributes (College of Policing, 2019). This is followed by post-assessment testing measures to evaluate a candidate's morals and behavioural tendencies that examine their psychological aptitude for the corresponding role (College of Policing, 2019). Following admission into the police force, new recruits are required to complete a two-year Initial Police Learning Cirriculum, consisting of programmes at initial/first responder level - including Code of Ethics, Evidence-Based Policing, Professionalising the Investigation Process (PIP) Forensics 21, Protecting Vulnerable People including Child Sexual Exploitation and Modern Slavery, Mental Ill Health, Equality and Human Rights, Search and many more (College of Policing, 2020). In addition, depending on the type of specialization, new recruits are required to complete approximately 10 weeks of direct learning on community support and engagement (College of Policing, 2020).

The integration of technology to support community policing initiatives in the United Kingdom is a relatively novel area of research, hence, data regarding these indicators have been scarce. News reports and other media publications highlight technology being mobilized by local police forces in a variety of scenarios including updates to existing IT infrastructure, statistical tools for logging and analyzing crime data, AI enabled software for examining crime patterns and drone units to capture aerial shots of crime-related events (Hodgkins, 2018). While technology-based advancements are expected to improve policing efforts, researchers are keen to emphasize their inability to act as a substitute for community partnerships. Integral to community policing initiatives are agency-community partnerships and forces in England and Wales have taken it upon themselves to establish a variety of collaborative efforts. For example, the Safer Cities scheme was introduced in the early 1990's to encourage police-community partnerships and reduce crime (Oakley, 2001). Following this initiative, a variety of new programs and policies have been enacted by local police forces and governments to foster relationships with local neighbourhoods. In addition, the police also have partnerships with NGOs to tackle issues including public health and arrest incidents, homelessness, safety in schools, community safety etc. (Oakley, 2001).

The final facet of COP assessment includes feedback integration to improve policing efforts in local communities. The UK police forces utilize surveys to understand citizens' perspectives regarding crime rates, police performance, training, police perception and trust (Office for National Statistics, 2020). Results from these surveys are also made publicly available to promote transparency between government bodies, policing agencies and the public. The UK government has also written a wide range of policy narratives regulating police interactions with homeless persons, mentally-ill individuals, juveniles and minority groups. In addition, efforts are being pursued to increase public consultation on local police force performance, through avenues including an Individual Police Complaints Commission, which examines civilian complaints (UK Government, 2020). Qualitative assessment of community support measures reveal that police forces have coordinated drug education programs through partnerships with local schools. Recent efforts have also focused on addressing victim assistance and crime prevention.

COP Implementation in Scotland

Table 3.1 COP Implementation Scores in Scotland

Communication	18
Problem-Solving	18
Community Consideration	23
Community Support	23
Total	82

Scotland was selected for comparison due to the large and diverse 28,168 square mile geographic area that Police Scotland is responsible for to determine if and how COP initiatives can

be implemented on a larger scale (Police Scotland, 2020). Police Scotland is the largest police force in the United Kingdom, excluding the UK's Metropolitan Police, responsible for patrolling only 620 square miles (Metropolitan Police, 2020). Upon employing the COP scoring methodology, Scotland received an overall score of 82. In the category of communication, Scotland received 18 out of 25 for primarily due to the accessibility of information on its website, its diverse patrol methods and its structuring of the police through local, regional and national divisions. In the category of problem solving, Scotland's robust screening process and engagement with community partners for to support victims of hate crimes and sexual violence and to educate youth about the impacts of drug use through school boards bolstered Scotland's score of 18. For community consideration, Scotland received a score of 23 for its official policies on victim support, working with children that are experiencing sexual harassment, and in its policy addressing the escalation of citizen complaints. Scotland's score was further strengthened by the Your Police survey conducted in 2019 that shaped many of the current police reforms. Finally in the category of community support, Scotland's drug education campaigns in all levels of schools, Victim Care Cards and efforts at crime prevention through addressing cybercrime risks garnered a score of 23 out of 25. The lack of a citizen police academy in Scotland prevented the country from receiving full points in this subcategory.

In the category of communication, Scotland's police structure garnered the country several points using the COP measurement. In Scotland, due to the large geographical area that the police are responsible for patrolling, Police Scotland is currently structured into local, regional and national divisions. At the local level, the police are divided into 13 local policing divisions responsible for specific community wards and police in these divisions are designated as the Community Policing Team with their contact information listed on the website (Police Scotland, 2020). In addition to these ward-based policing divisions, police are also assigned to specific regions of Scotland that oversee the ward-based policing divisions and national divisions that oversee regional and local divisions (Police Scotland, 2020). Regional and national divisions also contain specialist crime divisions. According to Police Scotland's Quarterly Fact Sheet for 2020, in total, 1,684 officers are in the national division while the regional division employ 3,211 officers and the local divisions employ 12,352 officers (Police Scotland, 2020). This means that approximately 70% of Scotland police officers are employed at the local level and, based on the regional model, nearly 90% are dedicated to patrolling specific areas (Police Scotland, 2020). However, in Scotland officer representativeness of racial and gender characteristics of the general population remains low. Only 1% of police officers and staff identified as Black and Minority Ethnic while 90% were Scottish White, White Minority or White British (Police Scotland, 2019). Additionally, 70% of police officers in Scotland are male while 30% are female (Police Scotland, 2019). In the subcategory of patrol accessibility, Police Scotland also employs foot patrol as well as the mounted and cycle patrol (Police Scotland, 2020). The Police Scotland website not only provides for the reporting of crimes by citizens and forums to provide feedback but also to report police behaviour and misconduct (Police Scotland, 2020). The website also highlights local, regional and national crime statistics and the arrests made in response. Finally, Police Scotland link their own YouTube videos and social media to their website and many of the local divisions have started their own social media accounts to collaborate with their community.

In the category of problem-solving, Scotland's minimal education requirements limit its score. To become a police officer in Scotland, an individual must be 18 years of age therefore, since schooling is mandatory until 16 in Scotland this policy requires the completion of only primary school (Education Scotland, 2020). However, in the subcategory of officer screening, Scotland scores full points as it conducts an Assessment Day which emphasizes assessing the analytical and problem-solving skills of the new recruit (Scotland Police, 2020). Additionally, using the Scottish Police Service National Fitness Standard, the Scottish Police assess a candidate's psychological and mental fitness for the position through multiple phases of interviews (Police Scotland, 2020). More recently, Scotland Police has been emphasizing the need for local police divisions to understand the diverse cultures of the communities they serve (Scottish Police Authority, 2016). Additionally, due to the structuring of the regional and local divisions of the police in Scotland nearly 80% of police officers have over 8 hours of community policing training (Police Scotland, 2020). Furthermore, in 2020 Police Scotland released its 2020 Cyber Strategy to increase the number of specially-trained officers to address increases in cybercrime (Police Scotland, 2020). The strategy includes a focus on online fraud and bank theft as well as online child sex abuse crimes due to significant increases in these types of crimes during COVID-19. The Strategy will train 150 officers to start and more in the future to also proactively support communities through identifying cyber risks.

In the subcategory of community partnerships, Scotland's engagement with victims' services organizations to support those of racially-motivated crimes, hate crimes and sexual violence along with its work with community organizations at the local level, its collaboration with schools and school boards to recruit volunteers and highlight the challenges of drug abuse all contribute to its high score (Police Scotland, 2020). The police in Scotland also engage with social services such including children and family services to support neglected youth and engage with local research institutions including the Scottish Institute of Policing Research to survey the public and identify areas for improvement (Police Scotland, 2020). In 2019, Police Scotland conducted their largest survey of the general public with 11,656 respondents to the Your Police survey that asked quantitative and qualitative questions concerning public sentiments of police, community police priorities, local trust in police and ways to improve communications with the public (Police Scotland, 2020). The feedback received from this survey was utilized to develop local police plans, improve and prioritize specific types of criminal activity and allocate resources to regions where respondents that expressed feelings of being unsafe were located (Police Scotland 2020).

On the Police Scotland website, the organization has listed multiple policies on specific key issues. For example, policies on the escalation procedure for civilian complaints is clearly outlined as well as policies for supporting victims of domestic violence and juveniles facing sexual abuse and exploitation (Police Scotland 2020). Additionally, policies on supporting those in need of mental health services are also highlighted as are the organizations the police collaborate with in these scenarios (Police Scotland, 2020). The Police Scotland website outlines the procedure for escalating a complaint about an officer's conduct. If a citizen is unhappy with the handling of the complaint by

the police, they can request that the Police Investigations & Review Commissioner conduct a review (Scotland Police, 2020). The PIRC is an independent organization that conducts a review of the way the complaint has been handled (Police Investigations & Review Commissioner, 2020). The PIRC then publishes an executive summary of its findings on its website with recommendations to the responsible policing body including a direction to reconsider the case which the police are required to conduct (Police Investigations & Review Commissioner, 2020). This oversight function and its published findings bolster Scotland's score.

Lastly, for community support, Scotland's recent initiatives further raised its score. Based on the scoring criteria, Scotland receives full points for its targeted educational campaigns in elementary, secondary and post-secondary schools to teach youth, adolescents and young adults about the impacts of drug use (Police Scotland, 2020). In the area of victim assistance, Scottish police not only engage consistently with local and regional victim support services but also adopted new procedures to make victims feel more comfortable asking for help. For example, in addition to providing each victim with a Victim Care Card that highlights information about the officer investigating the crime and how to access victim support, the Scottish police also offer victims different methods of being contacted about the case and offer victims with the choice between a male and female officer to interview them about the crime. This is part of a larger emphasis by the Scottish government on the rights of victims of a crime through the Victims' Code for Scotland that outlines the rights victims have following a crime including minimum levels of service, participating in the investigation, and compensation for costs (Government of Scotland, 2018).

In the area of crime prevention, Scotland receives a significant number of points for its multiple campaigns including No Knives, Better Lives to reduce youth violence, the Choices for Life campaign with pop-up road shows to highlight the effects of New Psychoactive Substances, as well as campaigns for young drivers to reduce vehicle accidents and fatalities (Police Scotland, 2020). Police Scotland also engages with organizations through the special constable program to offer mentorship programs for young people (Police Scotland, 2020).

COP Implementation in New Zealand

Table 3.2 COP Implementation Scores in New Zealand

Communication	15
Problem-Solving	15
Community Consideration	18
Community Support	15
Total	62

Employing the COP methodology within the jurisdiction of New Zealand achieved an overall score of 63 among the four overall categories of communication, problem solving, community

consideration and community support. Within the first category of communication, New Zealand received a total score of 15. The community personnel subcategory that took into consideration localized policing efforts and patrol accessibility achieved relatively modest scores within this category. The subcategories of officer representativeness of both gender and race, as well as, website accessibility both revealed to be drivers in the communication score. Among the problem solving category, the lowest scoring subcategory was educational requirement since New Zealand does not have minimum educational requirements for prospective officers. This low score within education, however, was increased through the officer screening and community partnerships subcategories bringing up scoring within the broader problem solving category to 15.

New Zealand's highest scoring category within the COP methodology was community considerations. This can be attributed to the significant efforts related to survey use, policies on key issues, and civilian complaint mechanisms. Based on these considerable efforts within these subcategories, community considerations achieved a score of 18. The final variable of community support, similar to the categories of communication and problem solving, achieved a score of 15. The majority of this category's scoring was due to New Zealand's victim assistance and crime prevention efforts, including the utilization of adult diversion schemes, drug education programs, and array of victim resources for victimization of sexual assault and hate crimes.

New Zealand is a constitutional monarchy with a parliamentary style of governance. Although this slightly varies from the U.S. federal presidential system, the two countries nonetheless possess similarities regarding cultural values among the general public. This is even more prominent among community policing efforts, where similar methods and tools have been employed to address commonalities of ensuring public safety among the general public, as well as broader systemic institutional issues related to socio-economic status, race and gender. Based upon the scoring scheme utilized to measure community-oriented policing among the four identified categories, the New Zealand Police achieved a considerable score. Of the considered categories and the related subcategories, New Zealand Police achieved relatively consistent scores. Within the subcategory of community personnel under communication, the New Zealand Police was found to be divided into 12 policing districts that consist of localized neighbourhood policing teams (New Zealand Police, 2020). These districts include nine in the North Island and three in the south that largely utilize both foot and bicycle patrols within their respective communities (New Zealand Police, 2020). In addition to these units, New Zealand Police also have over 700 staff dedicated across five communication centres for roles including dispatchers, communicators and intelligence analysts.

Under the subcategory of officer representativeness New Zealand also achieved relatively high scores. This is highlighted by the fact that of the most recent recruits to the New Zealand Police, approximately 50% are women (New Zealand Police, 2018). This is matched with improved racial compositions among the force, including 30% of officers that derive from the nation’s Indigenous Māori population, 12% from Asian backgrounds, and 9% being of Pasifika descent. As such, the New Zealand Police force is significantly diverse according to its ethnic and gender population composition. Coupled with prominent diversity amongst the force is the use of modern

technologies. This includes using websites for citizens to report crimes, file complaints and give feedback, as well as provide public access to crime statistics (New Zealand Police, 2020). The New Zealand Police also runs a significant social media presence on both Twitter and Facebook to better connect with their communities and keep their residents up to date on the latest findings and alerts.

Within the problem-solving category, the New Zealand Police uses a series of rigorous testing and screening to determine the aptitude of new recruits and onboarding officers. This includes the use of a psychometric test, based on numerical, verbal and abstract reasoning (New Zealand Police, 2020). A finding worth noting, however, was the absence of a minimum education level, nor reference to previous military or armed forces experience (New Zealand Police, 2020). Emphasis is instead largely grounded upon personal qualities and broader experiences that the New Zealand Police consider to be well-suited for becoming a police officer. Also within the problem-solving category are the considerable community partnerships that the New Zealand Police has engaged. In addition to school-related programs, since 1999, one of the agency's most prominent partnerships is with Neighbourhood Support New Zealand— a nation-wide, community led movement and registered charity intended to improve community safety, emergency preparedness, and connectivity (Neighbourhood Support, 2019). This significant community engagement is also revealed through the New Zealand Communities Football Cup— a yearly soccer tournament created and held by the New Zealand Police to connect with diverse communities and celebrate positive social change (New Zealand Police, 2019).

Among the community policing categories, the highest scoring category were the variables included under community considerations. Under this category, New Zealand's high performance can largely be attributed to their use of an independent policing review board known as the Independent Police Conduct Authority (IPCA) (Independent Police Conduct Authority, 2017). This at arms length body investigates grievances of misconduct, as well as instances of homicide as the result of police (Independent Police Conduct Authority, 2017). In addition to this broader legislative mandate and authority, the IPCA makes all investigations and corresponding reports publicly available for increased accountability within their communities (Independent Police Conduct Authority, 2020). Coupled with the efforts by the IPCA, the New Zealand Police themselves also considerably engage efforts similar to the IPCA. This includes generating yearly citizen satisfactory reports to integrate into policing strategies and protocols, as well as workplace surveys for internal performance measurement and improvement (New Zealand Police, 2017).

Another component worth noting among New Zealand's community consideration category is the significant efforts with their Indigenous Maori populations. Largely based upon the Treaty of Waitangi commitment, all police officers are trained in Maori culture and values (New Zealand Police, 2020). This way officers possess the necessary methods and tools of approaching subject matters that relate to Maori populations, including instances of victimization (New Zealand Police, 2020). In addition to these efforts, the New Zealand Police Commissioner regularly engages with the Maori Focus Form— an interest group formed of senior kaumatua and kaui to discuss matters relevant to their ongoing partnerships and policing strategies (New Zealand Police, 2020). These

police-Indigenous relations are even more localized through the use of District Maori Advisory Boards that are present in all 12 of New Zealand's Police Districts (New Zealand Police, 2020).

The final category of community supports scored consistent scores along with the other related categories. Key themes that emerged included the educational campaigns that are employed across the nation regarding drug use and related peer pressures (New Zealand Police, 2020). Additionally, the New Zealand Police offers numerous resources and supports in regard to victim assistance, including a victim notification register for victimization related to sexual assault and hate crimes (New Zealand Police, 2020) This notification system provides regular updates to victims of the currend standings of thier aggeressors related to sentencing, imprisonment and/or home detention (New Zealand Police, 2020). Related to victims, the New Zealand Police also operates significant programming for crime prevention that appears to be a centre pillar for their approach to community policing (New Zealand Police, 2020). Along with crime prevention, the New Zealand Police is also focused on approaches to restorative justice that pertains to address the impact of the offenders actions and appropriate methods of redress in a manner that is more community-based than a formal court proceeding (New Zealand Police, 2020).

Overall, the New Zealand Police achieved a considerable score among the community-oriented policing model. Given the extensive resources made available among various aspects of policing, the diversified and localized staff, oversight and accountability mechanisms and strong community partnerships, this comes with no surprise. From these scores, it appears that New Zealand holds significant ties within all of their neighbourhood districts within the nation.

COP Implementation in France

Table 3.3 COP Implementation Scores in France

Communication	4
Problem-Solving	16
Community Consideration	5
Community Support	13
Total	38

Based on the COP scoring methodology provided in this analysis, France received a total score of 38. This is the lowest score of all of the countries and jurisdictions provided outside of the United States. Based on the four categories: communication, problem-solving, community consideration, and community support, the majority of the points were accumulated from the problem solving and community support categories (29 points). Within these two categories, the majority of the points came from the problem solving category through points being allocated for education requirements, officer screening, officer training, technology, and partnerships.

In addition, the remaining points were accumulated from the communication and community support. As aforementioned, acquiring police statistics, particularly on the representativeness of the police in accordance to the population are simply not gathered. Moreover, data on the categories and community personnel and patrol accessibility were nowhere to be found as well. France is the lowest scoring country due to its policies (or lack thereof) on race and ethnicity, and therefore, this permeates to the scoring methodology that we have outlined above. In essence, 4 points were awarded to the communication category, 16 towards problem solving, 5 on community consideration, and finally 13 points for community support.

There are many institutional differences between the United States and France which makes this comparison interesting. One significant difference is the notion and understanding of the idea of "race" (or lack thereof in the French case) in different aspects of society. In this case, police officers and the institution of policing in general. An analysis of France is included to illustrate the differences and difficulties that a country experiences when directing a national police force in the absence of any race-conscious policies. Utilizing the scoring scheme to measure community policing through the 4 categories, France's National Police received a score of 38. Relative to the other jurisdictions analyzed, this is among the lower-scoring police agencies. One reason for France being the lowest scoring country, is because of France's policy of rejecting the collection of race-based data on the general population and specifically on the diversity within the National Police. This is seen clearly in the "Communication" category. This category covers multiple sub-categories, those being: community personnel, officer representativeness, patrol accessibility, website accessibility, and social media use. As it pertains to officer representativeness from qualitative data, there is little to no information (qualitative or quantitative) regarding France's police force. This is due to the fact that France is a country that does not "see race". As a matter of policy, France rejects registration on the basis of race, ethnicity, or religion (Ewijk, 2015). This means that the idea of race is unacknowledged on a systemic level and therefore information on sub-categories such as representation are simply not gathered. However, there is one area in police representation that this accounted for and that is the gender representativeness of women personnel. In France, women were more present among the higher-ranking than among the lower-ranking police officers. Among the commissioners, 18% were female and 14% of the patrol officers were female.

In the category of "Problem Solving", France received the lowest number of points in comparison with other countries and jurisdictions. Surprisingly, France scored relatively well in education requirements with a bachelor's degree or equivalent diploma being a requirement to join the National Police (Police Nationale, 2020). Additionally, in the subcategory of officer screening, the French National Police employ a 1 to 5 scale to assess applicants for their medical fitness. Applicants must score a 2 to be considered and scores are given based on fitness of psyche, physical fitness, eyesight, and hearing). Once applicants are accepted, the initial training of police officers lasts 18 months and includes physical training and course work (Police Nationale, 2020). However, the training offered through the Higher Police Academy does not include any sensitivity training and the National Police have dismissed the need for this type of training (European Monitoring Centre on Racism and Xenophobia, 2005). Racism is discussed in general terms during training but is

considered to be too sensitive of an issue to be directly addressed in France's police academies (European Monitoring Centre on Racism and Xenophobia, 2005). Additionally, psychological assessments do not occur throughout an officer's term of service. As a result, due to high stress and fraught police-community relations, from 2019 to 2020, 94 National Police officers committed suicide which a rate 36% higher than the rest of the population (Defender of Rights, 2020).

France's score is also lower due to its limited engagement with community partnerships. Although the French National Police do engage with a significant amount of anti-racism and human rights non-governmental organizations (NGOs) including the Council of Jewish Institutions in France regarding anti-Semitism, the engagement is limited to the National Police's reliance on these NGOs to provide legal support for victims of racist crimes (European Monitoring Centre on Racism and Xenophobia, 2005). The National Police limit their engagement with these organizations as the National Police do not view the NGOs as representative of certain vulnerable segments of the population and therefore only engage to connect victims with the NGOs' services (European Monitoring Centre on Racism and Xenophobia, 2005). Until recently, there have been no engagement initiatives with these NGOs to improve community relations, reduce racist acts, or provide police support for vulnerable segments of the population. Regarding the subcategory of community partnerships, there has been the recent development of new laws in France that aim to strengthen community engagement with the police. These new programs outline community engagement as it revolves around 5 major operational principles, those being: 1) new territorial organization that increases the visibility of police patrols at the local level and that lets police stations decide how to allocate their personnel in order to meet local needs, 2) The responsibilities of police officers at all levels, 3) the multi-skilling of police officers, who must be able to undertake a broad range of tasks, 4) Permanent interactions with other local actors in order to build strong partnerships, 5) "privileged relationship with the population", implying a better service to the public and a better identification of its needs and a better information about the results achieved.

In the category of "Community Consideration", France's score is bolstered by the Office of the Defender of Rights that is an independent authority that reviews complaints regarding officers lodged by civilians and ensures the National Police's compliance with their Code of Ethics (Defender of Rights, 2020). The Code of Ethics includes policies on the chain of command, uniform, relationship with the general public, use of force and identity checks (Ministry of the Interior, 2014). The Defender of Rights can also request disciplinary action for police officers (Defender of Rights, 2020). However, disciplinary action cannot be taken by the Defender of Rights but is instead left to the determination of senior officials within the National Police (Defender of Rights, 2020). The Office of the Controller General also provides an additional layer of oversight by ensuring that the human rights of all people are upheld during their detention and can also request penalties for officers that participate in misconduct (Controller General, 2017). However, France's score is limited in this subcategory because of its refusal to initiate race-conscious policies as well as its lack of transparency with reporting police stops (Defender of Rights, 2020). As highlighted in the Defender of Rights Report in 2020, the deteriorating relationship between French National Police and racialized communities has largely been a result of these police stops. According to the report,

racialized individuals are 5 times more likely to be concerned about police checks (Defender of Rights, 2020). While 80% of men -report they have not been stopped in the last 5 years, 50% of Arab or Black respondents were stopped in the last 5 years at least once (Defender of Rights, 2020). Young people are also disproportionately stopped, with 80% of young people aged 18-25 being stopped in the last 5 years compared to 16% of the rest of the population (Defender of Rights, 2020). In the report, the Defender of Rights blamed police unions for preventing the introduction of stop forms to record the instances where police checks occur (Defender of Rights, 2020).

Finally, in the category of “Community Support”, the French National Police consistently engage with a large number of human rights and anti-racism NGOs to connect victims of crimes with adequate legal and psychological support. In addition, the National Police Study and Training Centre in France "Centre National d'Etudes et de Formation" (CNEF) is chiefly responsible for “in-service training for police officers” (COE, 1993). This government entity has taken steps for major training initiatives in the area of police and immigrants. For instance, the National Police Training Charter aims to improve relations between police officers and the public and to aid officers in understanding social factors' (COE, 1993). A number of measures recommended in connection with the latter aim included "in all departments, encouraging the holding of meetings or round tables with members of society concerned by police activity: the general public, those who work with the police, special communities, etc” (COE, 1993). Summer schools have been a source of knowledge for police officers in their interactions with minority groups. At these summer schools, police officers and teachers spend about a week working together on a problem (usually teenagers or the family). For instance, participants have previously tackled the question of how to achieve a healthy "multicultural society."

Overall, based on the limited data available, France received a low score in comparison to all other countries and jurisdictions. This score is due to the lack of data in the communication category, particularly in the sub-category of community personnel, officer representativeness, and patrol accessibility. As aforementioned, this is because France does not recognize, from a legalistic perspective, the idea of “race” and therefore there are no race-conscious policies.

Discussion

COP implementation in the U.S. revealed that most scores fell into a central range following a normal distribution, revealing that most forces tend to score closer to the average for all four categories. The highest score among the U.S. sample set was 74, obtained by Roanoke County Police Department, which was still lower than the scores obtained by the United Kingdom and Scotland. Higher scores were expected for jurisdictions abroad (except France) as they are accumulated scores for countries in comparison to each local enforcement agency in the U.S. The quantitative analysis in the U.S. provided lower scores as they are subject to minute differences whereas large level trends in the qualitative analysis for abroad jurisdictions will not highlight such details. Abroad jurisdictions also comprise multiple local police forces grouped together to provide an accumulated score, which can inflate the scores beyond actuality. The lowest score in the U.S sample set was 11, which was much lower than the lowest score of international jurisdictions such as France. This large

gap in scores is thought to be because of the methodological limitations arising from comparing qualitative and quantitative data, in addition to the aforementioned factors of varying sample sizes and accumulated scores. Individually examining each category of COP implementation in the U.S. shows that communication and problem-solving tend to be more normally distributed than community support and consideration. The latter two categories report more variation in the scores, which might indicate the police-community partnerships show regional fragmentation.

Upon the implementation of COP and the collection of data pertaining to the related categories, significant patterns emerge beyond the contexts of the United States. Among England, Wales and Scotland, policing agencies within these jurisdictions hold significant challenges related to racial composition and diversity. As highlighted by the officer representativeness subcategory, a large component of officers within these agencies are from White majority backgrounds. This is in contrast to the portion of officers that are racial minorities, who only make up a small proportion of police forces. Even more so, a lack of racial diversity among police officers is further emphasized by the fact that even among the racial minority officers that are present, these percentages are not reflective of the racial composition within the broader population. Given the racial composition of the majority of police officers within the UK (excluding Ireland), the very premise of community-based policing is open to significant scrutiny. Fostering a sense of "community" with the general public becomes quite challenging when the majority of police officers are not a part of the very communities they police. Even more so, a lack of racial diversification leaves approaches to policing skewed, where only a small portion of the nations values, perceptions and cultures are incorporated within broader strategies and practices.

Given France's disregard to measure racial diversity, measuring the representativeness of officers subcategory was unable to derive any meaningful findings. Due to the absence of race-based data collection and publication, French police force composition essentially remains unknown. As a result of this, any existing racial inequalities within the force that may be hindering their ability to achieve effective community policing will continue to remain unacknowledged— and by extension, unaddressed. This ambiguity, however, possesses additional challenges, and includes police interaction within their communities. Without the acknowledgement of race, discriminatory and prejudiced policing practices will also go unaddressed, leaving racial minorities to endure any potential misconduct. Despite racial diversity shortfalls, England, Wales, New Zealand and France, appear to be making significant strides to gender diversity. Within these nations, there are increasing amounts of female officers, including higher levels of women senior management. With regard to the communication category, and more broadly, community policing, higher rates of female officers hold the potential to improve community relations. More female officers translates to a better representation of communities and broader society as the traditionally male-dominated field of policing, is beginning to look more like the communities they protect and serve. Increased female officers may also increase the likelihood for a broader and diverse range of perspectives to be incorporated in policing practices, policies and protocols.

A consistent similarity that has been documented within jurisdictions beyond the US relates to community consideration. Specifically, all nations have in place considerable mechanisms of oversight and accountability. Typically this includes independent police oversight bodies that possess their own investigative authority through legislative and or statutory governance. Instances of police misconduct as the result of homicide and civilian complaints, all consistently appear to be dealt with by independent oversight entities. Matched with arms-length oversight, England, Wales, Scotland and New Zealand, place significant emphasis on survey use. Similar to the responsibilities of oversight bodies, these police agencies themselves also conduct some form of analysis. Survey efforts largely pertain to collecting information regarding the perception of officers within their respective communities to foster improved relations among communities by promoting a sense of openness. Another consistent finding across all nations outside of the US includes the emphasis of problem solving and analytical skills of officer recruits. While these desired soft skills remain similar, variation exists across educational requirements. Within both Scotland and New Zealand, no minimum education levels are listed as a requirement to become a police officer. Both jurisdictions merely outline the minimum age limit for consideration and a desired set of skills. These findings, however, can be starkly contrasted to the French national policing agency that minimally requires the educational attainment of an undergraduate degree. Police agencies in England and Wales provide a middle ground between the two variation groups, giving preference to those with higher levels of education while still considering those without education. Related to officer onboarding, among the policing agencies considered, only France does not utilize some form of psychological testing. All other jurisdictions require psychological measurements to assess the mental and cognitive well-being of prospective officers.

Limitations and Future Directions

While our measurement scheme distributes different scores for each sub-category, it indicates that these scores represent different levels of significance to the overarching definition of COP. Weightings of these sub-categorical questions were finalized based on definitions reviewed by Maguire and Mastrofski (2000), however, this provides an empirical challenge as some of these sub-categorical factors could be a greater facilitator to COP in some jurisdictions than others. The current scoring scheme does a poor job of dynamically capturing this variation. One of the challenges of using a standardized scoring scheme for multiple jurisdictions is the inability to identify the impact of each sub-categorical variable. For example, social media outlets might be heavily utilized in regions where digital communication is paramount but with our scoring criteria, the magnitude of this impact would go undetected. Another limitation of our measurement scheme is that individual level differences might be dismissed, as there are multiple ways to achieve full-scores in each sub-category. The current structuring of the measurement dismisses individual level efforts for sub-categories, since national level data is utilized for jurisdictions outside the U.S., while the LEMAS dataset provides county, local or regional level data. This entails limitations on the validity of the comparisons drawn between countries. Finally, this measurement scheme, while flexible, does not retain any information regarding financial budgeting and fiscal support for COP implementation. Future research should utilize this measurement strategy to incorporate categories

to assess financial commitments and collect quantitative data for jurisdictions outside the US, to solidify the findings of this paper.

Conclusion

In conclusion, this paper sought to propose a measurement scheme for COP implementation that improved upon existing index-based assessments of COP initiatives. By developing a measurement scheme that assigned scores to jurisdictions based on key dimensions of community policing, this paper measured the adoption of COP practices by 1,119 American police agencies while providing a comparative analysis of COP practices in the United Kingdom, New Zealand, France and Scotland. The patterns that emerged from this analysis demonstrate a strong potential for improvement in many of the American police agencies that received a low score. Analysis of the American police agencies also highlighted the higher proportion of sheriff's offices in the lowest ten scores among American police agencies that requires a further investigation of the potential discrepancies between municipally-managed police departments and elected sheriff's offices in the future. The correlation between the COP implementation score and the presence of a COP component in the agency's mission statement demonstrated the measure proposed in this study is indeed effective at assessing the level of COP implementation in a given jurisdiction. In the comparative analysis of the United Kingdom, Scotland and France, the lack of racial representativeness of each of these jurisdictions and the limited gender representativeness of New Zealand and Scotland emerged as clear limitations on COP implementation. Each of these jurisdictions outside of the United States possessed significant oversight and, excluding France, these jurisdictions also all prioritized surveying the communities the police serve. Excluding France largely due to its policy of refusing to collect race-based data and its limited focus on public engagement, the highest scores were associated with the United Kingdom and Scotland while middle to lower scores were more frequently associated with U.S police agencies. This difference in scores can partially be attributed to the quantitative LEMAS data being compared with qualitative macro-level data from international jurisdictions. Overall, the proposed measurement scheme and differences in scores highlighted the strong potential for increased COP implementation across the U.S and France. The scheme also identified areas for improvement among higher scoring international jurisdictions including increasing the racial representativeness of the police force and improving victim assistance as well as crime prevention policies.

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Appendix

```
#### PREPARE WORKSPACE ####

# Load in data manipulation libraries
library(tidyverse)
library(plyr)
library(dplyr)
library(tm)
library(reshape2)

# Load in graphing libraries
library(ggplot2)
library(extrafont)

# Set appearance
theme_set(theme_minimal())
loadfonts(device="win")

# Load in data
load("LEMAS 2016.rda")
df <- da37323.0001
rm(da37323.0001)


#### CALCULATE COMMUNICATION SCORES ####

#--- COMMUNITY PERSONNEL ---#

# PERCENT SWORN PERSONNEL DESIGNATED FOR COMMUNITY POLICING ACTIVITIES
df$A1.i <- ifelse(df$FTSWORN != 0, df$NUMCPO / df$FTSWORN, NaN)
df$A1.i <- ifelse(df$A1.i > 1, 1, df$A1.i)
df$A1.i <- floor(df$A1.i / 0.2)

# PERCENT SWORN PERSONNEL WITH PRIMARY RESPONSIBILITY FOR PATROL ASSIGNED TO SPECIFIC AREAS
df$A1.ii <- ifelse(df$FTSWORN != 0, df$CP_BEATS_NUM / df$FTSWORN, NaN)
df$A1.ii <- ifelse(df$A1.ii > 1, 1, df$A1.ii)
df$A1.ii <- cut(df$A1.ii, c(0, 0.5, 0.75, 1), c(0, 1, 2), right=FALSE, include.lowest=TRUE)
df$A1.ii <- as.integer(df$A1.ii) - 1

# PERCENT SWORN PERSONNEL THAT REGULARLY RESPOND TO CITIZEN CALLS AND REQUESTS
df$A1.iii <- ifelse(df$FTSWORN != 0, df$NUMRESPOFF / df$FTSWORN, NaN)
df$A1.iii <- ifelse(df$A1.iii > 1, 1, df$A1.iii)
df$A1.iii <- cut(df$A1.iii, c(0, 0.8, 1, 1.1), c(0, 1, 2), right=FALSE)
df$A1.iii <- as.integer(df$A1.iii) - 1

# PERCENT SWORN PERSONNEL WHOSE PRIMARY DUTIES ARE RELATED TO SCHOOL SAFETY
school <- ifelse(df$FTSWORN != 0, df$NUMSRO / df$FTSWORN, NaN)
school <- ifelse(school > 1, 1, school)

# PERCENT SWORN PERSONNEL WHOSE WERE BI- OR MULTILINGUAL
bilng <- ifelse(df$FTSWORN != 0, df$PERS_BILING_SWN / df$FTSWORN, NaN)
bilng <- ifelse(bilng > 1, 1, bilng)
df$A1.iv <- ifelse((bilng > 0.2) | (school > 0.2), 1, 0)

#--- OFFICER REPRESENTATIVENESS ---#

# Read in race data
df_race <- read.csv("County Census Data 2016.csv")
```

```
df_race$COUNTY <- toupper(df_race$CTYNAME)

# Calculate race composition for each county
df_race$WHITE_PERCENT <- (df_race$NHWA_MALE + df_race$NHWA_FEMALE) / df_race$TOT_POP
df_race$BLACK_PERCENT <- (df_race$NHBA_MALE + df_race$NHBA_FEMALE) / df_race$TOT_POP
df_race$HISPN_PERCENT <- (df_race$H_MALE + df_race$H_FEMALE) / df_race$TOT_POP
df_race$NATIV_PERCENT <- (df_race$NHIA_MALE + df_race$NHIA_FEMALE) / df_race$TOT_POP
df_race$ASIAN_PERCENT <- (df_race$NHAA_MALE + df_race$NHAA_FEMALE) / df_race$TOT_POP
df_race$HAWAI_PERCENT <- (df_race$NHNA_MALE + df_race$NHNA_FEMALE) / df_race$TOT_POP
df_race$BIRAC_PERCENT <- (df_race$TOM_MALE + df_race$TOM_FEMALE) / df_race$TOT_POP

# Read in county data
df_county <- read.csv("FIPS to County.csv")
df_county$COUNTY <- toupper(df_county$COUNTY)

# Fill in missing county values by FIPS
df$COUNTY <- trimws(df$COUNTY)
county <- mapvalues(df$FIPS, from=df_county$FIPS, to=df_county$COUNTY, warn_missing=FALSE)
df$COUNTY <- ifelse(df$COUNTY == "", county, df$COUNTY)

# Clean county values in both dataframes
words <- c(" COUNTY", " PARISH", " BOROUGH", " MUNICIPALITY", " CITY", " CO", " CO.")
df$COUNTY <- removeWords(df$COUNTY, words)
df$COUNTY <- gsub("(.*),.*", "\\1", df$COUNTY)
df_race$COUNTY <- removeWords(df_race$COUNTY, words)

# Merge race composition for each county with dataframe
county_id <- select(df, "COUNTY", "STATE")
race_merged <- join(county_id, df_race, by="COUNTY", type="left", match="first")

# RACIAL REPRESENTATIVENESS OF SWORN PERSONNEL NEW HIRES
white_new <- abs((df$PERS_NEW_WHT / df$PERS_NEW_TOTR) - race_merged$WHITE_PERCENT)
black_new <- abs((df$PERS_NEW_BLK / df$PERS_NEW_TOTR) - race_merged$BLACK_PERCENT)
hispn_new <- abs((df$PERS_NEW_HSP / df$PERS_NEW_TOTR) - race_merged$HISPN_PERCENT)
nativ_new <- abs((df$PERS_NEW_IND / df$PERS_NEW_TOTR) - race_merged$NATIV_PERCENT)
asian_new <- abs((df$PERS_NEW_ASN / df$PERS_NEW_TOTR) - race_merged$ASIAN_PERCENT)
hawai_new <- abs((df$PERS_NEW_HAW / df$PERS_NEW_TOTR) - race_merged$HAWAI_PERCENT)
birac_new <- abs((df$PERS_NEW_TWO / df$PERS_NEW_TOTR) - race_merged$BIRAC_PERCENT)
race_new <- white_new + black_new + hispn_new + nativ_new + asian_new + hawai_new
race_new <- ifelse(df$PERS_NEW_TOTR != 0, race_new, NaN)

# GENDER REPRESENTATIVENESS OF SWORN PERSONNEL NEW HIRES
gender_new <- abs(0.5 - (df$PERS_NEW_FEM / df$PERS_NEW_TOTS))
gender_new <- ifelse(df$PERS_NEW_TOTS != 0, gender_new, NaN)
df$A2.i <- ifelse((race_new <= 0.2) | (gender_new <= 0.2), 1, 0)

# RACIAL REPRESENTATIVENESS OF SWORN PERSONNEL
white_ratio <- ifelse((df$PERS_WHITE_MALE + df$PERS_WHITE_FEM) / df$FTSWORN > 1,
                      1, (df$PERS_WHITE_MALE + df$PERS_WHITE_FEM) / df$FTSWORN)
white_sworn <- abs(white_ratio - race_merged$WHITE_PERCENT)
black_ratio <- ifelse((df$PERS_BLACK_MALE + df$PERS_BLACK_FEM) / df$FTSWORN > 1,
                      1, (df$PERS_BLACK_MALE + df$PERS_BLACK_FEM) / df$FTSWORN)
black_sworn <- abs(black_ratio - race_merged$BLACK_PERCENT)
hispn_ratio <- ifelse((df$PERS_HISP_MALE + df$PERS_HISP_FEM) / df$FTSWORN > 1,
                      1, (df$PERS_HISP_MALE + df$PERS_HISP_FEM) / df$FTSWORN)
hispn_sworn <- abs(hispn_ratio - race_merged$HISP_PERCENT)
nativ_ratio <- ifelse((df$PERS_AMIND_MALE + df$PERS_AMIND_FEM) / df$FTSWORN > 1,
                      1, (df$PERS_AMIND_MALE + df$PERS_AMIND_FEM) / df$FTSWORN)
nativ_sworn <- abs(nativ_ratio - race_merged$NATIV_PERCENT)
asian_ratio <- ifelse((df$PERS_ASIAN_MALE + df$PERS_ASIAN_FEM) / df$FTSWORN > 1,
```

```
                    1, (df$PERS_ASIAN_MALE + df$PERS_ASIAN_FEM) / df$FTSWORN)
asian_sworn <- abs(asian_ratio - race_merged$ASIAN_PERCENT)
hawai_ratio <- ifelse((df$PERS_HAWPI_MALE + df$PERS_HAWPI_FEM) / df$FTSWORN > 1,
                    1, (df$PERS_HAWPI_MALE + df$PERS_HAWPI_FEM) / df$FTSWORN)
hawai_sworn <- abs(hawai_ratio - race_merged$HAWPI_PERCENT)
birac_ratio <- ifelse((df$PERS_MULTI_MALE + df$PERS_MULTI_FEM) / df$FTSWORN > 1,
                    1, (df$PERS_MULTI_MALE + df$PERS_MULTI_FEM) / df$FTSWORN)
birac_sworn <- abs(birac_ratio - race_merged$BIRAC_PERCENT)
race_sworn <- white_new + black_new + hispn_new + nativ_new + asian_new + hawai_new
race_sworn <- ifelse(df$PERS_NEW_TOTR != 0, race_new, NaN)
df$A2.ii <- cut(race_sworn, c(-1, 0.1, 0.2, 2), c(2, 1, 0), right=TRUE)
df$A2.ii <- as.numeric(as.character(df$A2.ii))

# GENDER REPRESENTATIVENESS OF SWORN PERSONNEL
gender_ratio <- ifelse(df$PERS_FEMALE / df$FTSWORN > 1, 1, df$PERS_FEMALE / df$FTSWORN)
gender_sworn <- abs(0.5 - gender_ratio)
df$A2.iii <- cut(gender_sworn, c(0, 0.1, 0.2, 2), c(2, 1, 0), right=TRUE)
df$A2.iii <- as.numeric(as.character(df$A2.iii))

#--- PATROL ACCESSIBILITY ---#

# USES FOOT PATROL AS A TYPE OF PATROL
values <- c("(1) Regularly", "(2) As needed", "(3) No")
df$A3.i <- as.numeric(as.character(mapvalues(df$OPER_FOOTPAT, from=values, to=c(3, 1, 0))))

# USES HORSES AS A TYPE OF PATROL
horse <- as.numeric(as.character(mapvalues(df$OPER_HORSPAT, from=values, to=c(1, 0, 0))))

# USES BICYCLES AS A TYPE OF PATROL
bikes <- as.numeric(as.character(mapvalues(df$OPER_BIKEPAT, from=values, to=c(1, 0, 0))))

# USES HUMAN TRANSPORTERS AS A TYPE OF PATROL
segwy <- as.numeric(as.character(mapvalues(df$OPER_SEGPAT, from=values, to=c(1, 0, 0))))

# USES GOLF CARTS AS A TYPE OF PATROL
golfc <- as.numeric(as.character(mapvalues(df$OPER_GOLF, from=values, to=c(1, 0, 0))))

# USES SNOW MOBILES AS A TYPE OF PATROL
snowm <- as.numeric(as.character(mapvalues(df$OPER_SNOWMOB, from=values, to=c(1, 0, 0))))
df$A3.ii <- horse + bikes + segwy + golfc
df$A3.ii <- ifelse(df$A3.ii >= 1, 2, 0)

#--- WEBSITE ACCESSIBILITY ---#

# MAINTAINED A WEBSITE FOR ENABLING CITIZENS TO REPORT CRIMES OR PROBLEMS
df$A4.i <- ifelse(df$TECH_WEB_REPORT == "(1) Yes", 1, 0)

# MAINTAINED A WEBSITE FOR ENABLING CITIZENS TO ASK QUESTIONS OR PROVIDE FEEDBACK
df$A4.ii <- ifelse(df$TECH_WEB_ASK == "(1) Yes", 1, 0)

# MAINTAINED A WEBSITE FOR ENABLING CITIZENS TO FILE COMPLAINS ABOUT POLICE BEHAVIOUR
df$A4.iii <- ifelse(df$TECH_WEB_COMPL == "(1) Yes", 1, 0)

# MAINTAINED A WEBSITE FOR PROVIDING DIRECT ACCESS TO CRIME STATISTICS OR DATA
crim <- ifelse(df$TECH_WEB_STAT == "(1) Yes", 1, 0)

# MAINTAINED A WEBSITE FOR PROVIDING DIRECT ACCESS TO STOP STATISTICS OR DATA
stop <- ifelse(df$TECH_WEB_STOP == "(1) Yes", 1, 0)

# MAINTAINED A WEBSITE FOR PROVIDING DIRECT ACCESS TO ARREST STATISTICS OR DATA
```

```
arst <- ifelse(df$TECH_WEB_ARR == "(1) Yes", 1, 0)
df$A4.iv <- crim + stop + arst
df$A4.iv <- ifelse(df$A4.iv >= 1, 1, 0)

#--- SOCIAL MEDIA USE ---#

# AGENCY USED TWITTER AS A SOCIAL MEDIA CHANNEL
twitt <- ifelse(df$TECH_SM_TWITTER == "(1) Yes", 1, 0)

# AGENCY USED FACEBOOK, GOOGLE+, OR A SIMILAR SERVICE AS A SOCIAL MEDIA CHANNEL
faceb <- ifelse(df$TECH_SM_FB == "(1) Yes", 1, 0)

# AGENCY USED BLOGS AS A SOCIAL MEDIA CHANNEL
blogs <- ifelse(df$TECH_SM_BLOG == "(1) Yes", 1, 0)

# AGENCY USED YOUTUBE OR OTHER VIDEO SHARING SERVICE AS A SOCIAL MEDIA CHANNEL
youtb <- ifelse(df$TECH_SM_YOUTUB == "(1) Yes", 1, 0)

# AGENCY USED MASS COMMUNICATION OR NOTIFICATION SYSTEM AS A SOCIAL MEDIA CHANNEL
massc <- ifelse(df$TECH_SM_MASSNOT == "(1) Yes", 1, 0)
df$A5.i <- twitt + faceb + blogs + youtb + massc
df$A5.i <- ifelse(df$A5.i >= 1, 1, 0)


#### CALCULATE PROBLEM-SOLVING SCORES ####

#--- EDUCATION REQUIREMENTS ---#

# MINIMUM EDUCATION REQUIREMENT FOR NEW OFFICER RECRUITS
values <- c("1", "2", "3", "4", "5")
df$B1.i <- substr(df$PERS_EDU_MIN, 2, 2)
df$B1.i <- as.numeric(as.character(mapvalues(df$B1.i, from=values, to=c(4, 3, 2, 0, 0))))

# NO MILITARY SERVICE AS AN EXCEPTION TO MINIMUM EDUCATION REQUIREMENT
df$B1.ii <- ifelse(df$PERS_MIL == "(2) No", 1, 0)

#--- OFFICER SCREENING ---#

# USES PERSONALITY OR PSYCHOLOGICAL INVENTORY FOR SCREENING NEW OFFICER RECRUITS
perstest <- ifelse(df$PERS_PERSTEST == "(1) Yes", 1, 0)

# USES PSYCHOLOGICAL INTERVIEW FOR SCREENING NEW OFFICER RECRUITS
psych <- ifelse(df$PERS_PSYCH == "(1) Yes", 1, 0)

# USES ANALYTICAL OR PROBLEM-SOLVING ASSESSMENT FOR SCREENING NEW OFFICER RECRUITS
probsolv <- ifelse(df$PERS_PROBSOLV == "(1) Yes", 1, 0)

# USES ASSESSMENT OF UNDERSTANDING OF DIVERSE POPULATIONS FOR SCREENING NEW OFFICER RECRUITS
culture <- ifelse(df$PERS_CULTURE == "(1) Yes", 1, 0)

# USES MEDIATION OR CONFLICT MANAGEMENT SKILLS ASSESSMENT FOR SCREENING NEW OFFICER RECRUITS
conflict <- ifelse(df$PERS_CONFLICT == "(1) Yes", 1, 0)
df$B2.i <- perstest + psych + probsolv + culture + conflict
df$B2.i <- ifelse(df$B2.i > 3, 3, df$B2.i)

#--- OFFICER TRAINING ---#

# PROPORTION OF SWORN PERSONNEL WITH AT LEAST EIGHT HOURS OF COMMUNITY POLICING TRAINING
values <- c("1", "2", "3")
df$B3.i <- substr(df$CP_TRN_INSRV, 2, 2)
```

```
df$B3.i <- as.numeric(as.character(mapvalues(df$B3.i, from=values, to=c(3, 2, 0))))

# PERCENT SWORN PERSONNEL WITH PRIMARY RESPONSIBILITY FOR PATROL ENCOURAGED TO PROBLEM-SOLVE
df$B3.ii <- ifelse(df$CP_SARA_NUM / df$FTSWORN > 1, 1, df$CP_SARA_NUM / df$FTSWORN)
df$B3.ii <- cut(df$B3.ii, c(0, 0.25, 0.5, 2), c(0, 1, 2), include.lowest=TRUE, right=FALSE)
df$B3.ii <- as.numeric(as.character(df$B3.ii))

#--- TECHNOLOGY USE ---#

# USES TECHNOLOGY TO SUPPORT THE ANALYSIS OF COMMUNITY PROBLEMS
df$B4.i <- ifelse(df$CP_TECH == "(1) Yes", 2, 0)

#--- COMMUITY PARTNERSHIPS ---#

# PROBLEM-SOLVING PARTNERSHIP OR WRITTEN AGREEMENT WITH ADVOCACY GROUPS
advgrp <- ifelse(df$CP_PSP_ADVGRP == "(1) Yes", 2, 0)

# PROBLEM-SOLVING PARTNERSHIP OR WRITTEN AGREEMENT WITH BUSINESS GROUPS
busgrp <- ifelse(df$CP_PSP_BUSGRP == "(1) Yes", 2, 0)

# PROBLEM-SOLVING PARTNERSHIP OR WRITTEN AGREEMENT WITH NEIGHBOURHOOD ASSOCIATIONS
neigh <- ifelse(df$CP_PSP_NEIGH == "(1) Yes", 2, 0)

# PROBLEM-SOLVING PARTNERSHIP OR WRITTEN AGREEMENT WITH UNIVERISTY OR RESEARCH GROUPS
univ <- ifelse(df$CP_PSP_UNIV == "(1) Yes", 2, 0)

# PROBLEM-SOLVING PARTNERSHIP OR WRITTEN AGREEMENT WITH SCHOOLS OR SCHOOL BOARDS
school <- ifelse(df$CP_PSP_SCHOOL == "(1) Yes", 2, 0)

# PROBLEM-SOLVING PARTNERSHIP OR WRITTEN AGREEMENT WITH FAITH-BASED ORGANIZATIONS
faith <- ifelse(df$CP_PSP_FAITH == "(1) Yes", 2, 0)

# PROBLEM-SOLVING PARTNERSHIP OR WRITTEN AGREEMENT WITH HEALTHCARE OR SOCIAL SERVICES
health <- ifelse(df$CP_PSP_HEALTH == "(1) Yes", 2, 0)

# PROBLEM-SOLVING PARTNERSHIP OR WRITTEN AGREEMENT WITH COMMUNITY ADVISORY GROUPS
comm <- ifelse(df$CP_PSP_COMM == "(1) Yes", 2, 0)
df$B5.i <- advgrp + busgrp + neigh + univ + school + faith + health + comm
df$B5.i <- ifelse(df$B5.i > 10, 10, df$B5.i)


#### CALCULATE COMMUNITY CONSIDERATION ####

#--- SURVEY USE ---#

# AGENCY CONDUCTS A FORMAL SURVEY OF LOCAL RESIDENTS ON CRIME EXPERIENCES OR POLICE SATISFACTION
df$C1.i <- ifelse(df$CP_SURVEY == "(1) Yes", 3, 0)

# USES INFORMATION FROM SURVEY TO PRIORITIZE CRIME OR DISORDER PROBLEMS
crprob <- ifelse(df$CP_SURVEY == "(1) Yes" & df$CP_SURV_CRPROB == "(1) Yes", 1, 0)

# USES INFORMATION FROM SURVEY FOR ALLOCATING RESOURCES TO NEIGHBOURHOODS
resource <- ifelse(df$CP_SURVEY == "(1) Yes" & df$CP_SURV_RESOURCE == "(1) Yes", 1, 0)

# USES INFORMATION FROM SURVEY FOR EVALUATING OFFICER OR AGENCY PERFORMANCE
perform <- ifelse(df$CP_SURVEY == "(1) Yes" & df$CP_SURV_PERFORM == "(1) Yes", 1, 0)

# USES INFORMATION FROM SURVEY FOR TRAINING DEVELOPMENT
training <- ifelse(df$CP_SURVEY == "(1) Yes" & df$CP_SURV_TRAINING == "(1) Yes", 1, 0)
```

```
# USES INFORMATION FROM SURVEY FOR INFORMING AGENCY POLICIES AND PROCEDURES
policy <- ifelse(df$CP_SURVEY == "(1) Yes" & df$CP_SURV_POLICY == "(1) Yes", 1, 0)
df$C1.ii <- crprob + resource + perform + training + policy
df$C1.ii <- ifelse(df$C1.ii > 2, 2, df$C1.ii)

#--- KEY ISSUE POLICIES ---#

# AGENCY HAS WRITTEN POLICY OR PROCEDURAL DIRECTIVES ON MENTALLY ILL PERSONS
mentill <- ifelse(df$POL_MENTILL == "(1) Yes", 2, 0)

# AGENCY HAS WRITTEN POLICY OR PROCEDURAL DIRECTIVES ON HOMELESS PERSONS
homeless <- ifelse(df$POL_HOMELESS == "(1) Yes", 2, 0)

# AGENCY HAS WRITTEN POLICY OR PROCEDURAL DIRECTIVES ON DOMESTIC DISPUTES
domdisp <- ifelse(df$POL_DOMDISP == "(1) Yes", 2, 0)

# AGENCY HAS WRITTEN POLICY OR PROCEDURAL DIRECTIVES ON JUVENILES
juveniles <- ifelse(df$POL_JUV == "(1) Yes", 2, 0)

# AGENCY HAS WRITTEN POLICY OR PROCEDURAL DIRECTIVES ON RACIAL PROFILING OR UNBIASED POLICING
racprof <- ifelse(df$POL_RACPROF == "(1) Yes", 2, 0)

# AGENCY HAS WRITTEN POLICY OR PROCEDURAL DIRECTIVES ON CIVILIAN COMPLAINTS
comp <- ifelse(df$POL_COMPL == "(1) Yes", 2, 0)

# AGENCY HAS WRITTEN POLICY OR PROCEDURAL DIRECTIVES ON REPORTING USE OF FORCE
repuof <- ifelse(df$POL_REPUOF == "(1) Yes", 2, 0)

# AGENCY HAS WRITTEN POLICY OR PROCEDURAL DIRECTIVES ON CULTURAL AWARENESS TRAINING
cultaw <- ifelse(df$POL_CULTAW == "(1) Yes", 2, 0)
df$C2.i <- mentill + homeless + domdisp + juveniles + racprof + comp + repuof + cultaw
df$C2.i <- ifelse(df$C2.i > 10, 10, df$C2.i)

#--- CIVILIAN COMPLAINTS ---#

# HAS CIVILIAN COMPLAINT REVIEW BOARD OR AGENCY THAT REVIEW COMPLAINTS AGAINST OFFICERS
df$C3.i <- ifelse(df$POL_CCRB == "(1) Yes", 3, 0)

# CIVILIAN COMPLAINT REVIEW BOARD OR AGENCY HAS INDEPENDENT INVESTIGATIVE AUTHORITY
subpwr <- ifelse(substr(df$POL_CCRB_SUBPWR, 5, 7) == "Yes" & df$POL_CCRB == "(1) Yes", 2, 0)

# AGENCY HAS WRITTEN POLICY REQUIRING SEPARATE USE OF FORCE INVESTIGATION OUTSIDE COMMAND CHAIN
extinv <- ifelse(df$POL_COMP_EXTINV == "(1) Yes" & df$POL_CCRB == "(1) Yes", 2, 0)
df$C3.ii <- subpwr + extinv
df$C3.ii <- ifelse(df$C3.ii > 2, 2, df$C3.ii)

# AGENCY MAINTAINS COMPUTERIZED FILES WITH INFORMATION ON CIVILIAN COMPLAINS
df$C3.iii <- ifelse(df$TECH_FILE_COMPL == "(1) Yes", 5, 0)


#### CALCULATE COMMUITY SUPPORT ####

#--- EDUCATIONAL CAMPAIGNS ---#

# AGENCY CONDUCTED A CITIZEN POLICE ACADEMY
df$D1.i <- ifelse(df$CP_CPACAD == "(1) Yes", 2, 0)

# AGENCY ADDRESSES DRUG EDUCATION IN SCHOOLS
values <- c("1", "2", "3", "4", "5")
df$D1.ii <- substr(df$ISSU_ADDR_DRUG_ED, 2, 2)
```

```
df$D1.ii <- as.numeric(as.character(mapvalues(df$D1.ii, from=values, to=c(3, 2, 1, 0, 0))))

#--- VICTIM ASSISTANCE ---#

# AGENCY ADDRESSES VICTIM ASSISTANCE
values <- c("1", "2", "3", "4", "5")
df$D2.i <- substr(df$ISSU_ADDR_DRUG_ED, 2, 2)
df$D2.i <- as.numeric(as.character(mapvalues(df$D2.i, from=values, to=c(10, 6, 3, 0, 0))))

#--- CRIME PREVENTION ---#

# AGENCY ADDRESSES CRIME PREVENTION
values <- c("1", "2", "3", "4", "5")
df$D3.i <- substr(df$ISSU_ADDR_CRMPREV, 2, 2)
df$D3.i <- as.numeric(as.character(mapvalues(df$D3.i, from=values, to=c(10, 6, 3, 0, 0))))


#### CONSOLIDATE SCORES ####

# Combine scores together
df$SCORE_COMMUNICATION <- df$A1.i + df$A1.ii + df$A1.iii + df$A1.iv + df$A2.i + df$A2.ii +
                          df$A2.iii + df$A3.i + df$A3.ii +  df$A4.i + df$A4.ii + df$A4.iii +
                          df$A4.iv + df$A5.i
df$SCORE_PROBLMSOLVING <- df$B1.i + df$B1.ii + df$B2.i + df$B3.i + df$B3.ii + df$B4.i
df$SCORE_CONSIDERATION <- df$C1.i + df$C1.ii + df$C2.i + df$C3.i + df$C3.ii + df$C3.iii
df$SCORE_COMMUNITYSUPP <- df$D1.i + df$D1.ii + df$D2.i + df$D3.i
df$SCORE_FINAL <- df$SCORE_COMMUNICATION + df$SCORE_PROBLMSOLVING +
                  df$SCORE_CONSIDERATION + df$SCORE_COMMUNITYSUPP


#### ANALYZE RESULTS ####

# Graph distribution of final scores
ggplot(df, aes(x=df$SCORE_FINAL)) +
  geom_histogram(aes(y=..density..),
                 binwidth=5,
                 colour="black", fill="white") +
  geom_density(alpha=0.2, fill="black") +
  labs(x="COP Implementation Score",
       y="Density") +
  theme(text=element_text(size=14, family="CMU Serif"))

# Graph distribution of scores by dimension
start = match("SCORE_COMMUNICATION", names(df))
end = match("SCORE_COMMUNITYSUPP", names(df))
subset = melt(df[, start:end])
labs <- c("Communication", "Problem-Solving", "Community Consideration", "Community Support")
levels(subset$variable) <- labs
ggplot(subset, aes(x=value)) +
  geom_histogram(aes(y=..density..),
                 binwidth=2,
                 colour="black", fill="white") +
  geom_density(alpha=0.2, fill="black") +
  labs(x="COP Implementation Score",
       y="Density") +
  theme(text=element_text(size=14, family="CMU Serif")) +
  facet_wrap(. ~ variable, ncol=2)

# List agencies with highest scores
cols <- c("AGENCYNAME", "STATE", "POPSERVED", "SCORE_FINAL")
```

```
top <- arrange(subset(top_n(df, 10, SCORE_FINAL), select=cols), SCORE_FINAL)

# List agencies with lowest scores
cols <- c("AGENCYNAME", "STATE", "POPSERVED", "SCORE_FINAL")
bottom <- arrange(subset(top_n(df, -15, SCORE_FINAL), select=cols), SCORE_FINAL)

# Graph final scores by region
west <- c("AK", "WA", "OR", "CA", "HI", "MT", "ID", "WY", "NV", "UT", "CO", "AZ", "NM")
midwest <- c("ND", "MN", "WI", "MI", "SD", "NE", "KS", "IA", "MO", "IL", "IN", "OH")
northeast <- c("ME", "NY", "PA", "VT", "NH", "MA", "RI", "CT", "NJ")
south <- c("TX", "OK", "AR", "LA", "MS", "TN", "KY", "AL", "WV", "VA", "NC", "SC",
           "GA", "FL", "DE", "DC", "MD")
df$REGION <- ifelse(df$STATE %in% west, "West", "Other")
df$REGION <- ifelse(df$STATE %in% midwest & df$REGION == "Other", "Midwest", df$REGION)
df$REGION <- ifelse(df$STATE %in% northeast & df$REGION == "Other", "Northeast", df$REGION)
df$REGION <- ifelse(df$STATE %in% south & df$REGION == "Other", "South", df$REGION)
ggplot(df, aes(x=REGION, y=SCORE_FINAL)) +
  geom_boxplot(fill="#d6d6d6") +
  labs(x="Region",
       y="COP Implementation Score") +
  theme(text=element_text(size=14, family="CMU Serif"))

# Analyze differences in scores by region
df %>%
  group_by(REGION) %>%
  dplyr::summarize(Mean = mean(SCORE_FINAL, na.rm=TRUE))
oneway.test(SCORE_FINAL ~ REGION, data=df)

# Graph final scores by service population
top_pop <- unname(quantile(df$POPSERVED, 0.75, na.rm=TRUE))
bottom_pop<- unname(quantile(df$POPSERVED, 0.25, na.rm=TRUE))
df$POP_QUARTILE <- ifelse(df$POPSERVED >= top_pop, "Top 25%", "Other")
df$POP_QUARTILE <- ifelse(df$POPSERVED <= bottom_pop, "Bottom 25%",
                          df$POP_QUARTILE)
df$POP_QUARTILE <- ifelse(df$POP_QUARTILE == "Other", NaN, df$POP_QUARTILE)
ggplot(df[df$POP_QUARTILE == "Top 25%" | df$POP_QUARTILE == "Bottom 25%", ]
       %>% filter(!is.na(POP_QUARTILE)),
       aes(x=POP_QUARTILE, y=SCORE_FINAL)) +
  geom_boxplot(fill="#d6d6d6") +
  labs(x="Population Served",
       y="COP Implementation Score") +
  theme(text=element_text(size=14, family="CMU Serif"))

# Analyze differences in scores by service population
t.test(SCORE_FINAL ~ POP_QUARTILE,
       data=df[df$POP_QUARTILE == "Top 25%" | df$POP_QUARTILE == "Bottom 25%", ]
       %>% filter(!is.na(POP_QUARTILE)))

# Graph final scores by black population
top_black <- unname(quantile(race_merged$BLACK_PERCENT, 0.75, na.rm=TRUE))
bottom_black <- unname(quantile(race_merged$BLACK_PERCENT, 0.25, na.rm=TRUE))
df$RACE_QUARTILE <- ifelse(race_merged$BLACK_PERCENT >= top_black, "Top 25%", "Other")
df$RACE_QUARTILE <- ifelse(race_merged$BLACK_PERCENT <= bottom_black, "Bottom 25%",
                          df$RACE_QUARTILE)
df$RACE_QUARTILE <- ifelse(df$RACE_QUARTILE == "Other", NaN, df$RACE_QUARTILE)
ggplot(df[df$RACE_QUARTILE == "Top 25%" | df$RACE_QUARTILE == "Bottom 25%", ]
       %>% filter(!is.na(RACE_QUARTILE)),
       aes(x=RACE_QUARTILE, y=SCORE_FINAL)) +
  geom_boxplot(fill="#d6d6d6") +
  labs(x="Percent Black Population",
```

```
       y="COP Implementation Score") +
  theme(text=element_text(size=14, family="CMU Serif"))

# Analyze differences in scores by black population
t.test(SCORE_FINAL ~ RACE_QUARTILE,
       data=df[df$RACE_QUARTILE == "Top 25%" | df$RACE_QUARTILE == "Bottom 25%", ]
       %>% filter(!is.na(RACE_QUARTILE)))


#### TEST VALIDITY ####

# Print number of agencies with community policing mission statement
summary(df[df$AGENCYTYPE != "(3) Primary state or highway patrol department", ]$CP_MISSION)

# Print number of agencies with community policing plans
summary(df[df$AGENCYTYPE != "(3) Primary state or highway patrol department", ]$CP_PLAN)

# Graph implementation scores by community policing mission statement
ggplot(df %>% filter(!is.na(CP_MISSION)), aes(x=CP_MISSION, y=SCORE_FINAL)) +
  geom_boxplot(fill="#d6d6d6") +
  labs(x="Region",
       y="COP Implementation Score") +
  theme(text=element_text(size=14, family="CMU Serif"))

# Analyze differences in scores by community policing mission statement
t.test(SCORE_FINAL ~ CP_MISSION,
       data=df %>% filter(!is.na(CP_MISSION)))

# Graph implementation scores by community policing mission statement
df$CP_MISSION2 = substring(df$CP_MISSION, 5)
ggplot(df %>% filter(!is.na(CP_MISSION)), aes(x=CP_MISSION2, y=SCORE_FINAL)) +
  geom_boxplot(fill="#d6d6d6") +
  labs(x="Has Community Policing Component in Mission Statement",
       y="COP Implementation Score") +
  theme(text=element_text(size=14, family="CMU Serif"))

# Analyze differences in scores by community policing mission statement
t.test(SCORE_FINAL ~ CP_MISSION,
       data=df %>% filter(!is.na(CP_MISSION)))

# Graph implementation scores by community policing plan
df$CP_PLAN2 = substring(df$CP_PLAN, 5)
ggplot(df %>% filter(!is.na(CP_PLAN)), aes(x=CP_PLAN2, y=SCORE_FINAL)) +
  geom_boxplot(fill="#d6d6d6") +
  labs(x="Has Specific Community Policing Plan",
       y="COP Implementation Score") +
  theme(text=element_text(size=14, family="CMU Serif"))

# Analyze differences in scores by community policing plan
t.test(SCORE_FINAL ~ CP_PLAN,
       data=df %>% filter(!is.na(CP_PLAN)))
```