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The Current and Potential Role of Crime Analysts in Evaluations of Police Interventions: Results From a Survey of the International Association of Crime Analysts

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Abstract

Crime analysts play a pivotal role in evidence-based policing by readily diagnosing the nature of crime and disorder problems. Such analysis products are key in the design of evidence-based strategies. The role of analysts in the subsequent process of evidence-based policing, the evaluation of programs to determine *what works*, is less known. The current study seeks to fill this gap in the literature through a survey of the International Association of Crime Analyst Membership. Findings suggest that program evaluation lies on the periphery of the crime analysis profession. Across all measures incorporated in this study, program evaluation was emphasized less than all other crime analysis functions. Findings of logistic regression models further suggest that, for the most part, no specific factors are associated with increased levels of program evaluation experience. We conclude with a discussion of how crime analysts can become more involved in evaluations of police programs and strategies.

Keywords

program evaluation, crime analysis, evidence-based policing, survey research

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Introduction

The emergence of crime analysis can be considered a driving force in the modern evolution of policing (Santos, 2014). Despite their direct involvement in the design and implementation of contemporary policing strategies, crime analysts have not been readily incorporated in the evidence-based policing movement. Program evaluation, the primary vehicle for evidence generation, has been left to academic scholars, with researcher–practitioner partnerships commonly focusing on the evaluation of police practices. Consequently, crime analysis units typically do not engage in high-level scientific endeavors that can directly speak to the effectiveness of police practices (Weisburd & Neyroud, 2011). Given that effective crime analysis is expected to lead to crime reduction (Santos, 2014), crime analysts arguably should play a central role in determining whether a significant crime reduction has occurred.

The current study explores the role of crime analysts in program evaluation via a survey of members of the International Association of Crime Analysts (IACA), the preeminent professional organization of the crime analysis community. The analysis empirically measures analyst training, task frequency, confidence, and opinions related to program evaluation, as compared with predominate crime analysis functions (e.g., intelligence analysis, criminal investigative analysis, tactical analysis, strategic analysis, and administrative analysis). Analyst responses were compared across these job functions via one-way analysis of variance (ANOVA) and Kruskal–Wallis tests. The analysis ends with a series of logistic regression models meant to identify analyst and agency factors significantly related to levels of program evaluation activity. In consideration of the study findings, we conclude with an argument that crime analysts should occupy a more central role in program evaluation, outlining several recommendations that may assist in achieving this goal.

Review of Relevant Literature

Evidence-Based Policing

Over recent decades, policing has seen increased calls for the use of scientific evidence in the formation of public policy. Evidence-based policing advocates for the use of scientific evidence in the adoption of police strategies, with police practices based on *what works* as identified by rigorous program evaluation (Sherman & Eck, 2002; Sherman et al., 1997). This movement has been welcomed by both criminologists and practitioners and has increased the use of science to inform policy and practice (Lum, Koper, & Telep, 2011; Sherman & Eck, 2002; Welsh, 2006).

The evidence base for *what works* has predominately been generated by academics outside of police agencies. For example, the evidence-based policing matrix (Lum et al., 2011), created for the purpose of developing principles on

the nature of effective police strategies, includes a total of 146 studies as of the date of this writing.[1] While a small subset of these evaluations includes both academics and police personnel as authors (e.g., Groff et al., 2015; Piza & O'Hara, 2014; Telep, Mitchell, & Weisburd, 2014), the majority of studies include only academic authors, demonstrating that evidence generation predominately occurs outside of police departments. Practitioners-as-authors in policing research are generally rare (Guillaume, Sidebottom, & Tilley, 2012), even in studies where data were collected directly by police personnel (Jenkins, 2015). It should be noted that academic researchers play a central role in policing research for good reason. For agencies wishing to develop and implement evidence-based practices, partnering with researchers provides the opportunity to benefit from their analytical expertise, a rare skill set among practitioners. For researchers, such partnerships provide the opportunity to explore *real-world* problems and access to data necessary for such exploration, which may not be accessible outside of such collaborations. In this sense, partnerships between academic researchers and police practitioners can be mutually beneficial.

Despite these benefits, there are some issues inherent in researcher–practitioner partnerships that warrant mentioning. First, despite their appeal, such collaborations are infrequent. For example, in their review of published works in the journal *Police Practice and Research*, which explicitly calls for the submission of articles coauthored by practitioners and researchers, Guillaume et al. (2012) found that only 8% of articles published between 2002 and 2011 were joint publications between researchers and practitioners. The *ad hoc* nature of these collaborations can be largely explained by their reliance on external funding (Jenkins, 2015), which is commonly needed to free academic researchers from their time commitments at their home institutions or provide compensation for research team members. In addition, researcher–practitioner partnerships have commonly been characterized by role conflicts of the two sides, which may explain their relative infrequency. For academic researchers, whether a particular project is deemed a success or failure is less important than the development of knowledge. For practitioners, however, such information can be deemed as their own personal failure (Braga & Schnell, 2013, p. 342). Furthermore, the realities public safety practitioners face makes strict adherence to the scientific process unrealistic in many instances. To illustrate this point, Braga (2010) discussed his work with Edward F. Davis III during Davis's tenure as superintendent of the Lowell, MA Police Department and Commissioner of the Boston, MA Police Department. While head of the Lowell Police Department, Davis worked with Braga to implement a randomized controlled trial testing the effect of problem-oriented policing strategies on crime and disorder hot spots (Braga & Bond, 2008). When appointed commissioner in Boston, political pressure and an increase in violent crime pressured Davis to implement crime prevention strategies quickly, leaving insufficient time for *a priori* consideration of rigorous program evaluation (Braga, 2010).

Braga's (2010) account of his partnership with Davis suggests that police agencies should take a more active role in program evaluation, as having the internal capacity to design and implement rigorous analyses may better reflect the pace of policing than partnerships with outside academics. Recently, scholars have advocated different versions of researcher–practitioner partnerships to better fit policing needs. The notion of embedded criminologists, outside academic researchers taking an active role in the day-to-day routine of police agencies, has received considerable attention (Braga, 2013) following successful application of this model in corrections (Petersilia, 2008). Others have emphasized the important role of *pracademics*, active police officers who have received academic (typically graduate level) research training (Huey & Mitchell, 2016). Huey and Mitchell (2016) argue that pracademics can provide police an internal resource to conduct in-house, rigorous program evaluations, resulting in increased knowledge regarding *what works*. Furthermore, pracademics can disseminate knowledge throughout the agency by converting technical and academic jargon into terms more accessible to police officers and commanders (Huey & Mitchell, 2016).

In our view, both embedded criminologists and pracademics represent models that can greatly bolster the internal capacity of police to conduct rigorous program evaluation. However, the incorporation of embedded criminologists seems to hinge on a number of factors outside the control of police, such as the academic's host institution granting partial leave to be on site in the agency, the individual academic having the professional flexibility to explore problems important to the agency, and the availably of funds to acquire the academic's time from the host institution (Braga, 2013). Furthermore, as noted by Braga (2016), ''there are simply not enough skilled and willing academic researchers available to meet the growing demands by policing departments for scientific knowledge'' (p. 308). As internal employees, pracademics may be more readily leveraged by police agencies for research and evaluation purposes.

While acknowledging the potential impact of pracademics, Willis (2016) argued that a focus on the talents and contributions of individual officers diverts attention away from larger organizational issues that may undermine their influence. A number of Willis's (2016) arguments are relevant to the current study. First, declining police budgets mean that allocating funds toward research positions, and away from law enforcement functions (e.g., patrol and investigations), is not feasible in many cotemporary police agencies. In addition, moving an officer from the street to a research position may create tension among the rank-and-file who may see the reassignment as an unwarranted promotion and to residents who may resent no longer having access to someone uniquely qualified to address community concerns. While a compromise may be to have pracademics split their time between law enforcement and research duties, such an approach is unrealistic given the demands of both roles (Willis, 2016, p. 317).

The purpose of the current study is not to contribute to either side of the debate regarding police pracademics. Rather, we argue that in many police departments, there exists a mechanism that perhaps can be more readily leveraged for evidence generation on *what works* in policing: crime analysis units. Similar to pracademics, crime analysts are internal police employees with analytical expertise and institutional knowledge. Unlike pracademics, crime analyst is an existing position, meaning additional expenditures are not needed to create this internal function. Crime analysts are completely dedicated to the analytical functions of the agency, meaning there is little risk of creating a role conflict by including crime analysts directly in evidence generation. Leveraging crime analysts in program evaluation can help remedy some key issues of researcher–practitioner partnerships. In particular, outside researchers are not involved in the day-to-day workings of the police agency and are instead typically focused on a small subset of programs, if not a singular program. This means most crime prevention efforts of the agency are not readily evaluated via researcher–practitioner partnerships. Interventions outside the scope of researcher–practitioner partnerships are likely not evaluated at all, as police departments rarely rigorously evaluate their own crime prevention efforts (Haberman & King, 2011). Given their internal role in police operations, crime analysts may be able to conduct formal evaluations of a wider array of programs, hence increasing their police agency's program evaluation activity. Similar to pracademics, crime analysts have in-depth knowledge of contextual aspects of police programs, which can assist in generating "practice-based evidence" that can inform various aspects of police strategy (Boba, 2010). We believe that these considerations make crime analysts logical candidates to conduct in-house program evaluations for police.

Crime Analysts as a Vehicle for In-House Program Evaluations

The rate of change and innovation in policing has outpaced virtually all other government entities, with the police reconsidering their fundamental mission and many of their core strategies within a relatively short-time frame (Weisburd & Braga, 2006). In many ways, crime analysts have been front-and-center in this strategic evolution of policing. As illustrated by Santos (2014), crime analysis products are essential to many cotemporary policing strategies, including problem-oriented policing, hot spots policing, pulling levers (i.e., focused deterrence), CompStat, intelligence-led policing, and predictive policing. While crime analysis does not replace the work and skills of sworn police personnel, it is designed to complement and add value to that work (Santos & Taylor, 2014, p. 502). Indeed, Santos (2013a) found that the implementation of the stratified model of problem solving, analysis, and accountability, which incorporates rigorous crime analysis in the daily functions of all levels of a police agency, was associated with significant crime reductions in Port St. Lucie, FL.[2]

Crime analysis is widely recognized as involving five primary functions: intelligence analysis, criminal investigative analysis, tactical analysis, strategic analysis, and administrative analysis (Boba, 2001, 2009; Bruce, 2008; Santos, 2013b). Intelligence analysis involves the study of organized criminal activity for the purpose of assisting investigative personnel in linking people, events, and property. Criminal investigative analysis involves the study of serial criminals, victims, or crime scenes to develop patterns that will assist in solving serial activity. Tactical analysis involves the examination of crime incident characteristics such as how, when, and where such activity has occurred for the purpose of developing patterns and trends, identifying investigative leads or suspects, and clearing cases. Strategic analysis involves the study of crime and law enforcement information integrated with sociodemographic and spatial factors to determine long-term patterns of activity and to assist in problem solving. Lastly, administrative analysis involves the presentation of interesting findings of crime research and analysis to inform audiences within law enforcement administration, city government or council, and citizens.

Notably absent from this work description is program evaluation for the purpose of generating evidence on *what works*. This does not necessarily mean that crime analysts are completely isolated from program evaluation. In a national survey of police personnel, Santos and Taylor (2014) found that while patrol officers and first-line supervisors most often incorporated tactical and strategic crime analysis into their daily functions, management reported that they most often looked to crime analysis products to evaluate their intervention efforts. However, Santos and Taylor (2014) noted that, across all level of police agencies, the use of crime analysis was not well integrated with officers incorporating crime analysis products on an infrequent basis. While these findings report how different police personnel use crime analysis products, they do not speak to preparedness of crime analysts to conduct program evaluation or how frequently analysts engage in evaluation activity. We find this curious in light of the fact that crime analysis is ultimately expected to lead to a reduction of crime. Santos (2014, p. 153) presented a flow chart depicting the relationship between crime analysis and crime reduction. In this chart, a given crime analysis product directly leads to the selection and implementation of a crime prevention response, which then leads to an anticipated reduction of crime. Left implicit in this process is the fact that a reduction of crime has to be empirically measured. Given that their work is considered the starting point of the crime reduction process, crime analysts are natural candidates to help determine the effectiveness of police interventions. However, the role of crime analysts in program evaluation has not been empirically measured in prior research.

Advocating for the increased use of crime analysts in program evaluation requires us to explore whether the prerequisites for doing so have been met. To conduct program evaluations, analysts would seemingly need to receive a level of training commensurate with that received for their other functions.

In general, research suggests that crime analysts lack training in important skills related to the profession, with on-the-job training the most common manner by which analysts develop their skillset (O'Shea & Nicholls, 2003). Kringen, Sedelmaier, and Elink-Schuurman-Laura (2016) conducted a more detailed assessment of statistical training of crime analysts through a survey of 98 criminal justice educators (identified through the Academy of Criminal Justice Sciences) and 146 crime analysts (identified through the IACA). While about 76% of crime analyst respondents reported taking undergraduate statistics classes, results suggest that statistical training offered by colleges and universities did not address common needs of the crime analysis profession (Kringen et al., 2016). Outside of official classroom training, on-the-job instruction was the most commonly reported form of statistics training. Most respondents reported receiving crime analysis training formally from professional organizations or private businesses, or informally via on-the-job training.

Outside of these studies, we are unaware of any research that systematically measures and compares crime analyst training across different aspects of the profession (e.g., strategic analysis, tactical analysis, etc.). In addition, Kringen et al. (2016) focused on the relevance of statistics and crime analysis courses to the crime analysis profession but did not measure the application of applied skills to program evaluation. Therefore, the preparedness of crime analysts to conduct program evaluation, as compared with other aspects of the profession, remains an open question. It is with this issue in mind that we designed the current study.

Scope of the Current Study

The present study examines the extent to which crime analysts are incorporated in program evaluations of policing strategies and interventions. An online survey was constructed and administered to members of IACA to empirically measure analyst training, task frequency, confidence, and opinions of importance of program evaluation, compared with similar measures for other common crime analysis tasks. ANOVA and Kruskal–Wallis tests were conducted to determine whether various outcome measures differed across the different crime analysis tasks. Following these analyses, logistic regression models explored whether specific analyst and agency factors were significantly related to reported levels of program evaluation activity.

Methodology

To assess the extent that crime analysts are utilized in program evaluation of policing practices, we constructed a survey to gauge various measures related to respondent's involvement in program evaluation as compared with other common crime analysis tasks.[3] These measures include respondent's degree of

analyst training, task frequency, confidence in performance, and opinions of program evaluation importance compared with the five aforementioned crime analysis functions: intelligence analysis, criminal investigative analysis, tactical crime analysis, strategic crime analysis, and administrative crime analysis. Descriptions of program evaluation and crime analysis tasks were derived from seminal texts on crime analysis (Boba, 2001) and criminal justice research methodology (Maxfield & Babbie, 2015) and included within the survey for respondents to reference. Additional explanatory variables were also included in the survey. In total, the survey included 25 questions and, based on field testing, took approximately 20 minutes to complete.[4]

The completed survey was then distributed to crime analysts via the IACA listserv. The survey was distributed in three waves over the span of 1 month: August 7, 2015; August 14, 2015; and August 24, 2015. During the course of the first wave, the authors collected responses from 126 crime analysts, with each subsequent wave receiving fewer responses (August 14, 2015 yielded 25 responses; August 24, 2015 yielded 26 responses). In total, the survey yielded 177 responses, with 10 excluded due to incomplete entries. After these exclusions, the final sample included 167 cases.

Determining a precise response rate is challenging in this instance due to the nature of the IACA listserv. In their survey of the IACA membership, Wartell and Gallagher (2012) reported that the IACA listserv included approximately 1,000 followers. However, given our focus on crime analysts, not all of these followers were eligible for the study.[5] The IACA listserv is followed by members outside of the crime analysis field, such as academic researchers (including both authors of this article), software developers, and nonanalyst police personnel. With that said, our sample size was about 54% larger than that of Wartell and Gallagher (2012) (167 vs. 108) meaning we accounted for a somewhat larger proportion of the IACA's analyst membership. Of the final sample, 49% of the respondents worked in local police agencies with 100 officers or more, 23% worked in police departments with less than 100 officers, and 17% worked in county sheriff's offices. Only 12 respondents reported working for an agency outside the United States, with one additional respondent not reporting agency location. Based on descriptive statistics reported in prior research, the demographics of our sample are reflective of the total IACA membership (IACA, 2011) and of the respondents included in prior surveys of the IACA (Belledin & Sherman, 2009; Kringen et al., 2016; Wartell & Gallagher, 2012). The average length of time as an analyst in our sample was 8.55 years, which was slightly higher than the average time as an analyst in previous IACA surveys (Belledin & Sherman, 2009; Wartell & Gallagher, 2012). This can be expected given the time since IACA membership was last surveyed, and the growing emphasis on the importance of crime analysts in contemporary policing.

Analytical Approach

The current study explored six separate research questions.[6] The first five compared experiences with program evaluation to the main activities of crime analysis, as outlined below:

> RQ 1: How much training have crime analysts received for Program Evaluation, as compared to the other crime analysis functions?
> RQ 2: How often do crime analysts conduct Program Evaluation activities, as compared to the other crime analysis functions?
> RQ 3: How confident are crime analysts in conducting Program Evaluation activities, as compared to the other crime analysis functions?
> RQ 4: How important do crime analysts think Program Evaluation is to the mission of their agency, as compared to the other crime analysis functions?
> RQ 5: How important do crime analysts think Researcher-Practitioner partnerships are for successful Program Evaluations, as compared to the other crime analysis functions?

In testing these research questions, the Likert style responses were quantified as ordinal values (see Table 1). For each question, the lower bound response suggesting a complete absence of the outcome measure (e.g., *never received training* or *not at all confident*) was coded as 0. Each subsequent response was assigned the next highest value through the upper bound response. Response values ranged from 0 to 4 for training experience, and from 0 to 3 for the task frequency, confidence levels, importance to agency mission, and importance of research partnerships questions. The mean Likert values were measured for each of six crime analysis functions: program evaluation, intelligence analysis, criminal investigative analysis, tactical crime analysis, strategic crime analysis, and administrative crime analysis. This follows the statistical approach of recent surveys of police personnel (e.g., Carter & Grommon, 2015).

For each research question, we used ANOVA models to test for the presence of any significant differences in mean response values across the crime analysis activities. ANOVA rests on the assumption that the variance in the dependent variable is equal across groups. Bartlett's χ^2 tests were conducted to test the homogeneity of variance assumption inherent in ANOVA (Hamilton, 2013, p. 151). When Bartlett's test achieves statistical significance, the homogeneity of variance assumption is violated. While ANOVA is relatively robust to modeling violations, we also measured differences in the dependent variable via Kruskal–Wallis tests, the nonparametric version of ANOVA. This adds to the robustness of the analysis by ensuring that the ANOVA and Kruskal–Wallis findings are in agreement, thus rendering any equal variance violations moot.

Table 1. Likert Response Scoring Criteria.

Variable	Response score	Variable	Response score
Types of crime analysis tasks training		How many employees in agency?	
	Never [0]		*50 or fewer* [0]
	On-the-job training [1] *1-day in-class training* [2] *1-day online training* [2]		*Between 50 and 99* [1]
	Multiple-days in-class training [3]		*Between 100 and 499* [2]
	Multiple-days online training [3]		*Between 500 and 999* [3]
	Semester-long college course [4]		*1,000 or more* [4]
Frequency of types of crime analysis tasks		Education Level	
	Never [0]		*No college* [0]
	Not often [1]		*College credits with no degree* [1]
	Often [2]		*Associate's degree* [2]
	Very often [3]		*Bachelor's degree* [3]
			Graduate degree [4]
Confidence level of types of crime analysis tasks		Analysts in agency	
	Not at all confident [0]		*1* [0]
	Somewhat confident [1]		*2–5* [1]
	Confident [2]		*6–9* [2]
	Very confident [3]		*More than 10* [3]
Importance of types of crime analysis tasks to agency		Jurisdiction population	
	Not important [0]		*2,499 or fewer* [0]
	Somewhat important [1]		*2,500– 9,999* [1]
	Important [2]		*10,000–24,999* [2]
	Very important [3]		*25,000–49,999* [3]
	Don't know [4]		*50,000–99,999* [4]

(continued)

Table 1. (continued)

Variable	Response score	Variable	Response score
Importance of research partnerships			*100,000–249,000* [5]
	Not important [0]		*250,000–499,999* [6]
	Somewhat important [1]		*500,000–999,999* [7]
	Important [2]		*1,000,000 or more* [8]
	Very important [3]		

The sixth and final research question further explores analyst experience with program evaluation:

> RQ 6: What analyst and agency factors are significantly related to an analyst's program evaluation experience?

To explore this question, binary logistic regression models were conducted for each of the five aforementioned response categories: program evaluation training, program evaluation task frequency, program evaluation confidence, opinion of the importance of program evaluation to agency mission, and opinion of the importance of research partnerships for conducting program evaluation. In each model, the lowest level of the Likert responses (i.e., *never*, *not at all*, *not important*) was coded as "0" with all other responses coded as "1." This approach tested whether any factors were significantly related to analyst's experience with and opinions of program evaluation.[7]

Each binary logistic regression model incorporated 10 independent variables (see Table 2). IACA Certified is a binary measure noting whether the respondent was certified by the IACA or not. *Years as Crime Analysts* and *Years with Current Agency* are continuous variables identifying the number of years the respondent has worked as a crime analyst and has been employed with her or his current agency, respectively. *Civilian* is a binary measure of whether the respondent is a civilian analyst (as opposed to a sworn police officer), and *Supervisor* is a binary measure of whether the respondent has a supervisory position in her or his agency. *Education Level* is an ordinal measure of the amount of college education the respondent has received, from no college (0) to a graduate degree (4). *Current Research Partner* is a binary measure of whether the respondent's agency is actively involved in a researcher–practitioner partnership while *Prior Research Partnership* measures whether the respondent's agency has been previously involved in such a partnership. *Analysts in Agency* is an ordinal measure including four categories of staffing: 1 analyst (1), 2 to 5 analysts (2), 6 to 9 analysts (3), and more than 10 analysts (4). Lastly,

Table 2. Logistic Regression Model: Descriptive Statistics.

Variable	Frequency (%)	Variable	Frequency (%)
Evaluation training		Civilian	
Never	77 (46.7)	*No*	17 (10.2)
On-the-job training	36 (21.8)	*Yes*	150 (89.8)
1-day training	16 (9.7)	Supervisor	
Multiple-day training	23 (13.9)	*No*	139 (83.2)
Semester-long college course	13 (7.9)	*Yes*	28 (16.8)
Evaluation task frequency		Education level	
Never	69 (42.1)	*No college*	5 (3.0)
Not often	67 (40.9)	*College credits with no degree*	20 (12.0)
Often	26 (15.9)	*Associate's degree*	7 (4.2)
Very often	2 (1.2)	*Bachelor's degree*	60 (35.9)
		Graduate degree	75 (44.9)
Evaluation confidence level		Current research partnership	
Not at all confident	47 (29.0)	*No*	121 (72.5)
Somewhat confident	55 (34.0)	*Yes*	46 (27.5)
Confident	42 (25.9)	Prior research partnership	
Very confident	18 (11.1)	*No*	96 (57.5)
		Yes	71 (42.5)
Importance of evaluation to agency		Analysts in agency	
Not important	17 (11.4)	*1*	68 (40.7)
Somewhat important	39 (26.2)	*2–5*	50 (29.9)
Important	50 (33.6)	*6–9*	28 (16.8)
Very important	43 (28.9)	*More than 10*	21 (12.6)
Importance of research partnerships		Jurisdiction population	
Not important	15 (9.4)	*2,500– 9,999*	3 (1.8)
Somewhat important	38 (23.9)	*10,000–24,999*	6 (3.6)
Important	56 (35.2)	*25,000–49,999*	19 (11.4)
Very important	50 (31.5)	*50,000–99,999*	36 (21.6)
IACA certified		*100,000–249,000*	37 (22.2)
No	154 (92.2)	*250,000–499,999*	31 (18.6)
Yes	13 (7.8)	*500,000–999,999*	12 (7.2)
		1,000,000 or more	23 (13.8)
Years as crime analyst		Years with current agency	
Mean	8.6	*Mean*	10.0
Standard deviation	6.6	*Standard deviation*	8.1
Minimum	0.5	*Minimum*	0.5
Maximum	34	*Maximum*	33

Jurisdiction Population is an ordinal measure of the residential population of the jurisdiction that the agency services. The categories range from 2,500 to 9,999 persons (1) to 1,000,000 or more persons (8; Reaves, 2015).

Findings

Before presenting findings of the statistical analysis, we present a word cloud of the responses to the open-ended survey item "Briefly describe the most common analysis tasks that you conduct with your current agency" (see Figure 1).[8] The word cloud is an exploratory inquiry into the most common tasks of the crime analysis profession, with words presented in larger font more commonly used

Figure 1. Word cloud of top words in respondent description of most common crime analysis tasks (excluding *crime* and *analysis*).

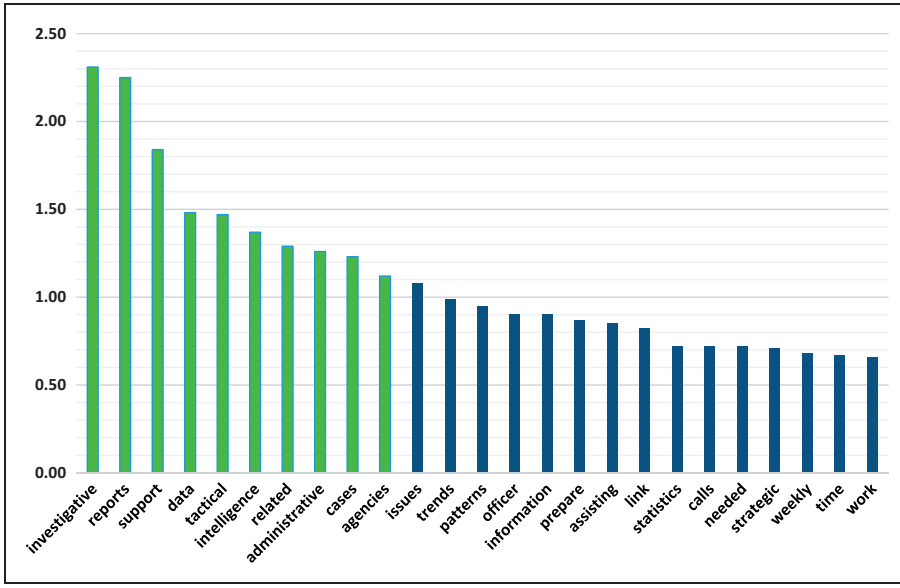

Figure 2. Top 25 words in responses identifying the most common crime analysis tasks (excluding *crime* and *analysis*).
Note. Top 10 words colored in green.

than words in smaller font. From visual inspection of the word cloud, crime analysts most often use the words *reports*, *investigative*, and *tactical* in their responses. Figure 2 presents a bar graph denoting the weighted percentage, the frequency of the word relative to the total words counted, of the top 25 words in the responses. The 10 most frequently used words included six indicative of common crime analysis functions and products, such as *investigative*, *tactical*, *intelligence*, *administrative*, *related* (i.e., common characteristics across crimes), and *cases*. Two of the other words are indicative of the end products (*reports*) and purpose (*support*) of their work. *Data* reflect the necessary ingredients for all crime analysis functions, while *agencies* may suggest that crime analysis products are created for the purpose of informing more entities than the analyst's host agency. Interestingly, words and phrases such as evaluation, evidence based, and research are absent in both the word cloud and bar graph.[9]

Findings of the statistical analyses provide more precise measures of analyst activity. Table 3 reports the findings of the ANOVA and Kruskal–Wallis tests of crime analyst training.[10] Respondents reported the least training experience for program evaluation, with about 47% of the sample having *never* received any program evaluation training. For each other crime analysis function, *in-class instruction conducted over multiple days* was the most common form of training.

Table 3. Crime Analyst Training Experience.

	Program evaluation		Intelligence analysis		Criminal investigative analysis		Tactical crime analysis		Strategic crime analysis		Administrative crime analysis	
Frequency	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%
Never received training	77	46.7	16	9.6	24	14.6	10	6.0	13	7.8	25	15.1
On-the-job training	36	21.8	23	13.9	24	14.6	35	21.0	42	25.1	52	31.3
In-class (1 day or less)	15	9.1	9	5.4	8	4.9	8	4.8	10	6.0	13	7.8
Online (1 day or less)	1	0.6	2	1.2	3	1.8	3	1.8	4	2.4	3	1.8
In-class (multiple days)	19	11.5	87	52.4	72	43.9	81	48.5	71	42.5	53	31.9
Online (multiple days)	4	2.4	11	6.6	11	6.7	14	8.4	11	6.6	10	6.0
Semester-long college course	13	7.9	18	10.8	22	13.4	16	9.6	16	9.6	10	6.0
Mean (*SD*)	1.15 (1.35)		2.41 (1.15)		2.27 (1.28)		2.35 (1.10)		2.28 (1.17)		1.89 (1.24)	
F (*p*)	25.92 (0.00)											
Bartlett's χ^2 (*p*)	9.60 (0.09)											
Kruskal–Wallis (*p*)	97.73 (0.00)											

Note. The frequency column displays all seven types of training include on the survey instrument. However, the statistical analysis coded cases according to the duration of training. Both the "In-Class (1 day or less)" and "Online (1 day or less)" categories were coded as "1" for the statistical analysis while "In-Class (multiple days)" and "Online (multiple days)" were both coded as "3." It is this score that contributed to the mean values subjected to the significance tests.

Tests of the mean Likert values found these differences to be statistically significant.

Table 4 reports the findings of the task frequency and confidence level models. Respondents most often reported *never* (42.1%) conducting program evaluation with *not often* the second most common response (40.9%). This stands in contrast to the other crime analysis functions, with *often* or *very often* the most common response in each case. For program evaluation, respondents most often reported being *somewhat confident* (34.0%) in conducting the task with *not at all confident* (29.0%) the second most common response. This stands in stark contrast with the other tasks, with *very confident* the most

Table 4. Crime Analysis Task Frequency and Confidence Level.

	Program evaluation		Intelligence analysis		Criminal investigative analysis		Tactical crime analysis		Strategic crime analysis		Administrative crime analysis	
Frequency	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%
Task frequency												
Never	69	42.1	13	7.9	18	10.9	6	3.6	6	3.6	15	9.1
Not often	67	40.9	53	32.1	37	22.4	19	11.4	46	27.7	44	26.7
Often	26	15.9	53	32.1	58	35.2	62	37.1	67	40.4	56	33.9
Very often	2	1.2	46	27.9	52	31.5	80	47.9	47	28.3	50	30.3
Mean (*SD*)	0.76 (0.76)		1.80 (0.94)		1.87 (0.98)		2.29 (0.81)		1.93 (0.84)		1.85 (0.96)	
F (*p*)	56.11 (0.00)											
Bartlett's χ^2 (*p*)	17.61 (0.00)											
Kruskal–Wallis (*p*)	193.64 (0.00)											
Confidence level												
Not at all confident	47	29.0	18	11.0	15	9.1	3	1.8	4	2.4	14	8.5
Somewhat confident	55	34.0	40	24.4	34	20.7	24	14.5	32	19.3	31	18.8
Confident	42	25.9	47	28.7	54	32.9	63	38.0	70	42.2	55	33.3
Very confident	18	11.1	59	36.0	61	37.2	76	45.8	60	36.1	65	39.4
Mean (*SD*)	1.19 (0.98)		1.90 (1.02)		1.98 (0.97)		2.28 (0.78)		2.12 (0.80)		2.03 (0.96)	
F (*p*)	27.42 (0.00)											
Bartlett's χ^2 (*p*)	21.30 (0.00)											
Kruskal–Wallis (*p*)	99.27 (0.00)											

Note. In the task frequency analysis, the *Very Often* category for program evaluation only had two responses. Such a small sample size may negatively affect the analysis by reducing statistical power and causing complications in the calculation of within-group variances. To ensure that the analysis was not compromised by these factors, an alternate model was conducted with the *Often* and *Very Often* responses considered a single category coded with a value of "2." This analysis produced near identical results as the main analysis: Program evaluation had the lowest mean with the differences in mean statistically significant according to both the ANOVA and Kruskal–Wallis tests. Given space constraints, the findings of the alternate analysis are not presented in text but are available from the lead author upon request.

Table 5. Crime Analyst Opinions on Task Importance to Agency Mission and Research Partnerships.

Frequency	Program evaluation		Intelligence analysis		Criminal investigative analysis		Tactical crime analysis		Strategic crime analysis		Administrative crime analysis	
	N	%	N	%	N	%	N	%	N	%	N	%
Agency mission												
Not important	17	10.6	3	1.9	7	4.3	2	1.2	2	1.2	5	3.1
Somewhat important	39	24.2	19	11.7	16	9.8	4	2.5	11	6.7	36	22.1
Important	50	31.1	37	22.8	33	20.1	36	22.1	62	38.0	63	38.7
Very important	43	26.7	101	62.3	105	64.0	120	73.6	88	54.0	52	31.9
Don't know	12	7.5	2	1.2	3	1.8	1	0.6	0	0.0	7	4.3
Mean (*SD*)	1.80 (0.98)		2.48 (0.78)		2.47 (0.84)		2.69 (0.58)		2.45 (0.68)		2.04 (0.83)	
F (*p*)	27.23 (0.00)											
Bartlett's χ^2 (*p*)	51.05 (0.00)											
Kruskal–Wallis (*p*)	99.89 (0.00)											
Research partnerships												
Not important	15	9.0	51	30.5	46	27.5	50	29.9	33	19.8	38	22.8
Somewhat important	38	22.8	48	28.7	56	33.5	50	29.9	41	24.6	53	31.7
Important	56	33.5	40	24.0	36	21.6	40	24.0	55	32.9	51	30.5
Very important	50	29.9	21	12.6	21	12.6	20	12.0	31	18.6	18	10.8
Blank response	8	4.8	7	4.2	8	4.8	7	4.2	7	4.2	7	4.2
Mean (*SD*)	1.89 (0.96)		1.19 (1.03)		1.20 (1.00)		1.19 (1.02)		1.53 (1.03)		1.31 (0.96)	
F (*p*)	12.31 (0.00)											
Bartlett's χ^2 (*p*)	1.68 (0.89)											
Kruskal–Wallis (*p*)	53.80 (0.00)											

common response for intelligence (36.0%), criminal investigative (37.2%), tactical (45.8%), and administrative crime analysis (39.4%). For strategic crime analysis, *confiden*t (42.2%) was the most common response. For both task frequency and confidence level, differences in mean Likert values were statistically significant.

Table 5 reports the findings of the agency mission and research partnership models. In regard to personal opinions on the importance of each crime analysis function to the mission of their respective law enforcement agency, there is a statistically significant difference in the average perceived level of importance

across the different crime analysis functions. Compared with all other crime analysis functions, only about 26% of respondents reported that program evaluation is a *very important* function to the mission of their agency. Conversely, the percentage of responses of *very important* was about 62%, 64%, 73%, 54%, and 32% for intelligence analysis, criminal investigative analysis, tactical crime analysis, strategic crime analysis, and administrative crime analysis, respectively. Regarding personal opinions of the importance of partnerships with outside researchers for performance of each crime analysis function, there is a statistically significant difference across the different crime analysis functions. Respondents most often (33.5%) reported that partnerships with outside researchers were *very important* for program evaluation functions. *Not important* or *somewhat important* were the most common responses for each of the other crime analysis functions. This reinforces the perspective that police personnel consider program evaluation a job for outside academic researchers.

Cumulative results of the mean difference tests indicate that program evaluation is a less central component of the analyst profession than each of the other

Table 6. Logistic Regression Results: Analyst Program Evaluation Experience.

Covariates	Training		Frequency		Confidence		Opinion of importance		Opinion of research partnership influence	
	OR	*SE*	*OR*	*SE*	*OR*	*SE*	*OR*	*SE*	*OR*	*SE*
IACA certified	1.95	1.28	0.69	0.43	1.16	0.85	0.58	0.51	1.15	1.31
Years as analyst	1.03	0.34	1.07	0.04	1.11	0.05*	1.03	0.06	0.97	0.06
Years with current agency	1.02	0.03	1.00	0.03	0.94	0.03	0.95	0.04	0.97	0.05
Civilian	1.10	0.67	0.89	0.55	0.11	0.11*	0.58	0.61	(omitted)	
Supervisor	1.69	0.88	0.98	0.52	0.58	0.36	0.34	0.25	1.57	1.61
Education level	1.21	0.21	1.08	0.19	0.85	0.17	0.90	0.25	1.34	0.37
Current research partner	0.78	0.43	1.52	0.87	4.36	2.97*	1.03	0.99	1.82	1.84
Prior research partner	1.94	0.94	1.49	0.72	1.04	0.54	1.41	1.19	1.34	1.14
Jurisdiction population	0.88	0.11	0.88	0.11	0.87	0.12	1.05	0.20	1.12	0.23
Number of analysts in agency	1.07	0.22	1.01	0.21	0.90	0.21	1.23	0.43	0.60	0.20
N	163		163		163		163		146	
Log likelihood	−106.20		−103.09		−84.69		−49.68		−44.72	
Pseudo R^2	0.06		0.06		0.11		0.05		0.07	

*$p < .05$.

crime analysis functions. However, it is possible that certain analyst or agency factors may be significantly associated with reported levels of program evaluation experience. To explore this possibility, the analysis concludes with a series of binary logistic regression models testing the influence of 10 independent variables on levels of involvement with program evaluation in terms of training, frequency, confidence, opinion of importance, and opinion of research partnership influence (see Table 6). Most of the models generated completely null results, with statistically significant covariates appearing only in the confidence model. In the confidence model, years as an analyst was significantly related to the reported level of confidence conducting program evaluation, with each additional year a respondent was employed as an analyst associated with an 11% increase in the likelihood of having at least some confidence conducting program evaluation. Interestingly, civilian analysts were about 89% less likely to report confidence with program evaluation than their sworn police officer counterparts. Finally, respondents in agencies with current research partnerships with outside institutions were over four times more likely to report confidence with program evaluation than respondents in agencies absent such partnerships. This finding makes intuitive sense, as analysts in such agencies may have worked in some capacity with outside researchers, prompting increased confidence in their own skillsets.

Discussion and Conclusion

Incorporating crime analysts into program evaluation functions of police agencies can pay dividends for evidence-based policing. Unfortunately, findings of the current study suggest that crime analysts are greatly underutilized in program evaluation tasks. Across all measures incorporated in this study, program evaluation was emphasized less than other crime analysis functions. The logistic regression models further suggest that, for the most part, no agency or analyst specific factors were associated with different levels of program evaluation experience. Given these findings, we conclude that the crime analysts included in our sample were largely uninvolved in program evaluation.

We believe these findings have significant implications for the crime analysis field and evidence-based policing. Scholars have noted that the current model of evidence-based policing, in which academics largely dictate the process of program evaluation, likely perpetuates a disconnect between science and practice, may actually reduce the amount of experimentation and problem solving that occurs within police agencies, and generally discourages police from becoming active research participants (Rosenbaum, 2010; Sparrow, 2011). Having the police take more direct control over the scientific inquiry occurring within their departments can result in an expanded role for problem solving and a more practically relevant menu of *what works* in addressing the myriad of harms police are called upon to address (Sparrow, 2011, 2016).

Crime analysts may be the police personnel best positioned to conduct program evaluations. Crime analysts are the sole police employees whose job revolves almost entirely around working with data (Shane, 2007, p. vii), requiring technical proficiency with a number of software packages (e.g., geographic information system mapping, database creation and maintenance, and quantitative reasoning; Boba, 2009; Bruce, 2008). These experiences can be leveraged in determining whether interventions successfully generate crime reduction. It should be noted, however, that a benefit of researcher–practitioner partnerships is the independence of the outside researchers. In this sense, outside researchers may have less *conflict of interest* than crime analysts, making them less apprehensive about reporting negative findings to police leadership than crime analysts. However, many strategic innovations in policing, such as hot spots policing (Sherman & Weisburd, 1995), have been the brain children of academic researchers rather than the police departments they work with. While findings of a recent meta-analysis suggest that outside researcher involvement in program design and implementation does not bias evaluation results (Welsh, Braga, & Hollis-Peel, 2012), it is false to claim that outside researchers have no personal attachment to programs they evaluate. Furthermore, the results of Welsh et al. (2012) suggest that crime analysts' attachment to the programs of their agencies would not automatically remove their objectivity when conducting evaluations.

With this said, we believe efforts should be made to better align the work functions of crime analysts with program evaluation. First, police agencies need to emphasize the importance of program evaluation within their agencies. This is nothing new, as the evidence-based policing movement is built upon the perspective that police leadership should readily consult the scientific evidence when developing policies and practices. However, if a commitment to science is necessary for police to consult the evidence base when making policy decisions, it is likely even more important in convincing police leaders to dedicate departmental resources to this endeavor. Police leaders should further ensure that crime analysts have the requisite time to commit themselves to program evaluation. As has been acknowledged in prior research, crime analysis covers a range of activities, with crime analysts contributing analytical products to inform numerous police strategies (Santos, 2013a, 2014; Santos & Taylor, 2014). It may not be possible for the additional responsibility of program evaluation to be added to the workload. However, police leaders may help ensure the integration of program evaluation by redesigning existing strategies to better leverage the benefits of crime analysis and problem solving. For example, despite its popularity in contemporary policing, CompStat has been shown to generate reactionary strategies aimed at short-term solutions and reinforce bureaucratic, standard models of policing (Vito, Reed, & Walsh, 2017; Weisburd, Mastrofski, McNally, Greenspan, & Willis, 2003). Recent research suggests that meetings more readily incorporating crime analysis principles often spawn innovative responses to crime problems (Bond & Braga,

2015). While crime analysis takes a more central role in such meetings, they may actually demand less time than CompStat, which requires the creation of a large number of maps, graphs, and reports. Problem-solving meetings, hence, may create a more supportive environment for program evaluation by emphasizing the most valuable crime analysis processes while minimizing time spent on less beneficial tasks and outputs. Police leadership can also temporarily pair crime analysts with personnel of other units to generate organic opportunities for knowledge exchange and skill development. For example, crime analysts can devote a portion of their time to working with their agency's research and planning unit, which may help provide the necessary data and support personnel to assist analysts in conducting program evaluations (Bond & Gabriele, 2016). Others have similarly argued that having crime analysts work closely with pracademics can generate similar benefits (Braga, 2016). Furthermore, just as police departments may organize crime analysts according to specific missions of the agency (e.g., by having analysts at police headquarters, individual police precincts, and within specialized units; Bruce, 2008), a subset of analysts can be dedicated to program evaluation. That way, the agency's crime analysis functions as a whole would not need to be adjusted in order to incorporate program evaluation.

Our findings illustrated that crime analysts most often reported receiving no program evaluation training (46.7%), with on-the-job training the second most common response (21.8%). This stands in stark contrast to other crime analysis functions, for which multiple-day in-class training was most commonly reported. Police should more readily provide opportunities for analysts to develop program evaluation skillsets. Training can be tailored according to the analysis needs of various units within the police organization (Tillyer et al., 2014). For example, training for analysts deployed at the unit level can emphasize techniques relative to tactical crime analysis, as this is the function these analysts will primarily be involved in. Training of program evaluation skills could be focused toward analysts situated at the command level, given that high-level management is most likely to require information regarding the success of specific strategies (Santos & Taylor, 2014; Tillyer et al., 2014). Within such a training model, generating in-house expertise for program evaluation is not as taxing as an approach seeking to make all analysts proficient program evaluators. Additionally, crime analysts are not transferred to different units as often as sworn police officers, meaning their continued presence within a given unit can help institutionalize program evaluation. In this sense, there exists an important role for the IACA, which readily offers both in-person and online training courses on a year-round basis across all regions of the United States and online. While these courses focus on a range of crime analysis tactics, such as crime mapping, Microsoft excel pivot tables, problem analysis, and tactical analysis, issues pertaining to program evaluation are completely absent from the curriculum.[11] The crime analysis profession would greatly benefit from the

IACA offering program evaluation training, which echoes calls made previously by others (Lum & Koper, in press).

There also appears to be a role for researcher–practitioner partnerships in the development of program evaluation skills among crime analysts. Prior research suggests that researcher–practitioner partnerships are inherently one sided, providing more benefits to the academic researchers. Academic research partners conduct largely *hit-and-run* research in which data are collected and a journal article written without much consideration of how the findings can be used to best inform the ongoing practice of the partnering police agency (Rosenbaum, 2010). This issue is exacerbated by the differing goals and career reward systems of academic researchers and police practitioners (Buerger, 2010). As a solution, scholars have advocated for designing researcher–practitioner partnerships according to the action research methodology, a cogenerative process that emphasizes equality in ownership by partnering researchers with practitioners and drawing from the strengths of both constituencies (Lewin, 1947; Toch & Grant, 1982). Examples of such successful partnerships appear in policing (e.g., Burkhardt et al., 2015; Engel & Whalen, 2010; Tillyer et al., 2014), as well as fields outside of criminal justice (e.g., Isobell, Lazarus, Suffla, & Seedat, 2016; Secret, Abell, & Berline, 2011). This style of collaboration can lead to significant knowledge exchange between participants, in which outside researchers learn about important contextual and procedural aspects of interventions. Crime analysts would be exposed to various aspects of program evaluation, developing skills they can employ in their day-to-day duties and disseminate these newfound skills within her or his agency.

At this point, we find it necessary to acknowledge potential drawbacks to our argument for crime analysts to be more involved in evaluations of police practices. As reflected in our sample, crime analyst positions are predominately occupied by civilians. This can be a barrier to change as the integration of crime analysis in police agencies can be usurped by an organizational hierarchy that takes little notice of civilian staff (Santos & Taylor, 2014; Taylor, Kowalyk, & Boba, 2007). It is possible that such an organizational hierarchy would similarly resist crime analysts taking a central role in program evaluation. However, research has shown that researcher–practitioner partnerships are not driven by the sensibilities of rank-and-file or mid-manager officers but result from the commitment of forward thinking police leadership (Braga, 2010, 2013; Jenkins & Decarlo, 2015). The use of crime analysts in program evaluation can similarly be driven by police leaders. Indeed, research has shown that the major determinant of police officer behavior and adherence to policy is the philosophy and policy of their chief (Fyfe, 1998, p. 1,247). Whether the research evidence that informs the creation of particular policies and strategies is generated by outside researchers or internal crime analysts seems less material than the publicly declared commitment of police leadership to such practices.

Program evaluation also requires a range of methodological and statistical expertise. This is precisely why academics have been so prominently featured in evidence-based policing, as training in doctoral graduate programs provides the methodological and statistical skills necessary for rigorous evaluation. The requisite time and resources may not typically be available to train crime analysts at a similar level. However, given the vast array or problems faced by police, program evaluations need not incorporate high-level scientific techniques to generate information useful for strategy development (Sparrow, 2011). While the use of such research methods may preclude the work of crime analysts from appearing in top-tier academic journals (Weisburd & Neyroud, 2011), they can nonetheless be influential in the day-to-day problem-solving activities of police (Sparrow, 2011). It should be noted, however, that crime analysts developing a formidable program evaluation skillset are not out of the realm of possibility. Huey and Mitchell (2016, p. 301) noted that the number of police officers with graduate training has increased, meaning that the integration of academic research methods into policing may be more possible today than at any time in the past. A similar argument can be made in favor of crime analysts taking lead roles in program evaluation. In the current study, 44.9% of respondents reported having a graduate degree (see Table 2). Such analysts can apply their graduate training in their police agency functions. This perspective is not only based on observations from the empirical literature but also from the personal experience of the lead author during his 5 years working as a crime analyst for a large police agency (comprised at the time of over 1,000 officers) in a high-crime, mid-sized American city.

Despite these policy implications, the current study, like most research, suffers from specific limitations that should be mentioned. We incorporated a convenience sample in obtaining respondents for the survey, meaning our findings are not generalizable to the overall IACA membership or the general crime analysis community. Future research should seek to work directly with crime analyst organizations like the IACA for the purpose of generating probability samples, which would allow results to be generalized. Our survey instrument also did not capture when crime analysts were not involved in program evaluation because others within their agencies were primarily responsible for the task. The presence of pracademics, for example, may minimize opportunities for others to engage in program evaluation. In addition, while the role of research and planning units in program evaluation is unclear, the existence of such units in a police agency is associated with higher levels of innovation (Bond & Gabriele, 2016). It may be the case that agencies innovative enough to house research and planning units may already be taking the lead in evaluating their own programs and practices, which would preclude the need for crime analysts to do so. Future research should supplement individual analyst surveys with organizational surveys to better gauge the structure of police agencies represented in the sample. In addition, different crime analysis functions (strategic analysis, tactical analysis, etc.)

often overlap. So, while we provided descriptions and examples of each type of analysis in our survey, it is possible that some respondents may not have known the differences between the categories, which may have contaminated the results. Similar confusion may have surfaced regarding our definition of program evaluation, given that crime analysts may perform basic program evaluation in many aspects of their work but may not realize it due to their lack of formal instruction. Prior to administering our survey, we had three people active in the crime analysis profession review the survey to ensure its clarity. However, the reader should be aware of this potential issue. In sum, we believe that the role of crime analysts in program evaluation warrants increased empirical attention and call for researchers to improve upon the methods incorporated in the current study to further explore this topic.

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Notes

1. See http://cebcp.org/evidence-based-policing/the-matrix/
2. It should be noted that the introduction of crime analysis faced a number of internal challenges from police commanders, who would resist change by questioning the validity of analytical products for the purpose of having more control over their workload and being held accountable for fewer problems (Santos, 2013a).
3. The survey was designed and administered through the Google Forms software.
4. The survey instrument has been made available at the following url: https://goo.gl/U1lpES. Descriptions of program evaluation and each crime analysis task appear immediately prior to Question 11 of the survey.
5. The first question of the survey asked respondents to identify their current job function. Those selecting a nonanalyst profession were prohibited from answering the remainder of the survey questions.
6. All quantitative analyses were conducted in the Stata software package, version 13.
7. We originally planned on conducting ordinal logistic regression analyses using the original Likert value responses as dependent variables. However, proportional odds

tests found that in three of the five models, the proportional odds assumption was violated, meaning the relationship between all pairs in the order categories were not the same. This suggested that ordinal models were not appropriate in this instance. However, we should note that the findings of the ordinal regression models were not qualitatively different from the logistic regression findings. Given space constraints, the ordinal regression findings are not presented in text but are available from the lead author upon request.

8. The word cloud was created in the QSR NVivo software package, version 10.
9. In both the word cloud and bar graphs, the words *crime* and *analysis* were excluded from the analysis. These words are indicative of the position that the respondents hold rather than the specific task they complete. Furthermore, respondents repeating portions of the question in their open-ended answer would artificially inflate the prominence of these words in the survey responses. Indeed, when included in the word counts, *crime* and *analysis* are the most frequently included words.
10. Across all models, the ANOVA and Kruskal–Wallis findings were nearly identical in terms of statistical significance, each at $p < .05$.
11. See http://iaca.net/training_descriptions.asp

References

Belledin, S., & Sherman, T. (2009). *IACA global census 2008*. *Forecaster*. Overland Park, KS: International Association of Crime Analysts.

Boba, R. (2001). *Introductory guide to crime analysis and mapping*. *Community oriented policing services*. Washington, DC: U.S. Department of Justice, COPS Office.

Boba, R. (2009). *Crime analysis with crime mapping* (2nd ed.). Thousand Oaks, CA: SAGE.

Boba, R. (2010). A practice-based evidence approach in Florida. *Police Practice & Research: An International Journal*, *11*(2), 122–128.

Bond, B. J., & Braga, A. A. (2015). Rethinking the compstat process to enhance problem-solving responses: Insights from a randomized field experiment. *Police Practice & Research: An International Journal*, *16*(1), 22–35.

Bond, B. J., & Gabriele, K. R. (2016). Research and planning units: An innovation instrument in the 21st-century police organization. *Criminal Justice Policy Review*. doi: 10.1177/0887403415624947

Braga, A. A. (2010). Setting a higher standard for the evaluation of problem-oriented policing initiatives. *Criminology & Public Policy*, *9*(1), 173–182.

Braga, A. A. (2013). *Embedded criminologists in police departments*. *Ideas in American policing*. Washington, DC: Police Foundation.

Braga, A. A. (2016). The value of "pracademics" in enhancing crime analysis in police departments. *Policing: A Journal of Policy and Practice*, *10*(3), 308–314.

Braga, A. A., & Bond, B. J. (2008). Policing crime and disorder hot spots: A randomized controlled trial. *Criminology*, *46*(3), 577–607.

Braga, A. A., & Schnell, C. (2013). Evaluating place-based policing strategies: Lessons learned from the smart policing initiative in Boston. *Police Quarterly*, *16*(3), 339–357.

Bruce, C. W. (2008). Fundamentals of crime analysis. In S. L. Gwinn, C. W. Bruce, S. R. Hick & J. P. Cooper (Eds.), *Exploring crime analysis: Readings on essential skills* (pp. 7–32). Overland Park, KS: International Association of Crime Analysts.

Buerger, M. E. (2010). Policing and research: Two cultures separated by an almost-common language. *Police Practice and Research: An International Journal*, *11*(2), 135–143.

Burkhardt, B. C., Akins, S., Sassaman, J., Jackson, S., Elwer, K., Lanfear, C., . . . Stevens, K. (2015). University researcher and law enforcement collaboration: Lessons from a study of justice-involved persons with suspected mental illness. *International Journal of Offender Therapy and Comparative Criminology*, ▮▮, 1–18.

Carter, J. G., & Grommon, E. (2015). Officer perceptions of the impact of moible broad-band technology on police operations. *Policing & Society*. doi:10.1080/10439463.2015.1112388

Engel, R., & Whalen, J. (2010). Police-academic partnerships: Ending the dialogue of the deaf, the Cincinnati experience. *Police Practice & Research: An International Journal*, *11*(2), 105–116.

Fyfe, J. J. (1998). Terry: A [n Ex-] cop's view. *St. John's Law Review*, *72*(3–4), 1231–1248.

Groff, E. R., Ratcliffe, J. H., Haberman, C. P., Sorg, E. T., Joyce, N. M., & Taylor, R. B. (2015). Does what police do at hot spots matter? The Philadelphia policing tactics experiment. *Criminology*, *53*(1), 23–53.

Guillaume, P., Sidebottom, A., & Tilley, N. (2012). On police and university collaborations: A problem-oriented policing case study. *Police Practice and Research: An International Journal*, *13*(4), 389–401.

Haberman, C. P., & King, W. R. (2011). The role of research and planning units in law enforcement organizations. *Policing: An International Journal of Police Strategies & Management*, *34*(4), 687–698.

Hamilton, L. (2013). *Statistics with STATA. Updated for version 12*. Boston, MA: Cengage Brooks/Cole.

Huey, L., & Mitchell, R. J. (2016). Unearthing hidden keys: Why pracademics are an invaluable (if underutilized) resource in policing research. *Policing: A Journal of Policy and Practice*, *10*(3), 300–307.

International Association of Crime Analysts (IACA). (2011). *What is crime analysis?* Overland Park, KS: Author.

Isobell, D., Lazarus, S., Suffla, S., & Seedat, M. (2016). Research translation through participatory research: The case of two community-based projects in low-income African settings. *Action Research*. doi:10.1177/1476750315626779

Jenkins, M. J. (2015). The use of qualitative methods and practitioners-as-authors in journal publications of police research. *Police Practice & Research: An International Journal*, *16*(6), 499–511.

Jenkins, M. J., & DeCarlo, J. (2015). *Police leaders in the new community problem-solving era*. Durham, NC: Carolina Academic Press.

Kringen, J. A., Sedelmaier, C. M., & Elink-Schuurman-Laura, K. D. (2016). Assessing the relevance of statistics and crime analysis courses for working crime analysts. *Journal of Criminal Justice Education*. doi:10.1080/10511253.2016.1192211

Lewin, K. (1947). Group decision and socail change. In T. Newcomb & E. Hartley (Eds.), *Readings in social psychology* (pp. 202–203). New York, NY: Holt and Company.

Lum, C., & Koper, C. (in press). *Evidence-based policing: Translating research into practice*. Oxford, England: Oxford University Press.

Lum, C., Koper, C. S., & Telep, C. W. (2011). The evidence-based policing matrix. *Journal of Experimental Criminology*, *7*(1), 3–26.

Maxfield, M. and Babbie, E. (2015). *Research Methods for Criminal Justice and Criminology* (p. 362). Stamford, CT: Cengage.

O'Shea, T., & Nicholls, K. (2003). Police crime analysis: A survey of US police departments with 100 or more sworn personnel. *Police Practice and Research: An International Journal*, *4*(3), 233–250.

Petersilia, J. (2008). Influencing public policy: An embedded criminologist reflects on California prison reform. *Journal of Experimental Criminology*, *4*(4), 335–356.

Piza, E. L., & O'Hara, B. A. (2014). Saturation foot-patrol in a high-violence area: A quasi-experimental evaluation. *Justice Quarterly*, *31*(4), 693–718.

Reaves, B. (2015). *Local Police Departments, 2013: Equipment and Technology*. Washington, DC: US Department of Justice, Office of Justice Programs, Bureau of Justice Statistics.

Rosenbaum, D. P. (2010). Police research: Merging the policy and action research traditions. *Police Practice and Research: An International Journal*, *11*(2), 144–149.

Santos, R. B. (2013a). Implementation of a police organizational model for crime reduction. *Policing: An International Journal of Police Strategies & Management*, *36*(2), 295–311.

Santos, R. B. (2013b). *Crime analysis with crime mapping* (3rd ed.). Los Angeles, CA: SAGE.

Santos, R. B. (2014). The effectiveness of crime analysis for crime reduction: Cure or diagnosis? *Journal of Contemporary Criminal Justice*, *30*(2), 147–168.

Santos, R. B., & Taylor, B. (2014). The integration of crime analysis into police patrol work: Results from a national survey of law enforcement agencies. *Policing: An International Journal of Police Strategies & Management*, *37*(3), 501–520.

Secret, M., Abell, M. L., & Berlin, T. (2011). The promise and challenge of practice-research collaborations: Guiding principles and strategies for initiating, designing, and implementing program evaluation research. *Social Work*, *56*(1), 9–20.

Shane, J. (2007). *What every chief executive should know: Using data to measure police performance*. Flushing, NY: Looseleaf Publications.

Sherman, L. W., & Eck, J. E. (2002). Policing for crime prevention. In D. P. Farrington, D. L. MacKenzie, L. W. Sherman & B. C. Welsh (Eds.), *Evidence-based crime prevention* (pp. 295–330). Abingdon, England: Routledge.

Sherman, L. W., Gottfredson, D., MacKenzie, D., Eck, J., Reuter, P., & Bushway, S. (1997). *Preventing crime: What works, what doesn't, what's promising: A report to the United States Congress*. Washington, DC: U.S. Department of Justice, Office of Justice Programs.

Sherman, L. W., & Weisburd, D. (1995). General deterrent effects of police patrol in crime "hot spots": A randomized controlled trial. *Justice Quarterly*, *12*(4), 625–648.

Sparrow, M. K. (2011). *Governing science: New perspectives in policing. Executive session on policing and public safety*. Washington, DC: U.S. Department of Justice, Office of Justice Programs.

Sparrow, M. K. (2016). *Handcuffed. What holds policing back, and the keys to reform*. Washington, DC: Brookings Institution Press.

Taylor, B., Kowalyk, A., & Boba, R. (2007). The integration of crime analysis into law enforcement agencies: An exploratory study into the perceptions of crime analysts. *Police Quarterly*, *10*(2), 154–169.

Telep, C. W., Mitchell, R. J., & Weisburd, D. (2014). How much time should the police spend at crime hot spots? Answers from a police agency directed randomized field trial in Sacramento, California. *Justice Quarterly*, *31*(5), 905–933.

Tillyer, R., Tillyer, M. S., McCluskey, J., Cancino, J., Todaro, J., & McKinnon, L. (2014). Researcher-practitioner partnerships and crime analysis: A case study in action research. *Police Practice and Research: An International Journal*, *15*(5), 404–418.

Toch, H., & Grant, J. D. (1982). *Participation and change*. New York, NY: Sage Publications, Inc.

Vito, G. F., Reed, J. C., & Walsh, W. F. (2017). Police executives' and managers' perspectives on Compstat. *Police Practice and Research: An International Journal*, *18*(1), 15–25.

Wartell, J., & Gallagher, K. (2012). Translating environmental criminology theory into crime analysis practice. *Policing: A Journal of Policy and Practice*, *6*(4), 377–387.

Weisburd, D., & Braga, A. A. (Eds.). (2006). *Police innovation: Contrasting perspectives*. Cambridge, England: Cambridge University Press.

Weisburd, D., Mastrofski, S. D., McNally, A. M., Greenspan, R., & Willis, J. J. (2003). Reforming to preserve: Compstat and strategic problem solving in American policing. *Criminology & Public Policy*, *2*(3), 421–456.

Weisburd, D., & Neyroud, P. (2011). *Police science: Toward a new paradigm. New perspectives in policing. Executive session on policing and public safety* (p. 23). Washington, DC: U.S. Department of Justice, Office of Justice Programs.

Welsh, B. C., Braga, A. A., & Hollis-Peel, M. E. (2012). Can " disciplined passion" overcome the cynical view? An empirical inquiry of evaluator influence on police crime prevention program outcomes. *Journal of Experimental Criminology*, *8*(4), 415–431.

Willis, J. J. (2016). The romance of police pracademics. *Policing: A Journal of Policy and Practice*, *10*(3), 315–321.

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