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Can community policing reduce perceived disorder? Results from a quasi-experiment in Trinidad and Tobago

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ABSTRACT

This impact evaluation tests the effects of community policing, with an emphasis on problem-oriented policing, on perceived social and physical disorder in a disadvantaged Caribbean community. We use a pre-post, quasi-experimental design with two groups. The data include three waves of citizen surveys carried out in both groups. We use outcome measures developed from exploratory and confirmatory factor analysis and a difference-in-differences approach to compare changes in perceived social and physical disorder over time between residents in the treatment and comparison areas. Both the treatment and comparison areas experienced statistically significant small to modest reductions in perceived social and physical disorder between wave 1 (2006) and wave 2 (2007); the decrease was more pronounced in the treatment area. No significant changes in perceived social or physical disorder occurred between wave 2 (2007) and wave 3 (2008). Item-level analyses indicated that the composite measures of disorder masked important changes at the item level. The results suggest that community policing with a problem-solving approach can improve residents' perceptions of social and physical disorder. The findings highlight the need to consider the nature of the community policing intervention and the quality and dosage of its implementation.

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Introduction

Research shows that neighbourhood characteristics influence the well-being of residents in communities across the globe. Social and physical disorder in neighbourhoods is associated with a variety of deleterious outcomes, including psychological and physiological stress, depression, alcohol and drug use, risky sexual behaviours, obesity, violence, and criminal victimisation (e.g. Burdette and Hill 2008, Hill *et al.* 2005, Jang and Johnson 2001, Latkin and Curry 2003, Ross and Mirowsky 2001, Sampson and Raudenbush 1999, Taylor and Covington 1988). Efforts to reduce social and physical disorder can improve the health, wellness, safety, and quality of life of community residents. As a result, disorder reduction initiatives have become an important component of neighbourhood-based crime prevention and health promotion strategies (Braga *et al.* 2015, Branas *et al.* 2018). This study tests whether a community policing intervention implemented in Trinidad and Tobago, a small two-island developing nation in the Caribbean, was successful in reducing levels of perceived social and physical disorder. The intervention was implemented in Gonzales, a community of about 5600 residents in the hillsides surrounding Port of Spain, the nation's capital. This is one of a handful of studies that relies on experimental or quasi-experimental methods to test the effectiveness of

police interventions for reducing disorder. To our knowledge, it is the only study that uses such methods to test the effects of community policing on disorder in a developing nation.

Background

In this section, we review previous scholarship useful for framing the present study. We begin by reviewing the literature on the meaning and measurement of neighbourhood disorder. We then provide a brief review of the literature on community policing and its effects on neighbourhood disorder.

Disorder

The study of disorder has a long history across multiple disciplines. Within criminology, disorder plays an important role in several theoretical perspectives on the relationships between neighbourhood characteristics, fear of crime, and crime (e.g. Hinkle and Weisburd 2008, Sampson and Groves 1989, Sampson and Raudenbush 1999, Shaw and McKay 1942, Taylor 1999, Wilson and Kelling 1982). Despite the large body of research on disorder (predominantly from the U.S. and U.K.), scholars have not settled on a universal definition (Harcourt 2001, Kubrin 2008, Skogan 2015). As a result, disorder has been conceptualised, operationalised, and measured in multiple ways in the scholarly literature, using a variety of methods (e.g. citizen surveys, systematic social observations, and official data sources). Commonly, disorder is divided into two components: social disorder and physical disorder.¹ According to a recent review of the literature, 'physical disorders present relatively enduring visible conditions, while many social disorders are brief, if sometimes frequent incidents or events' (Skogan 2015, p. 466). In many studies, indicators of physical disorder include abandoned cars or buildings, vacant and overgrown lots, trash and litter, damaged or poor street lighting, and the presence of empty alcohol containers or used drug paraphernalia; frequent indicators of social disorder include public drinking, the presence of unruly groups of people, prostitution, and drug sales. As these examples illustrate, behaviours or places that are considered disorderly may or may not violate laws or municipal codes. Moreover, research shows that there is often a perceptual overlap between social disorder and crime (Armstrong and Katz 2010, Gau and Pratt 2008, 2010, Maguire *et al.* 2017, Ross and Mirowsky 1999, Worrall 2006).

One reason that scholars have not agreed on a universal definition of disorder may be research evidence that suggests what constitutes disorder depends on the context. For example, some residents may perceive public consumption of alcohol as a clear form of social disorder, while others may view such behaviour as innocuous. Likewise, some people may consider graffiti to be a form of art while others may consider it vandalism. Indeed, research across different settings consistently shows that perceptions of social and physical disorder vary across individuals, groups, neighbourhoods, and cultures (e.g. Hinkle and Yang 2014, Hipp 2010, Sampson 2009, Sampson and Raudenbush 2004, Wallace 2015, Wallace *et al.* 2015, Ward *et al.* 2017, Wickes 2013, Yang *et al.* 2018, Yang and Pao 2015). Quantitative and qualitative research from Trinidad and Tobago, where the research reported here was carried out, reveals that residents perceive disorder differently than residents in the developed nations where most of the research has been conducted (Johnson *et al.* 2016, Maguire *et al.* 2017). Regardless of the complexities associated with the definition and measurement of disorder, studies demonstrate that it exerts a variety of deleterious effects on communities, including direct and indirect effects on crime, fear of crime, and social cohesion (Ross and Jang 2000, Skogan 2015, Chen and Rafail 2021). A recent meta-analysis also concluded that neighbourhood disorder affects health outcomes among residents, including mental health, substance abuse, and overall health (O'Brien *et al.* 2019). Understanding neighbourhood disorder remains a worthy and important challenge, particularly in the developing world, where little is known about these issues (Abdullah *et al.* 2015, Friche 2013, Johnson *et al.* 2016, Villarreal and Silva 2006). We agree

with Wallace *et al.*'s (2015, p. 260) advice that scholars should 'seek to elaborate on what disorder means, in general and for particular places, people, and moments in time'.

Community policing

Community policing is a potentially viable approach for reducing neighbourhood disorder. Broadly defined, community policing is 'a philosophy that promotes organisational strategies that support the systematic use of partnerships and problem-solving techniques to proactively address the immediate conditions that give rise to public safety issues such as crime, social disorder, and fear of crime' (Office of Community Oriented Policing Services 2014, p. 3). Community policing empowers officers to engage in problem solving and develop partnerships with residents and other stakeholders (Bureau of Justice Assistance 1994; Scheider *et al.* 2003; Trojanowicz and Bucqueroux 1990). Many prior studies of the impact of community policing have focused on outcomes like crime (Eck and Maguire 2000, Zhao *et al.* 2002), fear of crime (Adams *et al.* 2005, Dalgleish and Myhill 2004, Lord *et al.* 2009; Maguire *et al.* 2019, Ratcliffe *et al.* 2015), and citizen satisfaction with the police (Gill *et al.* 2014).

A developing body of research, which we review below, has examined the impact of community policing on both objective and subjective measures of neighbourhood social and physical disorder. When implemented effectively, both the problem-solving and community partnership elements of community policing can address disorderly conditions in neighbourhoods (Gill 2014) and may avoid the negative effects associated with other policing approaches (Crichlow 2016, Green 1999, Weisburd *et al.* 2011). For example, in partnership with community members, police can give residents a voice in how they are policed, a factor that is thought to be especially important in the communities we examine in this study (Wallace 2010). Based on feedback from residents, neighbourhood officers can develop problem-solving projects that focus on reducing physical disorder (trash, graffiti, abandoned homes or cars, etc.) or social disorder (loitering, prostitution, drug dealing, etc.). Ideally, neighbourhood residents would help to identify specific disorder problems and work with police and other stakeholders to address those issues. Indeed, a survey of residents in Trinidad found that 71% would be willing to work with police on a community policing project in their district (Deosaran 2002).

Research evidence suggests that neighbourhood incivilities, including indicators of physical and social disorder, can generate increased fear or perceived risk of crime (e.g. LaGrange *et al.* 1992, Perkins and Taylor 1996, McGarrell *et al.* 1997, Ross and Jang 2000). Residents who live in or near disorderly neighbourhoods may be motivated to improve local conditions, with or without the assistance of police, to minimise fear, improve quality of life, and deter future crime and victimisation (Muniz 2012). Police officers can facilitate such efforts in several ways. For example, they can help protect, organise and motivate citizens, businesses, and social services (Berk and MacDonald 2010, McGarrell *et al.* 1999, Wagers 2007, Weisburd *et al.* 2011). Moreover, they can effectively leverage their law enforcement authority (Clarke and Bichler-Robertson 1998, Higgins and Coldren 2000, Mazerolle *et al.* 2000) and ensure consequences for those who remain out of compliance, or who are unwilling to obey the law (Higgins and Coldren 2000, Pate and Skogan 1985).

Research conducted in a variety of settings has found that community policing is associated with reductions in perceived disorder (Baker and Wolfer 2003, Breen 1997, Collins *et al.* 1999, Pate and Skogan 1985, Reisig and Parks 2004, Skogan *et al.* 1995, Wycoff and Skogan 1993). Two recent systematic reviews explored the impact of community policing and problem-oriented policing (POP) on social and physical disorder and other outcomes. Updating the work of Weisburd *et al.* (2010), Hinkle and colleagues (2020) conducted a meta-analysis of 34 experimental or quasi-experimental studies on the effectiveness of problem-oriented policing for reducing crime and disorder (seven focused on disorder). They found that POP was associated with an 18.9% reduction in disorder offenses in POP treatment areas/groups compared to the controls. In 2014, Gill and colleagues conducted a meta-analysis of the effects of community policing on disorder and other outcomes. They identified 16

separate estimates of the effects of community policing on disorder. Community policing was effective in reducing disorder in half of these estimates. Overall, the authors concluded that in some instances, community policing ‘helped to reduce citizens’ perceptions of social and physical disorder in their neighbourhood’ (Gill 2014, p. 412).²

Two patterns are evident from research on the effects of community policing or problem-oriented policing on perceived disorder and set the stage for the present study. First, nearly all the research has taken place in developed nations, primarily the United States and the United Kingdom. We were unable to locate any experimental or quasi-experimental studies on the effects of community policing on perceived disorder in the developing world. Thus, the present study makes a unique contribution to the literature. Second, little is known about the reliability and validity of the outcome measures used in much of the research. Although a robust debate has taken place in the scholarly literature about the meaning and measurement of perceived disorder, with a particular focus on its structure or dimensionality and the discriminant validity of the resulting measures (Armstrong and Katz 2010, Gau and Pratt 2008, 2010, Maguire *et al.* 2017, Ross and Mirowsky 1999, Worrall 2006), most of the research testing the impact of community policing on perceived disorder has not attended to these important conceptual and measurement issues. To address these limitations, the present study draws on carefully derived measures of perceived physical and social disorder developed from confirmatory factor analysis methods to explore the impact of community policing in a developing nation.

The present study

Using a quasi-experimental design, we examine whether a community policing initiative that emphasised a problem-solving approach reduced perceived disorder in Gonzales, an urban community located in East Port of Spain, the capital of Trinidad and Tobago. Building on previous research and theory, this study tests two hypotheses:

- (1) the implementation of community policing in Gonzales was associated with decreased levels of perceived *physical* disorder, and
- (2) the implementation of community policing in Gonzales was associated with decreased levels of perceived *social* disorder.

As best we can determine, a rigorous evaluation of the impact of community policing on physical or social disorder in a developing nation has not yet been published. Thus, this study makes a unique contribution to the literature by expanding the variety of settings in which community policing’s impact has been evaluated.

Research setting and background

Trinidad and Tobago is a two-island nation in the southeastern Caribbean. Trinidad, which is home to most of the nation’s population and industry, is located approximately seven miles off the northeast coast of Venezuela and 21 miles from Tobago. Although it is the wealthiest nation in the Caribbean due to its reserves of oil and natural gas, Trinidad and Tobago is still considered a developing nation by several international bodies.³ Trinidad and Tobago experienced a notable increase in violent crime starting in 2000, with the number of homicides more than quadrupling in less than a decade and remaining high today. Researchers attribute the increase in violence to the rapid spread of gang conflict throughout the nation’s disadvantaged communities (Adams *et al.* 2021, Maguire *et al.* 2008). Alongside the increase in violence, the nation also experienced significant increases in fear and decreases in public confidence in the police and other justice institutions (Adams 2012).

The Gonzales community

Gonzales is a community of approximately 5600 residents located in the eastern foothills of Port of Spain, the capital of Trinidad and Tobago.⁴ Although culturally vibrant, Gonzales faces many challenges characteristic of disadvantaged urban communities throughout the developing world, including poor infrastructure development, widespread unemployment, and high crime rates. Gonzales is home to both planned development and a squatter population. While a large section of Gonzales features paved roads and homes with electricity and indoor plumbing, some roads in the community are unpaved and residents must traverse dirt pathways and steep staircases carved into the hillside. Many of the homes in the squatter portion of the community are built from makeshift materials and do not have legal electricity or running water. In addition to these utility and infrastructure problems, Gonzales has high levels of crime and violence, much of which is related to gang activity in the community. In community forums, residents identified their most salient concerns as crime and disorder, unemployment, and an inadequate physical and social infrastructure. Residents called for improvements in public safety, relationships with police, trash disposal, streetlights, social activities, employment opportunities, and access to water. Given these concerns, religious leaders and community activists launched the multi-pronged *Pride in Gonzales* initiative to address the community's security, infrastructure, and social development needs (Pride in Gonzales 2005). The formation of a community policing unit in Gonzales was an important component of this grass-roots community development effort.

The Gonzales Community Policing Project

The Gonzales Community Policing Project began in February 2006. Residents requested that the project be led by a female police official because they believed a woman would be more sensitive to the community's needs.⁵ The Trinidad and Tobago Police Service honoured this request. The project involved implementing community partnerships and problem-solving strategies to achieve four main objectives: (1) reduce crime and victimisation; (2) reduce disorder; (3) reduce fear of crime; and (4) improve police-citizen relationships. As detailed elsewhere (Maguire *et al.* 2019), the Gonzales project started strong (even winning an award for community policing in the Caribbean), but faced significant implementation challenges including poor and unstable staffing, inadequate resources, and inconsistent support from police leaders over the following two years. Despite these organisational challenges, officers in the unit received extensive training in community policing and problem-oriented policing, and significant support from U.S. field advisors (particularly between February 2007 and July 2008 when one advisor lived full-time in Trinidad). Over the course of the project, the police unit emphasised community engagement, formed critical partnerships with governmental and non-governmental organisations, and completed several significant problem-oriented policing projects that targeted social and physical disorder problems in the community. These projects are detailed below.

POP project 1

The first formal POP project undertaken by the Gonzales officers developed in response to concerns raised by community members during door-to-door canvassing by the officers. Officers were asked to conduct informal surveys as part of the scanning and analysis phases of the SARA (Scanning, Analysis, Response, Assessment) process during training. Residents identified trash in empty lots and the streets, and a lack of regular trash collection, as significant problems in the neighbourhood. To address these issues, officers photographed the trash and visited the Sanitation Department. During their visit, the officers learned that trash collectors were afraid to enter Gonzales because they had been robbed while collecting trash there. The officers worked out a mutually agreeable schedule and ensured the Sanitation Department that they would provide security going forward. In addition, the officers helped ensure that new trash bins were distributed throughout the community, existing bins were 'beautified' and made more presentable, and a routine schedule for bulk trash pickup was arranged. To launch this effort, the officers helped organise a large-scale bulk

trash collection week in April 2008. They distributed a flyer to all residents notifying them of the dates and pre-determined locations where bulk and excess trash would be picked up. During that week, at least six large dump truckloads of rubbish, abandoned appliances, and other items were removed from the community. Many residents expressed their gratitude to the officers and to the Sanitation Department for addressing this issue in the community.

POP project 2

The abandoned vehicle project launched in November 2007, after Gonzales residents identified derelict vehicles as a persistent neighbourhood problem that warranted attention. Residents and police were concerned about these vehicles for several reasons. Many of the vehicles were beyond repair, unsightly, unsafe, and unnecessarily occupied limited space on narrow roadways or in yards. Furthermore, residents and officers both indicated that gang members stored weapons and drugs in these vehicles. The Gonzales officers carefully documented and photographed all potential abandoned vehicles in Gonzales (approximately 30 cars). They worked with the City Corporation Police and Public Health Department to determine the registration status for each, and whether the vehicles were officially considered 'derelict' and therefore subject to removal as a health hazard. In March 2008, the Gonzales officers partnered with the Transport and Cleansing Department to transport derelict vehicles to the landfill or a recycling centre. Additional vehicles were removed in April and May. The officers also ensured that any repairable cars were moved from public streets to private property or were getting the necessary repairs. These cleanup activities were covered by the local media and residents again expressed their appreciation and gratitude to the officers (Bethel 2008).

POP project 3

Residents were also concerned about truancy in the community, particularly whether truant students might be spending time with neighbourhood gangs. As a result, officers met with the principal of the local elementary school to discuss these concerns. The school provided documentation outlining which students were persistently absent or tardy. With input and cooperation from school leaders, teachers, social workers, and parents, the officers developed individual follow-up plans with several students to get them back in school. One officer was assigned to monitor these students and, in some cases, to escort them to and from school. In addition, the officers helped to organise youth camps to occupy students over the summer.

In addition to the three POP projects targeting specific disorder problems, the well-publicised launch of the Pride in Gonzales initiative and the mere presence of additional officers in the neighbourhood may have encouraged residents to become more proactive in addressing community problems. Even prior to receiving their formal POP training, some of the Gonzales officers responded to requests from residents to help improve neighbourhood lighting. These officers worked with the Trinidad and Tobago Electricity Commission to have streetlights installed throughout the community and to identify strategic locations for installation to maximise impact and safety. Further, over the course of the project, the officers established a mobile command post in the community where residents could request assistance or speak to officers about problems in the neighbourhood, canvassed door-to-door to chat informally with residents about their concerns, participated in youth summer camp activities and community fiestas, and organised a public health fair. Through these formal and informal processes, the community policing intervention may have influenced both objective and perceived social and physical disorder in the community.

Methods

To test the effects of the community policing intervention on perceived disorder, we used a pre-post quasi-experimental design with two groups: a treatment community (Gonzales) where the intervention was implemented, and a comparison community (Belmont) where it was not implemented.⁶ The

impact evaluation is based primarily on data from three waves of citizen surveys administered in both communities. To contextualise our findings, we also draw on quantitative data about implementation dosage and qualitative data from interviews and focus groups with police officers, community leaders, residents, and other key stakeholders.

Data

We administered three waves of face-to-face surveys in both communities using the IMPACT ('I Matter: Public Attitudes on Communities in Trinidad') survey instrument. A local research firm conducted the surveys from June 18 to August 12, 2006 for wave 1, from July 6 to August 28, 2007 for wave 2, and between June 3 and July 11, 2008 for wave 3. In total, we received 1805 completed surveys from randomly selected residents (approximately 600 surveys in each wave), split evenly between Gonzales and Belmont.⁷ The response rate was 79% for wave 1 (81% in Belmont, 76% in Gonzales), 84% for wave 2 (86% in Belmont, 81% in Gonzales), and 83% for wave 3 (83% in Belmont and 81% in Gonzales).⁸ The IMPACT survey covered numerous topics associated with residents' experiences and perceptions related to policing, public safety, and community conditions. Many of the survey items, including those addressing perceived neighbourhood disorder, were drawn from items used in previous research. Local advisors reviewed the questionnaire to ensure that its wording was clear and culturally appropriate for use in Trinidad, particularly for use in communities with low literacy.⁹ We refined the instrument based on lessons learned from conducting a pre-test with a small sample.

Our impact evaluation is based primarily on data from the IMPACT surveys, but we draw on other data sources to provide useful contextual information and inform the quantitative findings.¹⁰ First, we conducted interviews and focus groups with police officers and other key community stakeholders about conditions in Gonzales, including neighbourhood physical and social disorder, crime and violence, relationships between the police and the public, awareness of the community policing intervention, and other related issues. Second, we took extensive field notes to document the POP projects and other officer activities over the course of the Gonzales Project. Third, we tracked the community policing officers' patrol schedules throughout the evaluation period (Maguire *et al.* 2019). The patrol data reflects the amount of time that officers were physically present in Gonzales, but it does not include time they spent on POP projects or other activities outside the community. We use the qualitative data about the POP projects and the quantitative patrol data to provide a crude indicator of programme 'dosage' relevant to the disorder outcomes. [Figure 1](#) illustrates the temporal fluctuations in the amount of time officers spent in the community, along with the general time periods for the POP projects, and the survey administration dates. Together, these data demonstrate that the presence and activities of the officers varied over the course of the evaluation period and provide some context for thinking about the implementation of the community policing intervention and its impact on perceptions of disorder.

Evaluation design

We sought to delay the launch of the community policing intervention until the wave 1 survey had been administered, but due to factors beyond our control, it was initiated in February 2006, several months before the wave 1 survey was fielded. Thus, unfortunately, we cannot draw inferences about the effects of the initial phase of the intervention. Comparing the wave 1 and wave 2 survey results enables us to estimate the effects of the intervention from approximately July 2006 through July 2007. Similarly, comparing the wave 2 and wave 3 survey results enables us to estimate the effects of the intervention from approximately July 2007 through July 2008. The fact that the intervention was not implemented evenly over time makes it more difficult to draw clear inferences about its impact. However, the uneven implementation trajectory also provides an opportunity to

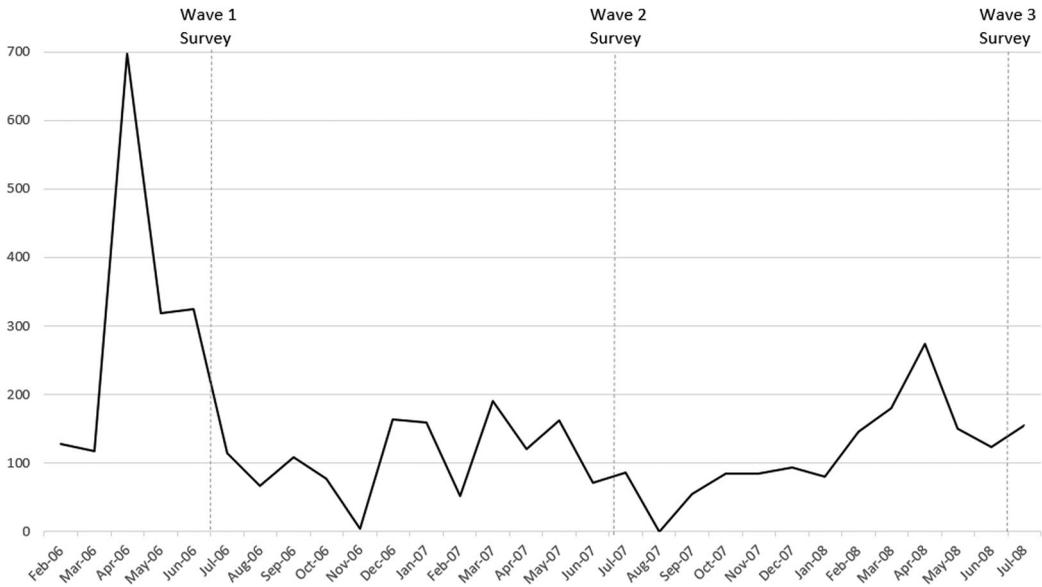


Figure 1. Hours per Month Spent in Gonzales by Community Policing Officers. Note: The dashed vertical lines represent the approximate midpoints of the three survey administration periods.

test whether differences in the nature and depth of the intervention between waves are associated with changes in perceived disorder.

We randomly sampled approximately 300 residents from the treatment area (Gonzales) and 300 residents from the comparison area (Belmont) during each of three waves. The survey data were collected from three independently sampled cross sections. Therefore, this is not a true panel design because the same individuals were not surveyed in each wave. The research methodology literature often refers to separate cross-sections as ‘pseudo-panels’ and the data sets as ‘pooled cross sections’ or ‘repeated cross sections’. Analyzing repeated cross-sectional data raises some methodological challenges (Deaton 1985, Verbeek and Nijman 1992). While this approach does not allow for direct measurement of individual change, it can be used to measure aggregate-level change. One commonly used approach for estimating causal effects of an intervention with two or more groups and two or more time periods is the ‘difference-in-differences’ (DD) design (Ashenfelter and Card 1985, Buckley and Shang 2003). We rely on the DD approach to compare changes in perceived disorder over time between residents in the treatment and comparison areas.

With repeated cross-sectional data, the basic linear equation for the DD model can be expressed as: $Y_{i,t} = \alpha + \beta D_{i,t} + \delta t + \gamma D_{i,1} + \varepsilon_{i,t}$ In this equation, i denotes the individual respondent and t denotes the time period (coded 0 for pre-test and 1 for post-test observations). $Y_{i,t}$ denotes the outcome score for individual i at time t . As we will explain shortly, the outcome scores in this study are not observed variables. Instead they are latent variables which we estimate within a structural equation modelling framework. $D_{i,t}$ is a dummy variable that is coded 0 for the comparison area and 1 for the treatment area. $D_{i,1}$ represents the interaction between the treatment area dummy ($D_{i,t}$) and the time period dummy (t); it is coded 1 for observations in the treatment area during the post-test and 0 otherwise (Buckley and Shang 2003). The parameters to be estimated are α , which is an intercept term; β , which represents the effect of being located in the treatment area; δ , which represents the effect of time; γ , which is the difference-in-difference estimate of the impact of the intervention (and is thus the main quantity of interest); and ε , which is the disturbance term (Buckley and Shang 2003). Covariates can be added to this basic model to account for differences between the treatment and comparison areas on factors thought to influence perceived disorder.

Outcomes

Our impact evaluation seeks to estimate the effects of the community policing intervention in Gonzales on perceived neighbourhood disorder. Our interest is in testing the effects of the intervention on residents' *perceptions*, therefore we rely on perceptual measures rather than observational measures. A small body of research has focused on the nature and measurement of perceived disorder, with a particular focus on the extent to which perceptions of disorder overlap with perceptions of crime (Maguire *et al.* 2017; Armstrong and Katz 2010, Gau and Pratt 2008, Gau and Pratt 2010, Ross and Mirowsky 1999, Worrall 2006). Using exploratory and confirmatory factor analysis and the same data set as this study, Maguire *et al.* (2017) found evidence of two separate dimensions of perceived disorder. One dimension included items tapping into physical disorder, while the other focused on a mix of items tapping into social disorder and minor drug-related crime. Here we treat these two dimensions as outcomes and measure them using 11 items from the IMPACT surveys.¹¹ Descriptive statistics for each item are shown in Table 1.

Covariates

Consistent with the difference-in-differences design, the model for each outcome includes three dummy variables. One dummy variable contrasts the treatment and comparison areas, one contrasts wave_t and wave_{t-1}, and one contrasts the post-test treatment observations with all others. The coefficient for the latter variable serves as the difference-in-differences estimate of the treatment effect. In addition, we include four individual-level demographic covariates that may be associated with perceived disorder: age, sex, race, and education.¹² Descriptive statistics for the four covariates are shown in Table 2. Although the treatment and comparison areas have similar demographic compositions, we include these four covariates to reduce their influence on our treatment effect estimates.

Results

We begin by providing a visual summary of changes in perceived physical and social disorder for the treatment and comparison groups over the three waves. Figure 2 illustrates mean unweighted sum scores for the six items used to measure perceived physical disorder during each wave. It shows that both the treatment and comparison areas experienced significant decreases in perceived physical disorder between waves 1 and 2. The decrease is greater in the treatment community than in the comparison community, which suggests that the difference is due to the intervention. From wave

Table 1. Mean Values for Perceived Physical and Social Disorder Items.

Items	Wave 1		Wave 2		Wave 3	
	Gonzales	Belmont	Gonzales	Belmont	Gonzales	Belmont
<i>Physical Disorder Items:</i>						
Q27. Trash and garbage on the sidewalks/streets	2.14	2.37	2.00	2.21	1.99	2.17
Q28. Graffiti on buildings and walls	1.42	1.38	1.16	1.14	1.13	1.25
Q29. Vacant or abandoned houses/buildings	1.62	1.62	1.38	1.34	1.32	1.43
Q30. Poor lighting	1.82	1.82	1.15	1.29	1.24	1.35
Q31. Abandoned cars	1.34	1.21	1.13	1.31	1.23	1.24
Q33. Empty or overgrown lots of land	1.88	1.68	1.55	1.47	1.54	1.56
<i>Social Disorder Items:</i>						
Q34. Groups of teenagers or adults hanging out ... and causing trouble	2.13	1.75	1.49	1.59	1.73	1.72
Q35. People buying and selling drugs on the street	2.30	2.10	1.63	1.81	1.88	1.89
Q36. People drunk in public on the street	1.73	1.62	1.22	1.42	1.40	1.37
Q38. People smoking marijuana in public	2.30	2.19	1.76	1.73	1.98	1.81
Q39. Loud or unruly neighbours	1.53	1.43	1.31	1.43	1.44	1.45

Note: All items are ordinal, with response options ranging from 1 to 3 and higher numbers associated with greater problem severity (1 = Not a problem, 2 = Somewhat of a problem, and 3 = A big problem).

Table 2. Descriptive Statistics for Samples (Wave 1).

Variable	Gonzales	Belmont
<i>Age</i>		
Less than 30	30.4%	27.2%
30–64	51.5%	58.4%
65+	18.1%	14.4%
<i>Sex</i>		
Male	45.7%	45.5%
Female	54.3%	54.5%
<i>Race/Ethnicity</i>		
African	71.1%	65.0%
East Indian	5.0%	6.4%
Mixed	22.6%	28.6%
Other	1.3%	0.0%
<i>Education</i>		
Junior secondary or less	35.3%	32.8%
Secondary	53.5%	55.7%
Technical/vocational	5.6%	5.7%
Tertiary/University	5.6%	5.7%

2 to wave 3, [Figure 2](#) shows a slight increase in perceived physical disorder in the control area and a slight decrease in the treatment area.

[Figure 3](#) illustrates mean unweighted sum scores for the five items used to measure perceived social disorder during each wave. It shows that both the treatment and comparison areas experienced significant decreases in perceived social disorder from wave 1 to wave 2, a pattern that is consistent with the decrease in physical disorder depicted in [Figure 2](#). The decrease in perceived social disorder is more pronounced in the treatment area, suggesting that some share of the decrease is due to the influence of the community policing intervention. From wave 2 to wave 3, [Figure 3](#) shows a very slight increase in perceived social disorder in both communities, suggesting that the intervention did not reduce perceived social disorder between waves 2 and 3.

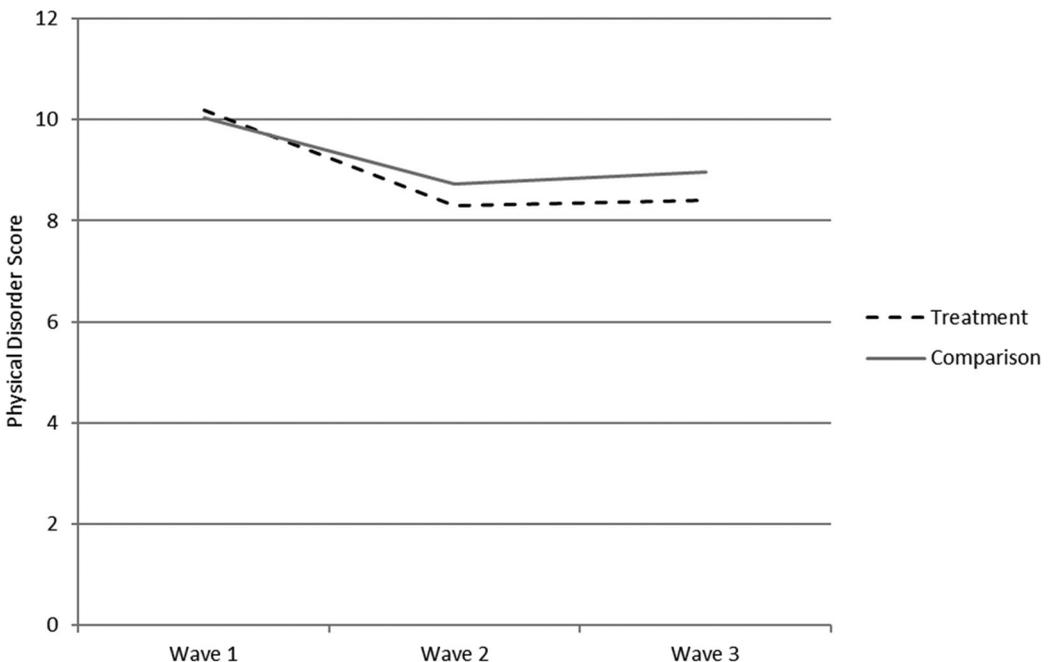


Figure 2. Perceived Physical Disorder, Wave 1 to Wave 3.

The descriptive findings shown in Figures 2 and 3 are helpful for visualising the effects of the intervention on the two outcomes. However, to conduct a more rigorous impact assessment, we estimated two linear regression models using the difference-in-differences approach described earlier. The first regression model contrasts waves 1 and 2, and therefore estimates the impact of the intervention from approximately July 2006 to July 2007. Table 3 lists standardised and unstandardised regression coefficients, t-statistics, and *p*-values. These results reveal that controlling for the effects of four covariates (age, sex, race, and education), the intervention (represented by the 'DD treatment effect' variable) had a statistically significant effect on perceived physical disorder ($\beta = -0.10, p = .045$) and social disorder ($\beta = -0.22, p < .001$) between waves 1 and 2. Note the significant effect of the wave 2 dummy variable in the models for perceived physical disorder ($\beta = -0.23, p < .001$) and social disorder ($\beta = -0.19, p < .001$). This effect acknowledges that both outcome variables decreased significantly from wave 1 to wave 2. However, the treatment area experienced significantly greater reductions in perceived physical and social disorder than the comparison area. Our results demonstrate that although the treatment and comparison areas experienced a significant decrease in perceived physical and social disorder, only a portion of these changes can be attributed to the effects of the intervention. One possible explanation for these changes is a 'history' effect that influenced both communities, though we do not have a clear or convincing explanation for what that effect might be (Campbell and Stanley 1963).¹³

The second regression model contrasts waves 2 and 3. Table 4 shows that, controlling for age, sex, race, and education levels, the intervention did not have a statistically significant effect on perceived physical disorder ($\beta = -0.01, p = .831$) or social disorder ($\beta = 0.02, p = .689$) between waves 2 and 3. Both communities experienced a slight upward trend in perceived physical disorder ($\beta = 0.04, p = .388$) and social disorder ($\beta = -0.04, p = .318$), but these changes were not statistically significant.

So far, our interpretation of the treatment effect estimates has been based primarily on statistical significance levels. While statistical significance is a useful criterion for some purposes, it does not provide evidence about the magnitude of an effect. For that, we need a measure of effect size. Table 5 presents standardised mean-difference effect sizes (together with confidence intervals) that summarise the effects of the intervention on perceived physical and social disorder. These effect sizes are based on linear regression models that included covariates to control for the influence of age, sex, race, and education. According to Cohen (1988), an effect size of .20 is a small effect, .50 is medium, and .80 is large. According to Lipsey (1999), an effect size of .15 is

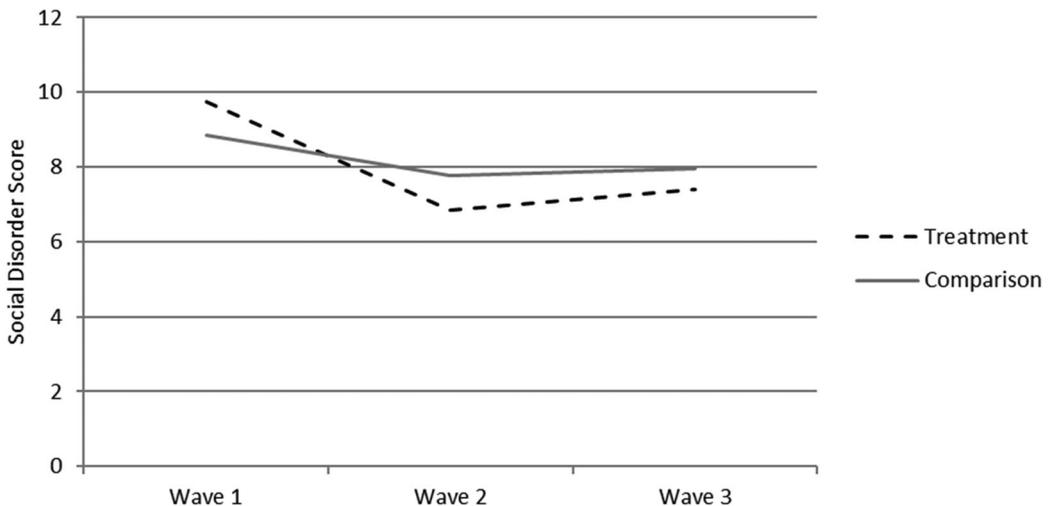


Figure 3. Perceived Social Disorder, Wave 1 to Wave 3.

Table 3. Regression Results for Perceived Physical and Social Disorder (Wave 1 vs. Wave 2).

Independent Variables	Perceived Physical Disorder				Perceived Social Disorder			
	<i>B</i>	β	<i>t</i>	<i>p</i>	<i>B</i>	β	<i>t</i>	<i>p</i>
Group dummy (treatment = 1)	0.18	0.03	0.82	.415	0.90	0.15	3.72	.000
Time dummy (wave 2 = 1)	-1.29	-0.23	-5.84	.000	-1.17	-0.19	-4.80	.000
DD treatment effect	-0.63	-0.10	-2.00	.045	-1.54	-0.22	-4.42	.000
Sex dummy (male = 1)	-0.19	-0.03	-1.22	.222	-0.24	-0.04	-1.41	.160
Race dummy (African = 1)	-0.04	-0.01	-0.25	.806	0.21	0.03	1.10	.270
Education dummy (/tertiary/university = 1)	0.22	0.02	0.81	.418	0.79	0.08	2.59	.010
Age dummy (65+ = 1)	-0.12	-0.03	-0.99	.318	-0.25	-0.05	-1.70	.089

small, .45 is medium, and .90 is large. These subjective criteria must be interpreted in the context of varied research domains and research questions.

We interpret the effect sizes in Table 5 as suggesting the following inferences. First, between waves 1 and 2, the treatment area experienced a small but statistically significant decrease in perceived physical disorder ($d = -0.20, p = .045$) relative to the comparison area. Second, during that same period, the treatment area experienced a moderate, statistically significant decrease in perceived social disorder ($d = -0.45, p < .001$) relative to the comparison area. Third, between waves 2 and 3, the treatment area experienced a negligible, non-significant decrease in perceived physical disorder ($d = -0.01, p = .831$) relative to the comparison area. Fourth, during that same period, the treatment area experienced a negligible, non-significant increase in perceived social disorder ($d = 0.04, p = .689$).

Item-level results

To determine whether the findings we have reported so far were driven by certain items comprising the overall physical and society disorder indices, we carried out supplementary analyses at the item level. We estimated a series of ordinal probit models to test the effect of the intervention on each individual item. The results are shown in Table 6. For ease of interpretation, we summarise the sign and significance of the effects rather than listing the actual probit coefficients. Thus, zero is used to indicate coefficients that were not statistically significant, a negative sign indicates significant negative coefficients, and a positive sign indicates significant positive coefficients.

Earlier we reported that the community policing intervention was associated with a significant reduction in perceived physical disorder from wave 1 to wave 2. The item-level analyses shown in Table 6 reveal that the change in the overall scale score for perceived physical disorder was driven primarily by a reduction in just two items: poor lighting and abandoned cars.

Earlier we reported that the community policing intervention was associated with a significant reduction in perceived social disorder from wave 1 to wave 2. The item-level analyses shown in Table 6 reveal that the change in the overall scale score for perceived social disorder was driven by all but one of the five items comprising the scale. The only social disorder item that did not change significantly from wave 1 to wave 2 was people smoking marijuana in public.

Table 4. Regression Results for Perceived Physical and Social Disorder (Wave 2 vs. Wave 3).

Independent Variables	Perceived Physical Disorder				Perceived Social Disorder			
	<i>B</i>	β	<i>t</i>	<i>p</i>	<i>B</i>	β	<i>t</i>	<i>p</i>
Group dummy (treatment = 1)	-0.41	-0.09	-2.09	.036	-0.58	-0.11	-2.43	.015
Time dummy (wave 2 = 1)	0.17	0.04	0.86	.388	0.23	0.04	1.00	.318
DD treatment effect	-0.60	-0.01	-0.21	.831	.013	0.02	0.40	.689
Sex dummy (male = 1)	-0.12	-0.03	-0.85	.394	-0.32	-0.06	-1.95	.051
Race dummy (African = 1)	0.25	0.05	1.62	.105	0.59	0.10	3.12	.002
Education dummy (tertiary/university = 1)	0.30	0.04	1.42	.154	0.78	0.10	3.14	.002
Age dummy (65+ = 1)	-0.61	-0.07	-2.36	.018	-1.05	-0.10	-3.14	.002

Table 5. Standardized Mean Difference Effect Sizes (*d*) Adjusted for Covariates.

Temporal Contrast	Outcome	<i>d</i>	95% C.I. (Lower)	95% C.I. (Upper)
Wave 1 v. Wave 2	Physical Disorder	-0.20	-0.32	-0.09
Wave 1 v. Wave 2	Social Disorder	-0.45	-0.57	-0.34
Wave 2 v. Wave 3	Physical Disorder	-0.01	-0.13	0.09
Wave 2 v. Wave 3	Social Disorder	0.04	-0.07	0.15

Our earlier analyses revealed no significant changes in perceived physical or social disorder from wave 2 to wave 3. However, as shown in Table 6, these findings conceal key changes at the item level. With regard to perceived physical disorder, Table 6 reveals that the intervention was associated with significant reductions in two items: graffiti on buildings and walls, and vacant or abandoned buildings or houses. However, Table 6 also reveals that the intervention was associated with a significant *increase* in one item: abandoned vehicles. We discuss this counterintuitive finding in detail in the Discussion section. Recall that there was no significant change in the overall scale score for perceived physical disorder from wave 2 to wave 3. The combination of two items with significant decreases and one item with a significant increase suggest the likelihood that these changes may have cancelled one another out in the analysis of overall scale scores. With regard to perceived social disorder, the results presented in Table 6 are consistent with the findings from the overall scale scores. None of the items comprising the perceived social disorder scale changed significantly from wave 2 to wave 3.

Discussion

The results from this study provide an interesting opportunity to reflect on community policing and its effects on disorder. Recent systematic reviews conclude that community policing and problem-oriented policing approaches can reduce disorder (Gill *et al.* 2014, Hinkle *et al.* 2020). Notably, all of the disorder-related studies included in these reviews were conducted in the U.S., U.K., or Canada. Our findings indicate that a problem-oriented community policing intervention can also reduce perceived social and physical disorder in a developing nation.

From an evaluation standpoint, the study highlights the need to clearly delineate the nature of a community policing intervention, to consider the quality and dosage of its implementation, and to use both quantitative and qualitative data to understand its impact (Maguire *et al.* 2019, Bradford *et al.* 2018). Using partnerships and problem-solving strategies, the Gonzales Community Policing Project sought to reduce disorder in the community (among other outcomes). During the intervention period, the community policing officers received extensive training, maintained a presence in the community, and engaged in several formal and informal POP projects in collaboration with

Table 6. Effect of Community Policing Intervention on Individual Disorder Items.

Items	Wave 1 – Wave 2	Wave 2 – Wave 3	Wave 1 – Wave 3
<i>Physical Disorder Items:</i>			
Q27. Trash and garbage on the sidewalks/streets	0	0	0
Q28. Graffiti on buildings and walls	0	-	-
Q29. Vacant or abandoned houses/buildings	0	-	0
Q30. Poor lighting	-	0	0
Q31. Abandoned cars	-	+	0
Q33. Empty or overgrown lots of land	0	0	-
<i>Social Disorder Items:</i>			
Q34. Groups of teenagers or adults hanging out ... and causing trouble	-	0	-
Q35. People buying and selling drugs on the street	-	0	-
Q36. People drunk in public on the street	-	0	-
Q38. People smoking marijuana in public	0	0	0
Q39. Loud or unruly neighbours	-	0	0

community-based and governmental partners. To evaluate the impact of their efforts on perceived social and physical disorder, we analyzed three waves of community survey data.

Our analyses revealed statistically significant reductions in perceived physical and social disorder in the early phase of the community policing intervention (between survey waves 1 and 2). The effects of the intervention on perceived social disorder during this period were particularly robust.¹⁴ Although the community policing officers were still in the midst of their training on problem-oriented policing during this time, they were physically present in Gonzales while parked in their mobile police post, engaging in foot and vehicle patrols, canvassing residents, and participating in other activities. Their mere presence in the community may have contributed to residents' altered perceptions of social disorder, especially between waves 1 and 2 when their presence was still novel. It is also possible that the actual level of social disorder declined when officers were present. As noted elsewhere (Maguire *et al.* 2017), our measure of social disorder taps into the 'street life' in this community; it was common to see young men (including gang members) hanging out, selling drugs, drinking alcohol, serving as gang lookouts, or acting as gatekeepers to the community. The visibility of the community policing officers may have directly reduced the number of individuals on the street engaging in these behaviours, and therefore influenced residents' perceptions of social disorder.

In addition, while the Gonzales officers had not yet implemented any formal POP projects that were directly intended to reduce physical disorder, several officers did participate informally in a lighting-improvement project in Gonzales during this period. Notably, our item-level analyses indicated that residents' concerns about poor lighting declined significantly between waves 1 and 2 and that this effect was a major driver of the overall decline in perceived physical disorder during this time frame.

Between waves 2 and 3, community policing officers in Gonzales implemented two problem-oriented policing projects (trash and abandoned car removal) that were directly intended to reduce physical disorder, and one that may have impacted social disorder (the truancy project). We anticipated that this phase of the intervention would achieve the most pronounced effects, especially in relation to physical disorder – the officers were fully trained, had benefited from outside mentoring from experts in community and problem-solving policing, and were initiating POP projects on matters of direct concern to community residents. Yet, in contrast to our expectations, the findings revealed no significant changes in perceived physical or social disorder during this period.

Detailed item-level analyses provide insight into the physical disorder results, suggesting that our focus on the overall scale score masked important changes at the item level. For example, from wave 2 to 3, the community policing intervention was associated with a statistically significant reduction in perceptions of graffiti and vacant or abandoned buildings as problems in the neighbourhood. While the formal POP projects did not focus attention on graffiti or buildings specifically, it is plausible that the trash removal and beautification efforts undertaken by the officers may have positively affected residents' perceptions of the built environment more generally. In addition, some of the officers had a long-term goal of removing one or two abandoned buildings in the neighbourhood so they could not be used by gang members or drug addicts. We can only speculate, but it is possible that residents were aware of their plan and this knowledge influenced their perceptions. In the end, however, the full meaning of these results remains uncertain.

Surprisingly, the item-level analyses comparing waves 2 and 3 revealed that the intervention was associated with a significant *increase* in perceptions of abandoned vehicles as a problem in the community. This counter-intuitive result is especially noteworthy given that the community policing officers carried out a POP project in which they arranged for the *removal* of almost all abandoned vehicles from the community. This finding suggests that some residents may not have perceived abandoned vehicles as a problem until the well-publicised removal of these vehicles raised their consciousness about it. Historically, some law enforcement interventions have generated this kind of 'backfire' effect, particularly in the short term. For example, an experimental study of broken

windows policing within crime hot spots in three California cities documented a backfire effect on citizen perceptions of physical disorder (Weisburd *et al.* 2011). Together, the increase in the abandoned cars item combined with the decrease in the graffiti and vacant buildings items helps explain why there was no change in the overall level of perceived physical disorder between waves 2 and 3.

Finally, the POP project on trash removal, carried out between waves 2 and 3, did not appear to alter residents' assessments of the trash problem in Gonzales. Despite the spectacle of large garbage trucks removing a sizeable amount of trash and bulk rubbish from the community, we found no significant change in citizen perceptions of the trash problem across any of the data collection periods. One reason for this null finding may be that people perceive levels of disorder differently (e.g. Hinkle and Yang 2014, Wallace *et al.* 2015); what could have been a meaningful change to some observers may have been less obvious to others. Another possible explanation emerges from our fieldwork. Though the presence of trash is routinely included as a key measure of physical disorder and community decline in many U.S.-based studies, our interviews and focus groups with Gonzales residents suggest that garbage was not perceived as an indicator of community breakdown, but instead as a reflection of inadequate government services (see Johnson *et al.* 2016, Maguire *et al.* 2017). Thus, isolated efforts to remove rubbish from the community like those undertaken as part of the intervention may not significantly change residents' perceptions that trash is a perpetual problem in the community.

Limitations

Although this study makes important contributions to the literature, we encourage readers to keep in mind the study's limitations. First, and most importantly, despite our best efforts, we were unable to delay the launch of the community policing initiative until after the wave 1 survey. This limited our ability to draw inferences about the initial impact of the intervention prior to the administration of the wave 1 survey. Second, while the study makes a unique contribution as the first quasi-experimental evaluation of the effect of community policing on disorder in a developing nation, the research design has certain limitations. There are some differences between the treatment and comparison communities, and the proximity of the communities leaves open the possibility of spatial spillover effects. Finally, the data analyzed here are now somewhat dated and do not reflect more recent community policing initiatives in Trinidad and Tobago, including the innovative 'Hearts and Minds' programme implemented by the Trinidad and Tobago Police Service (see Maguire *et al.* 2018, Wallace 2014). We urge readers to use caution in interpreting our findings in light of these limitations.

Conclusion

Research has documented how physical and social disorder can harm the health, safety, and quality of life of residents in communities across the globe. As a result, many community-based public health and crime-reduction programmes incorporate strategies to reduce disorder. This study revealed that community policing with a problem-oriented policing approach was able to reduce perceived social and physical disorder among residents of a disadvantaged community in a developing nation. To our knowledge, it is the first quasi-experimental evaluation of the effects of community policing and problem-oriented policing on disorder in a developing nation setting. As the knowledge base on police interventions continues to grow, we hope it will continue to expand beyond the handful of developed democracies that currently dominate the scholarly literature. Careful, rigorous research is needed to understand whether these interventions can enhance community well-being in a broad range of settings, cultures, and contexts.

Notes

1. The latter is sometimes further divided into physical disorder and physical decay (e.g. Ross and Mirowsky 2001; Marco *et al.* 2015).
2. In a related study, Braga *et al.* (2015) systematically reviewed and meta-analyzed 30 experimental and quasi-experimental design studies that focused on policing disorder to determine whether such efforts reduced crime. Although the outcome of interest in this analysis was crime and not disorder, the authors found that policing disorder projects were associated with a significant, but modest, crime reduction effect. Moreover, the largest effects were associated with community and problem-solving strategies designed specifically to reduce social and physical disorder.
3. The United Nations classifies Trinidad and Tobago as a 'small island developing state' and the International Monetary Fund includes it in their 'Emerging Market and Developing Economies' category. As of 2015, the final year in which the World Bank classified nations by development status, Trinidad and Tobago was listed as a developing nation with a 'high income' economy. The United Nations Development Program lists Trinidad and Tobago in the second tier ('High Human Development') of its four human development classifications (Very High, High, Medium, and Low).
4. Accurate population information for Gonzales is difficult to determine because the community is spread across several different jurisdictions, the boundaries are debated, and the squatter community is underrepresented in official statistics. For details, see Pride in Gonzales Committee (2005), Section 4.1.1 on Population Size & Growth.
5. A female police official in the Trinidad and Tobago Police Service has expressed a similar sentiment, noting that 'female police officers have always been thought to be far more effective than male officers in dispensing community oriented policing services' (Lancaster-Ellis 2013, p. 24).
6. Gonzales is a community within Belmont. At the time of the intervention, the two areas were similar in terms of socioeconomic status, demographics, and crime. For the purposes of the evaluation, Gonzales was considered the treatment area, and the rest of Belmont (not including Gonzales) was the comparison area. Most of the work carried out by the community policing officers in Gonzales did not occur near the border with Belmont, therefore we are not very concerned about the potential for 'diffusion of benefits' from Gonzales to Belmont. Further, there were no similar community policing programs, training efforts, or POP projects attempted in Belmont during the study timeframe.
7. In Belmont, sampling was proportional to the size of the population, using community boundaries based on census files from the Trinidad and Tobago Central Statistical Office. Sampling in Gonzales was based on community boundaries identified by Gonzales residents, which are larger than the official boundaries used by the Central Statistical Office (Pride in Gonzales Committee 2005). Gonzales was then split into eight neighborhood zones and the sample was drawn proportional to the population within each zone. Using GIS maps, interviewers chose a start house, calculated a sampling interval, and visited every n^{th} house from the start location based on the sampling interval. At each sampled household, interviewers used the 'last birthday' method to select an eligible adult to participate in the survey. If the selected participant was not present, interviewers made three call backs before coding the case as a non-response using AAPOR final distribution code 2.25 for non-contact (American Association for Public Opinion Research 2015).
8. These response rates were calculated using Response Rate 1 (RR1) from the American Association for Public Opinion Research (2015).
9. Translation was not necessary since English is the official language in Trinidad and Tobago. With help from our local partners, we made some minor adjustments to the instrument to incorporate colloquial terms and improve respondent comprehension of questions and response options.
10. A variety of data were collected to ensure a rigorous evaluation of the Gonzales Project, including calls-for-service, crime data, community surveys, systematic observation of community characteristics, field notes from participant observation, interviews and focus groups, and data on police patrol, training, and other activities.
11. Since the factor structure of the items used to measure perceived physical and social disorder in this dataset has previously been established (Maguire *et al.* 2017), here we rely on additive indices to measure both dimensions. Six items are used to measure physical disorder and five items are used to measure social disorder. Cronbach's alpha values for perceived physical disorder ($\alpha=.730$) and social disorder ($\alpha=.829$) confirm that both indices are internally consistent.
12. As an additional diagnostic step to assess the comparability of the treatment and comparison groups, we estimated a logit model that included age, sex, race, and education as predictors of group membership. None of the predictors was statistically significant.
13. We attribute these changes to external factors that were not unique to the treatment or comparison areas and exerted similar effects on both areas. We can only speculate on what these factors were. One possibility is a highly publicized peace treaty that occurred in September 2006 involving gangs located throughout the Port of Spain metropolitan area (including Belmont and Gonzales) Resulting reductions in gang activity may have affected perceived social disorder, though a causal linkage between the peace treaty and

perceived physical disorder is less obvious. Again, this is speculative since we lack the data to test the effects of the peace treaty on perceived physical or social disorder. Our interviews with local officials did not reveal any other competing interventions or other potential explanations for these changes in perceived disorder.

14. To be clear, our findings revealed that both the treatment and comparison areas experienced significant reductions in perceived physical and social disorder. However, the reduction was more pronounced in the treatment area than the comparison area, thus suggesting that the intervention was responsible for a significant portion of the decrease.

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