Caring about the community, counteracting disorder: 311 reports of public issues as expressions of territoriality

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ABSTRACT

Many cities now receive and digitally archive requests for government services through constituent relationship management (CRM) systems (e.g., 311 hotlines). Some reports seek to counteract deterioration or disorder in urban neighborhoods (e.g., potholes), suggesting that they might be motivated by territoriality. We examined this question through a survey of CRM users in Boston, MA, which was combined with their patterns of reporting, as derived from the CRM database ($N = 660$). The survey included measures of three territorial motives and social and personal relationships with the neighborhood. We test a three-layer model in which neighborhood relationships predict territorial motives, and both predict reporting patterns. The findings suggest that the greatest motive for such reports is to benefit the community. Other results regarding the role of social cohesion and local social networks are also discussed. Overall, the study provides a substantive interpretation for CRM reports that was previously absent.

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1. Introduction

Physical disorder has long been seen as an important indicator of the well-being of a city neighborhood (see Booth, 1903; Jacobs, 1961; Mayhew, 1862; Sampson & Raudenbush, 1999; Taylor, 2001; Wilson & Kelling, 1982). Deterioration and other incivilities, like graffiti, accumulating garbage, or the iconic "broken window," reflect a space that is poorly maintained and managed, and can be symptomatic of a deeper vulnerability in the community's ability to regulate its public spaces. Most research on disorder has focused on its role as a signal of other neighborhood characteristics, and the effect that it can have on residents and passers-by (Keizer, Lindenberg, & Steg, 2008; O'Brien & Wilson, 2011; Perkins, Meeks, & Taylor, 1992; Pitner, Yu, & Brown, 2012; Skogan, 1992; Wilson & Kelling, 1982), but less is known about the behaviors that are responsible for the maintenance of the public spaces, what one might call *custodianship*. Research has yet to specify where and how often individuals act as custodians, what their motives are for doing so, and how these patterns and dynamics vary across individuals.

A major methodological challenge for the study of custodianship is that its constituent behaviors are difficult to measure. Actions that serve to maintain the public space are sufficiently rare that no protocol of systematic observation has been developed for them, and survey measures on the topic are likely to be subject to both recall error and reporter bias (e.g., Bator, Bryan, & Schultz, 2011). A new technology, increasing in popularity in Western Europe and the United States, offers a potential solution to this challenge. Constituent Relationship Management (CRM) systems, colloquially known as 311 lines, provide residents with a set of convenient channels for requesting city services, often including not only a telephone hotline but also web-based applications. Such systems receive hundreds of requests per day, each one a discrete moment in which an individual has chosen to take action on some issue. Many of these refer to instances of deterioration or neglect in the public space, like street light outages, potholes, or graffiti, in which case the call itself is an instance of custodial behavior. The CRM database is an archive of these reports, and though its original intent was to assist city officials in the management of service delivery, it has the potential to be a valuable resource for research on neighborhood maintenance.

With this premise in mind, O'Brien (2013) forwarded a methodology that uses the CRM database to measure individual differences in the frequency and geographic range of custodianship. Analyzed in isolation, though, it is unclear how these measures relate to established behavioral and attitudinal constructs, information that would be necessary for them to contribute to current

research. Traditionally, maintenance and personalization of the public space have been treated as an expression of territoriality, or those attitudes, behaviors, and cognitions that arise from ownership of objects or space (Taylor, 1988). This has been supported empirically by studies that have found that houses whose residents are more territorial are better maintained and are more likely to have decorations at holidays (Brown & Werner, 1985; Harris & Brown, 1996), and neighborhoods whose residents exhibit greater territoriality are cleaner, have lower levels of crime, and are, overall, more orderly (Brown, Perkins, & Brown, 2004; Pitner et al., 2012). The current study evaluates this proposed relationship between territoriality and custodial requests for service by using a novel multi-method approach that augments the CRM database of Boston, MA with surveys completed by its users. The combination of these two data sources allows us to examine the territorial motivations that underlie these requests, and how both emerge from relationships with the neighborhood. Towards this end, the following sections summarize the existing literature on territoriality as a behavioral construct, and discuss the sorts of measures that would be necessary to examine whether and how a particular behavior is in fact an expression of territoriality.

1.1. Territoriality and urban neighborhoods

Human territoriality has been a popular area for scientific study since the mid-20th century, originally growing out of a deep body of work in biology that focused primarily on how animals claim territories and defend them from intrusion by others (e.g., Ardrey, 1966). It was noted, though, that territorial behaviors in humans were not limited to aggression and defense, leading researchers to expand the definition more generally to all behaviors, cognitions, and attitudes that arise from a sense of ownership over an object or space, and serve to define interpersonal roles surrounding it (Altman, 1970; Brown, 1987; Edney, 1974; Sundstrom & Altman, 1974; Taylor, 1988). Thus, psychological ownership, or "the feeling of possessiveness and of being psychologically tied to an object" (Pierce, Kostova, & Dirks, 2001: 299), is the primary basis for territoriality, driving those behaviors that establish, communicate, and maintain one's relationship to an object or space relative to others (Brown, Lawrence, & Robinson, 2005). This might include the overt establishment of borders (i.e., mine vs. yours), but also more subtle acts that indirectly signal ownership, for instance, by personalizing an item in recognizable ways. It also includes mechanisms that reduce conflict and facilitate collective functioning where space and items are shared.

Territoriality is on display in urban neighborhoods at two different levels (Brown & Altman, 1981). First, as in any residential setting, individuals and families are responsible for their homes, conducting regular maintenance, and attending to any desired landscaping or other lawn and house decoration. This might be referred to as the primary territory. Second, owing to high population density, urbanites share considerable public space—some of which might even technically be private, like front steps—which requires its own physical and social maintenance, referred to as the secondary territory. This has been of major interest to urban researchers as it provides an insight into the overall function of communities, and how residents collectively manage their space. If this maintenance fails for any reason, the neighborhood could eventually fall into a disordered state, characterized by both physical deterioration and social misconduct.

Despite the popularity of the subject, very few studies have examined the discrete behaviors that are responsible for the maintenance of the public space, how they vary across individuals, and how in turn this variation influences the overall maintenance of the neighborhood. Instead, most work has focused on evidence

of territoriality in the physical and social scenery of the neighborhood. Because territoriality is equated with behaviors that maintain and personalize the space, it is possible to estimate its strength in a neighborhood through artifacts like the level of physical disorder (Harris & Brown, 1996), lawn or holiday decorations (Brown & Werner, 1985; Werner, Peterson-Lewis, & Brown, 1989), or elements that announce property boundaries, like fences or "NO TRESPASSING" signs (Caughy, O'Campo, & Patterson, 2001). In this way, territoriality is measured indirectly through the consequences of its operation.

One reason for this approach might be a methodological challenge. Territorial behaviors themselves are rare, and therefore difficult to observe in a systematic fashion, especially if the focus is the public space. The recording of a single such event would require the coincidence of an issue in the public space and an individual who decides to take responsibility for said issue. Given multiple hours of observation, a researcher may observe this coincidence a few times at most, making comparisons across neighborhoods difficult, and comparisons across individuals virtually impossible. There have been a few exceptions to this rule, though each with their weaknesses. During a door-to-door survey Edney (1972) found that individuals with more signs and fences on their lawn answered the doorbell more quickly. The correlation was interpreted as evidence for a coordinated suite of territorial behaviors. Others have examined the likelihood that individuals will intervene in a public disturbance, either informally or formally, but typically through self-reports and not through measures of actual actions (Heckler, Ho, & Urquhart-Ross, 1974; Wells, Schafer, Varano, & Bynum, 2006).

The CRM system offers a potential window into a specific form of territorial behavior known as custodianship, or those acts that seek to maintain the space by either preventing or counteracting deterioration. When people work to counteract or prevent physical disorder they are proactively asserting ownership over the space and its conditions. Because there are various ways and contexts in which territoriality might manifest itself, it would be most appropriate to say that custodianship comprises a subset of these behaviors, and, likewise, only entails a subset of the cognitions and motives associated with them. Custodianship might be observed as direct action, like sweeping a sidewalk, but is also readily visible in those CRM reports that instigate city services to address an instance of deterioration or denigration, like a street light outage or graffiti. The CRM database contains a digital record for each such record, providing an extended time-course that is sufficient to measure individual differences in reporting, overcoming the overall rarity of such actions. O'Brien (2013) demonstrated the methodological potential of the CRM database, referring to such reports as custodianship, a particular expression of territoriality oriented around maintenance. This characterization seems fitting given the content and functional impact of the reports, but, as with any administrative data set, the data are novel and have no external validity relative to established measures and constructs. Thus, there is a need to explore which, if any, territorial motives they in fact reflect, and, in turn, if and how they are driven by relationships with the surrounding neighborhood.

1.2. Assessing the role of territoriality in CRM reports

The CRM system is just one of many large, digital data sets that have emerged in recent years, each capturing some aspect of human behavior or society in unprecedented detail. Many have argued that these "big data" will lead to a computational social science that promises to transform existing models and theories (Lazer et al., 2009). For this to occur, however, two questions must be answered for any such data set: 1) What in fact do the data measure?; and 2) How do these measurements connect to the

existing theories that they promise to transform (Boyd & Crawford, 2011)? In the current case, O'Brien's (2013) methodology for measuring custodianship has addressed the first question, but there remains a need for construct validity, that is, a substantive interpretation that relates custodianship in the form of CRM reports to other, established constructs (Messick, 1995). Because custodianship is conceptualized to be a subset of territoriality, the goal here is to understand how and in what manner these reports fit into the broader constellation of territorial behaviors and their known precursors. In this section we examine the types of measures that would be necessary to examine this question, particularly focusing on the motives that users of the CRM system might have for doing so, and how they are reflective of territoriality.

Broadly speaking, territorial behaviors are governed by a suite of cognitions and emotions that are attentive to the management of a space and are themselves driven by one's relationship with that space (Taylor, 1988). At the heart of this model is an individual's sense of psychological ownership (Brown et al., 2005), the strength of which modulates territorial cognitions and the behaviors they produce. In turn, one's sense of psychological ownership is influenced by the manner in which the individual interacts with and conceives of the space. Typically, territorial behaviors are split into two main classes (Brown, 2009; Brown et al., 2005). The first is described as "marking," or the general maintenance associated with owning something. This includes basic upkeep but also beautification and other aspects of personalization. The second is defense from intrusion or violation by others.

The way these manifest in urban neighborhoods is shaped in large part by the fact that it is a secondary territory, shared by the many residents and visitors. One consequence of this is that psychological ownership can exist not only at the individual level, but also as an emergent property of the community, referred to as collective psychological ownership (Pierce & Jussila, 2010). Because maintenance and defense are shared needs, and, in turn, shared tasks, territoriality becomes a prosocial act benefiting the broader community. It might occur through an individual acting alone, as in shoveling out a fire hydrant after a storm, or through a collaborative effort between neighbors, like a "Spring Cleaning" day when volunteers pick up garbage. A second consequence is that defense becomes more about preventing certain behaviors than about excluding certain people. Though territorial boundaries and disputes between gangs are well-established in the common image of urban neighborhoods (e.g., Harding, 2010; Suttles, 1972), most neighborhoods do not overtly repel outsiders. Instead, residents are tasked with defending against particular behaviors that are defined as locally unacceptable, a capacity that many scholars see as a critical part of a neighborhood's social well-being (Bursik & Grasmick, 1993; Sampson, Raudenbush, & Earls, 1997; Shaw & McKay, 1942/1969).

Taken together, these might then reflect three distinct territorial motives for custodianship, and, consequently, that an individual might have for reporting a public issue to a CRM system, either via dialing a telephone number or reporting in a mobile application. These are: 1) to benefit the broader community; 2) to collaborate with others in the community on maintenance; and 3) to enforce social norms. The CRM system could arguably serve as a tool to satisfy any or all of these. The services that follow the calls offer a tangible benefit to the community. The function of the system is broadly collaborative. And it can be used to report human incivilities, like the improper storage of trash.

We must also consider a fourth motive for maintaining the public space, and one that is rooted not in individuals' territoriality, but their economic interests (Fischel, 2005). Those who live in a neighborhood have some level of investment in it, and therefore have something to gain or lose through its long-term trajectory.

Being that neighborhood deterioration can lead to lower property values for all residences (Seo & von Rabenau, 2011), residents may be motivated to maintain the space not out of a need to contribute to the community, nor because they want to defend the space from norm violations, but because they are concerned about the neighborhood's economic fortunes. This would be particularly salient for homeowners (O'Brien, 2012).

These motives may themselves be influenced by the relationship that an individual has with the local neighborhood. Theorists have most often posited that social integration and neighborhood attachment play such a role, engendering a greater sense of territoriality. First, personal relationships between neighbors allow the negotiation and establishment of shared norms for behavior in the public space and expectations for its maintenance (Sampson, 1997; Sampson et al., 1997). These interpersonal mechanisms can generate a sense of collective psychological ownership within the community, supporting the collective responsibility that underlies maintenance and defense of the space. It would follow that this sense of ownership and responsibility for local norms will transfer more strongly to those who are more integrated into the community. A series of studies by Brown and colleagues (Brown & Werner, 1985; Harris & Brown, 1996; Werner et al., 1989), for example, found that those more socially connected with the neighborhood exhibited stronger maintenance and decoration of their homes. Social integration might occur in either of two forms: strong ties, or close personal relationships with neighbors; or, more commonly in modern cities, through a more casual set of relationships with neighbors that are isolated to occasional, neighborhood-based interactions (i.e., weak ties; cf. Granovetter, 1973).

A second factor is the attachment one has to the neighborhood. Environmental psychologists and human geographers have both focused on the process through which place is formed, referring to it as "experienced space" (Tuan, 1977) or the shared experience of space (Gordon & Koo, 2008). The distinction between space and place is important. Whereas space is mere physical extension, place encompasses the motivations and processes through which people form meaning. When this meaning and the emotions it entails become intertwined with an individual's concept of self, it can create a sense of attachment. Though attachment and territoriality are sometimes treated interchangeably (e.g., Pitner et al., 2012), they are in fact distinct. Importantly, attachment is an emotion that can enhance psychological ownership and, in turn, territoriality. Previous work has consistently demonstrated a strong relationship between attachment to place and behaviors and markers associated with the maintenance and personalization of one's home and the neighborhood (Comstock et al., 2010; Harris & Brown, 1996; Werner et al., 1989). One's attachment to a place, however, is typically rooted in a combination of social and physical aspects of a neighborhood (Bonaiuto, Aiello, Perugini, Bonnes, & Ercolani, 1999; Brown & Perkins, 1992; Brown, Perkins, & Brown, 2003; Shumaker & Taylor, 1983), and can be easily confounded with social integration. Thus, if place attachment does enhance territoriality, making it a precursor to motives for making reports to the CRM system, it is an open empirical question as to whether it does so exclusively through its social components or also through the extent to which a person identifies with the physical space itself. This is a question that has rarely been addressed, and something we aim to test here, as we describe in more detail below.

1.3. The current study

The current study combines the CRM database with a survey of its users to examine a three-layer model, wherein neighborhood relationships promote territoriality, which in turn provides motives for managing the public space. It is also possible that neighborhood

relationships can influence behaviors without giving rise to conscious motives. The CRM database includes all requests for service received by the system through its multiple channels, most notably the telephone hotline, the self-service web portal, and the smart phone application (Citizens Connect). The behavioral measures, based on O'Brien's (2013) methodology for measuring individual differences in custodianship using the CRM system, describe the frequency of reports made regarding the public space and their geographical range. The methodology capitalizes on two important features of the database. First, users of the system are able to register, creating an account that archives and tracks all of their reports, creating a sub-record that can be analyzed and described. In addition, these accounts often include contact information, either in the form of an e-mail or home address, facilitating certain types of spatial analyses, as well as the contacts required for the survey. Second, each case record indicates the type of services requested, and it is possible to distinguish those that are for issues in the public space, which would in turn qualify as instances of custodianship, from those that are for personal needs (e.g., general request, bulk item pick-up). Using this it is possible to tailor the measures of frequency and geographic range specifically to custodial calls.

An initial analysis of a 15-month CRM database found that those individuals who do make custodial reports make them rarely (76% made only one) and almost exclusively about issues within a narrow region surrounding their home (79% made reports only within two blocks; O'Brien, 2013). This last point gives preliminary evidence that these sorts of reports do reflect territoriality, that is, they are a place-based behavior that is anchored by ownership. The current study seeks to extend the utility of this methodology by combining the CRM database with surveys of individuals who reported one or more cases during the year 2012. Those registered users who had e-mail addresses associated with their accounts were invited to participate in a survey, the responses to which were then connected to a database of their reporting patterns. The survey included items about an individual's motives for using the CRM system and benefits it provides, covering the four motives described above. Also included in the survey were a series of scales regularly used to measure perceptions of one's neighborhood and relationships with neighbors, including: neighborhood attachment (Bonaiuto et al., 1999), perceived social cohesion, and density of one's own social networks in the neighborhood (Sampson et al., 1997).

The primary goal of this study was to explore whether and how custodial reports received by the CRM system are driven by territorial motivations and the relationships reporters have with their neighborhoods. Because of the inductive nature of the study, we do not advance any specific *a priori* hypotheses, apart from the argument that this particular form of custodianship is in fact a manifestation of territoriality. Importantly, to test the theoretical model as lain out here, we use two analytical techniques that bear noting. The first regards the fact that more than half of CRM users make requests only for personal needs, and that the majority of those who have called in public issues have done so only once (O'Brien, 2013). This aspect of the study population is valuable because it provides a natural comparison of two groups: both groups know of and use the CRM system, but one has used it to address public issues, the other has not. Thus, the analysis first examines differences between custodians and non-custodians, controlling for any unmeasured factors that might influence a person's tendency to engage with the system in the first place. We then examine the variation in calling patterns among custodians. Second, we seek to separate the physical and social components of neighborhood attachment by making the assumption that the social component will be largely captured through the two measures of social integration. Thus, instead of using the survey scale for place attachment

in its raw form, we use a version that has had the variance it shares with the measures of social integration removed. This isolates attachment specifically to the place, independent of social relationships.

2. Methods

2.1. Participants

Registered users of the CRM system who had made at least one request for service during 2012 through any channel and had an e-mail address on file were recruited to take a survey regarding their usage of the system and attitudes towards their neighborhood. These survey responses were then merged with the CRM database in such a way that it was possible to analyze them in conjunction with their reporting patterns. There were 765 respondents (response rate = 21%), 743 of whom could be merged with a particular user account. The current analysis is limited to the 660 respondents who completed all items used in the analysis here.

2.2. Procedure

Respondents completed the survey via the online platform Survey Monkey. Separately, the unique account identifier was used to isolate for each individual all of the reports they had made during the year 2012, from which we calculated variables that described an individual's calling patterns. The survey responses and the database of user characteristics were then linked using e-mail address.

2.3. Measures

2.3.1. Survey variables

The survey included a series of items regarding why the respondent uses the CRM system ("Please rate the importance of the following for why you use the Mayor's Hotline:") and how it is helpful ("How helpful has Citizens Connect been for:"). Seven of these specifically referenced the neighborhood or local community. These seven items reflected the four motives described above. *Benefitting the local community* was measured with two items: "[It's important] because it improves my community" and "[It's helpful for] changing your neighborhood." *Collaborating with neighbors* was measured with two items: "[It's helpful for] seeing who cares about your community" and "[It's helpful for] connecting you with others in your community." *Enforcing norms* was measured with two items: "[It's important] because others do not follow laws and social norms of the community" and "[It's important] because it will make the neighborhood safer." *Maintaining property values* was measured with one item, "[It's important] because it's good for property values." This categorization was supported by a factor analysis (results available upon request).

Three scales measured the relationship the respondent had with the neighborhood of residence. *Perceived social cohesion* was measured as the extent to which neighbors know and trust each other and have shared norms and expectations (5 items; alpha = .89 e.g., "People in my neighborhood can be trusted."). *Local social networks* were measured as the number of family and friends that an individual had in the neighborhood (2 items; e.g., "Not counting the people that live with you, how many friends live in your neighborhood?"). These scales were drawn from Sampson et al. (1997). *Neighborhood attachment* measured the personal connection an individual felt with his or her neighborhood (6 items; alpha = .87; e.g., "This is the ideal neighborhood to live in."; Bonaiuto et al., 1999).

Respondents also reported their sex, race, age (in 10-year ranges), income, and highest education attained. Many declined to

report their income, so highest education was used as the main indicator of socioeconomic status.

2.3.2. Reporting patterns

Each individual's reporting patterns were calculated from the requests for service associated with his or her account in the year 2012 (O'Brien, 2013). *Custodian* was a dichotomous variable indicating whether an individual had made one or more requests regarding a public issue. Public issues were determined as any of 59 case types that were in the public domain. For custodians two measures were calculated: number of reports of public issues *within the neighborhood* ($N = 302$). The count of reports is limited to a buffer 150 m from the individual's home, in keeping with the theoretical frame of territoriality and a conservative estimate of "neighborhood." *Range* was measured as the furthest distance from an individual's home that they requested services for a public issue (using the Pythagorean equation, $\sqrt{(x_r - x_h)^2 + (y_r - y_h)^2}$, where the subscripts r and h indicate the location of the report and the home, respectively).

2.4. Analysis

All descriptive analyses, correlations, and regressions were conducted using SAS 9.2. Structural equation models examining the three-layer relationship between neighborhood relationships, territorial motivations, and calling patterns were tested using MPlus 7 (Muthen & Muthen, 2013).

3. Results

3.1. Composition of sample and descriptive statistics

The sample of survey respondents was largely white, well-educated, and middle-aged (see Table 1 for more detail on demographics). It was about evenly split between males and females. Correlations between the various measures of neighborhood relationship and territorial motivation were generally positive and significant (see Table 2 for all correlations), the one major exception being a negative correlation between perceived social cohesion and the use of the system for norm enforcement ($r = -.08$, $p < .05$). As expected, the three measures of neighborhood relationship correlated highly (attachment & cohesion: $r = .54$, $p < .001$; attachment & networks: $r = .30$, $p < .001$; networks & cohesion: $r = .21$,

$p < .001$), though not so much to suggest they were equivalent. A third measure was then calculated, an estimate of connection to the physical space, as the residual of neighborhood attachment regressed on social cohesion and social networks, effectively removing the variation associated with positive connection to the local social environment (32% of the variation).

In this sample, 426 respondents (65%) had made at least one report of an issue in the public space during 2012. Of these, the median and mode reporter made two reports of public issues (29%). Some made considerably more, with 9% making ten or more such reports, and three individuals making more than 100 calls (max = 348). This distribution is skewed upwards from that of the general population of CRM users, of which 41% made reports of public issues in 2012, 72% of which made only one such report.

3.2. Motives for using the CRM system

Respondents ranked benefiting the community as being their greatest motive for using the CRM system ($M = 4.32$ sd = .84). Next most important was the opportunity to enforce local norms ($M = 3.41$ sd = 1.24), followed by the opportunity to connect with the community ($M = 2.73$, sd = 1.22), and then by the maintenance of property values ($M = 2.52$, sd = 1.54). Using 3.0, the neutral point on the Likert-scale, as a cut-point, the first two motives were seen as being a part of the system, while the latter two were not. A repeated-measures ANOVA indicated that these differences were in fact significant ($F = 373.82$, $p < .001$), and post-hoc tests confirmed this for all pair-wise comparisons (Tukey's adjustment, $p < .01$ for all tests).

An important question is how these motives for using the system emerge from one's relationship with the neighborhood. This was tested using a series of multiple regressions that also included demographic predictors (all model parameters reported in Table 3). Perceptions of social cohesion were most consistently associated with these motives; they predicted greater intention to benefit the community ($B = .24$, $p < .001$) and to connect with others ($B = .16$, $p < .001$), but less of a motive to enforce local social norms ($B = -.10$, $p < .05$). Having denser networks within the neighborhood predicted a greater motive to enforce norms ($B = .10$, $p < .05$) as well as to maintain property values ($B = .08$, $p < .05$). Last, attachment to space predicted a greater desire to benefit the local community ($B = .23$, $p < .001$) and to enforce social norms ($B = .09$, $p < .05$). In addition, those who reported higher levels of education reported a lower motivation to connect with others, to enforce norms, and to maintain property values, while Black and Hispanic respondents both reported wanting to use the system to connect with neighbors, and Hispanic respondents were more likely to indicate its use in maintaining property values (see Table 3 for parameters).

3.3. Predicting reporting patterns

We then examined how these neighborhood relationships and territorial motives predicted the ways in which people made use of the CRM system. Structural equation models tested the three-layer model in which relationships with the neighborhood give rise to motivations, both of which then predict patterns in calling. Demographic characteristics were entered as predictors for measures in each of these three categories. Initial models estimated parameters for: those bivariate relationships that were significant in the regressions using neighborhood relationships to predict motives; all neighborhood relationships and motives predicting calling patterns; all demographic factors predicting all other variables. These were then trimmed until only significant parameters remained in the final models.

Table 1
Demographic information for survey participants.

	Count (%)		Count (%)
Gender		*Age*	
Male	327 (50%)	18–24	10 (2%)
Female	333 (50%)	25–34	116 (17%)
		35–44	156 (24%)
		45–54	170 (26%)
Ethnicity		55–64	125 (19%)
White	527 (80%)	65–74	71 (11%)
Black	58 (9%)	>75	12 (2%)
Hispanic	16 (2%)		
Asian	10 (2%)		
Other	49 (8%)		
Education level			
High school or less	34 (5%)		
Some college	89 (13%)		
Professional degree	17 (3%)		
Associate's degree	35 (5%)		
Bachelor's degree	220 (33%)		
Master's degree	221 (33%)		
Doctoral degree	44 (7%)		

Table 2
Descriptive statistics for and correlations between measures of one's relationship with the local neighborhood and territorial motivations for using the CRM system.

	Neighborhood relationship			Territorial motivations			
	Social Cohesion	Social Networks	Nbhd Attach	Community	Connecting	Enforcement	Property Values
Social cohesion	1	.20***	.53***	.25***	.17***	−.08*	.09*
Social networks		1	.30***	.10**	.15***	.10**	.14***
Nbhd attachment			1	.33***	.14***	.05	.09*
Benefit community				1	.30***	.23***	.13***
Connecting w others					1	.24***	.28***
Norm enforcement						1	.31***
Property values							1
Mean (Std Dev)	3.83 (0.90)	2.70 (0.98)	3.72 (1.03)	4.32 (0.84)	2.73 (1.22)	3.41 (1.24)	2.52 (1.54)

Note: N = 660 respondents.
*$p < .05$, **$p < .01$, ***$p < .001$.

We first examined differences between custodians and those who did not use the CRM system to report public issues (main parameters of interest illustrated in Fig. 1; all other parameters reported in Appendix). Of the 660 respondents analyzed here, 426 (65%) made a public report. The strongest predictor in the model was that custodians reported a considerably higher tendency to use the CRM system to benefit the community (O.R. = 1.59, $p < .001$). People who wanted to use the system to connect with others, however, were less likely to report public issues (O.R. = .80, $p < .01$). Seeing the CRM system as a way to enforce norms or to maintain or raise property values were non-significant predictors. Once these motives were accounted for, none of the neighborhood relationships predicted the likelihood of having acted as a custodian.

The second model considered how territorial motives and neighborhood relationships predicted patterns of reporting public issues among custodians (see Fig. 2; all parameters reported in Appendix). This included geographical range, measured as the distance of the public issue they reported furthest from home (limited to those public reporters whose home address was known, $N = 302$), and the number of reports made. Both variables had a Poisson distribution, requiring a logit link function.

The model found that geographical range was narrower for those who reported greater attachment to the physical space (O.R. = .55, $p < .001$). It was in fact the only significant predictor of geographical range. Turning to number of calls, those who more strongly endorsed the capacity of the CRM system to benefit the community made more calls within the neighborhood (O.R. = 1.90, $p < .001$). Contrastingly, those who perceived greater social cohesion made fewer calls (O.R. = .60, $p < .001$). No other motives and neighborhood relationships were significant predictors.

3.4. Clarifying the influence of social cohesion

Interpreting results using perceptions of social cohesion can be ambiguous. The measure is worded so that people are describing the community within which they live, thus the responses of people living in the same neighborhood are inherently correlated as they are describing the same thing; empirically this has consistently been the case for this particular measure (e.g., Sampson et al., 1997). It is then unclear if the effect seen in these models is of the community, or if there are differences in motivations and behaviors between neighbors who perceive different levels of cohesion. To address this issue we decomposed the base measure into the neighborhood mean (the average of all those living in the census tract) and the deviation from this mean (per Raudenbush & Bryk, 2002), and reran all regressions in which social cohesion was a significant predictor with both as predictors.

In three of the four regressions the deviation of social cohesion was a significant predictor, and with a magnitude slightly greater than the single measure had in the original models: benefiting the

community (B = .28, $p < .001$), collaborating with others (B = .21, $p < .001$), and number of calls made (O.R. = .57, $p < .001$). For each of these the neighborhood mean was a non-significant predictor, indicating that the relationship is at the individual level, describing differences between people living in the same neighborhood. Using the system to enforce social norms, however, was predicted by the neighborhood mean (B = −.14, $p < .01$) and not the deviation, indicating a correlation at the neighborhood level.

4. Discussion

The study successfully demonstrated the territorial motives underlying custodianship, as measured through requests for government services regarding issues in the public space, and, in turn, the way they are influenced by the relationships individuals have with their neighborhood. Given these three layers of analysis—relationships, motives, and behaviors—and the inclusion of multiple measures in each, the specific findings are diverse and do not lend themselves well to a specific narrative. For this reason, we summarize them by highlighting six major themes. Five of these are empirical, while the sixth, and possibly the most important, is the overarching contribution of the methodology and its potential for future research.

### 1) Custodianship is a prosocial, communitarian act

We examined four motives for reporting public issues: benefiting the local community; creating new social ties around the management of the neighborhood; enforcing local social norms; and maintaining property values. The first three are associated with territoriality, and the last with economic considerations. Of these, the desire to benefit the local community was the most consistent motive for reporting. It was the most strongly cited value of the

Table 3
Standardized beta coefficients from multiple regressions using neighborhood relationships and demographic characteristics to predict territorial motivations for using the CRM system.

	Community	Connect	Enforce	Property values
Perceived social cohesion	0.24***	0.16***	−0.10*	0.07
Social networks	0.05	0.07	0.10*	0.08*
Attachment to space	0.23***	0.04	0.09*	0.03
Female[a]	−0.10**	0.04	0.04	0.03
Age	−0.02	0.05	0.03	0.09*
Education	0.00	−0.13**	−0.09*	−0.17***
Black[a]	0.04	0.10**	0.05	0.06
Hispanic[a]	0.04	0.08*	0.06	0.08*
Adjusted R^2	0.12	0.07	0.04	0.07

Note: N = 660 respondents.
*$p < .05$, **$p < .01$, ***$p < .001$.
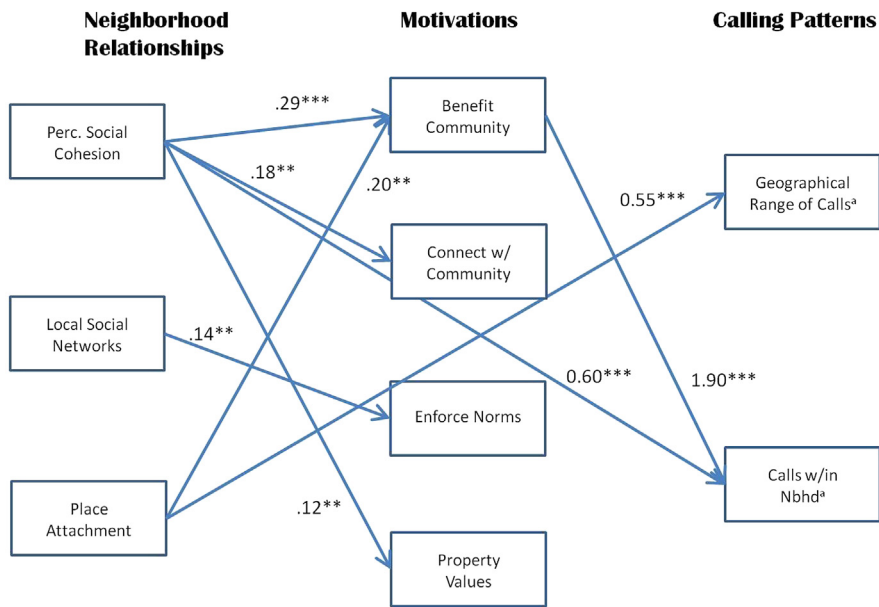[a] Dichotomous variable with "1" = to variable name.
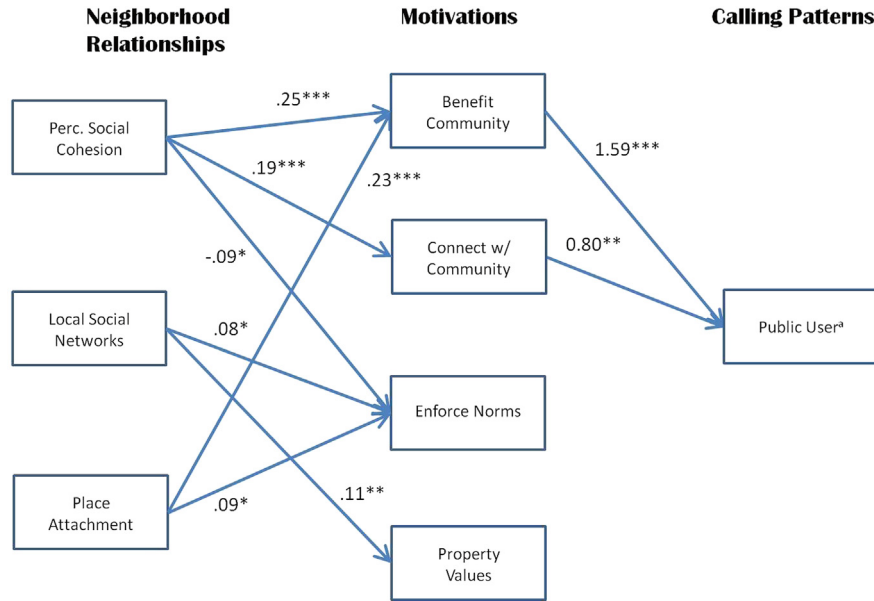
Note: *N* = 660 respondents. All variables also regressed on sex, age, education level, and ethnicity.
[a] – Owing to Poisson distribution, predicted using log link. Odds ratios reported.

Fig. 1. Structural equation model using neighborhood relationships and territorial motivations to predict the likelihood of having made a public report.

system, and was also a major factor in explaining individual differences in reporting public issues. Those respondents who saw the CRM system as serving this role not only were more likely to report public issues, but also tended to make more such reports within the neighborhood. In contrast, defending the space from those who would violate local norms and maximizing property values were neither salient nor influential. This is noteworthy because the CRM system could easily have both of these effects—users can report a variety of issues that reflect neglect or denigration in the public space (e.g., graffiti, code violations, illegal parking), and neighborhoods that are better maintained are likely to be more attractive to investors.

Note: *N* = 302 respondents who reported one or more public issues. All variables also regressed on sex, age, education level, and ethnicity.
[a] – Dichotomous variable with "1" = to variable name. Odds ratio reported for all predictive parameters.

Fig. 2. Structural equation model using neighborhood relationships and territorial motivations to predict patterns in reporting public issues.

This paints a picture of custodianship, at least as measured through CRM reports, as a prosocial act intended to provide benefit to oneself and others. Theory has generally argued that territoriality serves the function of both maintaining and defending space. The latter will be less prevalent, however, when the resource or space in question is a public good, and attempting to exclude others from it is either unfeasible or seen as improper, as is the case here. Even if a person is counteracting norm violations by making a call for government services, he or she is not actually excluding the original offender from the neighborhood or even sanctioning them. In this manner the effectiveness of the CRM system in promoting neighborhood maintenance may rely primarily on goodwill for the neighborhood, and not on a desire to exert social control.

2) Non-social attachment to place played a prominent role

As part of our examination of the role of neighborhood relationships in generating territorial motives and patterns of reporting, we created a measure that isolated attachment to the local space from social relationships. Most theory on territoriality argues that it is explicitly social in nature (Brown, 2009; Edney, 1974; Taylor, 1988), and yet we see the non-social aspects of place attachment playing a prominent role here, predicting both territorial motivations and reporting patterns. Higher attachment with the space was associated with a greater motivation to enforce local social norms and benefit the broader community. This latter finding is particularly notable because it indicates that one's abstract relationship with the local space can bolster social motivations. Further, via its effect on wanting to benefit the community, place attachment had an indirect effect on the likelihood of an individual being a public reporter (found to be significant in an additional model that removed motivations as mediating factors; results available upon request).

A third finding provides a more complex picture of the role of place attachment. As it increased, individuals took custodial action over a narrower geographic range, independent of other neighborhood relationships and motivations. This might indicate that if one's fundamental relationship with the neighborhood is with the space and not accompanied by social interactions and dynamics, the region for which she embraces the role of "custodian" becomes closer and closer to the limits of her own property. That is to say, care for the secondary territory of the neighborhood becomes merely an extension of caring for the primary territory of one's own house. Another somewhat more speculative interpretation regards the line between psychological ownership for the individual and the collective. It might be that social integration of some sort is necessary to endow a sense of collective psychological ownership, without which one's commitment to a place is seated entirely with the individual and her personal interests and concerns. It would then be unsurprising that this has a narrower geographical range, a distinction that may in fact map onto the transition from the primary to the secondary territory.

Taken together, these outcomes may speak to an underappreciated side of territoriality that is focused specifically on place, or the deeper meaning of and identification with a space as filtered through context, culture, and sociability (Tuan, 1977), without any explicit reference to social norms or context. Its dynamics, however, are complex, and they reveal how the adjacency of primary and secondary territories may support custodianship while also placing constraints on it.

3) Social cohesion had a complex relationship with territorial motivations and calling behaviors

Of the three neighborhood relationships, perceived social cohesion most often predicted territorial motivations and calling behaviors, though in contrasting ways. First, individuals who perceived their neighborhood as being more cohesive tended to more heavily emphasize the CRM system's potential to benefit the broader community and to collaborate with other individuals in public maintenance. These first two effects are not particularly surprising, as they are largely in keeping with theory about the social organization of neighborhoods; that one perceives a robust community means that there is something worth contributing to, and others who will also participate in such ventures (Foster-Fishman, Collins, & Pierce, 2013; Sampson, 2012).

Though the presence of a strong community might increase communitarian feelings, its direct effect on behavior, once these communitarian feelings are accounted for, may be the opposite. Those who perceived their neighborhood as more cohesive in fact reported fewer public issues. This might be best understood by framing the shared task of collective territorial management in a game theoretic model (O'Brien, 2012). If one believes that many individuals in the community are inclined to take care of the public space, they might be less inclined to do so in every possible case. Importantly, because this is a difference between neighbors, it is not that a wealth of vigilant residents, by calling in issues quickly, is limiting the opportunity of any one individual to make many reports. Instead, those members of the community who believe that the community is functional overall are less active than their neighbors. We must be careful about overinterpreting this as a "tragedy of the commons" story, however (Hardin, 1968). There is no evidence that these decisions are impacting overall group function. In the tradition of Ostrom's (1990) critique, it is in fact possible that individuals are calibrating their efforts to the likelihood that others will also take responsibility. Future studies should examine to what extent this is an instance of "free-riding" on the contributions of others, versus a behavioral mechanism that makes the relationship between efforts and outcomes more efficient.

Last, perceived social cohesion predicted a lower motive to enforce local social norms. This was the only neighborhood-level finding, meaning it was a function of the local social ecology, not of an individual's perception of it. This would suggest that in neighborhoods with greater cohesion there is simply less of a concern about others violating social norms, and thus it is a less salient motivating factor.

4) Local social networks drove protective motives

Having a larger social network (i.e., more strong ties) within the neighborhood also promoted territorial motives in a manner that might be described as more parochial or private. It predicted a greater desire to enforce local social norms and to maintain property values. This speaks to what is sometimes characterized as the parochial nature of strong interpersonal relationships between neighbors to the exclusion of broader relationships with the community (Browning, 2009; Small, 2004). It is important to note that more communitarian sentiments may result from local social networks via their impact on cohesion, and that this analysis isolates these two effects.

5) The medium of reporting might influence its interactions with territorial motives

As in any study, it is important to distinguish between the particularities of the measures used and the general behavioral phenomenon that is the focus. The CRM system provides a medium through which custodianship is expressed, but its idiosyncrasies may under- or overemphasize certain aspects of it. This is likely at work with the unexpected finding that those who were more motivated to use the CRM system to collaboratively maintain the

neighborhood were less likely to have reported a public issue. Far from being collaborative, these requests must be undertaken by a single individual, making it potentially underwhelming for those who would rather socialize around neighborhood maintenance.

The same theme could be a useful one for future research on the varying ways the CRM system might elicit custodianship, as it is more than just a telephone number, instead comprising multiple channels for reporting issues. In most cities this includes an online self-service portal, and in some a smart phone application. In Boston, it is also possible to make reports by texting or tweeting. Each of these different methods will have their own affordances, capitalizing on and satisfying potentially different sets of psychological mechanisms (Baym, 2010). Here we have analyzed the CRM database as a single corpus, lumping together reports from all of these channels, but dividing them might reveal greater nuance in how the medium of the CRM system mediates the relationship between territorial motivations and one's inclination to take action on instances of physical disorder.

6) CRM reports can support new research programs in custodianship and territoriality

These five empirical themes provide intriguing insights on custodianship and territoriality in urban neighborhoods, but each will require further exploration and study to be fully understood. The main takeaway of the study, then, lies not in any of these specific results, but in the methodology itself, and the opportunity that it presents. The CRM database, like other novel, digital data sets, was not created for research purposes. Nonetheless, it offers a unique window into the study of territoriality. On its own it lacks construct validity and cannot be interpreted in terms of the existing constructs and themes that are the basis of our science. The multi-methodological approach implemented here, however, has sought to overcome this difficulty. By combining these custodial calls with survey responses, we were able to place them within the broader constellation of relationships and motivations that constitute territoriality. This in turn imparts to the data a substantive meaning that was previously absent, opening the door for an array of future directions.

First, with a better understanding of these data in hand, future work might explore custodianship in any number of directions. The incorporation of surveys and observational protocols would support work on how this behavior is influenced by any of a variety of personal or ecological variables. The ability to track individual and aggregate behavior would also support experiments of various types. As noted above, work on territoriality in urban neighborhoods has slowed in recent years, in part because of the difficulty inherent in observing such behavior in a systematic fashion. In fact, the most active research programs on the subject have been in the field of management, examining the implications of psychological ownership and territoriality in the workplace (Brown et al., 2005), including: employee responses to feedback on ideas (Baer & Brown, 2012); the way employees react to perceived violations of their "territory" (Brown & Robinson, 2011); and the distinctive operation of family-owned businesses (Rantanen & Jussila, 2011) and entrepreneurial enterprises (Townsend, DeTienne, Yitshaki, & Arthurs, 2009). Indeed, custodianship closely parallels the concept of organizational citizenship behavior, or the tendency of employees to be voluntarily supportive, courteous, and otherwise prosocial towards their co-workers (Organ, 1988; Organ & Ryan, 1995; Smith, Organ, & Near, 1983). Future work might address analogous questions in urban neighborhoods, leading to a more robust understanding of territoriality across contexts. The intricacy and consequent flexibility of the CRM database means it might support any number of research projects of this sort.

Second, CRM systems are becoming increasingly common across urban areas, and in the United States some of the largest cities (e.g., Boston, New York, Chicago) are instituting common standards for archiving that would make their respective databases mutually compatible (i.e., http://opencivicdata.org). All told, these various advancements in technology and methodology could support cross-city and even international research on patterns of territoriality.

Third, the CRM database provides an inherent opportunity to collaborate with policymakers. Not only do they tell us much about the day-to-day patterns of neighborhood maintenance, they are part of an ongoing innovation in city services. By identifying the basic patterns of custodianship and the motivations that underlie them, researchers can contribute meaningfully to the future evolution of CRM systems in cities. For example, such work could inform messaging and outreach that will best speak to people's primary reasons for calling in public issues. The findings here would suggest that the most effective approach would be to characterize the system as an opportunity to improve and benefit the community. Alternatively, work could suggest advances to the system itself, refining it to most effectively elicit custodianship. The current system appears to be insufficiently social to engage those who want to collaborate with others in their community, something that might be addressed by future innovations. Such projects can be more than just advisory. If scholars and policymakers work together to develop these sorts of innovations as experiments, they can then evaluate them easily thanks to the continuous, longitudinal nature of the data. In this manner studies of this sort could support deep cross-sector collaborations.

4.1. Limitations and future research

There are two main limitations to this study and its interpretation that must be addressed. The first is the sample. We invited all users of the CRM system with e-mail addresses to participate. Previous work has indicated that this population is of higher socioeconomic status, more white, and has more homeowners than not only Boston more broadly, but also than other users of the CRM system who have not registered with it. The sample that then selected into our study was more active in using the CRM than the average user, creating an even greater skew. In some ways this was useful, providing greater variation in use than one would otherwise expect, enabling more robust comparison. But the question remains to what extent the main findings identified are consistent across the broader population. For example, is it possible that the CRM system would have been seen as more of a tool for norm enforcement if more individuals from disadvantaged neighborhoods were included in the sample? This and similar questions must be examined through future study.

As mentioned repeatedly, this is a single manifestation of custodianship, which is a single class of territorial behaviors, and the findings should be interpreted accordingly. The particularities of the behavior itself, and the medium through which it is transmitted have undoubtedly contributed to the profile of results seen here. Future research using a similar design will need to place these results in the broader context of territorial behaviors—how they operate, how they emerge from localized relationships and motivations, and, overall, their role in the dynamics of urban neighborhoods.

5. Conclusion

The primary intent of this study was to examine how the act of reporting an instance of physical disorder in fact maps onto

the territorial motives of local residents. In some senses, this was an exercise in construct validity, establishing a substantive interpretation for these data that might support future work. On its own, however, the study also provides a variety of insights into custodianship and territoriality in urban neighborhoods. By decoupling the collection of behavioral and attitudinal measures, the multi-methodological approach enabled the three-layer model from contextual factors to motives to behaviors while avoiding confounds between these measures. The result was a picture of a behavior with a clear profile: 311 reports were overtly communitarian while not particularly satisfying to those who want to connect with others; they did not seem to draw from a need to defend the neighborhood from others, a major aspect of territoriality; there was also evidence that there were non-social as well as social motivators for these reports. This is but a single "case," however, and a complete perspective on how territoriality contributes to a neighborhood's ecology will require the identification and interrogation of additional behaviors.

Acknowledgments

Appendix

Table A1
Complete parameter estimates from structural equation model using neighborhood relationships and territorial motivations to predict the likelihood of having made a public report.

Effect	Estimate	Effect	Estimate
Perceived social cohesion		*Public reporter*[a,b]	
Age	.11**	Age	1.17***
Black[a]	−.09*	Benefit community	1.59***
R^2	.02	Connect w/Neighborhood	0.80**
Local social networks		*Covariances*	
Age	.08*	Enforce norms ↔ Property values	0.30***
Black[a]	.14***		
Education	−.12**		
R^2	.05		
Place attachment			
Age	.17**		
Education	.09*		
R^2	.02		
Benefit community			
Female[a]	−.09*		
Perc. social cohesion	.25***		
Place attachment	.23**		
R^2	.12		
Connect w community			
Education	−.14***		
Black[a]	.11**		
Perc. social cohesion	.19***		

Table A1 (*continued*)

Effect	Estimate	Effect	Estimate
R^2	.07		
Enforce norms			
Education	−.12*		
Perc. social cohesion	−.12**		
Local social networks	.11**		
Place attachment	.09*		
R^2	.05		
Property values			
Age	.09*		
Education	−.18***		
Local social networks	.11**		
R^2	.06		

Note: $N = 660$ respondents.
*$p < .05$, **$p < .01$, ***$p < .001$.
[a] Dichotomous variable with "1" = to variable name.
[b] Odds ratio reported for all predictive parameters.

Table A2
Complete parameter estimates from structural equation model using neighborhood relationships and territorial motivations to predict patterns in reporting public issues.

Effect	Estimate	Effect	Estimate
Perceived social cohesion		*Geographical range of reports*[b]	
Black[a]	−.11*	Age	0.50***
R^2	.01	Place attachment	0.55***
Local social networks		*Calls w/in Neighborhood*[b]	
Black[a]	.23***	Female[a]	0.60**
Education	−.12[+]	Black[a]	0.62***
R^2	.08	Perc. social cohesion	0.60**
		Benefit community	1.90***
Place attachment			
Age	.17**	*Covariances*	
R^2	.03	Enforce norms ↔ Property values	0.30***
		Connect w/Nbhd ↔ Property values	0.22***
		Connect w/Nbhd ↔ Enforce norms	0.17**
Benefit community			
Female[a]	−.14**		
Perc. social cohesion	.29***		
Place attachment	.20**		
R^2	.14		
Connect w community			
Education	−.17**		
Perc. social cohesion	.19**		
R^2	.06		
Enforce norms			
Education	−.12*		
Perc. social cohesion	−.12*		
Local social networks	.14**		
R^2	.06		
Property values			
Education	−.24***		
Perc. social cohesion	.12*		
R^2	.07		

Note: $N = 302$ respondents who reported one or more public issues.
*$p < .05$, **$p < .01$, ***$p < .001$.
[a] Dichotomous variable with "1" = to variable name.
[b] Owing to Poisson distribution, predicted using log link. Odds ratios reported.

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