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Escaping the Valley of Disengagement: Two Field Experiments on Motivating Citizens to Monitor Public Goods

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Abstract

Governments cannot provide public goods effectively when they lack information about their delivery. Citizens, for their part, experience deficient or absent public services, but they lack incentives to provide monitoring when they do not expect governments to be responsive to their concerns. Over time, this reinforcing cycle creates what we term the valley of disengagement. We investigate how to activate and sustain citizen engagement in governance given the challenges posed by this vicious cycle. In two field experiments implemented in Kampala, Uganda, we recruited citizens to report on solid waste services to the municipal government. We find that neighbors' and leaders' nominations of reporters and public announcements about reporters' activity do not increase citizen monitoring. However, government responsiveness to reporters boosts participation over several months, highlighting the critical role of timely and targeted responsiveness by governments for sustaining citizen engagement in governance.

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Contents

1. Introduction

Governments often lack good information about where services should be extended, where existing public works are failing, and where contractors or government employees are shirking. These information problems contribute to the substandard provision of public goods. From their direct experience, citizens hold information about absent or deficient services, but when they do not expect a response from government, they lack incentives to share this information. We thus identify a key problem – the *valley of disengagement* – involved with initiating and sustaining citizen monitoring of governance. When citizens do not expect government to be responsive to their concerns, they have little incentive to provide useful information. Lacking data and public support, governments cannot easily improve services where they are in greatest demand, which over time reinforces distrust and disengagement and limits accountability.

We investigate how citizens can be motivated to provide information to governments in pursuit of public goods in light of this dilemma. In theory, governments could invest in self-monitoring systems, but it is usually more efficient to rely on reports from residents as a co-production strategy (Parks et al. 1981; Ostrom 1996), especially in the age of widely available information technologies. After all, citizens already possess the necessary information. We thus extend to the mass populace McCubbins' and Schwartz's seminal contribution about fire-alarm oversight (1984). Citizens can trip alarms that warn officials about problems with public services. The key is getting enough citizens to share their information in ways that take advantage of co-production potential.

We theorize that citizens will share information they possess about public goods and services when they have sufficiently positive beliefs about the responsiveness of government. Additionally, we hypothesize that neighbors' and leaders' nominations of monitors and public recognition of citizens' monitoring activities will increase engagement by identifying and motivating reporters who place a high value on public goods. We present a simple decision-theoretic model that captures how citizens' beliefs about the responsiveness of governments drives their participation in monitoring. The model highlights the importance for participatory governance of providing opportunities for citizens to positively update their beliefs about the responsiveness of government.

We test our theory in two pre-registered field experiments conducted in close partnership with the Kampala Capital City Authority (KCCA) related to the monitoring of solid waste services. We prompted citizens of Kampala, Uganda to send reports over a number of months to the KCCA about the management of solid waste in their neighborhoods. Solid waste is a major challenge in Kampala, with only a minority of waste entering the formal waste stream (Kinobe et al. 2015). Most trash is burned or discarded into informal dump sites. A large majority of Kampala residents are personally concerned with the poor provision of waste services, as revealed in our baseline survey. The KCCA would like to improve solid waste services but lacks efficient ways to collect information about the locations where service delivery is substandard – information that citizens possess. The main outcome of interest in this study is the initial and sustained reporting of citizens about solid waste services in their neighborhoods. The outcome measure is the actual, on-topic reports of citizens sent to the KCCA from mobile phones.

We first test whether nomination of reporters by neighbors, nomination by community leaders, and leaders' public recognition of monitors increases reporting. Other studies have found that individuals' prosocial tendencies and non-financial rewards have a greater impact on prosocial behaviors than financial rewards (Ashraf et al. 2014). Yet, it is not clear whether community networks can be leveraged to select prosocial individuals through nomination and/or offer sufficient non-financial rewards like social recognition to encourage the sustained engagement of citizens in governance. Previous research on networks mostly tracks how the resources offered by network connections predict engagement (Berardo and Scholz 2010), rather than how networks can be actively leveraged to select and motivate citizens to participate in governance. Related work on political participation indicates that recruiting citizens based on social connections is often effective (Brady et al. 1999). We investigate whether nominations and recognition within neighborhoods yield similar effects related to participatory governance.

To preview our results, even though we saw higher rates of reporting than any any other citizen reporting platform of which we are aware in Uganda or elsewhere (e.g., Blaschke et al. 2013; Grossman et al. 2014), with approximately 20% of reporters sending reports during our study period, we did not find strong evidence that any of the recruitment or announcement conditions increased short-term or long-term engagement by citizen monitors. This is good news for policy, suggesting that

costly recruitment and social motivation treatments do not produce more engagement by citizens.

We also experimentally treated some citizen reporters with responsiveness by the KCCA to test our prediction that rapid, timely, and targeted responsiveness is key to activating and sustaining citizen engagement in governance. Reporters from neighborhoods in the responsiveness treatment received a weekly, targeted announcement about how their reports were translated into official action plans and used to improve solid waste collection in Kampala, allowing us to test core theoretical propositions about how trust in government and beliefs in responsiveness drive engagement (e.g., Sandström et al. 2014).

We find that government responsiveness significantly boosts engagement of reporters over months, as measured by actionable and usable reports. The effects of responsiveness become larger over time, corroborating our theory that citizen monitors are continuously updating their beliefs about whether government is listening to and acting on their demands. Building responsiveness into governance arrangements might significantly increase participation by citizens in improving the delivery of public goods. However, an endline survey that we fielded five weeks after the reporting period did not reveal increased trust in government or satisfaction with services among treated reporters, suggesting either that trust in government is hard to move or that the broader effects of responsiveness are short-lived.

The results of these field experiments are particularly significant given that information and communication technologies (ICT) improve prospects for low-cost, targeted, and timely responsiveness by governments around the world. Indeed, finding ways to engage citizens in governance is vitally important across a wide range of government activities. Community policing depends on building trust between citizens and the police and thereby improving information necessary to act on crime (Brogden and Nijhar 2005). Education is enhanced by involving parents in the local administration of schools and monitoring of teachers (Duflo et al. 2015). Water user boards augment the collaborative management of water resources (Berkes 2009). However, in places where the capacity of government is low and the management of public services is poor, building responsive relationships with citizens is especially difficult. Citizens do not engage because they perceive governments to be unresponsive. And governments cannot improve public services because they lack information about citizens' demands.

By harnessing the strengths of new modes of citizen-government interaction to foster the sharing of information and responsiveness, it may be possible to escape the valley of disengagement in a variety of settings. Governments around the world are building platforms to collect information from citizens to improve the provision of public services (Smith and Reilley 2013). Some evidence suggests that ICT can broaden public participation in governance (Grossman et al. 2014). Yet other efforts have failed to activate and sustain high-levels of participation (Evans & Campos 2013; McGee and Carlitz 2013; Grossman et al. 2015; Grossman et al. 2016). Our results show that building these new ICT platforms is not enough to sustain citizen engagement in governance; citizens need to understand how their effort is rewarded in terms of responses from public officials.

2. Background and Theory

Information that voters convey at the polls does not guarantee responsive governance. The binary nature of election returns fails to convey what public goods and services are demanded and where they are absent or deficient. Before the many goods and services that citizens demand from government are actually delivered, long chains of delegation between citizens, politicians, bureaucrats, and contractors organized into multiple layers must be formed and moved to action. Agent slack and slippage are likely at every link in the chain, and so extensive information must be gathered on the behavior and resulting outcomes of agents at each stage in order for governments to effectively deliver public goods and services. Monitoring and oversight from the top down can prove very expensive (Kiewiet and McCubbins 1991), so bottom-up information is often sought as a low-cost and efficient solution to learn how frontline government units and their contractors are performing (McCubbins and Schwartz 1984). The information requirements for good governance are especially intense at the local level, where in most countries thousands of local governments provide goods and services to millions of people. Citizens possess critical information about the status of public goods and services, but they need to be motivated to provide information to the responsible government office.

If citizens do not believe that there will be a response to the information that they could provide, then they will not have incentives to engage in monitoring. Indeed, the record of transparency and

accountability initiatives that involve citizen monitoring of public goods provision is mixed (for recent reviews, see Joshi 2013; Fox 2015). Insofar as there is any consensus about the reasons why initiatives to solicit information and participation from citizens do not always improve service delivery, it is that citizens lack ways to motivate service providers to act on the information they offer (Banerjee and Duflo 2006, 124; Banerjee et al. 2004; Olken 2007), indicating that believing government will be unresponsive is correct in many settings. In contrast, studies about citizen monitoring in settings where rewards and punishment mechanisms are available to citizen monitors – whether through social pressure on providers (Bjorkman and Svensson 2009) or by enhancing enforcement by government (Caseley 2006) – have found citizen monitoring to be effective at improving public services.

In a recent reflection on this body of mixed evidence, Fox (2015) offers the important critique that many studies of citizen monitoring and government accountability are "tactical" rather than "strategic" – that is, they consider mostly how to get information flowing in one direction, rather than strengthening feedback loops between citizen monitors and governments. As Mansuri and Rao (2013) highlight in another review, the longer term success of social accountability schemes depends on governments using their abilities in sanctioning and oversight to act on the information gained through citizen engagement. However, considering the strategic context, where public services are substandard and, as a consequence, trust in government is low, the prior beliefs of most citizens will likely be that government is not responsive to their concerns. This will tend to decrease input of monitoring by citizens.

Consider the simple illustration of a government agency and k citizens C_1, C_2, …, C_k who might contribute to the supply of public goods by monitoring frontline providers. In this setting, each citizen has uncertain beliefs about whether government is *responsive* or *nonresponsive* to reports that they could submit. We denote the true probability that government will respond to a report by θ. Each citizen makes a decision about whether to report on public services (R_{kt}) as a function of their belief about the responsiveness of government at a given point in time $p_{kt}(\theta)$, the value that the individual places on a potential governmental response including prosocial considerations v_k, and the cost of the reporting c_k. Each citizen will report at time t if:

$$R_{kt} = \begin{cases} 1 & \text{if } p_{kt}(\theta)v_k > c_k \\ 0 & \text{if } p_{kt}(\theta)v_k \leq c_k \end{cases} \quad \textbf{(1)}$$

Before proceeding to simulate how this belief and incentive structure drives the dynamics of citizen engagement in governance, we consider each of the component parts and their place in existing theory:

2.1 Belief in Responsiveness of Government ($p_{kt}(\theta)$)

Even if government is responsive, citizens may fail to observe this and attribute proper credit. Low prior expectations worsen this dilemma. Citizens' combined experiences and beliefs thus often result in disengagement, which of course will provide few opportunities for updating. This vicious cycle of disengagement is poorly understood. In one of the few relevant studies, Tolbert and Mossberger show that citizens who interact online with governments in the United States generally have higher trust in government, perhaps through "interaction[s] with officials that are convenient and quick, potentially enhancing responsiveness" (2006, 357). They report increased citizen satisfaction after visits to government websites, but the mechanisms behind this effect are not well-identified, selection effects are a major concern, and ways that governments could foster positive beliefs are not explored.

In settings where institutional arrangements and political conditions make governments responsive, the core challenge is cultivating citizen beliefs about responsiveness that match the actual level of responsiveness from government. Closer to the setting of our own study, Grossman et al. (2016) ask how citizens can be motivated to report deficiencies in public services via SMS text to local politicians in Uganda. Low levels of perceived efficacy among citizens who experience service deficiencies creates significant challenges for participation. As an experimental treatment, the researchers sent messages to subjects from local officials encouraging reporting on deficient public services and find that the rate of ever-participation – citizens that use the platform at least once over a six-month period – rises from approximately 3.4 percent in control to 4.7 percent in treatment.

We take this idea further by experimentally informing citizen reporters, on a weekly basis, exactly what

the governmental agency receiving their reports is doing in response. Our responsiveness treatment included the KCCA's making weekly action plans for the mobilization and oversight of contractors in specific zones, organizing systematic zone-wide clean-ups, and engaging in new public outreach campaigns. Our treatment is designed to directly increase citizen beliefs about government responsiveness and therefore to perhaps increase "external efficacy." Our theory further predicts that we should observe greater effects of responsiveness as reporters are active for longer periods, since over time there will be more divergence between the beliefs of reporters who do and do not experience responsiveness.

Citizens who place a greater value on public goods should be more likely to act in ways that will lead to their production. Two factors should initiate and sustain citizen engagement: (1) attracting the participation of individuals who value a public good more highly and (2) raising the salience of the public good for the community. Indeed, past research consistently indicates that individuals with relatively high prosocial motivations undertake the bulk of online participation in governance (Budhathoki and Haythornthwaite 2013; Chandler and Kapelner 2013; Brabham 2009; Blaschke et al. 2013). While research on the role of networks – the pre-existing set of relationships and ties between members of a community – in governance finds that networks create opportunities for engagement by citizens and civil society (Berardo and Scholz 2010), there is little research that deals with actively leveraging social and community networks to select and incent participation in governance.

We consider two ways that community networks might be used to increase reporting. First, we expect that reporters selected through nomination by neighbors or community leaders will place a higher value on public goods than randomly-recruited reporters. As Brady et al. (1999) theorize, people who are closer to prospective participants in public affairs have advantages both in selection and motivation. Lab-in-field experiments in Uganda show that individuals with strong group attachments and community leadership positions display greater prosocial behavior in dictator games (Baldassarri and Grossman 2013). Because individuals who make nominations can maximize public goods by naming reporters with prosocial tendencies and leadership attributes, we expect that nomination will enhance the provision of citizen monitoring. Yet existing research on referrals and nominations have mainly been studied in labor markets where private rather than public-goods incentives dominate (Fafchamps et al. 2015; Beaman and Magruder 2012). Closest to the present study, Kim et al. (2014)

find that using "friend nominations" to select community members to distribute coupons for subsidized health-related goods results in higher uptake compared to relying on randomly-selected individuals or individuals with the most social ties. However, questions persist regarding both causal mechanisms and sustainability over time. Second, we expect that public announcements can motivate reporters to be more active. Previous work has found that non-financial rewards are more effective at motivating prosocial behavior than financial rewards (Ashraf et al. 2014). Providing potential actors with recognition for their contributions to collective goods may thus increase prosocial behavior (Karlan and McConnell 2014).

Across a variety of places and settings, "opportunity structure" influences citizen participation (Stevenson and Greenberg 2000; Leifeld and Schneider 2012; Vráblíková 2014), and costs to citizens undermine their engagement in public life (e.g., Speer 2012). Information technologies can thus alter the opportunity structure, primarily by substantially decreasing the costs of sharing and processing data relevant to public life (Oates 2003; Grossman et al. 2014; McGuire 2006; Charalabdis et al. 2012; Linders 2012; Rotberg & Aker 2013). Unlike engagement in governance via traditional means, which often involves significant time and costs for citizens, mobile phones allow for instantaneous and, in many deployments, toll-free access to public officials.

Considering the model above and its component parts, it is straightforward that decreasing the cost of reporting will encourage more engagement in governance. What is missing and more interesting is the time path of $p_{kt}(\theta)$ as each reporter perceives responsiveness or a lack thereof to their engagement. Consider a standard Bayesian updating model where the prior $p_{kt}(\theta)$ takes the form of a beta distribution, where $p(\theta) = \theta^{\alpha-1}(1-\theta)^{\beta-1}$. In each period t, if and only if a reporter submits a report, then they will have the opportunity to perceive with error whether government responds to the report.[1] More formally, after submitting a report, the citizen views the outcome of a Bernoulli trial screened by an error function $\varepsilon(\theta)$, which might not have an expected value of θ, such as when any response is not easy to attribute to the government or if the government is able to gain positive credit even though it is not responsive. We now have the machinery to simulate the reporting behavior of citizens over time.

[1] In our experiments, each period is 2-3 days, since reporters were sent prompts for reports 2-3 times per week. In principle, a period can be any interval where it is possible to submit monitoring *and* receive a response.

Consider a set of citizen reporters who have various prior beliefs about the responsiveness of government, when the true value of θ indicates that government is in fact the responsive type.[2] In the case of a government that has difficulty quickly enacting a response to public reports, we use the simple adjustment where $\varepsilon(\theta)$ is the outcome of the Bernoulli trial with probability θ, filtered by some number of periods of delay in the opportunity to observe responsiveness to reports. Of course, $\varepsilon(\theta)$ may take on a variety of forms that we do not attempt to fully anticipate here, but a delayed or unobserved response is perhaps the most typical type of error process that citizens experience when they interact with government. Recall that once the value of $p_{kt}(\theta)$ drops below a certain level, reporters will not submit reports and will therefore not have the chance to update their beliefs about responsiveness. This is the *valley of disengagement*: once reporters have sufficiently low beliefs in responsiveness, they will not update their beliefs about responsiveness because they will cease to provide monitoring. To avoid falling into this valley, it is necessary to either find monitors who place a great value on the public service or provide opportunities for monitors to positively update their beliefs that government is listening and responding to their concerns.

If reporters are selected who place higher value on the public good or if social motivation can raise the value of the public good, the value of $p_{kt}(\theta)$ will be lower before a reporter is deactivated. Figure 1 shows simulated paths of the mean value of $p_{kt}(\theta)$ at each period, which is equal to the posterior value of the previous period after taking into account the result of $\varepsilon(\theta)$, which in this case delays the observation of any response. In the left column of Figure 1, no selection process is present and no social benefits are added, which raises the value of $p_{kt}(\theta)$ needed to sustain reporting as compared to the right column, where the selection of prosocial reporters and the presence of social benefits lower the value of $p_{kt}(\theta)$ needed to sustain reporting, resulting in more reporting. If it is possible to identify monitors who place a higher value on the service in question, fewer will fall into the valley of disengagement.

[2] In the simulations below, we set $\theta = 0.8$, $c_k = 1$, draw the starting beliefs of reporters $p_{k,t=0}(\theta)$ randomly from a uniform distribution of mean values [0.1,0.9], and draw the value placed on the public good v_k from a uniform distribution of [1,5] for the case with no social motivation and [3,7] for the case with social motivation.

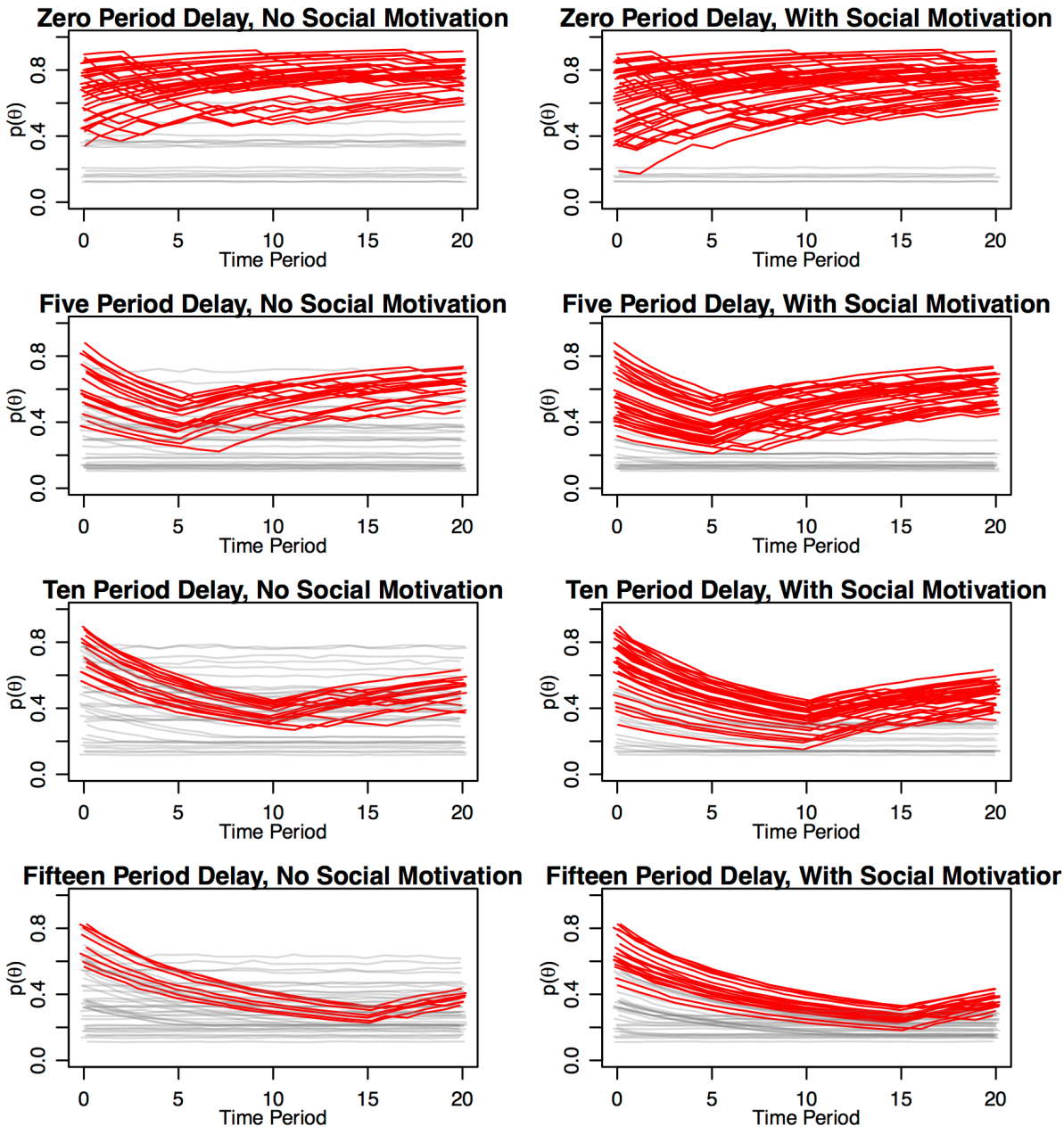

Figure 1. The posterior beliefs about the responsiveness of government when observations about responses to citizen reports are delayed by the number of periods indicated. Red lines indicate reporters who do not fall below the activation threshold during the reporting period and grey lines indicate reporters who fall below the activation threshold.

As displayed in Figure 1, any delay in observing the response of government to citizen reports also decreases posterior beliefs that government is the responsive type. The greater the delay between reports and response, the more reporters fall into the valley of disengagement. This means that only

citizens with very high prior beliefs about the responsiveness of government will persist in reporting (red simulated paths), while all others will fall below their activation threshold and fail to update further (grey simulated paths). Furthermore, a comparison of the top and bottom rows of Figure 1 highlight how the beliefs of reporters who do and do not experience rapid responsiveness display greater divergence over time. These dynamics illustrate the critical role that targeted responsiveness is likely to play in keeping beliefs about responsiveness high enough among at least some citizens to sustain engagement.

2.2 Pre-Registered Hypotheses

Based on the expectation that nomination can enhance the provision of reporting about solid waste services by raising the value of the public good (v_k, H1-H3) or by enhancing beliefs about the responsiveness of government ($p_{kt}(\theta)$, H4), we pre-registered the following hypotheses prior to randomly assigning experimental conditions or collecting any data (SI, Appendix D contains the exact wording of pre-registered hypotheses, which are shortened here for readability):

H1: Nomination by neighbors will increase reporting.

H2: Nomination by the local council chair will increase reporting.

H3: Announcement by the local council chair about the reporters will increase reporting.

H4: Responsiveness to citizen reports will increase reporting.

3. Experimental Design

We designed and carried out two randomized field experiments to understand whether community networks and government responsiveness can initiate and sustain participation by citizens in the governance of public services. In particular, the treatments that we employ are meant to raise either beliefs about responsiveness ($p_{kt}(\theta)$) or the value of the public good (v_k) among reporters who might engage in governance. We focus on citizen reporting about solid waste management, which generates

high levels of citizen concern, with 90% of residents in our study area personally concerned with the state of solid waste management as of 2014 (see SI, Appendix A for results of a pre-experimental survey).

Kampala, Uganda faces similar problems of monitoring and accountability for solid waste management as many other parts of the world (Bhuiyan 2010; Okot-Okumu and Nyenje 2011). Private companies contracted to remove solid waste often provide services of lower quality to groups of people that are not able to share monitoring information (Oteng-Ababio et al. 2010; Katusiimeh et al. 2012). Since most of Kampala is contracted to private collectors, city managers find themselves in a challenging position, especially given information asymmetries, pressures toward corruption, and wealth disparities across communities.

Our close partner in this project, the Kampala Capital City Authority (KCCA), has prioritized improving solid waste management to boost resident satisfaction and promote public health. Kampala is also one of the key strongholds of opposition support in Uganda, and the nationalized KCCA has a strong political mandate from the ruling party to improve resident satisfaction with government services. Additionally, the KCCA has been supported by international donors for more than a decade to improve waste management, but still finds it difficult to engage the public in actionable ways. Despite having used public resources to develop an interactive SMS platform and a mobile application to exchange information with citizens, the KCCA struggles to use its technological investments to exchange useful information with the public. They now seek to understand whether mobile technologies can enhance public engagement and encourage more accountable provision of public services.

In Phase 1, we recruited 1034 citizen reporters from a sample of 90 administrative zones to provide feedback on solid waste removal services and disposal practices at the spatial scale of neighborhoods.[3] In November 2015, our team of enumerators carried out a recruitment drive over a period of two weeks to form our experimental sample of reporters. The KCCA provided us with a list of

[3] One of the 90 zones was dropped from the sample due to a failure to conduct recruitment activities by the field team as assigned. Two of the zones are duplicates due to an error in the administrative files received from the KCCA that was discovered only after the project was out of the field. For analysis, the duplicate zone is considered two separate zones as this was how we allocated treatment assignment.

all zones (LC I) inside the capital city jurisdiction of Kampala and the associated shapefiles outlining their boundaries. At the time of the first experiment, there were a total of 755 zones (LC I) contained within 97 parishes (LC III) and 5 divisions used to manage waste services. We randomly selected 90 zones for our experimental sample. We dropped 11 zones from the original sample because they were demolished, lacked residencies, or gated communities that barred access. We replaced these 11 zones with another random sample to form the final experimental sample.

After selecting the experimental sample, we randomly assigned each zone to one of two reporter recruitment conditions using complete randomization (Figure 2, Panel A). In each zone, we then aimed to recruit 12 citizen reporters according to the recruitment condition assigned at the zone level, a process which yielded 1,034 unique reporters (see SI, Appendix B for detailed recruitment protocols):

(**Recruitment Baseline**) *Random Citizen recruitment*: Following a random walk pattern, the enumeration team approached adults walking or sitting outside of their homes or businesses and asked whether they would sign up to be a reporter.

(**Recruitment Treatment**) *Neighbor Nomination recruitment:* Following a random walk pattern, the enumeration team approached adults walking or sitting outside of their homes or businesses and asked whether they could nominate a "trustworthy and responsible" individual who lives in the zone to report on behalf of its residents. If the individual indicated willingness to make a nomination, the enumerator asked the citizen to make a face-to-face introduction to the nominated individual. This nominated individual was then asked whether they would sign up to be a reporter.

All reporters in this study were fully informed that the data they provided would be received by the KCCA without revealing the identity (mobile phone number) of any reporter, to avoid any concern that reporters would feel coerced into reporting. Over a 7-week period following the recruitment drive, all citizen reporters received prompts from the KCCA's interactive SMS messaging system in the same way. In Phase 1, reporters received a total of 17 prompts for information about waste pick-up schedules, waste burning practices in their zone, and the locations of waste piles that needed special attention by the KCCA or its contractors (See SI, Appendix C for a list of prompts). To make reporting

free for reporters, we sent an airtime credit initially to all reporters and then also sent replenishment credit each week to the phones of all reporters who submitted at least one response that week. To further encourage reporting, we held a lottery for a ~$10 prize in airtime each week for reporters in both the baseline and treatment condition in a uniform way. Further details and justification for the implementation procedures are contained in our publicly-available pre-analysis plan (EGAP design 20151103AA).

3.1 Phase 2 Experimental Design

In June 2016, our team of enumerators recruited an additional 1,905 reporters from 97 randomly selected administrative zones or local councils (LC I), again dropping five zones where research was impossible and replacing with six new random selections. In each zone, we aimed to recruit 20 reporters. Each zone was divided into four cells of roughly similar geographic size and five individuals were recruited to be reporters from each cell. Reporters were required to be adult residents of the zone and the primary user of their own mobile phone. The zones did not overlap with the Phase 1 sample (Figure 2).

With the zone as the unit of randomization, each Phase 2 zone was assigned one of eight different treatment combinations based on a three--arm experimental design. Two arms were recruitment and announcement conditions (Figure 2, Panel B). The third arm was responsiveness of government to citizen reports and was applied to both Phase 1 and Phase 2 zones (Figure 2, Panel C). The content of these treatments are as follows:

(**Arm 1, Recruitment Baseline**) *Random Citizen recruitment*: Following a random walk pattern, the enumeration team approached adults walking or sitting outside of their homes or businesses and asked whether they would sign up to be a reporter. This condition follows exactly the protocol from Phase 1 and serves as the baseline condition.

(**Arm 1, Recruitment Treatment**) *LC1 Nomination recruitment:* Reporters in these zones were recruited by the local council chairperson (LC1) or a delegated zone--level authority figure if the chairperson was not available. We chose LC1s to select citizen monitors because they are

typically well-connected with community members and able to select reporters willing to volunteer on behalf of the community. LC1s nominated reporters by introducing them to the recruitment team.

(**Arm 2, Announcement Treatment**) *Announcement of Reporters by LC1:* Reporters in these zones were informed that the LC1 would announce the citizen monitoring program and the names of reporters at an upcoming zone--wide meeting. After all 20 reporters were recruited, a list of the names of selected citizen monitors and information on the program were left with the LC1. The implementation team contacted LC1s by phone one week following the completion of the recruitment activity to remind the LC1s to make the announcement at a community meeting.[4] If the LC1 was not present during recruitment, we contact the LC1 by phone that day to inform him/her about the monitoring program and our request that they make an announcement about reporters at an upcoming zone meeting. Zones not assigned to treatment were assigned to a control condition where the LC1 was not requested to make an announcement.[5]

(**Arm 3, Responsiveness Treatment**) *Responsiveness from the KCCA:* We sent reporters in these zones weekly personalized text messages informing them that their responses had been sent to the KCCA Waste Management team and communicated to reporters the KCCA's action plans made on the basis of reports. In later weeks of the reporting phase, the KCCA took action to address solid waste based on reports, which may have been observable to reporters. In some weeks, we sent information listing the number of responses that individual reporters sent and the total number of responses by all citizen monitors in the reporter's zone, along with

[4] We collected data on compliance with the announcement treatment and found that only 38% of the community leaders in zones who were assigned to this condition and who we were able to contact at endline delivered the announcement treatment. The reporters in these zones still expected a community announcement, since they were fully informed about the upcoming announcement during recruitment, so we still consider them to have been treated. In SI Appendix G, we estimate complier average causal effects for the announcement treatment by 2SLS.

[5] All reporters who were recruited in zones assigned to the announcement condition were fully informed at recruitment that their names would be announced at a community meeting and could decline the invitation to participate. Additionally, the LC1 only announced that reporters had agreed to report on behalf of the community and never had access to the reports or aggregate data on the number of reports submitted. For ethical reasons, we did not risk subjecting reporters to social punishment for low levels of reporting and instead think of this treatment as allowing reporters to gain recognition from their community for reporting on behalf of the zone. This procedure was approved by both international and local review boards.

an offer to answer questions.[6] Any questions were answered during a call center held each week.

In this arm, program representative also contacted subjects one month after the start of the reporting period through voice calls in which they discussed the quantity of the subject's responses, reminded them of objectives and expected results of reporting, and explained how the reports were being used to improve waste management. Both active and inactive reporters received the responsiveness outreach. Reporters in zones assigned to control did not receive any messages or phone calls about what the KCCA was doing with their reports. For zones in the control condition, the KCCA asked only to receive a digest of reports at the end of the reporting period and did not respond weekly to reports.

The responsiveness treatment has several components, all of which were included to raise the belief of reporters that the government was receiving, processing, and responding to the reports that were submitted (an accurate belief in our setting). Responsiveness requires that government is attentive to the reports of monitors and that citizens know that government is attentive. We are not able to parse contributions of the different components of responsiveness, but like many field experiments conducted with organizational partners, our treatment was designed to maximize the chances of detecting an effect of an omnibus responsiveness treatment. This is a necessary first step in probing the effects of government responsiveness before parsing individual mechanisms.

[6] In SI Appendix H, we show that rates of reporting are unconditional on the number of reports that the subjects were informed as being received throughout the zone.

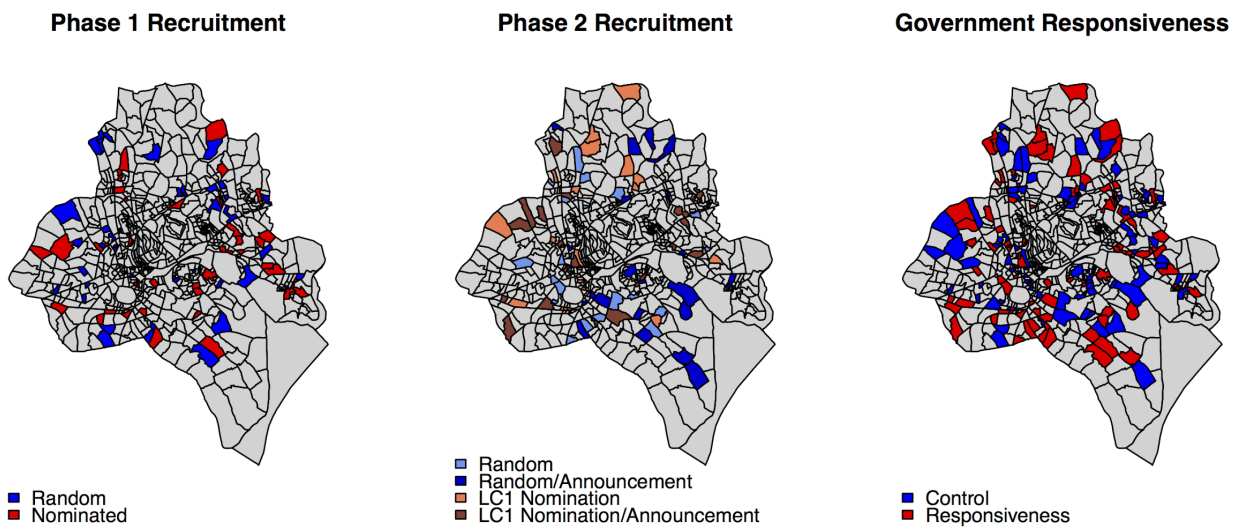

Figure 2. Final sample of zones within the jurisdiction of the Kampala Capital City Authority for Phases 1 and 2 recruitment drives and the combined responsiveness treatment condition. This is the final random sample, after replacing zones that did not contain residences or that were inaccessible.

During the 8-week Phase 2 reporting period between July 2 and August 29, 2016, all subjects recruited during Phase 1 and Phase 2 were sent 15 prompts to supply reports. The questions we asked reporters were based on information that the KCCA identified as most useful in monitoring the quality of services provided by its waste management contractor. Prompts included general questions about zone-level waste conditions and the quality, frequency, and proximity of waste collection services provided to the zone, along with several open-ended questions (See SI Appendix C for the list of prompts used in Phase 2). As in Phase 1, we encouraged reporters to answer prompts by running a lottery each week for ~$10 in airtime for all reporters in all treatment conditions in a uniform way. Five weeks after the end of the Phase 2 reporting period, we implemented a short survey to understand whether responsiveness increased trust in government and satisfaction with waste services, which would indicate longer-lasting shifts in more general attitudes as a result of responsiveness.

3.2 Summary of Experimental Design and Conditions

There was a break of almost six months between the two phases when no prompts were sent to reporters from Phase 1. Figure 3 summarizes the combined design of the two experiments described above and displayed in Figure 2.

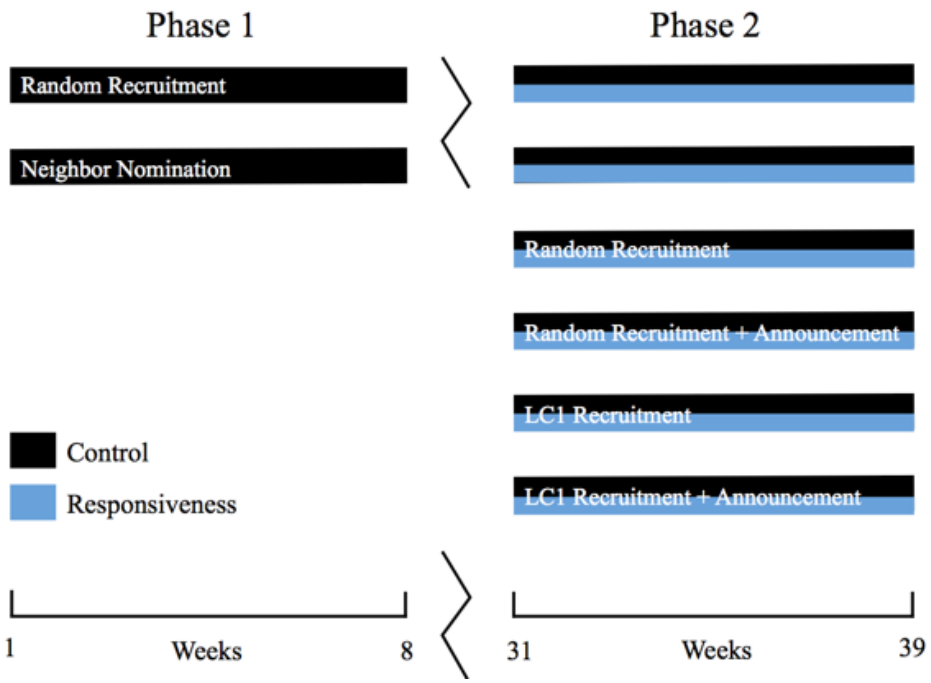

Figure 3. Diagram of experimental design for both Phases 1 and 2

As pre-registered, we measure reporting as follows: (1) The total number of active reporters (i.e., those submitting at least one report) during the reporting period; (2) The total number of reports submitted by each reporter during the reporting period; (3) The total number of reports submitted by each reporter during the last two weeks of the reporting period; and (4) The total number of open-ended reports (e.g. descriptions of location of piles) submitted by each reporter during the reporting period.

3.3 Descriptive Data on Reporters

The reporters in our study are likely to be fairly representative of Kampala residents, since many of the recruitment conditions began with random walks in randomly selected zones around the city. It may be the case that the nomination process produced reporters of a different type on observable characteristics, but we do not find strong evidence for this possibility (Table 1). The only notable exception is that LC1 nomination produced reporters with longer average periods of residence in the zone than did any of the other recruitment conditions. In order to avoid Hawthorne effects, the reporters were asked only to provide brief, non-sensitive information for intake into the KCCA reporting system, rather than a full survey of demographic and attitudinal responses that would have

required a different informed consent process for research subjects. All reporters were fully informed that the platform was being operated and tested with the KCCA.

Table 1. Characteristics of reporters in both Phases

Phase 1	Random Recruitment	Neighbor Nomination
Years in zone (mean)	9.24	9.15
Female (proportion)	0.39	0.45
Age (mean)	30.2	30.8
Satisfied with waste services (proportion)	0.28	0.32
Phase 2	Random Recruitment	LC1 Nomination
Years in zone (mean)	11.0	15.2
Female (proportion)	0.62	0.65
Age (mean)	32.4	36.0
Satisfied with waste services (proportion)	0.36	0.36

4. Analytical Methods

As we pre-registered, we performed hypothesis tests via randomization inference for difference in means between experimental conditions. We assume the sharp null hypothesis (no unit-level treatment effects) such that $Y_i(1) = Y_i(0)$ for all zones or reporters where $Y_i(1)$ is the potential outcome if assigned to nomination and $Y_i(0)$ is the potential outcome if assigned to random recruitment. We then generate 5,000 iterations of our exact clustered randomization procedure and capture the sampling distribution of treatment effects observed under the sharp null. We compare the observed difference in the value of interest between treatment conditions and compare that value to the sampling distribution to compute a *p*-value of how often such a difference would be observed by random chance. For the Phase 2 analysis, because of the ease of reporting on multiple crossed treatment arms, we estimate the effects of treatment at the reporter-level via OLS regression. We have confirmed that

the substantive and statistical significance of all effects are robust to the pre-registered difference-in-means specifications. Appendix F contains the same Phase 2 results with analysis performed at the zone level. We also observed significant non-compliance with the *LC1 Announcement* treatment in Phase 2, prompting us to estimate complier average causal effects as a robustness check on the intent-to-treat results reported below (see SI Appendix G). In no case does this change the substantive or statistical significance of the main results. We also consider, but do not find, evidence for spatial spillover of the Responsiveness treatment across zones (see SI Appendix J).

5. Findings: Phase 1

In the first experiment, we find marginal evidence that nomination boosts rates of report (Figure 4). In total, we received 493 SMS reports that were on-topic and contained information relevant to solid waste management. We see that reporters assigned to nomination submitted more reports over the entire study period as a point estimate, but this value is not highly inconsistent with random chance (Panel A; *te*=0.027, p=0.14). If we instead compare the mean number of responses per reporter by assigned recruitment condition, we find that nominated reporters submitted an average of 0.536 reports, while randomly recruited reporters submitted an average of 0.420 reports, which is again not highly inconsistent with random chance (Panel B; *te* = 0.115, p=0.14). Finally, if we consider how many times reporters responded to open-ended prompts for the locations of trash piles, potentially the most costly type of reporting in terms of effort, we see higher rates of reporting, but not so high that the rate is inconsistent with random chance (Panel C; *te*=0.020, p=0.13). Together, these results are suggestive, but not conclusive of the potential impact of nomination. Thus, we attempt to strengthen the nomination treatment and increase the sample size in the Phase 2 design.

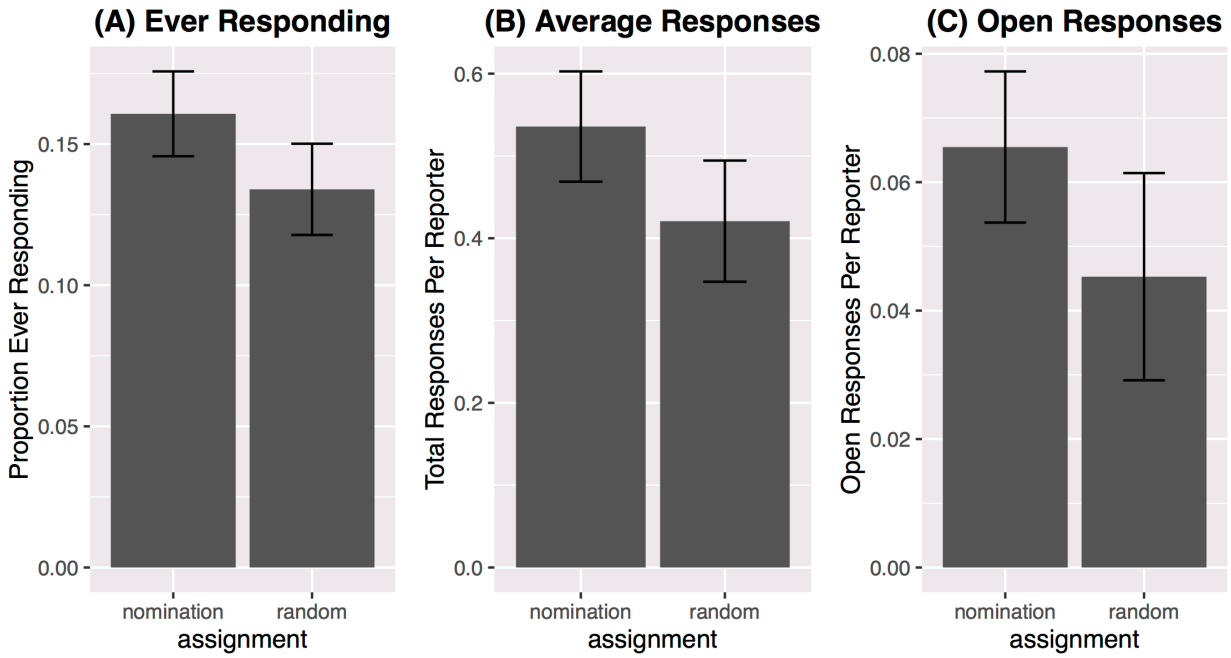

Figure 4. Reporting by recruitment condition during Phase 1. (A) Proportion of reporters who submitted at least one report by recruitment condition; (B) Average number of total reports per reporter by recruitment condition; (C) Average number of open-end reports per reporter on the location of waste piles by recruitment condition. No significant differences in reporting between recruitment conditions identified. All panels display one standard error bars.

6. Findings: Phase 2

In the second experiment, we examine the same three outcomes as a function of the three recruitment and treatment conditions. During Phase 2, we received 6,166 SMS reports that were on-topic and contained information relevant to solid waste management. We report results both for the pooled group of subjects recruited during Phase 1 and 2, as well as the results split by the recruitment phase. Considering first the number of reporters during Phase 2 who submitted at least one, on-topic report about solid waste management during the eight-week period, only the *Responsiveness* condition boosts participation (Table 2). Reporters recruited during Phase 1 from a zone assigned to the responsiveness condition are 50% more likely to be active during Phase 2 than reporters in control zones. Reporters recruited during Phase 2 from a zone assigned to the *Responsiveness* condition are 14% more likely to be active than reporters in control zones. This result indicates that hearing about what the government is doing with the reports can help initiate and sustain engagement in citizen reporting. In contrast, we do not observe any differences in the number of active reporters when

recruiting by either neighbor or LC1 nomination, or when reporters expected the LC1 chairperson to make an announcement about reporters' names at a community meeting. Thus, the evidence suggests that nominations and announcements are not effective at activating reporting on public services in this context, which is good news for policymakers who do not want to needlessly spend extra resources on recruitment and social motivation.

Table 2. Total number of active reporters during Phase 2

	DV: At Least One Report During Phase 2		
	(Pooled)	(P1 Reporters)	(P2 Reporters)
Responsiveness	0.065***	0.096***	0.048**
	(0.017)	(0.027)	(0.023)
Neighbor Nomination	-0.002	-0.002	
	(0.029)	(0.027)	
LC1 Nomination	-0.007		-0.007
	(0.022)		(0.023)
LC1 Announcement	0.028		0.027
	(0.022)		(0.023)
Phase 2	0.133***		
	(0.028)		
Intercept	0.075	0.192***	0.351***
	(0.046)	(0.023)	(0.023)
Observations	2,866	1,021	1,845
F Statistic	16.001***	6.470***	1.955
Note: one-tailed tests		*p<0.1; **p<0.05; ***p<0.01	

Turning to the total number of reports made by each reporter during the 8-week Phase 2 reporting period, we find very similar results, with only the responsiveness treatment driving more reports (Table 3). Pooling zones across recruiting periods, we find that the *Responsiveness* treatment increased the average number of reports per reporter by approximately 0.4 over eight weeks. This result is largely driven by the significant effect that the *Responsiveness* treatment had on treated Phase 1 reporters, among whom the *Responsiveness* treatment increased the number of total reports per

reporter by 83%. In contrast, the *Responsiveness* treatment did not increase the total number of reports by Phase 2 reporters in ways that are highly inconsistent with random chance (for P2 Reporters model, p=0.12). Like the results for active reporters, we do not observe any differences in the number of reports per reporter when recruiting was done by either neighbor or LC1 nomination, or when reporters expected the LC1 to make an announcement about the platform and reporters' names at a community meeting.

Table 3. Total number of reports submitted by each reporter during Phase 2

	DV: Total Number of Reports During Phase 2		
	(Pooled)	(P1 Reporters)	(P2 Reporters)
Responsiveness	0.431***	0.789***	0.232
	(0.144)	(0.200)	(0.194)
Neighbor Nomination	0.002	0.005	
	(0.241)	(0.200)	
LC1 Nomination	0.136		0.129
	(0.179)		(0.194)
LC1 Announcement	0.076		0.073
	(0.179)		(0.194)
Phase 2	1.027***		
	(0.228)		
Intercept	0.107	0.952***	2.272***
	(0.378)	(0.174)	(0.197)
Observations	2,866	1,021	1,845
F Statistic	13.526***	7.773***	0.654
Note: one-tailed tests		*p<0.1; **p<0.05; ***p<0.01	

Finally, we consider the total number of reports by each reporter during the last two weeks of the 8-week reporting period. As pre-registered, we are interested not only in the total effects of the *Responsiveness* treatment and the recruitment conditions, but also whether social motivation or government responsiveness can drive longer-term engagement in the collaborative management of public services. Like previous estimations, we fail to reject the null that any recruitment condition or

that the announcement about reporting by local leadership significantly increased reporting during the last two weeks of Phase 2. We do find, however, that responsiveness from government has a significant and positive effect. The *Responsiveness* treatment boosted reporting by Phase 1 reporters 123% and boosted reporting by Phase 2 reporters 32%. This result highlights how responsiveness is necessary to sustain engagement, even if it is not a predictor of initial engagement. Indeed, our theory predicts greater treatment effects as time elapses, as the beliefs of treated and control subjects diverge.

Table 4. Total number of reports submitted by each reporter during the last two weeks of Phase 2

	DV: Total Number of Reports During Last Two Weeks of Phase 2		
	(Pooled)	(P1 Reporters)	(P2 Reporters)
Responsiveness	0.091^{***}	0.119^{***}	0.075^{**}
	(0.026)	(0.035)	(0.036)
Neighbor Nomination	-0.005	-0.004	
	(0.044)	(0.035)	
LC1 Nomination	0.012		0.011
	(0.033)		(0.036)
LC1 Announcement	-0.007		-0.007
	(0.033)		(0.036)
Phase 2	0.113^{***}		
	(0.042)		
Intercept	-0.002	0.097^{***}	0.233^{***}
	(0.069)	(0.031)	(0.036)
Observations	2,866	1,021	1,845
F Statistic	6.273^{***}	5.661^{***}	1.503
Note: one-tailed tests			*p<0.1; **p<0.05; ***p<0.01

To aid the interpretation of this key finding, Figure 3 shows the proportion of reporters who submitted solid waste reports in response to each of the 15 prompts during the Phase 2 reporting period. The effect of the responsiveness treatment is most pronounced at the end of the reporting period when pooling all reporters. For reporters recruited during Phase 1, responsiveness to reports was critical for

boosting reporting throughout the reporting period. In SI Appendix E, we show that responsiveness boosted engagement both for reporters who were active during both halves of the Phase 1 reporting period and for reporters who became deactivated, indicating that responsiveness can both keep and bring citizens out of the valley of disengagement. For reporters recruited during Phase 2, responsiveness to reports only boosted reporting for the second half of the reporting period, which is consistent with our theoretical predictions. Future research might fruitfully disentangle which components of the omnibus treatment contribute most to the treatment effects that we estimate.

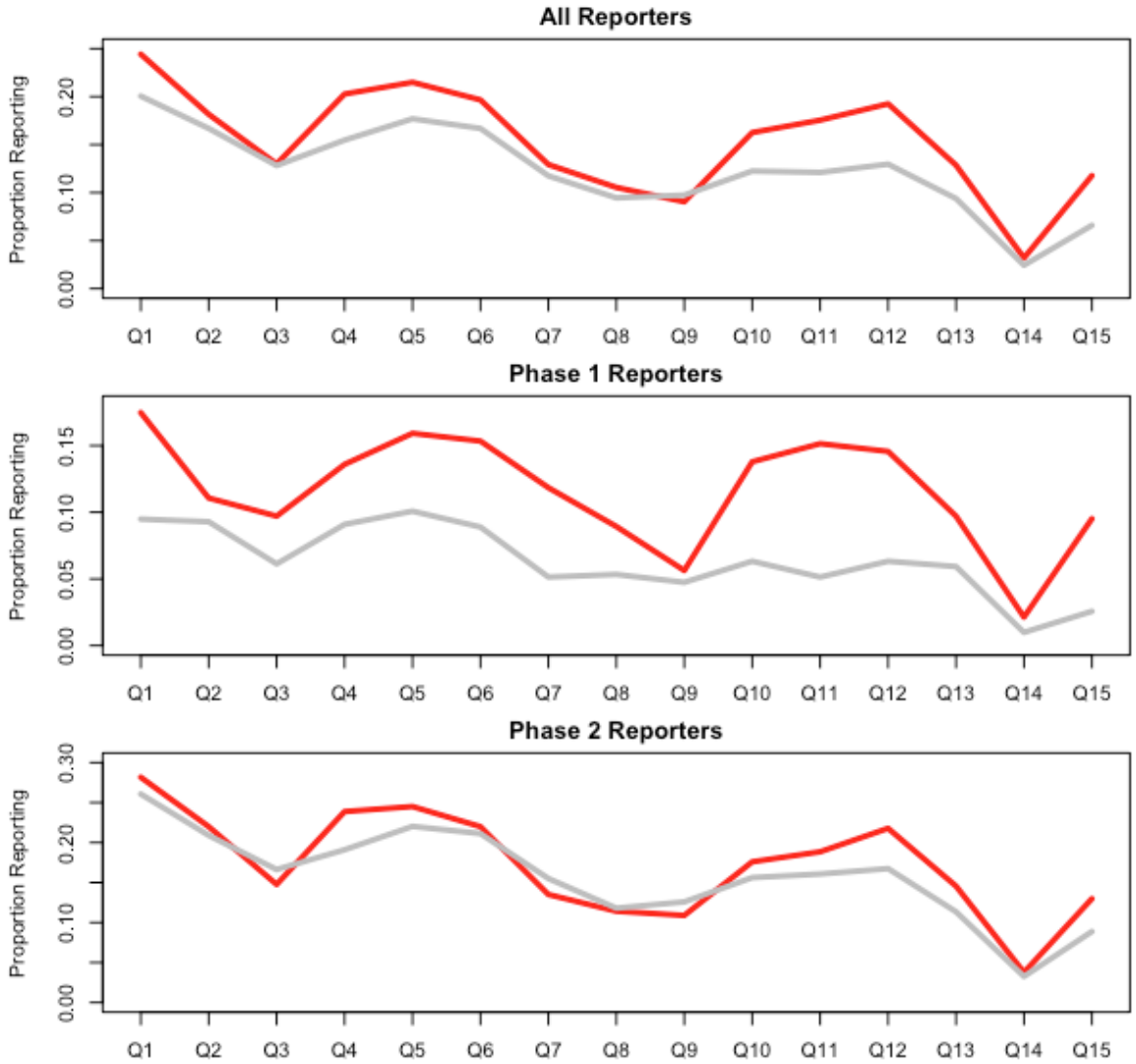

Figure 3. Proportion of reporters responding to each prompt during Phase 2 broken out by phase of recruitment. *Legend:* **red** is reporters assigned to the responsiveness condition, **grey** is reporters assigned to the control condition for responsiveness.

7. Attitudinal and Behavioral Outcomes on Trust in Government

To test the proposition that responsiveness from government increases reporter beliefs that government is responsive to their concerns, we fielded a post-reporting survey to measure reporters' trust in government and their behavioral willingness to help the KCCA manage services apart from solid waste. This survey (instrument available in SI Appendix I), administered five weeks after the Phase 2 reporting period ended, was intended to measure behavioral spillover from experiencing responsiveness from government in other areas of citizen engagement and to assess whether the treatment changed broader attitudes.[7] While responsiveness strongly influenced week-to-week reporting, it appears from the survey data that this effect quickly wears off and does not have long-term implications for attitudes about government and willingness to volunteer time to help government test and create processes for citizen engagement (Figure 4). In no case did volunteers randomly assigned to the *Responsiveness* treatment hold significantly more favorable attitudes about public services or government, measured by stated satisfaction with solid waste services, perceptions of KCCA responsiveness, and trust in government. Likewise, when reporters were asked to volunteer their time to help the KCCA develop and test a more general reporting platform for citizen monitoring across a range of public services, treated reporters were no more likely to volunteer either before or after an SMS reminder. These results intimate that deeper attitudes related to trust in government and willingness to assist future efforts are either difficult to move or the effects of interventions are short-lived.

[7] We find no evidence of differential attrition in the endline survey by the Responsiveness treatment condition (Chi-Squared test, p=0.55).

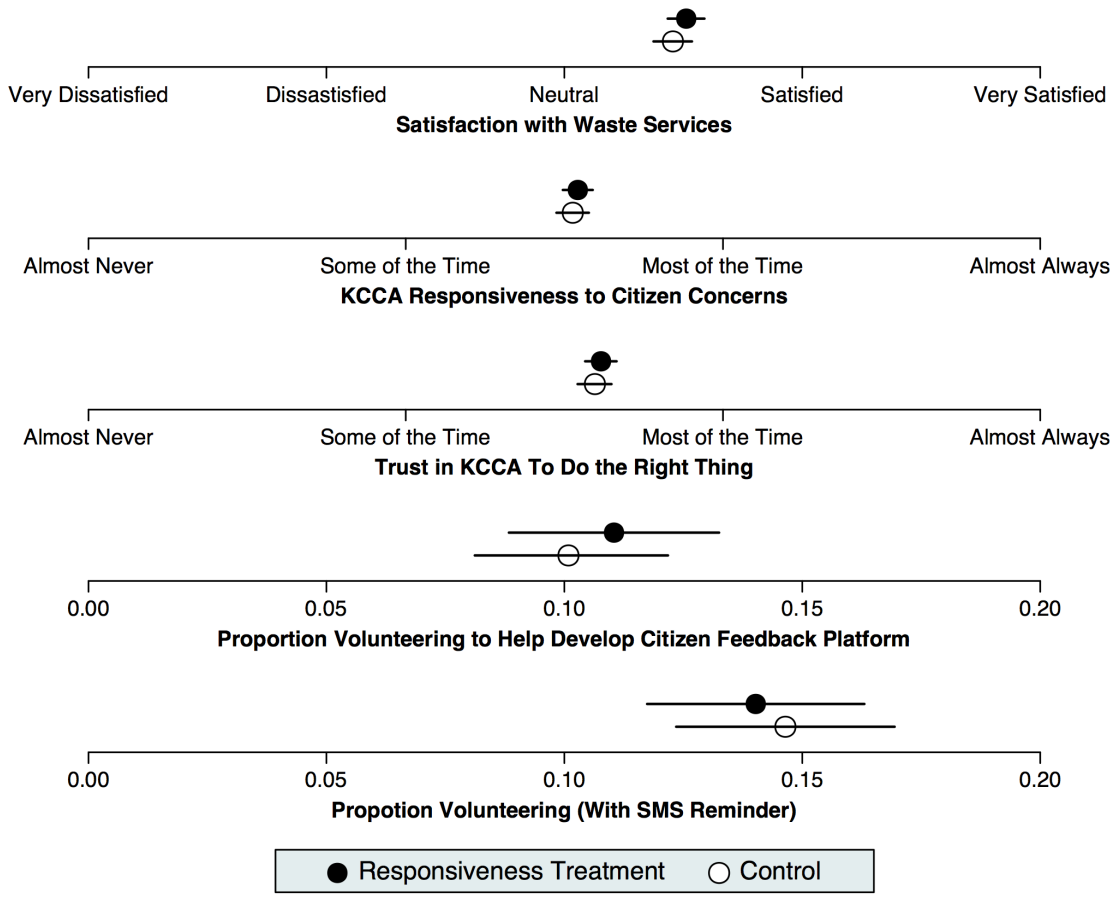

Figure 4. Attitudinal and behavioral responses to the Responsiveness treatment, with 95% CIs.

8. Discussion and Conclusions

Engaging citizens in monitoring public services may be critical to governance, and the text-messaging platform at the core of our field experiments exemplifies the tools that governments now commonly use to engage citizens worldwide (Weerakkody et al. 2015). Yet despite significant effort and investment to engage citizens in governance, many of these efforts nonetheless fail. Many of these failures do not appear in the scientific literature (McGee and Carlitz 2013; Dahlander and Piezunka 2014), making it difficult to understand how new technologies are or are not ushering in good governance.

We theorized that citizens fall into a *valley of disengagement* when they do not believe government is responsive to their concerns. Without input on failing or deficient services, governments struggle to

target services where they are in highest demand and ensure that frontline providers are not shirking. Substandard service delivery leads to further distrust and disengagement of citizens in a negative, self-reinforcing cycle. We theorized that governments might break out of this cycle by recruiting citizens with prosocial attributes, by heightening the social value of public goods and services, and by demonstrating responsiveness to citizen concerns.

To test these hypotheses, we created a partnership with the Kampala Capital City Authority in Uganda and modified an SMS platform to prompt and process thousands of spatially-explicit citizen reports about solid waste services. We find that citizens nominated by neighbors and local leaders – an effort to recruit citizens that value collective goods more highly – did not report significantly more frequently. Likewise, local leaders' announcements of citizen participation also did not increase reporting. From a policy perspective this is good news, suggesting that governments do not need to invest in costly, intensive screening methods to recruit monitors. In contrast, we find strong evidence that reporters who experienced a responsive government, effected through weekly personalized messages sharing real government plans emanating from reports, were significantly more likely to engage over several months.

Our findings are some of the first suggesting the limited effectiveness of attempting to activate community networks through nominations and recognition. These results are inconsistent with other findings on the significance of social networks for driving engagement of citizens in public affairs in Uganda (Blaschke et al. 2013). More broadly, our results offer some caution about the promise of initiating and sustaining collaborative forms of governance by relying on pre-existing social networks for the selection and motivation of citizen monitors, especially where trust in government is low (Olsson et al. 2006; Tkacheva and Bauhoff 2015; Avdeenko and Gilligan 2015).

Alternatively, this study produced strong evidence that government responsiveness can sustain citizen reporting on public services over time. A lack of responsiveness to citizens' reporting efforts might explain the relatively low rates of participation found in many e-governance platforms. However, the evidence also suggests that government responsiveness, while it can raise citizen engagement, does not appear to shift citizens' trust in government nor change their willingness to participate in future governance efforts. Other research suggests that attitudes about government change slowly, and that

important factors influencing citizens' trust in government include perceptions of efficacy (Parent et al. 2005), government responsiveness to citizens (Tolbert et al. 2006; Welch et al. 2005), and political-cultural variables like general satisfaction with democracy (Christensen et al. 2014). Future research might fruitfully parse which components of responsiveness are most effective at sustaining engagement and boosting trust over time. Additionally, subsequent research should investigate how improvements to the public service itself drive citizen engagement in governance.

New technologies hold the potential to make responsiveness more timely and targeted and thus enhance engagement by citizens. In organizing the responsiveness treatment that was part of this study, we were able to take advantage of information systems that sent targeted information to individuals based on their location. The magnitude of responsiveness increased dramatically at costs within reach for a municipal government in a developing country. In light of the widely available tools, the potential to increase citizen engagement in governance is high – provided governments are responsive.

Research has generated mixed evidence about citizen engagement in governance, with recent reviews highlighting the need to better understand feedback loops and the strategic nature of public engagement (Fox 2015). We show that responsive governments cannot depend on ICT without also credibly signaling their commitment to act on the information provided by citizens. By doing so, however, governments may be able to break out of the valley of disengagement, potentially overcoming the self-reinforcing cycle of low citizen involvement and the substandard provision of public goods.

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