

# Media, Common Knowledge, and Violence Against Women: A Field Experiment on Norms Change in Mexico\*

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## Abstract

How does media influence social norms? Two mechanisms have generally been suggested but not rigorously tested at the individual-level. Media may provide information about norms and persuade individuals to accept them (i.e., individual channel). Additionally, media may inform listeners about what other people are learning, creating common knowledge, and thus operate as a coordination mechanism (i.e., social channel). I disentangle these effects with a field experiment in Mexico, examining attitudes toward violence against women. To do so, I analyze the effect of a radio program when it is transmitted individually and privately versus when it is transmitted through social and public outlets. I find no evidence supporting the individual mechanism. The social channel, however, increased personal and perceived social rejection of violence against women, and unexpectedly, also increased pessimism on whether violence will decline in the future.

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# 1 Introduction

Social norms are highly influential in shaping individual behavior, including the use of violence. At the same time, individuals' beliefs about these norms and behaviors are substantively influenced by exposure to information provided by the media. However, while many scholars have studied the effect of media on people's beliefs and behavior, the underlying logic behind this process remains unclear. Two very different mechanisms have been suggested but not rigorously tested.

One is a *direct or individual* mechanism where media provides information about norms and persuades individuals to accept them. In this view, individuals go through a process of learning and belief formation (DellaVigna and Gentzkow, 2010; Bandura, 1986). The second one is an *indirect or social* mechanism where media operates as a coordination device. Coordination is needed since one can conceptualize social norms as coordination problems, that is, situations in which each person wants to participate only if others participate as well (Mackie, 1996; Chwe, 1998). If this is the case, the provision of *public* information can enhance coordination on that norm through the creation of common knowledge (Chwe, 2001; Mackie, 1996).

While the individual mechanism would have an effect regardless of the dissemination method, the social one would be stronger when dissemination has a public component. Hence, I argue that information has a very different effect when it is transmitted *individually and privately* (for example, through individual leaflets) than when it is transmitted through more *social or collective outlets* (such as mass media or public meetings). That is, *how* information is provided is important to fully understand the mechanisms behind its influence.

This paper aims to disentangle the extent to which information acts through the individual mechanism (via persuasion) versus the extent to which it does so through the social mechanism (via higher-order beliefs).<sup>1</sup> While these issues have been re-

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<sup>1</sup>Higher order beliefs refer to the beliefs individuals hold about the beliefs of others,

cently raised in the literature, they have not been tested at the individual-level. [Yanagizawa-Drott \(2014\)](#) analyzes the effect of Rwanda's 'hate radio' during the 1994 genocide. He argues that the broadcast increased participation in violence through both the individual and social mechanisms. However, the empirical analysis is unable to explicitly test these mechanisms at the individual-level.<sup>2</sup> Similarly, [Gottlieb \(2014\)](#) analyzes the effect of a village-level (i.e., public) informational intervention on political accountability in Mali. She finds evidence that the informational effect on voting simulations increases when the information reaches a larger number of villages in the commune. A different strand in the literature can be read as positing the individual and social channels as competing ones. Both [Paluck \(2009\)](#) and [Staub and Pearlman \(2009\)](#) analyze the effect of a reconciliation soap-opera in Rwanda aimed at reducing prejudiced behavior, but they disagree on whether the individual or social mechanism is the main driver of social outcomes. Critically, media interventions in the literature have mostly been public. Hence, by design, they induce common knowledge precluding the isolation of the social component from the individual one. To the best of my knowledge, no field experiment has manipulated these avenues of change. Thus, the relative strength of each particular mechanism remains unknown.

The goal of this paper is to fill this gap by providing evidence from a randomized field experiment in rural Mexico designed to disentangle the aforementioned effects at the individual-level. I study the effect of an audio soap-opera on a particular set of values and behaviors, namely attitudes toward violence against women. The issue of violence against women is an important and well suited case for studying the influence of media, namely for three reasons. First, violence against women is a global 

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the beliefs individuals hold about the beliefs that others hold about the beliefs of others, and so on.

<sup>2</sup>In [Yanagizawa-Drott's \(2014\)](#) empirical analysis, data is aggregated at the village-level. Nevertheless, the results strongly support the social mechanism.

concern. It is a violation of human rights and has extensive pernicious consequences that range from the direct physical and mental harm for women and their children to economic losses at the individual and national level. Second, in past years, development programs to improve women's economic, political, and social status have attracted substantive attention from researchers and policy-makers alike (e.g., [Duflo, 2012](#); [Beath, Christia, and Enikolopov, 2013](#); [Bush, 2011](#); [Giné and Mansuri, 2012](#)). It is crucial to enhance our understanding of the mechanisms behind particular policy interventions, such as social norms marketing, in order to improve their design and efficacy. Finally, the case of violence against women lends itself for studying the influence of media on social norms. Existing evidence supports the link between media and social norms related to violence against women. [Jensen and Oster \(2009\)](#) show that the introduction of cable television in India exposed viewers to new information about the outside world and other ways of life, decreasing the reported acceptability of violence toward women. But this effect could also be explained by the publicity of the media, which can plausibly influence social norms via coordination. This is because attitudes and behavior related to this type of violence can be understood as a coordination problem where strategic complementarities arise, namely participating in the cultural acceptance of violence is contingent upon the participation of others.

I partnered with the UNESCO Office in Mexico to implement the media intervention in San Bartolomé Quialana, a small rural, indigenous community in Oaxaca, Mexico, during May-June 2013. The soap-opera program analyzed here was designed to challenge norms of gender roles and, in particular, discourage violence against women. While holding the soap-opera content fixed, the experiment manipulated the social context in which individuals were able to receive the program.

The research design uses a randomization process which interacts with exogenous topography conditions that precluded parts of the community from accessing the broadcast. The area outside the loudspeaker's reach provides the leverage to

test the individual mechanism. Within this area, households were randomly invited to listen to the program, individually and privately, using an audio CD (*Individual broadcast*). Here, individuals were unaware of others listening to the program, precluding common knowledge creation and coordination, thus isolating the individual effect. On the other hand, the area within the loudspeaker's reach allows us to test the social mechanism. In this area, all households were able to listen to the program (*Public broadcast*). In addition, households were also randomly invited to listen to the program, but in a common place (*Group broadcast*). This might facilitate the generation of common knowledge and, importantly, aims to match the invitation-component of the Individual broadcast treatment. As such, the design created four treatment conditions as shown in Table 1.

[Table 1 about here.]

I find that media influence on social norms is driven by social effects rather than individual persuasion. I also find that social interactions such as community meetings are not necessary conditions for such social effects. The evidence suggest that the social channel decreased personal and perceived social acceptance of violence against women, while also increasing pessimism on whether violence will decline in the future. These effects were generally stronger with less-educated and older individuals. In contrast, the results show that the individual mechanism had no effect.

A central empirical concern is that systematic differences may exist between the areas with and without broadcast access, which could potentially affect attitudes toward violence against women. I argue that this does not appear to be the case, showing that a battery of individual and household characteristics are balanced between the two areas. Given the small size of the town and the nature of the treatment conditions, another concern is that the design could have been vulnerable to spill-overs. However, as I further discuss below, the experiment was designed to address this is-

sue to the extent possible, and most importantly, the presence of spill-overs would bias against the findings of the paper.

A growing literature has demonstrated that exposure to information provided by media outlets such as radio and television can influence a wide range of attitudes and behaviors. Mass media can impact political outcomes such as electoral behavior (Gentzkow, 2006; DellaVigna and Kaplan, 2007; Enikolopov, Petrova, and Zhuravskaya, 2011) and support for complex and contentious policies (Hayes and Guardino, 2011). Other studies investigate the effects of radio and television on social outcomes. Television can impact social norms like social trust (Olken, 2009) as well as attitudes toward out-group members (Gentzkow and Shapiro, 2004) and discrimination against women (Jensen and Oster, 2009). In the same vein, recent research has explored the influence of the media content in and of itself. For instance, entertainment soap-operas can increase divorce rates (Chong and La Ferrara, 2009) and reduce fertility rates (La Ferrara, Chong, and Duryea, 2012). Similarly, ‘education-entertainment’ soap operas can influence beliefs and norms about intergroup tolerance (Paluck and Green, 2009; Paluck, 2009).

This paper contributes to this literature by empirically distinguishing the individual and social effects of media influence. This is important for several reasons. First, it improves our understanding of the mechanisms through which media impacts social norms; these estimates help resolve an extant puzzle in the empirical literature on media influence. Second, such estimates are critical for thinking about questions of policy interventions. For instance, knowing the magnitudes of these two effects would allow media intervention designers to better assess whether they should focus on public or private programs. Third, it also shed light on the way media interventions may have pernicious or unintended effects.

The rest of the paper is organized as follows. The next section expands on the theoretical framework, followed by the research design. The empirical strategy and

results are presented afterwards. Finally, the last section concludes and discusses avenues for future research.

## 2 Theoretical Framework

Social norms are highly influential in shaping individual behavior, including discrimination and violence against a specific group, such as women. Norms can protect against violence, but they can also support and encourage the use of it. For instance, acceptance of violence is a risk factor for all types of interpersonal violence (Krug, Dahberg, and Mercy, 2002). As such, behavior and attitudes related to violence toward women are shaped and reinforced by social norms in general, and gender stereotypes and expectations within the society in particular. These norms persist within society because of individuals' preference to conform, given the expectation that others will also conform (Mackie, 1996). That is, participation in such norms and behaviors is a coordination problem as it is contingent upon the participation of others. This is because people are motivated to coordinate with one another when there are strategic complementarities: Social approval is only accrued by an individual if a sufficient number of people express their attitudes and behave in a similar way. Conversely, social sanctions can be inflicted on those with different expressed attitudes and behaviors if others do not join them.

Because of these considerations, numerous policies and programs have embarked on ambitious campaigns to address violence against women by promoting changes in social norms. Many of these strategies for social change take the form of media-driven information interventions, such as TV or radio soap operas. These efforts raise fundamental questions about the extent and the conditions under which media can influence social norms. Building upon the burgeoning literature on media effects, media influence can be decomposed into two effects: (1) an individual or direct effect,

and (2) a social or indirect effect.

**Individual or direct effect.** The individual or direct effect of media relies on persuasion. The emphasis is on the persuasive power of the content, which ignites an individual learning process, updating personal values and beliefs (DellaVigna and Gentzkow, 2010; Staub and Pearlman, 2009). This ‘individual educational process’ is in line with arguments put forward by social learning theory,<sup>3</sup> where the educational effect of the media works via media personalities as educational role models (Bandura, 1986). These educational role models are able to perform an instructive function, and transmit knowledge, values and behaviors among others. One can find arguments that solely focus on how people are (individually and privately) persuaded, such as the following:

Characters representing relevant segments of the viewing population are shown adopting the beneficial attitudes and behavior patterns. Seeing people similar to themselves change their lives for the better not only conveys strategies for how to do it, but raises television viewers’ sense of efficacy that they too can succeed. Viewers come to admire, and are inspired by, characters in their likenesses who struggle with difficult obstacles and eventually overcome them. (Bandura, 2004, p. 83)

**Social or indirect effect.** Media can also have an effect via a social mechanism. Here, media influence is rooted in the fact that it provides information that can enhance coordination on a norm or action through the creation of common knowledge (Chwe, 2001). This is because media’s method of delivery is a public one. Information that is known to be publicly available helps individuals to form an understanding of their shared beliefs (Mutz, 1998). Public information not only causes individuals to update their personal beliefs, but also allows them to update their beliefs about how

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<sup>3</sup>Also referred to as social cognitive theory.

widely these beliefs are shared (Morris and Shin, 2002).<sup>4</sup> In this vein, some authors argue that “attempts to change public behaviors by changing private attitudes will not be effective unless some effort is also made to bridge the boundary between the public and the private.” (Miller, Monin, and Prentice, 2000, p. 113).

Because of this, I argue that the method of dissemination of information is a significant driver of individuals’ beliefs and behavior. A *public* transmission of information –vis-à-vis a *private* one– facilitates the creation of common knowledge, thus increasing its influence on social norms.<sup>5</sup> This is the main hypothesis of this paper:

**Hypothesis 1 (Common Knowledge).** *The effect of an information intervention on attitudes and norms is greater when the method of delivery is public.*

A public method of delivery helps bring about, but by no means guarantees, common knowledge and coordinated action (Chwe, 1998). In reality, individuals might not know with certainty that others received the information, and thus everyone who received such information might not know with certainty that everybody else that received the information knows that others received the information, and so on. In other words, a public method of delivery may nonetheless be affected by some degree of uncertainty about whether others received the information. However, this degree of uncertainty is influenced by the type of social interactions created by the condi-

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<sup>4</sup>Here, public information is used to know that others received the information, and that everyone who received the information knows that everybody else that received the information knows this, and so on.

<sup>5</sup>Arguably, ‘strong’ and ‘weak’ hypotheses can be derived. The strong hypothesis would imply that only by increasing the publicness of the information above a certain threshold one should expect an effect. The weak version would postulate that by increasing publicness one is able to increase the effect. Differentiating between these two is beyond the scope of this paper. For evidence in this regard see Gottlieb (2014).

tions under which media is received. In particular, certainty can be bolstered through face-to-face interactions, such as community meetings (Chwe, 2001). Indeed, public community meetings have proven to be effective in achieving attitudinal and behavioral changes. Mackie (1996) describes the abandonment of female genital mutilation (FGM) practices and points out to the role of town meetings where the commitment to abandon FGM was publicized to the entire community. A recent field experiment in Benin finds that public meetings discussing programmatic platforms reduce the extent of clientelism (Fujiwara and Wantchekon, 2013). However, these type of community meetings might also facilitate other type of interactions, such as deliberation, which may confound the effect of common knowledge.

Hence, to address this heterogeneity within the public dissemination of information, one might also seek to explore the extent to which different levels of uncertainty and potential social interactions moderate the impact of information. However, the literature has been unable to unpack the public component from the face-to-face component. This raises the question of whether the public transmission of information is a necessary *and sufficient* condition to influence norms. I put such claim at test with the second hypothesis of this paper:

**Hypothesis 2 (Public Signal).** *A public method of delivery is a necessary and sufficient condition for an information intervention to influence attitudes and norms (i.e., no social interaction is required)*

### **3 A media intervention in San Bartolomé Quialana**

To test these hypotheses, I conducted this study in partnership with the UNESCO Office in Mexico under a UN Joint Program to prevent violence against women.<sup>6</sup> The

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<sup>6</sup>This program, “Construcción y Evaluación de un Modelo Integral para la Prevención de la Violencia de Género, en Poblaciones Indígenas de México desde un

overall initiative was implemented in a handful of communities in the states of Oaxaca and Chiapas, but the media intervention was specifically devised for San Bartolomé Quialana.

San Bartolomé Quialana (or simply Quialana) is a small rural, indigenous community located in the state of Oaxaca. The key features of San Bartolomé Quialana are broadly characteristic of rural, indigenous municipalities in the rest of Mexico. As of 2010, Quialana had a population of 2,470 habitants with 591 households.<sup>7</sup> Approximately 4 out of 5 people speak both Spanish and Zapotec (the local indigenous language) while the rest speak only Zapotec. Around 47% of the population lived under the national poverty line, which was slightly above the median percentage for municipalities in the region.<sup>8</sup>

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Enfoque Intercultural”, was put forward by UNDP, UNICEF, UNFPA, ECLAC, and UNESCO. See <http://www.onu.org.mx/proyectos.html>. Last accessed: October 26th, 2014.

<sup>7</sup>The Appendix provides additional demographic information about Quialana. Table A1 shows the population distribution by age and gender and Figure A1 shows the population distributed across blocks, data which was used when designing the sampling.

<sup>8</sup>The CONEVAL (National Council for the Evaluation of Social Development Policy) considers a person to be below the (multidimensional) poverty line when the exercise of at least one of her six social rights is not guaranteed *and* if she also has an income that is insufficient to buy the goods and services required to fully satisfy her needs. These six social rights are: education (access and years completed), access to health services, access to social security, housing (quality and space), basic services (water, sewer, electricity) and food security. As of 2012, CONEVAL defined the income based component of poverty in rural areas as those surviving on no more than USD 113 per month. The median population percentage under the poverty line in Oaxaca was

Although issues of gender equality are important throughout Mexico, they are particularly salient in the Southwestern States of Oaxaca and Chiapas. Levels of gender inequality and violence against women in San Bartolomé Quialana are broadly comparable with other municipalities in the region. As of 2005, its Gender Inequality Index (GII) was 0.66, slightly below the median for the State of Oaxaca (0.70) and equal to the median for the State of Chiapas (UNDP, 2009).<sup>9</sup>

For the purposes of this paper, an important aspect of Quialana is its cultural homogeneity. For instance, as of 2010, out of the 2,470 habitants, 2,412 were born and raised in Quialana. Another example of Quialana's cultural homogeneity is found in its habitants' religion, where approximately 90% are catholic. This is important since the ability to focus on a single community, holding cultural and social aspects 'constant,' makes it easier to isolate the individual-level informational mechanisms that drive media influence on attitudes and social norms.

### 3.1 The Soap-opera

The media intervention consisted of an audio soap-opera designed to challenge gender role norms and discourage violence against women. Entitled *Un nuevo amanecer en Quialana* (*A new dawn in Quialana*) it was produced in conjunction with a regional partner NGO and it included 4 episodes of approximately 15 minutes each, for a total running time of 57 minutes. The soap-opera was embedded in the local context featuring common reference points such as 'Tlacolula's market'. Framing the soap-opera in a way that makes it easy for the viewers to directly relate to the situations portrayed can increase its effect (La Ferrara, Chong, and Duryea, 2012). The plot evolved around a young couple who fell in love and started a family in Quialana. The 41.35% (mean = 39.92, s.d. = 19.22) and in Chiapas was 39.57% (mean = 43.39, s.d. = 17.47).

<sup>9</sup>Mean values (and s.d.) were .70 (.07) for Oaxaca, and .66 (.07) for Chiapas.

narrative was developed such that the leading male character gradually transformed from a loving and caring husband to a violent and aggressive figure. Research in the ‘entertainment-education’ literature shows that the male figure should not be displayed as a completely violent character from the outset so that listeners can create a rapport with him and not disregard his behavior as an exception (Singhal et al., 2003). In the same vein, the language of the script used injunctive norms (Paluck and Ball, 2010). For instance, instead of arguing “*beating women is wrong*” the soap-opera would say “*the citizens of Quialana believe that beating women is wrong*”. This actually biases against the main hypothesis of this paper since those in the *Individual Broadcast* treatment are exposed to these injunctive norms. One caveat of the narrative, however, is that because of structural constraints it did not contain channel factors to act out these norms.<sup>10</sup>

*Un nuevo amanecer en Quialana* was broadcasted using the community loudspeaker, located in the Town Hall. A particular feature of this loudspeaker was the variation in its reach. I leveraged this peculiarity in my research design, further described below.

## 4 Research Design

The research design combines two sources of variation to manipulate the method of delivery and the social context in which people are able to receive the media intervention. In particular, the publicness of the information is approximated by (1) exploiting arguably exogenous variation generated by the topography of the commu-

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<sup>10</sup>Channel factors are small but critical factors that facilitate or create barriers for behavior. One example of a successful channel factor was the promotion of a telephone hotline number that provides information to callers and can refer them to service providers (Singhal et al., 2003).

nity (i.e., within community variation of ‘broadcast access’), and (2) conducting a completely randomized field experiment to manipulate the social context in which the media intervention was implemented. I further describe each one below.

## **4.1 The Loudspeaker: Topography & Sound Check**

The design exploits arguably exogenous variation in the Town Hall loudspeaker’s reach to define two areas within Quialana: (1) the area *within the loudspeaker’s reach*, and (2) the area *outside the loudspeaker’s reach*. Only the latter provides a fertile ground to test the individual mechanism. This within community variation is mainly a product of topography conditions: from one end of the municipality to the other there is an altitude difference of more than 500 feet. To determine the precise boundaries between the two areas, I conducted a sound check to measure the loudspeaker’s reach.

[Figure 1 about here.]

Figure 1 shows the loudspeaker’s reach. Households on the bottom-left of the dividing line are within the loudspeaker’s reach, whereas those on the upper-right side are not.

### **4.1.1 Balance**

A valid concern is that systematic differences may exist between those in the area within the loudspeaker’s reach vis-à-vis those located in the area outside the loudspeaker’s reach, which could potentially be correlated with attitudes toward violence against women. While one of the advantages of conducting the study within a single community is precisely being able to leverage the cultural homogeneity and ameliorate concerns about structural differences, it is yet necessary to back-up this argument with evidence. To do so, I rely on data from the 2012 National Housing

Inventory.<sup>11</sup> I use a battery of individual characteristics (e.g., economically active female, born outside Quialana, catholic religion, etc.) and household characteristics (e.g., male head of household, 3 or more occupants per room, radio and television ownership, etc.), covering both social and economic indicators. Table 2 shows *t*-test statistics for difference in means of these variables. None of them show statistically significant differences at conventional levels, providing compelling evidence on the balance between the two areas.

[Table 2 about here.]

## 4.2 Randomization: Group & Individual Broadcasts

Leveraging the two areas described above, I conducted a randomized field experiment. Within each area, households were randomly invited to listen to the soap-opera via systematic sampling, creating the *Group* and *Individual Broadcast* treatments. Here, the experiment was able to hold the content of the media program constant while varying the social context in which it was received. In the area within the loudspeaker's reach, households were invited to listen to the program in the cafeteria next to the Municipal building (i.e., *Group Broadcast*). In the area outside the loudspeaker's reach, households were invited to listen to it in their homes using a CD-rom (i.e., *Individual Broadcast*). The regional partner NGO served as the public face of the treatments, which were presented as part of an initiative to create a local radio station.

In order to test the individual mechanism, the invitation to listen to the soap-opera (via the CD-rom) had to be privately delivered to the household.<sup>12</sup> CD-roms were handed out along with a short questionnaire meant as a listening-check device:

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<sup>11</sup>Web: <http://www3.inegi.org.mx/Sistemas/Mapa/Inv/Default.aspx?i=en>

<sup>12</sup>Caution was taken to prevent households from believing that other households were also receiving the program. Enumerators were trained to keep away from sight

the enumerator would leave the CD-rom and questionnaire sheet and then stop by a couple of hours later to pick up the sheet.<sup>13</sup> To test the social mechanism, the design had to create a comparable treatment group. This is the logic behind the *Group Broadcast*, where the invitation to listen the soap-opera (via the community meeting) matches the invitation component of the *Individual Broadcast*.

Moreover, the *Group Broadcast* provides leverage for further exploring the effects of public information. By creating a very particular form of social interaction (or at least knowledge about it), namely the group meeting, the Group treatment might increase the level of certainty individuals' have about others receiving the information, and so on. At the same time, this common knowledge mechanism might be confounded by other potential interactions facilitated by the meeting, such as deliberation. Inasmuch these interactions are indeed facilitated by the creation of common knowledge, the design is able to disentangle the social and individual mechanisms of media influence. However, to fully understand the social mechanism, one needs to explore whether the public transmission of information is a necessary *and sufficient* condition to influence norms. To potentially address this, the design created a public treatment without imposing such social interactions: households who were able to listen to the broadcast by being within the loudspeaker's reach but were not in the Group condition constitute the *Public Broadcast* treatment. Finally, households outside the loudspeaker's reach who did not receive the CD-rom represent the *baseline group*. These four conditions, with the number of households assigned to them, are summarized in Table 1.

An efficient estimation of each mechanism relies on the notion that those who receive all CD-roms but the one delivered to the household.

<sup>13</sup>The questionnaire consisted on rating the soap-opera, asking the name of the character with whom they identified the most, and providing some blank space for comments. Take up was 100%.

ceive the individual treatment are unaware of other treatments. Given the small size of the town and the nature the treatment conditions, the design was vulnerable to spill-overs. However, such spill-overs would bias against the main hypothesis of the paper. This is because those in the individual condition might find out that other people were also receiving the soap-opera. Nevertheless, in order to minimize potential spill-overs, invitations for the *Group Broadcast* were given out on a Friday. Both treatments were administered the next day: the *Individual Broadcast* treatment was conducted on Saturday –starting early in the morning, and the *Group and Public Broadcast* was also implemented during that evening. In the same vein, I faced a trade-off between minimizing these spill-over concerns and maximizing the intensity of the treatment. For the former, the ideal was to minimize the time between the treatments and the survey. For the latter, just as other media interventions have done, the ideal was to implement a weekly soap-opera over several weeks or months. Since the main goal of this study is to analyze the underlying mechanisms of media influence, I prioritized addressing the spill-over concerns at the expense of a limited intensity of the treatment. Thus, the media intervention was implemented as a one day event only, and the surveys were administered over the following few days.

### **4.3 Outcome measurement**

The regional partner NGO also served as the public face of the survey, which was presented as a mean to retrieve the opinion of Quialana citizens to inform and promote an initiative for creating a local radio station.<sup>14</sup> I evaluate four outcomes of interest, which I describe in detail below.

The first dependent variable is a measure of *Personal beliefs* aimed at capturing the extent to which people believe and are willing to state that violence against

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<sup>14</sup>Surveys were collected from June 3 to June 5. Enumerators were aware of the treatment differences but they were blind to the research hypotheses.

women is a recurring problem in the community. The question asked was “*Do you think that violence against women is something that happens here in Quialana?*” and it was coded from 1 (“*No, this never happens here in Quialana*”) to 5 (“*This happens too much in Quialana*”).

The second variable of interest captures *Perceived social rejection*. That is, the extent to which an individual believes that the community believes violence is a problem. The question was “*Do you think that that the community, the neighbors, and other families see violence against women as a serious problem here in Quialana?*” with responses coded from 1 (“*No, they do not see it as a problem at all*”) to 4 (“*They see it as a serious problem that needs to change*”).

The third variable, *Expectations about the future*, measures individual expectations that this type of violence will decline in the future. The question was “*Do you think the next generation of Quialana males...?*” with answers being coded from 1 (“*Will abuse women more*”) to 4 (“*Will never abuse women*”). That is, higher values represent more optimistic views about the future.

Finally, a behavioral measure was retrieved. Survey respondents were asked if they would sign a petition to support the creation of a violence against women support group: the variable *Petition signature* is coded 1 if they did, 0 otherwise.

Moreover, three key covariates were collected, namely an indicator for *Female* gender, respondent’s *Age*, and *Education*. A total of 201 households were surveyed. When available, both the male and female heads of the households were surveyed. This generated a maximum of 340 observations. Table 3 displays the descriptive statistics.

[Table 3 about here.]

### **4.3.1 Randomization Check**

Before moving on to the discussion of the empirical strategy and results, this section presents evidence of the soundness of the randomization procedure. Results are

shown in the Appendix but briefly discussed here. I use a multinomial logistic regression in which the dependent variable indicates the assignment to one of the four experimental groups and check whether any baseline covariate predicted membership to one of the treatment groups. The first set of results are shown in Table A2. The Age variable appears to be a significant predictor, while all variables together are jointly insignificant ( $p$ -value = .45). However, the result of Age is a product of outlier observations. Table A3 shows that, excluding 7 outliers (Age 80 or above), Age is no longer a statistically significant predictor of assignment into any of the treatment conditions. As further checks, I re-run the first estimation with the full sample, including the squared term of Age, and alternatively, including cubic splines of Age. Results are shown in Tables A4 and A5, respectively. None of the variables are statistically significant predictors and they are always jointly insignificant ( $p$ -values from .45 to .77). Overall, this suggests that the randomization process was indeed successful.

As an additional check on the quality of the sample, I analyze its representativeness on age and gender with data from the 2010 National Census (shown in Table A1). Table A6 shows a simple frequency comparison. The evidence convincingly points to a high level of representativeness, suggesting that the overall sampling process was also successful.

## 5 Empirical Strategy

The empirical strategy relies on estimating intention-to-treat effects (ITT). ITT is the appropriate estimation when analyzing the gross impact of any given intervention and when noncompliance patterns may arise.<sup>15</sup>

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<sup>15</sup>For instance, roughly 1 in 4 people invited to the *Group Broadcast* actually went to the cafeteria –i.e., received the treatment.

In this particular set up, however, the invitation to the Group Broadcast (i.e., the assignment to treatment) matches the theoretical motivation behind the treatment itself. That is, the invitation provides specific information about how the soap-opera is going to be disseminated (i.e., there will be a broadcast and an event where people are able to receive the program together) thus facilitating the creation of common knowledge.<sup>16</sup>

I conduct the analysis using OLS, with two empirical strategies, namely (1) *Group* versus *Individual* Broadcast and (2) all four treatment conditions.<sup>17</sup>

## 5.1 Social and Individual Mechanisms: Group versus Individual Broadcast

The first empirical strategy focuses on testing the *Group* and *Individual* Broadcast treatments against each other, as follows:

$$Y_{i,h} = \phi + \alpha \text{GroupBroadcast}_h + \mathbf{X}'_i \theta + \epsilon_{i,h} \quad (1)$$

and

$$\mathbf{X}'_i \theta = \text{Female}_i + \text{Age}_i + \text{Education}_i$$

where  $i$  indexes individuals and  $h$  households;  $Y_{i,h}$  represents the outcomes of in-

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<sup>16</sup>This also has implications for estimating local average treatment effects (LATE) since it may be read as a violation of the exclusion restriction. This precludes an unbiased estimation of the LATE.

<sup>17</sup>Results using (ordinal and binary) logistic models are presented in the appendix; results do not change.

terests aforementioned (continuous variables are expressed in standard deviations of the distribution of responses in the *Individual Broadcast* condition);  $GroupBroadcast_h$  is an indicator for whether the household was invited to the *Group Broadcast*. In this estimation, those in the *Individual Broadcast* treatment –i.e., living outside the loud-speaker’s reach *and* invited to listen to the CD-rom– constitute the baseline category. For efficiency gains, I include a vector of controls which consist of an indicator for Female gender, respondent’s Age, and Education which denotes a schooling indicator for whether the respondent (1) never attended school, (2) attended but did not finish primary school, or (3) finished primary school. Finally, the error term  $\epsilon_{i,h}$  is an individual error term allowed to be arbitrarily correlated within households but independent otherwise. Having assigned the treatments to households, I cluster the standard errors at the household-level.

The coefficient of interest in Equation (1) is  $\alpha$ ; it captures the social mechanism underlying media influence. In particular, Hypothesis 1 predicts  $\alpha > 0$ . Nonetheless, I test it with a two-sided test.

## 5.2 All treatment conditions: Full sample

The estimates of the *Group Broadcast* are able to isolate the social effects induced by common knowledge. However, they might be influenced by the increased certainty created by the face-to-face interaction, and might potentially be confounded by other social interactions –facilitated by the community meeting– such as deliberation. To address this and understand the extent to which a public method of delivery is a necessary *and* sufficient condition to influence norms, I rely on the full sample. Analyzing the full sample allows estimating the effect of each treatment by comparing it to the control group. To do so, I use the following estimation:

$$\begin{aligned}
Y_{i,h} = & \phi + \alpha \text{GroupBroadcast}_h + \gamma \text{PublicBroadcast}_h + \beta \text{IndividualBroadcast}_h \\
& + \mathbf{X}'_i \theta + \epsilon_{i,h}
\end{aligned} \tag{2}$$

where

$$\mathbf{X}'_i \theta = \text{Female}_i + \text{Age}_i + \text{Education}_i$$

As in the previous section,  $Y_{i,h}$  represents the aforementioned outcomes variables (continuous variables are expressed in standard deviations of the distribution of responses in the baseline condition) and  $\mathbf{X}'_i$  is the vector of controls. In the same vein,  $\text{GroupBroadcast}_h$  is an indicator for whether the household was invited to the *Group Broadcast*;  $\text{IndividualBroadcast}_h$  is an indicator for whether the household was instead invited to the *Individual Broadcast*.<sup>18</sup>  $\text{PublicBroadcast}_h$  is an indicator for whether a household is within the loudspeaker's reach but was *not* invited to the *Group Broadcast*. Finally, those living in the individual area without treatment represent the *baseline category*.

In Equation (2), the coefficients of interest are  $\alpha$ ,  $\beta$ , and  $\gamma$ . They measure the effect of the media intervention and, by design, can shed light on the different potential mechanisms. In this case, Hypothesis 1 predicts  $\alpha > \beta$  and  $\gamma > \beta$ , and more specifically, Hypothesis 2 predicts  $\gamma > 0$ . Again, I test the hypotheses with a two-sided test.

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<sup>18</sup>*Individual Broadcast* was the baseline category in the previous empirical strategy.

## 6 Results

### 6.1 Social and Individual Mechanisms: Group versus Individual Broadcast

In this section, I explicitly test to what extent media influence is driven by the social vis-à-vis the individual mechanism. Table 4 displays the results as follows: rows show the results for each dependent variable while columns show the coefficient of the *Group Broadcast* indicator (i.e.,  $\alpha$ ) from two different specifications. The first column displays the simplest specification possible, using only the social treatment indicator, while the second column includes the survey covariates (i.e., Female, Age, and Education). A summary of the results is illustrated in Figure 2.

[Table 4 about here.]

[Figure 2 about here.]

The first set of results correspond to the influence on Personal beliefs. The evidence suggests that those invited to the Group Broadcast were more likely than those invited to the Individual Broadcast to state that violence against women is a recurring problem in Quialana. The parameter estimate gains precision when introducing controls but remains stable ranging from .33 to .37 standard deviations relative to the Individual Broadcast condition, and is statistically significant at conventional levels.

When looking at the Perceived social rejection, the evidence points in the same direction: there is strong evidence supporting the social mechanism. The estimates are remarkably stable (.66 and .67) and statistically significant ( $p < 0.01$ ).

The third set of results pertain to how the program affected Expectations about the future. The estimates of the Group Broadcast invitation are negative, very stable (−.48 and −.49) and statistically significant, suggesting that those invited to the Group Broadcast were more pessimistic about the decrease of violence in the future.

This arguably perverse effect could be explained by several factors. One explanation might be that, while the Group Broadcast induced coordination around a new injunctive norm (i.e., people in Quialana should reject violence) it also raised awareness and facilitated coordination around a more subtle descriptive norm, namely that violent behavior is prevalent in the community. This more precise belief about the current situation of the community, coupled with the fact that the soap-opera did not offer any channel factors to act upon it, might have induced pessimistic expectations for the future extent of violence. Another explanation is that, as a result of the new common knowledge, individuals in the Group Broadcast treatment may foresee an increase opposition to violence against women, which in turn may potentially lead to a backlash effect. For instance, more women may speak out and oppose violence, creating a more violent response from a subset of men. While the data does not allow me rule out or pin down a particular explanation, it nonetheless shows that this effect is driven by the social mechanism.

The final set of results correspond to the Petition signature, namely a binary indicator of whether the petition to create a support group was signed or not. In this case, there are no discernible differences between treatment conditions. This null effect might be explained by the positive (and even enthusiastic) reception of the initiative: three out of four survey participants signed the petition, and anecdotal accounts from the enumerators suggest that many of those who did not sign it, did not do it because they did not know how to write.<sup>19</sup>

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<sup>19</sup>In anticipation of this possibility, enumerators were trained to casually note that the signature could be done by ‘signing with a mark, like an  $x$ ’. There were three signatures with an  $x$ , and several people asked enumerators to write their name and sign on their behalf. Of course, this strategy was only a marginal improvement, and not a solution to this potential consideration.

The overall evidence is clear. Changes in beliefs are driven by the social channel. However, creating common knowledge might also create a more precise belief of the status quo, thus setting negative expectations about future change, as suggested by the evidence on beliefs about the future prevalence of violence.

### **6.1.1 Heterogeneous Effects**

In this section I analyze the possibility that the Group Broadcast effects may be heterogeneous along the dimensions of Gender, Education, and Age. Figure A2 in the Appendix graphically summarizes the results.

I find no substantive differences between female and male groups.

In terms of age, some theories of cultural change argue that younger people are more likely to adopt new values (Inglehart, 1997). Supporting this view, I find that the Group treatment has a stronger effect in younger cohorts when it comes to perceived social rejection and expectations on the future prevalence of violence. However, I also find that the effect on personal beliefs is much stronger in older cohorts. In the same vein, there is some suggestive evidence that older cohorts are more likely to sign the petition, but it is not statistically significant at conventional levels.

Considering education is not only theoretically relevant, but also important from a policy perspective. This is because it is for the poorer and less educated individuals that one should expect media in general, and ‘edutainment’ programs in particular, to have the greatest influence (La Ferrara, Chong, and Duryea, 2012). The overall evidence supports this argument. Just like with the distinction between younger and older cohorts, the social treatment had a stronger effect in less educated individuals regarding Perceived social rejection and Expectations about the future, while the effect on Personal beliefs was stronger in more educated people. A potential explanation for these patterns might be that younger and less educated individuals are more sensitive about their community peers than older and more educated ones.

## 6.2 All treatment conditions: Full sample

Here I present the results from the second empirical strategy where I leverage the data from the full sample. Table 5 displays the results for each dependent variable using two estimations. The first one only includes the treatment indicators. The second one adds the survey covariates (i.e., Female, Age, and Education). The results of the second estimation are graphically summarized in Figure 3.

[Table 5 about here.]

[Figure 3 about here.]

The analyses on Personal and Perceived social rejection show that the informational effects on beliefs and norms are driven entirely by the social mechanisms. As can be seen in the first four columns, the estimates range from .29 to .64 and they are statistically significant at conventional levels. In contrast, the Individual Broadcast parameter has a negative sign and is far from statistical significance (standard errors are about twice the size of the coefficients).

The third set of results pertain to Expectations about the future. All estimated parameters for social treatments are similar in size, ranging from .18 to .25, and once again are negative and (weakly) statistically significant ( $p < 0.10$ ). In contrast, the Individual Broadcast parameters are positive but not statistically significant.

Lastly, columns 7 and 8 display the Petition signature results. Once again, no discernible effects emerge.

Additionally, I estimated several F-test of equality of coefficients. When comparing either one of the social conditions, Group ( $\alpha$ ) or Public ( $\gamma$ ) Broadcasts, against the Individual Broadcast ( $\beta$ ), all outcomes but the Petition signature exhibit a statistically significant difference at conventional levels. These results provide evidence in support of Hypotheses 1 and 2. Finally, the results from the third test (i.e., F-Test  $\alpha = \gamma$ ) show no statistically significant difference between the Group and Public Broadcast.

In short, the findings discussed here match the ones of the previous section. Overall, the results support the main hypothesis of this paper: social mechanisms seem to be the main drivers behind media influence on social norms. When further examining the social mechanism, the evidence shows that publicness in and of itself is a sufficient condition to influence attitudes and norms, in favor of Hypothesis 2.

### 6.2.1 Heterogeneous Effects

As before, I analyze the possibility that the treatment effects may be heterogeneous along the dimensions of Gender, Education, and Age. Figure A3 in the Appendix graphically summarizes the results.

When examining the Group Broadcast treatment, I once again find that younger cohorts exhibit a stronger effect when it comes to Perceived social rejection and Expectations on the future prevalence of violence. Older cohorts, however, are more likely to sign the Petition. In regards to education, the effect size for all but the Petition variable is larger for less educated people. In contrast, the effect on the Petition signature is (weakly) statistically significant ( $p < 0.10$ ) only for highly educated individuals.

The evidence from the Public Broadcast condition follows a similar pattern. However, in contrast to the Group Broadcast treatment, older cohorts are more strongly influenced by the Public Broadcast in their stated personal beliefs about violence.

Finally, the results for the Individual Broadcast show no statistically significant effects. If one pattern arises, however, is that older and more educated cohorts see a negative effect on their personal beliefs. That is, the direction of the effect suggests that people were less likely to state that they believe violence against women is a problem, an opposite result from the social treatments.

## 7 Concluding Remarks

This paper examines the different mechanisms underlying media influence on social norms, studying attitudes toward violence against women. To do so, I rely on two sources of variation to manipulate the method of delivery and social context in which households can receive the media intervention, namely exogenous topography conditions that precluded a significant part of the community to be able to listen the soap-opera broadcast and a randomization process that invited households to listen to the soap-opera in different ways.

The evidence tells a very consistent story: media influence on social norms is driven by social effects rather than individual persuasion. First, I show that a public method of delivery was able to decrease personal and perceived social acceptance of violence against women, whereas a private delivery had no discernible effects. I also show that public information is no panacea as it also increased pessimism on whether violence will decline in the future. Second, I present evidence that a pure public method of delivery (i.e., one that does not entail social interactions such as face-to-face interactions) is a necessary and sufficient condition to influence social norms.

These results provide individual-level evidence of the relative importance of individual and social mechanisms of media influence, in support of studies suggesting that indeed informational interventions work only through a social mechanism (Paluck, 2009; Gottlieb, 2014). The results also complement existing evidence on the link between media and attitudes about violence against women (Jensen and Oster, 2009) by providing a specific channel via which media may indeed affect norms around gender-based violence.

In this study I focus on the method of delivery while holding constant the content of the program and abstracting from the sources the information comes from. This elicits a number of further questions. One line of inquiry can analyze the role

of endorsers, namely to what extent informational effects are driven by the agents who deliver it, be them politicians, international organizations, NGOs, etc. Another natural line of inquiry is to analyze variation in the informational content, that is, understanding how different types of information influence social norms. In this paper, the soap-opera script used injunctive norms. As argued before, this had the effect of biasing against the findings presented here –given the fact that even those in the individual treatment would listen to these injunctive norms. An important question in the light of the findings presented here is what type of content can allude to the social interactions and social mechanisms argued above. This knowledge could inform and guide policies where public interventions could not be implemented.

All in all, a deeper understanding of the interaction between individual preferences and different types and sources of information can shed further light on the specific aspects of the social mechanism purported here.

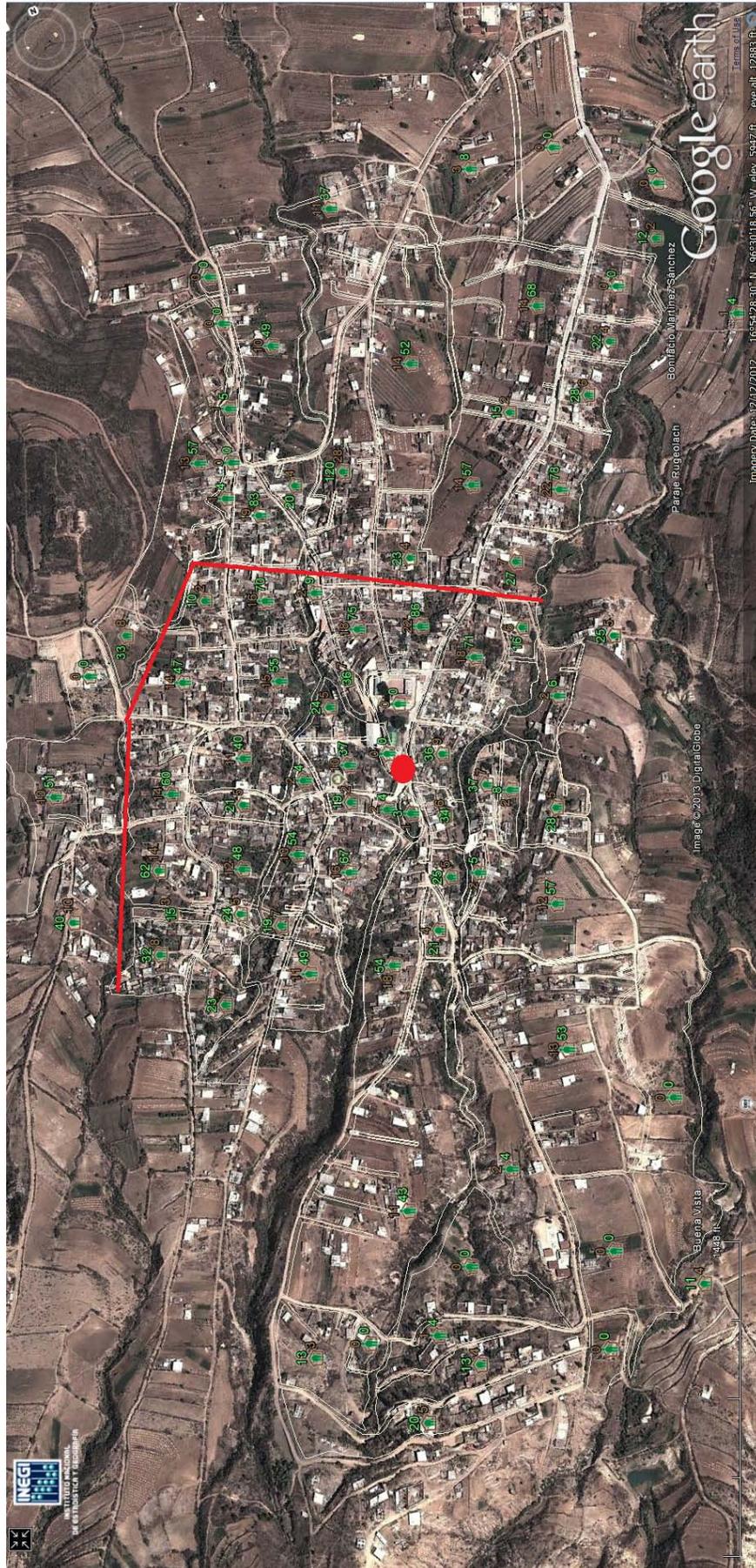
## References

- Bandura, Albert. 1986. *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, Albert. 2004. *Entertainment-Education and Social Change. History, Research, and Practice*. Lawrence Erlbaum Associates chapter Social cognitive theory for social and personal change enabled by the media, pp. 75–95.
- Beath, Andrew, Fotini Christia, and Ruben Enikolopov. 2013. “Empowering Women through Development Aid: Evidence from a Field Experiment in Afghanistan.” *American Political Science Review* 107 (3): 540–557.
- Bush, Sarah. 2011. “International Politics and the Spread of Quotas for Women in Legislatures.” *International Organization* 65 (1): 103–137.
- Chong, Alberto, and Eliana La Ferrara. 2009. “Television and divorce: evidence from Brazilian novelas.” *Journal of the European Economic Association* 7 (2-3): 458–468.
- Chwe, Michael. 1998. “Culture, Circles, and Commercials: Publicity, Common Knowledge, and Social Coordination.” *Rationality and Society* 10: 47–75.
- Chwe, Michael. 2001. *Rational ritual: Culture, coordination, and common knowledge*. Princeton University Press.
- DellaVigna, Stefano, and Ethan Kaplan. 2007. “The Fox News Effect: Media Bias and Voting.” *Quarterly Journal of Economics* 122 (3): 187–234.
- DellaVigna, Stefano, and Matthew Gentzkow. 2010. “Persuasion: Empirical Evidence.” *Annual Review of Economics* 2: 643–669.
- Duflo, Esther. 2012. “Women Empowerment and Economic Development.” *Journal of Economic Literature* 50 (4): 1051–1079.

- Enikolopov, Ruben, Maria Petrova, and Ekaterina Zhuravskaya. 2011. "Media and Political Persuasion: Evidence from Russia." *American Economic Review* 101 (7): 3253–3285.
- Fujiwara, Thomas, and Leonard Wantchekon. 2013. "Can Informed Public Deliberation Overcome Clientelism? Experimental Evidence from Benin." *American Economic Journal: Applied Economics* 5 (4): 241–55.
- Gentzkow, Matthew. 2006. "Television and Voter Turnout." *Quarterly Journal of Economics* 121 (3): 931–972.
- Gentzkow, Matthew, and Jesse Shapiro. 2004. "Media, Education and Anti-americanism in the Muslim World." *The Journal of Economic Perspectives* 18 (3): 117–133.
- Giné, Xavier, and Ghazala Mansuri. 2012. "Together We Will: Experimental Evidence on Female Voting Behavior in Pakistan." Unpublished manuscript.
- Gottlieb, Jessica. 2014. "Common Knowledge and Voter Coordination: Experimental Evidence from Mali." Unpublished manuscript.
- Hayes, Danny, and Matt Guardino. 2011. "The Influence of Foreign Voices on U.S. Public Opinion." *American Journal of Political Science* 55 (4): 830–850.
- Inglehart, Ronald. 1997. *Modernization and Postmodernization: Cultural, Economic and Political Change in 43 Societies*. Princeton University Press.
- Jensen, Robert, and Emily Oster. 2009. "The power of TV: Cable television and women's status in India." *Quarterly Journal of Economics* 124 (3): 1057–1094.
- Krug, Etienne G., Linda L. Dahberg, and Zwi Anthony D. Lozano Rafael Mercy, James A. 2002. *World report on violence and health*. World Health Organization.

- La Ferrara, Eliana, Alberto Chong, and Suzanne Duryea. 2012. "Soap Operas and Fertility: Evidence from Brazil." *American Economic Journal: Applied Economics* 4 (4): 1–31.
- Mackie, Gerry. 1996. "Ending Footbinding and Infibulation: A Convention Account." *American Sociological Review* 61 (6): 999–1017.
- Miller, Dale T., Benoit Monin, and Deborah A. Prentice. 2000. *Attitudes, behavior, and social context: The role of norms and group membership*. Lawrence Erlbaum Associates chapter Pluralistic ignorance and inconsistency between private attitudes and public behaviors, pp. 95–113.
- Morris, Stephen, and Hyun Song Shin. 2002. "Social Value of Public Information." *American Economic Review* 92 (5): 1521–1534.
- Mutz, Diana. 1998. *Impersonal Influence: How Perceptions of Mass Collectives Affect Political Attitudes*. Cambridge University Press.
- Olken, Ben. 2009. "Do Television and Radio Destroy Social Capital? Evidence from Indonesian Villages." *American Economic Journal: Applied Economics* 1 (4): 1–33.
- Paluck, Elizabeth Levy. 2009. "Reducing intergroup prejudice and conflict using the media: A field experiment in Rwanda." *Journal of Personality and Social Psychology* 96: 574–587.
- Paluck, Elizabeth Levy, and Donald P. Green. 2009. "Deference, Dissent, and Dispute Resolution: An Experimental Intervention Using Mass Media to Change Norms and Behavior in Rwanda." *American Political Science Review* 103 (4): 622–644.
- Paluck, Elizabeth Levy, and Laurie Ball. 2010. "Social norms marketing aimed at gender based violence: A literature review and critical assessment." International Rescue Committee.

- Singhal, Arvind, Michael J. Cody, Everett M. Rogers, and Miguel Sabido, eds. 2003. *Entertainment-Education and Social Change: History, Research, and Practice*. Routledge.
- Staub, Ervin, and Laurie Anne Pearlman. 2009. "Reducing intergroup prejudice and conflict: A commentary." *Journal of Personality and Social Psychology* 96 (3): 588–593.
- UNDP. 2009. *Indicadores de Desarrollo Humano y Género en México 2000-2005*. Programa de las Naciones Unidas para el Desarrollo - México.
- Yanagizawa-Drott, David. 2014. "Propaganda and Conflict: Evidence from the Rwandan Genocide." *Quarterly Journal of Economics* 129 (4).

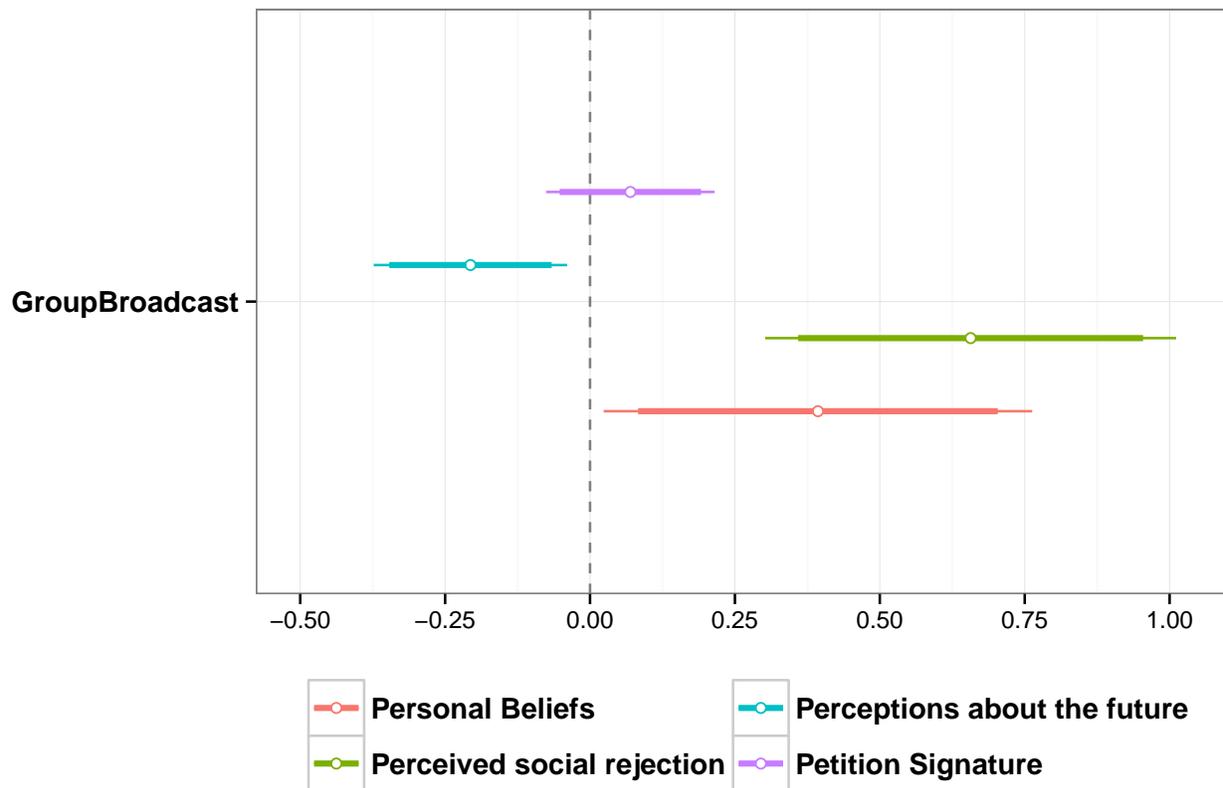


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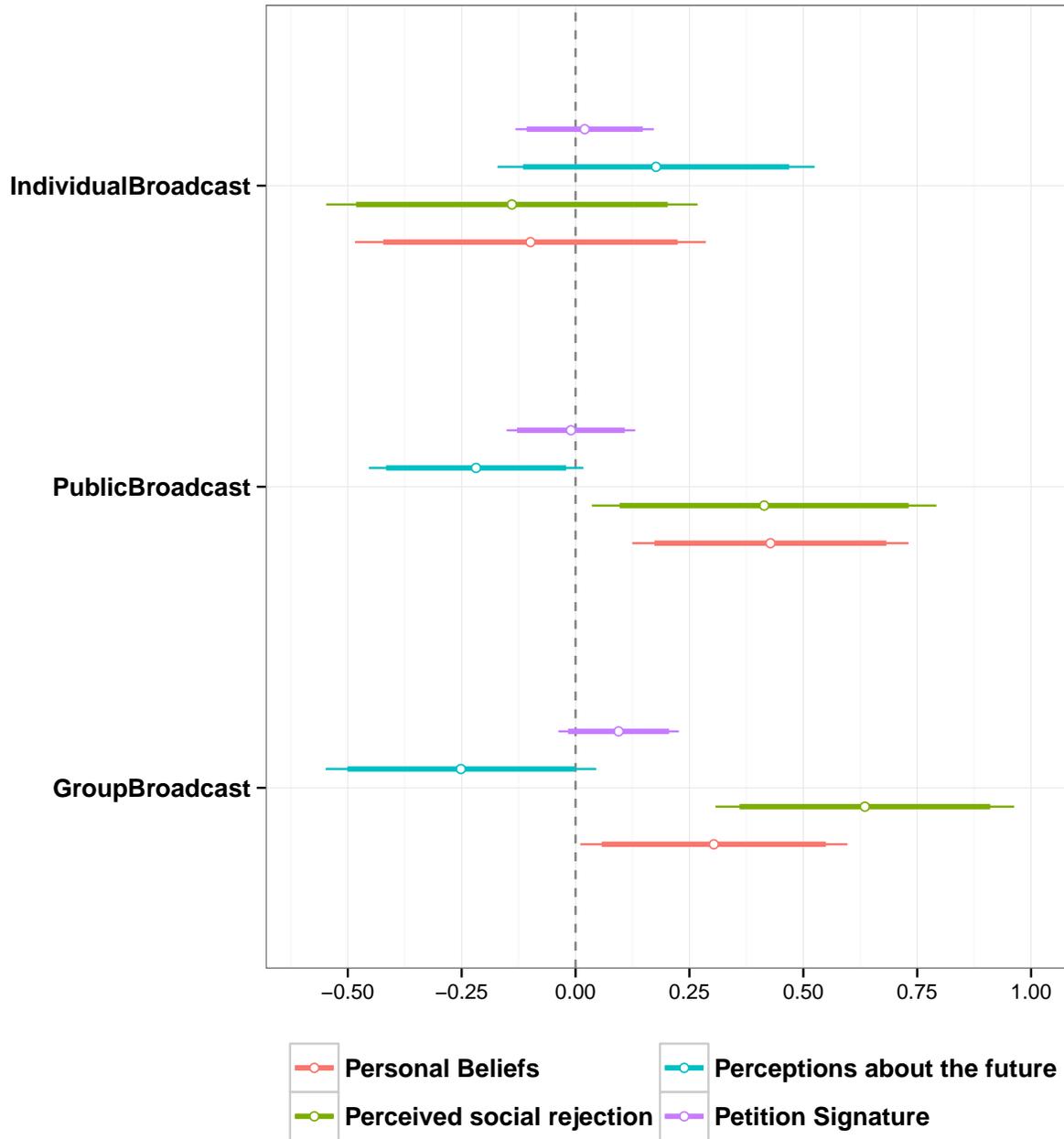
Figure 1: Total population (green). Number of households (brown). Solid red line: loudspeaker reach. Red filled circle: Location of the loudspeaker

Figure 2: **Social versus Individual Mechanisms**



*Note:* Effects of the Group Broadcast treatment on each of the four outcomes of interest. For continuous variables (all but Petition Signature), effects are expressed in standard deviations of the distribution of responses in the *Individual Broadcast* condition. Solid thin (thick) lines represent 95% C.I (90% C.I.)

Figure 3: **Social versus Individual Mechanisms**



*Note:* Effects of each treatment condition on each of the four outcomes of interest. For continuous variables (all but Petition Signature) effects are expressed in standard deviations of the distribution of responses in the baseline group. Solid thin (thick) lines represent 95% C.I (90% C.I.)

Table 1: **Treatments constructed by the Experimental Design**

<i>Treatments</i>	<b>Within the loudspeaker's reach</b>	<b>Outside the loudspeaker's reach</b>
<b>Invited to listen (How?) [Households/Surveys]</b>	I. Group Broadcast (common place) [58/96]	II. Individual Broadcast (CD-rom) [35/59]
<b>Not invited [Households/Surveys]</b>	III. Public Broadcast (public signal) [48/82]	IV. Baseline [60/103]

Table 2: **Statistical balance between areas within and outside the loudspeaker’s reach**

	Outside the loudspeaker’s reach		Within the loudspeaker’s reach		Diff.	SE	p-value
	N	Mean	N	Mean			
<b>Individual Characteristics</b>							
Female	813	0.58	1390	0.59	0.01	0.02	0.77
Economically Active Female	428	0.23	553	0.20	-0.03	0.03	0.25
Born outside Quialana	813	0.00	1390	0.00	-0.00	0.00	0.89
Catholic	813	0.89	1390	0.91	0.02	0.01	0.23
Does not speak Spanish	735	0.15	1293	0.15	0.01	0.02	0.74
High-School Graduate	506	0.03	835	0.03	0.01	0.01	0.57
Disabled (0-14 years old)	156	0.01	356	0.01	0.00	0.01	0.81
<b>Household Characteristics</b>							
Male head of household	189	0.72	335	0.71	-0.01	0.04	0.77
One bedroom house	182	0.37	332	0.40	0.03	0.05	0.51
With 3 or more occupants per room	167	0.41	264	0.38	-0.03	0.05	0.56
Electricity	189	0.97	338	0.98	0.01	0.01	0.50
Bathroom	189	0.93	338	0.96	0.02	0.02	0.23
Fridge	182	0.78	335	0.73	-0.05	0.04	0.20
Washing machine	139	0.32	232	0.28	-0.05	0.05	0.33
Car	130	0.38	252	0.32	-0.06	0.05	0.28
Radio	189	0.79	338	0.85	0.06	0.03	0.09
Television	186	0.77	335	0.79	0.02	0.04	0.61
Computer	144	0.03	188	0.05	0.02	0.02	0.35
Landline	158	0.46	302	0.44	-0.02	0.05	0.61
Cellphone	147	0.38	231	0.39	0.00	0.05	0.93

*Note:* Data from the 2012 National Housing Inventory.

‘Does not speak Spanish’ is based on population of 5 years old or more. The number of observations varies since the National Housing Inventory sets random entries as missing values to preserve confidentiality. Using differences in proportions for binary variables does not change the results.

**Table 3: Descriptive statistics**

<b>Variable</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min.</b>	<b>Max.</b>	<b>N</b>
Personal beliefs	4.296	0.909	1	5	335
Perceived social rejection	2.952	0.914	1	4	335
Expectations about the future	3.042	0.392	1	4	335
Petition signature	0.743	0.438	0	1	315
Female	0.637	0.482	0	1	339
Age	42.917	15.451	15	86	338
Education	2.368	0.656	1	3	337

Table 4: **Social and Individual Mechanisms: Group versus Individual Broadcast**

<i>Dependent Variable</i>	Group Broadcast [ $\alpha$ ]	
	(1)	(2)
Personal Beliefs	0.33 <sup>+</sup> (0.17)	0.37* (0.18)
N	154	153
Households	94	94
R-squared	0.03	0.07
Perceived social rejection	0.66** (0.18)	0.67** (0.18)
N	154	153
Households	94	94
R-squared	0.11	0.12
Expectations about the future	-0.48* (0.19)	-0.49* (0.20)
N	154	153
Households	94	94
R-squared	0.06	0.08
Petition Signature	0.05 (0.07)	0.07 (0.07)
N	141	140
Households	92	91
R-squared	0.01	0.07
Covariates		✓

Robust standard errors clustered at the household level in parentheses.

Covariates: Age, Female, Education.

<sup>+</sup>  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$

Table 5: All treatment conditions: Full sample

	Personal beliefs		Perceived rejection		Expectation on future		Petition signature	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Group	0.29 <sup>+</sup>	0.30 <sup>*</sup>	0.64 <sup>**</sup>	0.64 <sup>**</sup>	-0.24 <sup>+</sup>	-0.25 <sup>+</sup>	0.10	0.09
Broadcast ( $\alpha$ )	(0.15)	(0.15)	(0.16)	(0.17)	(0.14)	(0.15)	(0.07)	(0.07)
Public	0.45 <sup>**</sup>	0.43 <sup>**</sup>	0.40 <sup>*</sup>	0.41 <sup>*</sup>	-0.20 <sup>+</sup>	-0.22 <sup>+</sup>	0.03	-0.01
Broadcast ( $\gamma$ )	(0.16)	(0.15)	(0.19)	(0.19)	(0.12)	(0.12)	(0.07)	(0.07)
Individual	-0.08	-0.10	-0.13	-0.14	0.20	0.18	0.05	0.02
Broadcast ( $\beta$ )	(0.20)	(0.20)	(0.20)	(0.21)	(0.17)	(0.18)	(0.08)	(0.08)
N	335	330	335	330	335	330	315	310
Households	200	200	200	200	200	200	198	197
R-squared	0.05	0.06	0.08	0.08	0.04	0.04	0.01	0.06
Covariates		✓		✓		✓		✓
F-test $\alpha = \beta$	0.06	0.04	0.00	0.00	0.01	0.02	0.51	0.31
F-test $\gamma = \beta$	0.01	0.01	0.02	0.02	0.01	0.01	0.81	0.69
F-test $\alpha = \gamma$	0.30	0.44	0.21	0.26	0.75	0.81	0.31	0.11

Robust standard errors clustered at the household level in parentheses.

Covariates: Age, Female, Education.

<sup>+</sup>  $p < 0.10$ , <sup>\*</sup>  $p < 0.05$ , <sup>\*\*</sup>  $p < 0.01$