

How Does Media Influence Social Norms? A Field Experiment on the Role of Common Knowledge*

Eric Arias[†]

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Abstract

How does media influence beliefs, attitudes, and behaviors? We know surprisingly little about this influence and I argue that two mechanisms account for its impact. Media provides new information that persuades individuals to accept it (individual channel), but also, media informs listeners about what others learn, thus facilitating coordination (social channel). Using a field experiment in Mexico, I disentangle these effects and analyze norms surrounding violence against women. I examine the effect of a radio program when it is transmitted privately versus when it is transmitted through public outlets. Although I find no evidence supporting the individual mechanism, the social channel increased rejection of violence against women, support for gender equality, and unexpectedly, increased pessimism regarding the future decline of violence.

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[†]Ph.D. Candidate, Department of Politics, New York University. 19 W 4th St. 2nd Fl. New York, NY. Contact: eric.arias@nyu.edu

A central concern across social sciences has been to understand the extent to which mass communication can influence social and political outcomes. Indeed, many scholars have shown that media effects abound and cover a wide area of topics, anywhere from political support and electoral behavior up to the perpetration of violence. However, we know little about the underlying mechanisms behind these effects. That is, how is it that media influence beliefs, attitudes, and behaviors? In particular, how does media influence social norms?

The process underlying media influence can be broadly decomposed into two potential effects: (1) an individual or direct effect, and (2) a social or indirect effect. In the former, media provides information about new norms and persuades individuals to accept them (DellaVigna and Gentzkow, 2010; Bandura, 1986). In the latter, the information provided also serves as a coordination device. Coordination is needed because 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). As such, the provision of *public* information can enhance coordination on that norm through the creation of common knowledge (Chwe, 2001; Mackie, 1996).¹

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 differential 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. Critically, however, media itself has a public component, and media related interventions in the literature have naturally been public. Hence, by design, media is able to induce common knowledge precluding the isolation of the social component from the individual one, and thus making the task of fully understanding the microfoundations of media influence a daunting one.

This paper aims to fill this gap by disentangling the extent to which media influence acts through the individual mechanism (via persuasion) versus the extent to which it does so through the social mechanism (via higher-order beliefs).² To do so, I provide evidence from natural experiment combined with a randomized field experiment, conducted in partnership with the UNESCO. Specifically, I analyze the effects of a UNESCO norms campaign—a media (audio soap-opera) intervention—on a particular set of values and behaviors, namely attitudes and norms surrounding 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 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, and has even been linked to other macrolevel occurrences such as conflict and war (Hudson et al., 2012).³ Second, in past years, development programs aimed at improving women’s economic, political, and social status have attracted substantive attention from researchers and policy-makers alike (e.g., Duflo, 2012; Beath, Christia,

¹A fact or event is common knowledge among a group of people if everyone knows it, everyone knows that everyone knows it, everyone knows that everyone knows that everyone knows it, and so on. This is important for coordination because each person will participate only if others do. As such, for the information to be successful, each person must not only know about it, each person must also know that each other person knows about it. In fact, each person must know that each other person knows that each other person knows about it, and so on; that is, the information must be common knowledge (Chwe, 1998).

²Higher order beliefs refer to the beliefs individuals hold about the beliefs of others, the beliefs individuals hold about the beliefs that others hold about the beliefs of others, and so on.

³See also McDermott (2015).

and Enikolopov, 2013; Bush, 2011). A particularly popular type of intervention has been media and social norms marketing campaigns, with a special emphasis on ‘edutainment’ (e.g., Paluck, 2009; Paluck and Green, 2009).⁴ It is crucial to enhance our understanding of the mechanisms behind these policy interventions 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 as existing evidence points to the link between them. 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. As noted before, this is because attitudes and behavior surrounding this type of violence can be understood as a coordination problem where strategic complementarities arise, namely participating in the cultural rejection of violence is contingent upon the participation of others.

The intervention manipulated the social context in which individuals were able to receive the program. To do so, the research was conducted in San Bartolomé Quialana, a small rural, indigenous community in Oaxaca, Mexico, during May-June 2013, as I was able to combine (1) a natural experiment on a broadcast’s reach with (2) randomly assigned invitations to listen to the program. San Bartolomé Quialana is broadly representative of communities in the states of Oaxaca and Chiapas, where violence against women is a serious problem (UNESCO, 2012). With these elements in mind, an audio soap-opera program designed to challenge norms of gender roles and, in particular, discourage violence against women, was broadcast via the community loudspeaker. This particular loudspeaker had a special characteristic, however. Topography conditions affected its reach, precluding part of the community from accessing the broadcast. This is important because only the area outside the loudspeaker’s reach provides the leverage to test the individual mechanism. As such, 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*), but in addition, households were 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. Overall, the design created four groups as shown in Table 1.

[Table 1 about here.]

Measuring norms, attitudes and behavior with a survey of 340 individuals in 200 households, I find that media influence is driven by social effects rather than individual persuasion. I also find that social interactions such as community meetings are not always necessary conditions for such social effects. The evidence suggests that the social channel decreased personal and perceived social acceptance of violence against women and increased support for

⁴Social norms marketing includes marketing techniques, such as mass media and face-to-face campaigns, that are designed to alter individuals’ perceptions of social norms, specifically perceptions of attitudes and behaviors that are typical or desirable in their community. Rather than directly targeting personal attitudes or beliefs, social norms marketing targets perceptions of the prevalence of certain attitudes or beliefs in the community. Edutainment, the integration of educational messaging with popular entertainment, is a common form of social norms marketing (for a review see Paluck and Ball, 2010).

gender equality roles while also increasing pessimism on whether violence will decline in the future. In contrast, the results show that the individual channel had no effect.

A central empirical concern is that systematic differences may exist between the areas within and outside the loudspeaker's reach, which could potentially affect beliefs and behaviors related to violence against women. I argue that this is not the case and show 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 issue to the greatest extent possible, and most importantly, the presence of spill-overs would bias against the findings of the paper.

This study joins the growing literature demonstrating 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, social marketing interventions such '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 via which media impacts attitudes and 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.

Media and the Microfoundations of Social Norms Change

Norms are important because they are standards of behavior that are based on widely shared beliefs of how individual group members ought to behave in a given situation. As such, these customary rules of behavior coordinate individuals' interactions with others (Young, 2008). Because of this, 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 et al., 2002). Indeed, 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 (Lewis, 1969; Mackie, 1996). That is, participation in such norms and behaviors (or the diffusion of new ones) is a coordination problem. 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 (Coleman, 1990; Young, 2015).⁵ In short, *beliefs* about the acceptability of a given behavior are a key factor in explaining their occurrence (Mackie, 1996).

Because of these considerations, numerous policies and programs have embarked on ambitious campaigns to address social issues like violence against women by promoting changes in social norms (Tankard and Paluck, 2015). Many of these strategies for social change take the form of media-driven information interventions, such as TV or radio soap operas (for a review see Paluck and Ball, 2010). These efforts raise fundamental questions about the extent to and the conditions under which media can influence social norms in general, and about the microfoundations of such process in particular. Media influence can be broadly 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,⁶ where the educational effect of media works via educational role models (Bandura, 1986). These educational role models are able to perform an instructive function, and transmit knowledge, values and behaviors among others.

Social or indirect effect. Media can also have an effect via a *social mechanism*. Here, media influence is rooted in the fact that it can provide information in a way that enhances 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 widely these beliefs are shared (Morris and Shin, 2002). That is, 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, creating common knowledge. 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).

Given this, I argue that the method of dissemination of information is a significant driver of individuals’ beliefs (and higher order beliefs), and consequently, of their 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.⁷ This is the main hypothesis of this

⁵For instance, these sanctions can take the form of shaming, shunning, or any other form of social ostracizing (Paluck and Ball, 2010). Other scholars argue that norms are self-sustaining irrespective of the threat of punishment. Two other mechanisms sustaining norms are (i) negative emotions such as guilt or shame that are triggered when norms have been internalized and (ii) the desire to avoid intrinsic costs that would result from coordination failure (Young, 2008).

⁶Also referred to as social cognitive theory.

⁷Arguably, ‘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 –i.e., a ‘tipping-

paper:

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

A public method of dissemination 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 promotion 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 conditions under which norms' promotion 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 field experiment in Benin finds that public meetings discussing programmatic platforms reduce the extent of clientelism (Fujiwara and Wantchekon, 2013).

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 diffusion of norms. Thus, within the common knowledge framework, I analyze whether the publicness of the information is a sufficient condition for media influence and whether face-to-face interactions enhances such influence. That is, I disaggregate Hypothesis 1 into two secondary hypothesis:

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

Hypothesis 2b (Face-to-Face). *A public method of delivery of information with face-to-face interactions enhances the effect of information on attitudes and norms.*

UNESCO's Campaign: 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.⁸ The overall initiative was implemented in a handful of communities in the states of Oaxaca and Chiapas, but this media driven norms intervention was specifically devised for San Bartolomé Quialana.

point' argument (Finnemore and Sikkink, 1998). 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. See also Gottlieb (2015).

⁸This program, "Construcción y Evaluación de un Modelo Integral para la Prevención de la Violencia de Género, en Poblaciones Indígenas de México desde un Enfoque Intercultural", was put forward by UNDP, UNICEF, UNFPA, ECLAC, and UNESCO. See <http://www.onu.org.mx/proyectos.html>. Last accessed: November, 2015.

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 municipalities in the rest of Mexico. As of 2010, Quialana had a population of 2,470 habitants with 591 households.⁹ 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.¹⁰ In regards to media exposure, approximately 83% of the households own a radio.¹¹ This proportion is actually similar to the national average, estimated to be 77% in 2013 (INEGI, 2014).¹² However, at the time of the intervention, Quialana did not have a local community radio, and part of the UNESCO program involved providing the necessary skills and equipment to start one.¹³

Although issues of gender equality are salient throughout Mexico, they are particularly so 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).¹⁴ Furthermore, UNDP's (2009) report emphasizes that a big determinant of such inequality is gender-based violence. Surveys conducted by INEGI (2013) show how pervasive and entrenched violence against women is. In Oaxaca, 43.1 per cent of women reported having suffered some form of violence. However, only 10.1 per cent of them ask for help or file a complaint with the authorities.¹⁵

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 because the ability to focus on a single community, holding cultural and social aspects 'constant,' makes it easier to isolate the individual-

⁹Unless otherwise noted, data in this section is from the 2012 National Housing Inventory. 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.

¹⁰The 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 41.35% (mean = 39.92, s.d. = 19.22) and in Chiapas was 39.57% (mean = 43.39, s.d. = 17.47).

¹¹The most popular radio stations, *Asi Se Oye 91.5 FM* and *La Zapoteca 88.9 FM*, are located in Tlacolula and their radio programming is based almost entirely on music.

¹²The national average has been decreasing over the last decade, from around 90% in 2005, as a result of substitution toward other technologies such as personal computers and internet (INEGI, 2014).

¹³A few weeks after the intervention, on July 17, the UNESCO Office provided Quialana with a state-of-the-art audio equipment. See <http://www.cinu.mx/noticias/mexico/la-oficina-de-la-unesco-en-mex/>. Last accessed: November, 2015.

¹⁴The GII measures gender inequality in three areas, namely health, education, and income. A value of 1 implies perfect gender equality while a value of 0 implies maximal inequality. Mean values (and s.d.) were .70 (.07) for Oaxaca, and .66 (.07) for Chiapas.

¹⁵National averages were very similar: 44.9 per cent for reporting having suffered some form of violence, and 9.5 per cent of them asked for help or file a complaint with the authorities. These results correspond to women 15 years old or older that were ever married or in civil union, or continue to be.

level informational mechanisms that drive media influence on attitudes and social norms.¹⁶

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).¹⁷ The plot evolved around a young couple who fell in love and started a family in Quialana. The 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 because 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.¹⁸

Un nuevo amanecer en Quialana was broadcasted using the community loudspeaker. A particular feature of this loudspeaker was the variation in its reach. I leveraged this peculiarity in my research design, which I describe next.

Research Design

The research design combines two sources of variation. Specifically, the social context in which people are able to receive the intervention is manipulated by (1) exploiting arguably exogenous variation generated by the topography of the community (i.e., within community variation of ‘broadcast access’), and (2) randomly inviting households to listen to the program. I further describe each one below.

Natural Experiment: The Loudspeaker, Topography & Sound Check

While Quialana did not have a local radio at the time of the intervention, it did possess a loudspeaker –located on top of the Town Hall, in the center of the community. Before the intervention, this loudspeaker primarily and sporadically announced sales of small-scale household goods, such as construction materials, like bricks, or other livestock, like donkeys or pigs.

¹⁶See Cloward (2014) for a similar argument on her experiment in rural Kenya with the Maa-speaking community.

¹⁷See also Acharya (2004).

¹⁸Channel 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).

The design leverages variation in the 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*. 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. That is, the source of variation is *not* a function of distance to the loudspeaker per se, but mainly of altitude difference.¹⁹ 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.

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 and norms related to violence against women. While one of the advantages of conducting the study within a single, small (slightly more than a mile long) 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.²⁰ 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.]

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. Here, caution was taken to prevent

¹⁹In other words, two households can be located at the same distance from the loudspeaker and still one of them can fall within the loudspeaker's reach and not the other.

²⁰Web: <http://www3.inegi.org.mx/Sistemas/Mapa/Inv/Default.aspx?i=en>

households from believing that other households were also receiving the program –although as argued before, this would bias against my hypotheses.²¹ CD-roms were handed out along with a short questionnaire meant as a listening-check device: the enumerator would leave the CD-rom and questionnaire sheet and then stop by a couple of hours later to pick up the sheet, and based on this, compliance was 100%.²² To test the social mechanism, the design created a comparable treatment group, 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 to explore the effects of public information. By creating a very particular form of social interaction (or at least the 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 *sufficient* condition to influence norms as well the extent to which the face-to-face interactions can *enhance* the effect on 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 unbiased estimation of the mechanisms relies on two dimensions: one, facilitating the creation of common knowledge in the social conditions, and two, precluding it in the individual condition (i.e., no spillovers). First, for the broadcast to facilitate the creation of common knowledge, it should be the case that people who listens to it know that other people are hearing it too. This is less of a concern in the *Group Broadcast* treatment because information is explicitly given to the household, so they know that others are also receiving the invitation, and so on. However, a person in the *Public Broadcast* treatment might believe that she has heard the broadcast, say because she lives close to the Town Hall or because she believes she has particularly good hearing but that few of her neighbors actually have heard it. I attempt to address this in two ways. First, I include distance to the Town Hall as a control covariate in the empirical analysis. Second, as discussed below, the empirical strategy relies on the estimation of intention-to-treat effects (ITT) precisely because individuals might fail to comply with the treatment –in the case of the *Public Broadcast*, individuals might not listen to the program nor realizing that others are listening to it as well, and so on. As such, it represents a conservative or lower bound estimation.

The second dimension is linked to the notion that those who receive the individual treatment should be 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,

²¹Enumerators were trained to keep away from sight all CD-roms but the one delivered to the household.

²²The questionnaire consisted on rating the soap-opera, asking the name of the character with whom they identified the most, and providing space for comments.

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.

Similarly, the design 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, an alternative was to implement a weekly soap-opera over several weeks or months. Given that the main goal of this study was 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. Nonetheless, experiments where only 1 day, 1 hour, and even 25 minutes interventions were implemented have found profound effects (Paluck and Shepherd, 2012; Tanguy et al., 2014; Ravallion et al., 2015). Given these considerations, the norm intervention was implemented as a one day event only, and the surveys were administered over the following few days.

Outcome measurement

The regional partner NGO also served as the public face of the survey, presented as a mean to retrieve the opinion of Quialana citizens to inform an initiative for starting a community radio.²³ In the survey, three questions measured respondents' beliefs and estimation of others' beliefs and actions with respect to violence against women, and three other questions measured attitudes and individual actions related to it. Hence, I evaluate six 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 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*”). Given the qualitative evidence that violence is pervasive in Quialana (UNESCO, 2012) this item was designed to capture the respondent's personal beliefs about the desirability of (and hence, willingness to expose) certain actions. In other words, the intuition behind this question is to capture the shift from a perception where ‘husbands are never violent to their wives –they might engage in some aggressive behavior but that is not violence’ to a situation in which ‘that’ type of behavior is recognized as violence, and moreover, it is socially appropriate to judge it as serious problem.

The second variable of interest captures the *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*”). As in the previous question, this item aims to measure the shift in norm perception from a norm where violence is tolerated (e.g., the community experiences violence but sees it a routine and excusable) to a norm where violence is rejected. In other words, while the previous question indirectly captures the perceived social norm, this item does so directly.

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*

²³Surveys were collected from June 3 to June 5. Enumerators were aware of the treatment differences but they were blind to the research hypotheses.

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.

While these three measures are able to retrieve individuals’ perception about norms surrounding violence against women, they do not directly measure individual attitudes, beliefs, nor actions regarding gender roles or domestic violence. Outcomes four through six address this, including a behavioral outcome embedded in the survey.

The fourth outcome, *Value Transmission*, measures the extent to which the respondent would educate a child with gender equality values. This captures the parents’ decisions concerning which values to inculcate in their children, which are affected by perceived prevailing values in the society (Tabellini, 2008). In particular, it focuses on attitudes towards equality regarding household chores, which is seen by many as one of the key challenges for achieving gender equality (World Bank, 2012). The question was “*Would you educate your child so that domestic chores, such as doing laundry and cooking, are as much a responsibility of the men as they are of the women?*”, with the answer being coded 1 if the respondent supports this type of education, 0 otherwise.

The fifth variable captures the individual *Reaction to an episode of violence*. The question was “*If you see or hear a neighbor’s wife being beaten by her husband, what would you do?*”. Responses are collapsed into a binary variable in the following way: *Reaction to violence* takes a value of 1 if the respondents answers that they would interrupt the couple so to stop the violence and/or call the police so they intervene, and is coded 0 if the answer implies that they would not take any action at the moment.²⁴

The sixth variable retrieves a behavioral outcome. 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 signed the petition, 0 otherwise.²⁵

Finally, to account for multiple testing I also analyze an *Index* variable created using standardized inverse-covariance-weighted (ICW) averages of the aforementioned outcomes as proposed by Anderson (2008). ICW averaging provides an optimal way to construct a linear index of different indicators that all measure a common latent factor (O’Brian, 1984; Anderson, 2008). The scale of the resulting index is in control group standard deviations, and higher values can be interpreted as higher levels of rejection and perceived rejection of violence against women and increased support for gender equality.

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 A7 in the Appendix shows descriptive statistics.

Randomization Check

Before moving on to the discussion of the empirical strategy and results, this section briefly discuss the evidence regarding the soundness of the randomization procedure.

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 survey co-

²⁴Answers that take the value of 1 are of the type “call the police“ and/or “interrupt them to stop it”, while answers coded 0 are “do nothing, because it’s a private matter between husband and wife” or “do nothing at the moment, but ask what happened later”.

²⁵Not all respondents who responded yes to the question actually signed the petition. I further analyze this in the Appendix.

variate predicted membership to one of the treatment groups. The results (shown in the Appendix) indicate that the randomization 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.

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.²⁶ 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.²⁷

I conduct the analysis using OLS, with two empirical strategies, namely (1) *Group* versus *Individual Broadcast* and (2) all four treatment conditions.²⁸

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:

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

where i indexes individuals and h households; $Y_{i,h}$ represents the outcomes of interests aforementioned (continuous variables are expressed in standard deviations of the distribution of responses in the *Individual Broadcast* condition); *Group Broadcast* 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 loudspeaker’s reach and invited to listen to the CD-rom– constitute the baseline category. For efficiency gains, I include a vector of controls, $\mathbf{X}'_{i,h}$, 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. I also include as a control the natural logarithm of the *Distance* in meters between the household h and the Town Hall. 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.

²⁶For instance, people from roughly 1 in 4 households invited to the *Group Broadcast* actually went to the cafeteria –i.e., received the Group treatment.

²⁷This also has implications for estimating local average treatment effects (LATE) as it may be read as a violation of the exclusion restriction. As such, it precludes an unbiased estimation of the LATE.

²⁸Results using (ordinal and binary) logistic models are substantially the same and are presented in the Appendix.

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

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 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:

$$Y_{i,h} = \phi + \alpha \text{Group Broadcast}_h + \gamma \text{Public Broadcast}_h + \beta \text{Individual Broadcast}_h + \mathbf{X}'_{i,h} \theta + \epsilon_{i,h} \quad (2)$$

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 $\mathbf{X}'_{i,h}$ is the vector of controls. In the same vein, *GroupBroadcast_h* is an indicator for whether the household was invited to the *Group Broadcast*; *IndividualBroadcast_h* is an indicator for whether the household was instead invited to the *Individual Broadcast*.²⁹ *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 α , β , and γ . They measure the effect of the 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 2a predicts $\gamma > 0$ while Hypothesis 2b predicts $\alpha > 0$ with $\alpha > \gamma$. Again, I test the hypotheses with a two-sided test.

Results

Social and Individual Mechanisms: Group versus Individual Broadcast

This sections examines the extent to which media influence is driven by the social vis-à-vis the individual mechanism. Table 3 displays the results for each outcome of interest using two different specifications. The first one displays the simplest specification possible, using only the *Group Broadcast* indicator (i.e., α), while the second one includes the vector of control covariates (i.e., Female, Age, Education, Distance). A summary of the results is illustrated in Figure 2.

[Table 3 about here.]

[Figure 2 about here.]

²⁹*Individual Broadcast* was the baseline category in the previous empirical strategy.

Results regarding to the influence on Personal beliefs suggest 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 .35 standard deviations relative to the Individual Broadcast condition (p -value = 0.033 and p -value = 0.026, respectively).

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 .65) and precise.

The estimates of the Group Broadcast invitation on Expectations about the future are negative, very stable (−.48 and −.49) and statistically significant at conventional levels, 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 analyses of individual actions also support the social mechanism. Those invited to the Group Broadcast were 16 percentage points more likely (based on Model 8) than those invited to the Individual Broadcast to say they would educate their children on gender equality values. Similarly, the Group treatment also increased the probability of reacting to a violent event: treated respondents were 20 percentage points more likely (based on Model 10) to say they would try to stop a domestic dispute. The results for the Petition signature indicator, namely the behavioral measure of whether the petition to create a support group was signed or not, are displayed in Columns 11 and 12. The estimates suggests that those in the Group Broadcast treatment were 20 percentage points more likely (based on Model 12) to sign the petition than those in the Individual Broadcast.

The last two Columns show the results for the ICW Index. The substantial result is the same as before. Subjects invited to the Group Broadcast have an Index of responses .45 standard deviations higher than those invited to the Individual Broadcast. These results are all statistically significant at conventional levels.

The overall evidence is clear. Media influence, captured by changes in beliefs, attitudes and behavior, is driven by the social channel. However, creating common knowledge might also facilitate 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.

All treatment conditions: Full sample

This section presents the results from the second empirical strategy, using the full sample. Table 4 displays the results for each outcome using two estimations –as before. The first

one only includes the treatment indicators. The second one adds control covariates (i.e., Female, Age, Education, and Distance). The results of the second estimation are graphically summarized in Figure 3.

[Table 4 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. The first four columns show estimates ranging from .29 to .64 standard deviations from the baseline condition, and they are statistically significant at conventional levels. In contrast, the Individual Broadcast parameter has a negative sign and is far from statistical significance.

When analyzing the Expectations about the future, the estimated parameters for social treatments are similar in size, ranging from .20 to .24, and once again showing a negative sign. In contrast, the Individual Broadcast parameters are positive but far from statistically significant.

These first set of results support both the Group and Public treatments. While the analyses of individual attitudes and actions also support the social mechanism, the evidence in this case is stronger for the Group Broadcast –supporting Hypothesis 2b. The results for Value Transmission, Reaction to Violence, and the Petition signature are as expected: they show a positive effect of the social treatments. However, with the exception of Reaction to Violence, only the Group Broadcast treatment is statistically significant at conventional levels. A similar pattern emerges when analyzing the ICW Index on Columns 13 and 14.

Additionally, I estimated several F-test of inequality of coefficients. When comparing either one of the social conditions, Group (α) or Public (γ) Broadcasts, to the Individual Broadcast (β), they tend to show a statistically significant difference at conventional levels. Overall, these results provide strong evidence in support of Hypothesis 1. When pushing further the analysis of the social mechanism, the evidence shows that publicness in and of itself can be a sufficient condition to diffuse norms, in favor of Hypothesis 2a. At the same time, some of the evidence also suggests that face-to-face interactions can indeed enhance such effect, providing some support for Hypothesis 2b.

Overall, the findings discussed here replicate the ones from the previous section, suggesting that social mechanisms are the main drivers behind media influence on attitudes and norms.

Discussion

A valid concern when interpreting the results is the extent to which they represent a one-off case in a unique setting. As noted before, in many aspects, Quialana is similar to many other municipalities in Mexico as a community with high levels of media consumption and issues with gender inequality and violence against women. Similarly, as a large and diverse society aiming to empower women so to overcome social challenges, Mexico has much in common with other developing and even developed countries. For instance, Mexico ranks 31 out of 60 countries on the *World Values Survey (WVS) Wave 6 (2010-2014)* Index on whether it is ever justifiable for a man to beat his wife, with very similar scores to countries such as

Germany, Qatar, Russia and Peru.³⁰ In the same line, Mexico is also broadly representative on the prevalence of violence against women. This is confirmed by evidence from the *Violence against Women Prevalence Data (VAWPD)*, compiled by UN Women. Drawing data from international surveys (Center for Disease Control and Prevention Reproductive Health Surveys, Demographic and Health Surveys, and the WHO Multi-Country Study) and national population-based surveys, the VAWPD shows the percentage of intimate partner violence during a lifetime for a wide set of countries.³¹ While 43.1 percent of women in Oaxaca and 44.9 percent of women in Mexico reported having suffered some form of violence during their lifetime, the mean for the 70 countries in the VAWPD is 45.6 percent (s.d = 12.7). Finally, media consumption in Mexico –defined as listening to the radio (for news) daily– is also very similar to that of a wide range of countries. Evidence from the *WVS Wave 6* shows that Mexico ranks 38 out of 57 countries in terms of intensity of media consumption.³² In particular, 35.4% of Mexicans listen to the radio daily, proportion which is comparable to several and diverse countries, such as South Korea (30.3%), Brazil (35.1%), United States (36.7%), India (40.1%) or Russia (40.8%). Taking all together, this evidence suggests that the context of the case analyzed here is not unusual in other countries.

Yet, to what extent are the results from this study externally valid in the sense that they generalize beyond Quialana and Mexico? Answering such a question is difficult in that it requires conjecture on how the results would actually differ had this study been implemented in other populations or contexts. While there are numerous variations in context or treatment design that could change the estimates presented here, the results nonetheless speak to a plausibly general phenomenon. The notion that public information, via common knowledge and coordination, can induce differences in norms and behavior is often stated as a general proposition instead of stated as applying to a particular context. For instance, [Chwe \(2001\)](#) discusses a wide range applications across history and cultures, ranging from the introduction of the Apple Macintosh during the 1984 Super Bowl to how social media can facilitate protest. As such, this study employs a particular context and design to provide a proof of concept for such plausibly general phenomenon. Critically, the results suggest that social norm diffusion is primarily driven by a social mechanism and not individual persuasion. This is not to say that persuasion does not play a role but rather that norm promotion conducted in a public setting can more easily influence attitudes and norms.

These findings are also consistent with evidence emphasizing the role of norms as drivers of social change ([Tankard and Paluck, 2015](#)). For example, voter mobilization experiments have found that turnout is highest among individuals who are told that their electoral participation would be publicized to neighbors ([Gerber, Green, and Larimer, 2008](#)). More specifically, the findings provide individual-level evidence supporting studies suggesting that informational interventions work primarily through a social mechanism ([Paluck, 2009](#); [Gottlieb, 2015](#)). The results also complement existing research on the link between media and norms about violence against women ([Jensen and Oster, 2009](#)) by specifying a particular channel via which media affects these norms, as well as supporting the link between media and violent behavior in general ([Yanagizawa-Drott, 2014](#)).

Two particular results merit further exploration. First, the negative results on Expectations about the future was surprising. Further understanding the conditions under which

³⁰Mexico's score is 1.82, Germany 1.68, Qatar 1.85, Russia 1.88 and Peru 1.89. This index is the mean of responses where 1 implies that is never justifiable for a man to beat his wife and 10 implies that it is always justifiable. The full set of countries is displayed in the Appendix.

³¹Available at: http://www.endvawnow.org/uploads/browser/files/vawprevalence_matrix_june2013.pdf

³²The full set of countries is displayed in the Appendix.

these type of backlashes occur and can be precluded (e.g., emphasizing *channel factors*) is both theoretically and policy relevant. Second, the mixed results on the Public Broadcast point to the need for more inquiry into the conditions under which public information is a sufficient condition to influence norms and the conditions under which securing common knowledge via social interactions is actually necessary.

Finally, from a strictly policy perspective, there are potential concerns about whether the changes in reported attitudes, represent changes in behaviors, or just in reporting. Despite the behavioral evidence on the *petition signature*, one may be still concerned that exposure to the public treatments only changes what the respondent thinks other people want to hear and see about the acceptability of violence, but does not actually change the incidence of abuse. Without directly observing people in their homes, however, it is difficult to conclusively separate changes in reporting from changes in behavior. However, if media interventions only change what is reported, it still represents social norms change and progress. Changing social norms is a necessary (Jensen and Oster, 2009) and can be sufficient step toward changing the desired outcomes (Paluck and Green, 2009; Mackie, 1996).

Concluding Remarks

It is well known that exposure to information provided by the media outlets can influence a wide range of attitudes and behavior. However, less is known about the specific mechanisms behind such influence. Two broad mechanisms can account for such effects, namely an individual mechanism based on persuasion and a social mechanism based on higher order beliefs and coordination. This paper examines these mechanisms and disentangles their effects at the individual level, studying attitudes and norms toward violence against women. To do so, I partnered with the UNESCO Office in Mexico to conduct a field experiment in San Bartolomé Quialana, a small, rural, indigenous community in Oaxaca, Mexico.

The experiment consisted of a media intervention (an audio soap-opera) designed to promote gender equality and discourage violence against women. To test the alternative mechanisms, I relied on two sources of variation to manipulate *how* individuals were able to receive the program. First, I leveraged exogenous topography conditions that precluded part of the community from listening to the soap-opera broadcast. Second, I randomly invited households to listen to the soap-opera. Given these two dimensions, the research design created two social conditions (*Group* and *Public Broadcast*), an individual condition (*Individual Broadcast*) and a baseline group.

The evidence presented here shows a very consistent story: media influence on attitudes and social norms is driven mainly 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 and increased support for gender equality roles, 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) can be a necessary and sufficient condition to influence attitudes and social norms.

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

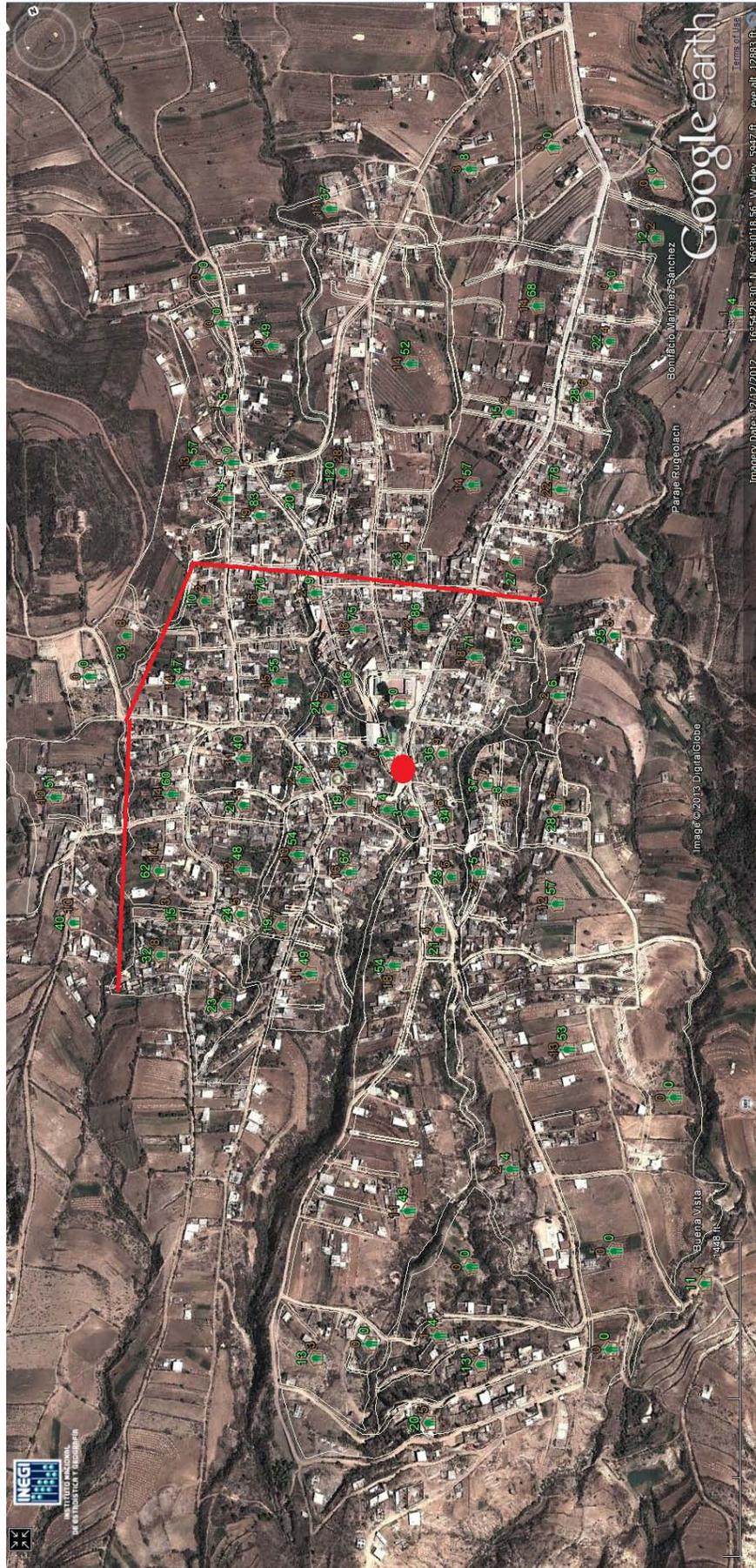
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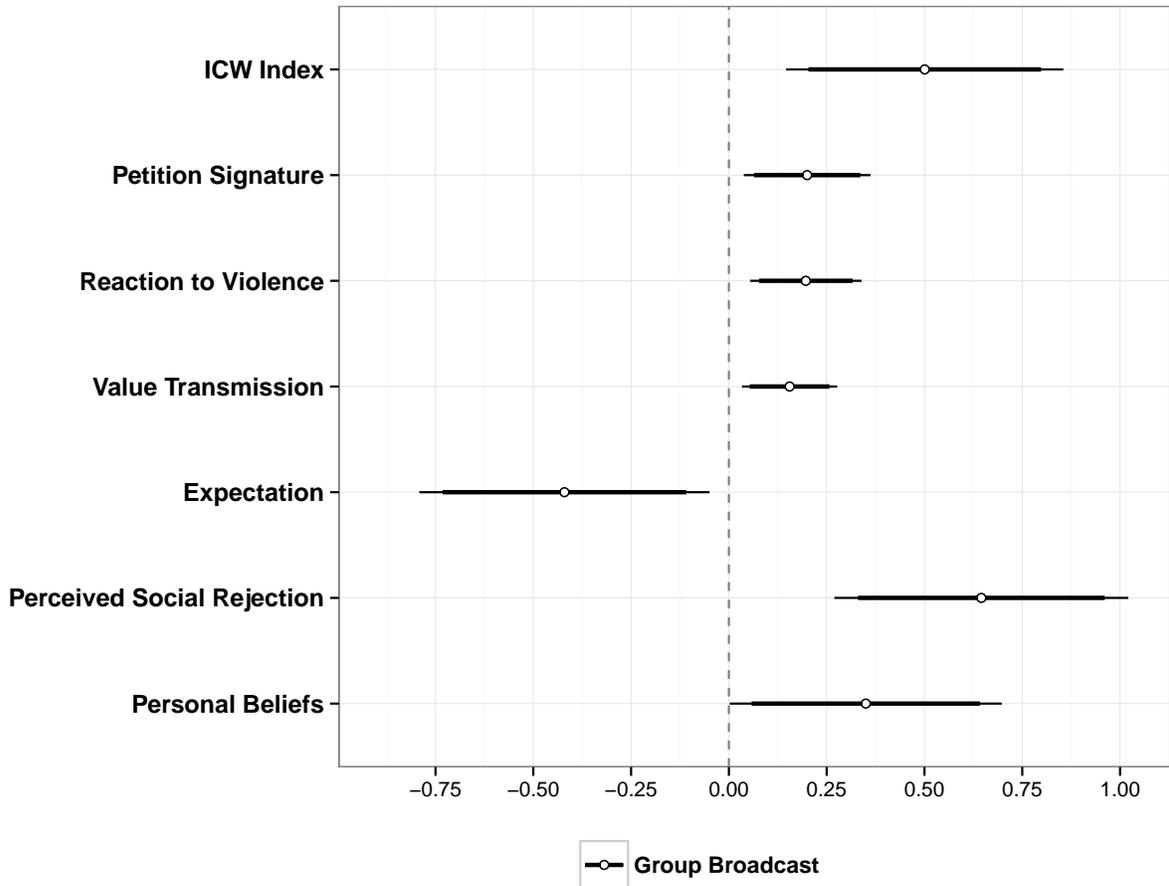


OUTSIDE THE LOUDSPEAKER'S REACH

WITHIN THE LOUDSPEAKER'S REACH

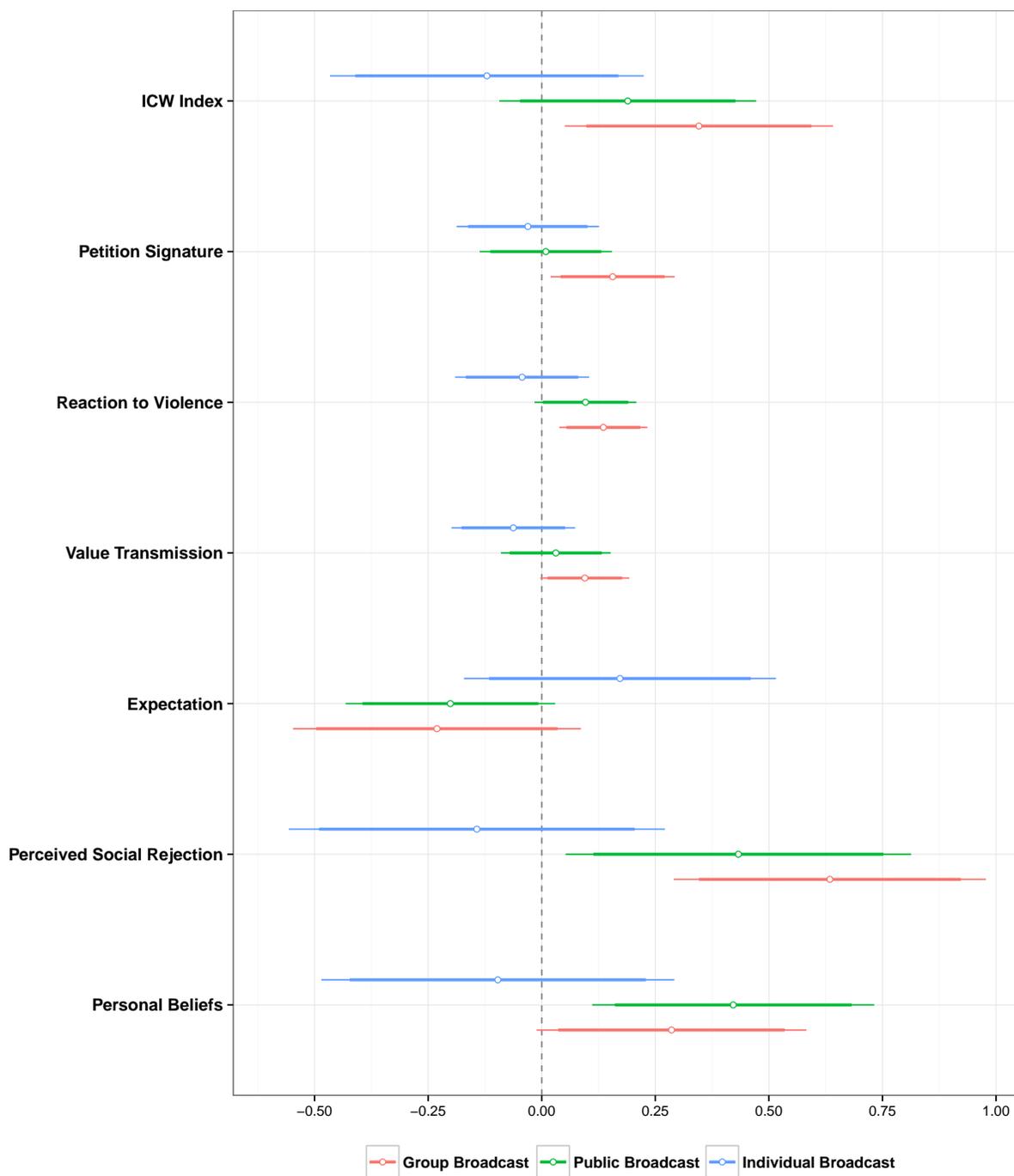
Figure 1: Total population (green). Number of households (brown). Solid red line: loudspeaker's reach. Red filled circle: Location of the loudspeaker

Figure 2: **Social and Individual Mechanisms: Group versus Individual Broadcast**



Note: Effects of each treatment condition on each of the outcomes of interest. Effects for continuous variables 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.)

Figure 3: All treatment conditions: Full sample



Note: Effects of each treatment condition on each of the outcomes of interest. Effects for continuous variables 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: **Groups created by the Research Design**

	Within the loudspeaker's reach	Outside the loudspeaker's reach
Invited to listen (How?) [Households/Surveys]	I. Group Broadcast (common place) [58/96]	II. Individual Broadcast (CD-rom) [35/59]
Not invited [Households/Surveys]	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			
Individual Characteristics							
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
Household Characteristics							
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. *p*-values are two-tailed tests.

Table 3: **Group versus Individual Broadcasts**

	Personal beliefs		Perceived rejection		Expectation on future		Value Transmission		Reaction to Violence		Petition signature		Index (ICW)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Group Broadcast (α)	0.33 ⁺	0.35 ⁺	0.66**	0.65**	-0.48*	-0.42*	0.13 ⁺	0.16*	0.15*	0.20**	0.16 ⁺	0.20*	0.39*	0.50**
	(0.18)	(0.18)	(0.18)	(0.19)	(0.19)	(0.19)	(0.07)	(0.06)	(0.07)	(0.07)	(0.09)	(0.08)	(0.19)	(0.18)
N	154	150	154	150	154	150	150	146	153	149	141	137	137	133
Households	94	91	94	91	94	91	94	90	94	91	92	88	92	88
R-squared	0.03	0.06	0.11	0.11	0.06	0.09	0.04	0.10	0.05	0.12	0.03	0.16	0.05	0.16
Covariates		✓		✓		✓		✓		✓		✓		✓

Robust standard errors clustered at the household level in parentheses. Covariates: Age, Female, Education, Distance. ⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table 4: All treatment conditions

	Personal beliefs		Perceived rejection		Expectation on future		Value Transmission		Reaction to Violence		Petition signature		Index (ICW)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Group	0.29 ⁺	0.29 ⁺	0.64 ^{**}	0.63 ^{**}	-0.24 ⁺	-0.23	0.10 ⁺	0.09 ⁺	0.14 ^{**}	0.14 ^{**}	0.18 [*]	0.16 [*]	0.34 [*]	0.35 [*]
Broadcast (α)	(0.15)	(0.15)	(0.16)	(0.18)	(0.14)	(0.16)	(0.05)	(0.05)	(0.05)	(0.05)	(0.07)	(0.07)	(0.16)	(0.15)
Public	0.45 ^{**}	0.42 ^{**}	0.40 [*]	0.43 [*]	-0.20 ⁺	-0.20 ⁺	0.06	0.03	0.12 [*]	0.10 ⁺	0.06	0.01	0.24	0.19
Broadcast (γ)	(0.16)	(0.16)	(0.19)	(0.19)	(0.12)	(0.12)	(0.06)	(0.06)	(0.06)	(0.06)	(0.07)	(0.07)	(0.16)	(0.14)
Individual	-0.08	-0.10	-0.13	-0.14	0.20	0.17	-0.04	-0.06	-0.01	-0.04	0.02	-0.03	-0.05	-0.12
Broadcast (β)	(0.20)	(0.20)	(0.20)	(0.21)	(0.17)	(0.18)	(0.07)	(0.07)	(0.08)	(0.08)	(0.08)	(0.08)	(0.20)	(0.18)
N	335	327	335	327	335	327	329	320	336	327	315	307	304	298
Households	200	197	200	197	200	197	200	196	200	197	198	194	197	193
R-squared	0.05	0.06	0.08	0.08	0.04	0.04	0.02	0.07	0.04	0.10	0.02	0.10	0.03	0.11
Covariates		✓		✓		✓		✓		✓		✓		✓
F-test $\alpha < \beta$	0.03	0.03	0.00	0.00	0.99	0.98	0.02	0.00	0.02	0.00	0.03	0.01	0.02	0.00
F-test $\gamma < \beta$	0.00	0.01	0.02	0.00	0.99	0.99	0.10	0.10	0.05	0.03	0.30	0.32	0.05	0.03
F-test $\alpha < \gamma$	0.85	0.40	0.10	0.15	0.62	0.58	0.23	0.09	0.32	0.21	0.07	0.02	0.23	0.14

Robust standard errors clustered at the household level in parentheses. Covariates: Age, Female, Education, Distance. ⁺ $p < 0.10$, ^{*} $p < 0.05$, ^{**} $p < 0.01$