

WORKING PAPER N° IDB-WP-1548

The Central Role of Social Dynamics in Nudging Social Norms for Collective Health

Déborah Martínez V
Ana María Rojas M
Carlos Scartascini
Alberto Simpser

Inter-American Development Bank
Department of Research and Chief Economist

March 2024



The Central Role of Social Dynamics in Nudging Social Norms for Collective Health

Déborah Martínez V*

Ana María Rojas M**

Carlos Scartascini*

Alberto Simpser***

* Inter-American Development Bank

** World Bank

*** ITAM

Inter-American Development Bank
Department of Research and Chief Economist

March 2024



**Cataloging-in-Publication data provided by the
Inter-American Development Bank
Felipe Herrera Library**

The central role of social dynamics in nudging social norms for collective health / Déborah Martínez Villareal, Ana María Rojas Méndez, Carlos Scartascini, Alberto Simpser.

p. cm. — (IDB Working Paper Series ; 1548)

Includes bibliographical references.

1. Social adjustment-Colombia-Econometric models. 2. Public health-Colombia-Econometric models. 3. Social norms-Colombia-Econometric models. 4. Coronavirus infections-Social aspects-Colombia-Econometric models. I. Martínez Villarreal, Déborah. II. Rojas Méndez, Ana María. III. Scartascini, Carlos G., 1971- IV. Simpser, Alberto, 1971- V. Inter-American Development Bank. Department of Research and Chief Economist. VI. Series. IDB-WP-1548

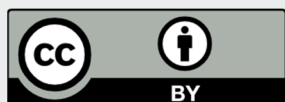
<http://www.iadb.org>

Copyright © 2024 Inter-American Development Bank ("IDB"). This work is subject to a Creative Commons license CC BY 3.0 IGO (<https://creativecommons.org/licenses/by/3.0/igo/legalcode>). The terms and conditions indicated in the URL link must be met and the respective recognition must be granted to the IDB.

Further to section 8 of the above license, any mediation relating to disputes arising under such license shall be conducted in accordance with the WIPO Mediation Rules. Any dispute related to the use of the works of the IDB that cannot be settled amicably shall be submitted to arbitration pursuant to the United Nations Commission on International Trade Law (UNCITRAL) rules. The use of the IDB's name for any purpose other than for attribution, and the use of IDB's logo shall be subject to a separate written license agreement between the IDB and the user and is not authorized as part of this license.

Note that the URL link includes terms and conditions that are an integral part of this license.

The opinions expressed in this work are those of the authors and do not necessarily reflect the views of the Inter-American Development Bank, its Board of Directors, or the countries they represent.



Abstract

Can societies be nudged to adopt beneficial behaviors? Publicizing how people behave on average—descriptive-norms nudging—has emerged as a key tool for increasing the adoption of desirable behaviors. While nudging, by describing social norms, has proven effective in one-shot interventions in small samples (marginal-effect designs), nudging on an ongoing basis at the population level may not necessarily lead to higher compliance and can give rise to major challenges. We use a simple model to show that social adjustment dynamics can drive a population’s behavior in unanticipated directions. We propose a general approach to estimating equilibrium behavior and apply it to a study of mask-wearing during the COVID-19 pandemic. Our empirical findings align with the analytical approach and indicate that publicizing mask-wearing rates on an ongoing basis could have backfired, as initially high rates would have settled into substantially lower equilibrium rates of the behavior. In other words, if scaled up, positive marginal-effect designs do not necessarily translate into full compliance with the intervention.

JEL classifications: D91, I18, H41

Keywords: COVID-19, Social norms, Social distancing, Normative expectations, Empirical expectations, Compliance

Project costs were funded by the Inter-American Development Bank and the French Agence Nationale de la Recherche. Financing agencies had no involvement in the study design, analysis, or interpretation of the data, in the writing of the report, or in the decision to submit the article for publication. This article was approved by the IRB of the Instituto Tecnológico Autónomo de México (ITAM) on July 1, 2020. The authors declare that they have no competing interests related to this work. The information and opinions presented herein are entirely those of the authors, and no endorsement by the Inter-American Development Bank, its Board of Executive Directors, or the countries they represent is expressed or implied.

1 Introduction

The question of how to encourage individual behaviors that yield social benefits is of long-standing interest across the social sciences (Axelrod, 1981; Ennett et al., 1994; Latané, 1996; Paluck et al., 2016; Smith, 2010). Behavioral interventions, commonly known as “nudges,” have recently received substantial attention. While many studies find nudges to be effective tools for eliciting beneficial behaviors, concerns are mounting about their effectiveness at scale (Chater and Loewenstein, 2022; Linos, 2022; Soman and Mazar, 2022). Can their benefits be preserved when scaled up to the societal level? Can entire populations be nudged towards greater adoption of beneficial behaviors?

We focus on nudges that utilize descriptive social norms in order to encourage desirable behaviors, subsequently denoted as “norms nudges.”¹ For present purposes, a norms nudge consists of publicizing how others in society behave on average.² The hope is that, for an individual who has not yet adopted the desired behavior, learning that many others have done so will increase the chances that she will also adopt it (Morgan and Laland, 2012; Bursztyn et al., 2020). Such nudges are increasingly commonplace (Bicchieri and Dimant, 2022).

A large body of evidence shows that norms nudges positively influence individual behavior in realms of policy interest, including tax compliance (Coleman, 2007; Luttmer and Singhal, 2014; Mascagni, 2017), energy use (Allcott, 2011; Alcott and Rogers, 2014; Bergquist and Nilsson, 2018; Schultz et al., 2007), charity donations (Alpizar et al., 2008; Smith et al., 2015; van Teunenbroek et al., 2020), female labor force participation (Bursztyn et al., 2020), voter turnout (Gerber and Rogers, 2009), recycling (Cialdini et al., 1990), and other areas. Nevertheless, norms nudges do not always work as intended. Some studies find that the effects are short-lived (Fielding et al., 2013) or counterproductive (Bicchieri and Dimant, 2022; Castro and Scartascini, 2015; Kuang et al., 2020; Schultz et al., 2007). Reasons for nudges’ failure include: giving rise to a “boomerang effect” by normalizing undesirable behaviors (Schultz et al., 2007), the fact that people make erroneous or unintended inferences from the nudges (Bicchieri and Dimant, 2022), and the observation that good choices may be hampered by numerous bottlenecks not addressed by the nudge (Soman and Mazar, 2022).

Does the existing body of evidence furnish a solid foundation for deciding whether to scale up norms nudges? We study a scenario where norms nudges are scaled up to the population level and implemented on an ongoing basis, as they might be if adopted as government policy. In such a scenario, we argue that dynamic effects arise that can shape the nudges’ outcomes in unanticipated and potentially undesirable ways. Even when a norms nudge is effective

¹We use “norm nudging” as in Bicchieri (2023): “the use of norm information to steer individual behavior in a prosocial direction.”

²In common usage, a descriptive social norm refers to the average behavior of a population, i.e., “what most people do” (Cialdini et al., 1990). We use the term to denote *an individual’s perception of the average behavior of a population*, which is close to what Bicchieri has termed “empirical expectations” (Bicchieri, 2006). Bicchieri (2006) proposes a more sophisticated definition of a descriptive social norm, as “a pattern of behavior such that individuals prefer to conform to it on condition that they believe that most people in their reference network conform to it”—that is, as a map from expectations to behavior.

in a small, one-off intervention, it could work very differently when implemented on a large scale and repeatedly over time. In addition to sounding this cautionary note and elaborating its conceptual foundations, we provide practical guidance on what kind of information might be needed to estimate the likely effectiveness of nudging with norms at the population level. Our analysis is thus complementary to recent work that studies challenges to scaling up norms nudges effectively but has not focused on dynamic processes (Bicchieri and Dimant, 2022; Chater and Loewenstein, 2022; Mazar and Soman, 2022).

The core idea advanced here is that population-level policies often unleash feedback mechanisms that can steer population-level behaviors in unexpected directions.³ While the simple concepts underlying this claim have been known at least since the 1960s (Schelling, 1960), they are frequently overlooked when recommending and designing large-scale policies consisting of publicizing descriptive norms (Prentice and Paluck, 2020). We diagnose this problem as arising from an issue of scale and nudging frequency. Some studies of norms nudges are run on relatively small groups of individuals and, therefore, have negligible impact on the aggregate behavior of the society where they are conducted. Even large interventions where the nudging occurs just once (instead of periodically or continuously) fail to spark dynamic effects. However, when norms nudges are applied to a full population and aggregate levels of compliance are rendered regularly visible, feedback effects kick in, moving the desired behavior in potentially unexpected directions. The key point is that *applying norms nudges on a large scale changes the descriptive norms themselves*. The effect of the nudge in period t changes the content of the nudge (i.e., the descriptive norm) in period $t + 1$, which in turn will influence nudge contents at $t + 2$, and so on. Such feedback processes can have a powerful impact on societal behavior.

Unfortunately, the likely effects of population-level nudging cannot be gleaned from the modal experimental study, where a nudge is randomized once within a small sample of individuals. We shall denote research studies that involve a small sample of people (i.e., a group much smaller than the full population), apply a norms nudge to a random subset one time, and measure their average effect on a given outcome variable as *marginal-effect designs*. Most existing studies of norm nudges are marginal-effect designs. Even when the treatment is randomized, the isolated point estimates of the causal effects of norms nudges yielded by marginal-effect designs generally contain insufficient information for predicting how feedback processes might unfold at the population level—and therefore for designing effective policy.⁴

³Our approach is different to Chater and Loewenstein (2022) but both articles share a similar conclusion that marginal-effect designs (“i-frame” in their case) may not lead to societal-level compliance or effective changes.

⁴An additional important reason why small studies can fail to scale up is ex ante heterogeneity in beliefs or compliance. In particular, individuals who learn that average societal levels of compliance are lower than their own might cease to engage in the desired behavior. While small studies of norms nudging are often conducted on samples of individuals who ex ante under-perform on the desired behavior, in whole populations, there will also exist individuals whose ex ante performance exceeds the societal average. Figure A7 illustrates heterogeneity in beliefs about tax compliance in the city of Junin in Argentina. While information about average tax compliance has been found to have a positive effect when provided to a sample of UK citizens known not to have paid their taxes (Hallsworth et al., 2017), the same nudge had no effect on average when

Instead, what is needed is information about a sufficiently ample range of the response curve that relates perceived aggregate behavior with actual individual behavior. To fix ideas, suppose that, in the context of the COVID-19 pandemic, a researcher informs 500 subjects, whose initial average rate of mask-wearing is 59%, that “80% of people wear a face mask in public spaces,” and finds that providing this information increases the average rate of mask-wearing by 11 pp (compared to a randomized control group where no such information is provided).⁵ Should a policymaker seeking to increase rates of mask-wearing conclude, on the basis of this finding, that a policy that informs the full public about prevailing rates of mask-wearing on an ongoing basis will have the desired effect of substantially increasing mask-wearing?

Generally speaking, the answer is “not necessarily.” Figure 1 illustrates why. Panel A is a model of individual behavior as a function of the individual’s beliefs. The vertical axis depicts the probability that a focal individual will engage in the desired behavior (e.g., mask-wearing in public). The horizontal axis represents the perceived fraction of society engaging in the behavior. The fact that the slope of the s-shaped curve is positive means that, for the individual, learning that more people wear masks than she initially believed will render her more likely to wear one herself. For example, if her belief about how many others wear masks in public shifts from 70% to 80%, the likelihood that she herself wears one rises by about 11 pp—from approximately 59% (point *A*) to 70% (point *B*). This is the type of information that a marginal-effect design is able to yield.

The direction and eventual equilibrium point of a dynamic adjustment process may, but need not, be equal in magnitude or direction to effect estimates from a marginal-effect design. Whether a dynamic adjustment process will help or hinder the spread of the desired behavior under a population-level norms nudge depends on the form of *frequency dependence*—understood as the relationship between perceived and actual aggregate behavior, and exemplified by the s-shaped curve in Panel B. The basic insight, due to Boyd and Richerson (1982, 1985), is that in order for societal rates of behavior to increase, it is necessary for the behavior to respond *more than proportionally* (to *over-respond*) to the behavior’s perceived societal prevalence.

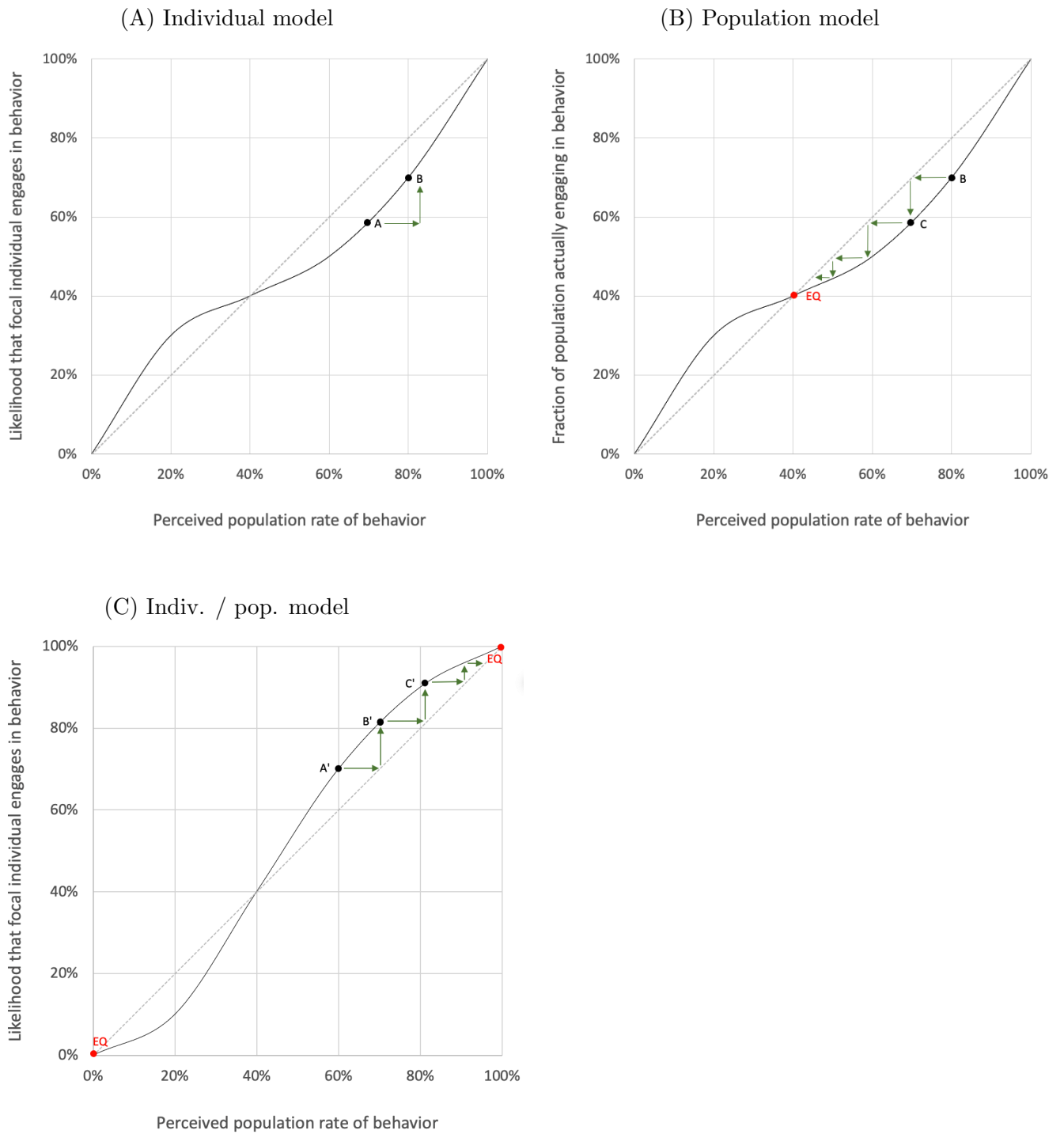
In Panel B of Figure 1, for example, average aggregate behavior over-responds (i.e., it lies above the 45-degree line) to perceived aggregate behavior everywhere left of the 40% mark on the horizontal axis. This form of frequency dependence is labeled “conformity.” To the right of the 40% mark, the figure depicts “weak nonconformity,” a state of affairs where behavior responds positively (i.e., the curve is upward sloping) but less than proportionately (i.e., the curve lies below the 45-degree line) to perceived behavior. Panel C shows the pattern to the right of the 40% crossing point is one of conformity, while below 40% it is one of weak nonconformity. In Boyd and Richerson’s approach, conformity implies that social dynamics increase the prevalence of a behavior, while nonconformity means that social dynamics decrease its prevalence.

provided to the universe of taxpayers in Junin (Castro and Scartascini, 2015).

⁵We use a COVID-19 related example because we ran our experiment in that context, but the same results would derive if we were considering an example about tax compliance, a medical examination, or

recycling behavior.

Figure 1: Marginal Effects vs. Dynamic Adjustment: Conceptual Illustration



Consequently, even when a marginal-effect design shows that informing the public about the population rate of a desired behavior increases the share of study participants engaging in the behavior upon first being nudged, the subsequent dynamic adjustment could either boost or undo such an effect. Moreover, whether boosting or undoing will ensue cannot be determined from a marginal-effect design alone. To drive this point home, contrast Panels A and B in Figure 1 with Panel C in the same figure. In both Panels A and C, a marginal-effect design would identify the causal effect of the aforementioned norms nudge to be an 11 pp increase in mask-wearing.⁶ While dynamic adjustment would subsequently boost the rate of the behavior in Panel C—where frequency dependence exhibits a pattern of conformity to the right of the crossing at 40%—in Panel B, as discussed previously, the pattern of weak nonconformity to the right of the crossing would lead to lower mask-wearing rates.⁷

For a policymaker seeking to encourage the adoption of a specific behavior, the problem is that dynamic adjustment can prevent widespread adoption even if, for each individual in society, the relationship between the social prevalence of the behavior and their own willingness to engage in the behavior is everywhere positive. It is also possible, of course, for dynamic adjustment to abet adoption, rendering the norms nudge more effective than in the absence of feedback processes. Therefore, an appropriate policy must be based on information about whether beliefs and behavior are related to a pattern of conformity or nonconformity in the situation of interest.

In what follows, we exemplify the elicitation of such information through a survey experiment. We then demonstrate how one might use such information to estimate the likely effectiveness of a norms nudge on aggregate behavior in a manner that considers adjustment dynamics. By showing the potential adjustment behaviors at different levels of compliance, we can evaluate how the potential social dynamics would operate if the information were provided at the societal level.

2 Research Design

To evaluate the potential impact of a social norms nudge on population dynamics, we fielded a survey experiment in Colombia in 2020 during the COVID-19 pandemic. While the experiment focuses on a COVID-related behavior, there is nothing particular about it that prevents extrapolation to other policy areas.

In this experiment, the survey included a vignette depicting a woman named “Ana” who arrives, without wearing a face mask, at a social gathering with friends—a birthday party. The main treatment consists of randomly varying, across study participants, the share of people at the gathering wearing a face mask when Ana arrives (0%, 20%, 40%, 60%, 80%,

⁶Aggregate mask-wearing would move from point A to point B in Panel A, and from from point A' to point B' in Panel C. The vertical axis in Panel C is intentionally unlabelled so that that panel can be interpreted as either an individual-level model (like Panel A) or a population-level model (like Panel C).

⁷This is consistent with many studies that have shown that providing a descriptive social norm can have a positive effect for those who estimated the norm to be lower than it is but a negative effect for those who had overestimated compliance (Castro and Scartascini, 2015).

or 100%), as follows:

Ana lives in Barranquilla. Her friend’s birthday is coming up, and she invited Ana, along with 10 close friends, to attend a get-together at her home.

Ana arrives at her friend’s birthday party not wearing a face mask, and [none/2/4/6/8/10] of her friends are wearing one.

Every survey respondent was exposed to one version of the vignette and subsequently asked to predict whether Ana would or would not subsequently put on her mask during the gathering. Answers to this question constitute our main outcome variable.

Our approach has several important advantages over alternatives. First, the vignette experiment makes it possible to elicit a “dose-response” curve describing the relationship between a range of values of the descriptive norm, on the one hand, and Ana’s average predicted behavior, on the other. Second, because participants are asked to predict the behavior of someone else, their responses are less prone to social desirability bias in comparison to asking directly about their (the participants’) own behavior (Fisher, 1993; Bicchieri et al., 2014).⁸ Third, vignette experiments have been successfully validated with behavioral benchmarks (Peabody et al., 2004; Hainmueller et al., 2015). Fourth, our approach made it possible to conduct the experiment during the pandemic without actually exposing anyone to contagion. During that time, the sort of situation described in the vignette closely reflected the participants’ real-world experiences, lending the exercise an added measure of realism.

2.1 Context and Sample

Barranquilla, with a population of 1.2 million, is Colombia’s fourth largest city. The experiment studied here was embedded within a larger online survey of COVID-19 experiences and attitudes. The survey was fielded in October 2020, in the wake of the first COVID-19 wave in Barranquilla (May 12 to August 31, 2020), which resulted in 1,606 deaths. By May 2021, Barranquilla’s COVID mortality had reached 384.9 per 100,000 population, which is high from a comparative perspective (Viana-Cárdenas et al., 2022).

Respondents were recruited by the City of Barranquilla’s local government, which sent out email invitations to participate in the survey of adults on its mailing list. Our main sample consists of 2,679 individuals. Over 88% of respondents reported being 54 years of age or younger, 72% being female, 45% completing secondary education, and 66% knowing someone who died of COVID-19.⁹ Two in three considered eating at a restaurant indoors

⁸Vignettes are widely used in experimental survey research (Alexander and Becker, 1978; Finch, 1987; Krumhuber et al., 2018). The idea is that “when respondents think about what the protagonist [described in the vignette] would do, they imagine what they would do if they were in their position” (Bicchieri et al., 2014, p.11).

⁹The sample is not representative of the city’s population—for example, females were over-represented. Given that the study’s objective is to understand the social adjustment dynamics in the context of a well-balanced survey experiment across groups, it does not affect the internal validity of the experiment.

highly risky. About 25% reported having visited friends or family at home, and about 7% having attended a party with 10 or more people during the week before being surveyed.

Treatment arms are well balanced on variables measured prior to treatment assignment, including age, gender, education, socioeconomic status, prior exposure to others who contracted COVID-19, and knowing someone who died of COVID-19 (Table A1 in the Online Appendix).¹⁰

2.2 Estimation

We estimate the following causal model using OLS regression with robust standard errors:

$$y_i = \alpha + \beta_{20} * T_{20,i} + \beta_{40} * T_{40,i} + \beta_{60} * T_{60,i} + \beta_{80} * T_{80,i} + \beta_{100} * T_{100,i} + \epsilon_i,$$

where i indexes study participants; $T_{k,i}$ are treatment assignment indicators, with $k \in \{0, 20, 40, 60, 80, 100\}$ denoting the percentage of people at the party wearing a mask when Ana arrives ($T_{0,i}$ is the omitted category); and ϵ_i are disturbances. Because the outcome variable y_i is dichotomous, the estimation equation constitutes a linear probability model. Standard errors are robust. Coefficients β_k estimate the average causal effects of assignment to the corresponding treatment branches.

2.3 Results

Table 1 contains the results for the main outcome variable. Coefficients in column 1 estimate the probability that Ana, who arrives without face cover, will put on a mask during the gathering upon encountering $k\%$ of attendees wearing one (for $k = 20, 40, 60, 80$, or 100) in comparison with the scenario where no attendee is wearing one—the omitted category. When no attendee is wearing a mask, the probability that Ana will put her mask on is 21.5%, increasing to 63.6% when all attendees are wearing one. Column 2 adds individual-level control variables, including sets of indicators for age categories, education categories, and socioeconomic status categories, as well as information on prior exposure to people who contracted or died of COVID-19, expected likelihood of contracting the virus in the following six months, and the expected likelihood of being hospitalized if sick from COVID-19 for someone of the respondent’s age. Results are virtually identical, as expected in light of the balance analysis.¹¹

Figure 2 conveys the regression results graphically, displaying the probability that Ana will put on a mask at the gathering by treatment branch (cross-hairs). The smooth black line interpolates the point estimates, while the smooth gray lines interpolate 95% confidence intervals on the estimates. The dashed straight line is the 45-degree line. The likelihood that Ana will put on a mask increases monotonically with the fraction of attendees wearing

¹⁰Nevertheless, as a robustness check, our analyses below include specifications that interact all treatment indicators with a set of predetermined covariates.

¹¹Results are unchanged in a specification that interacts control variables with treatment indicators (Online Appendix).

one. In other words, the greater the aggregate behavior, the greater the probability that Ana will adopt the behavior.

Table 1: Barranquilla Treatment Effects: Main Analysis

Treatment branch	Main results:			Placebo results:			
	(1)	At party (2)	(3)	Following day (4)	(5)	Following week (6)	(7)
Ana no / 2 friends yes	0.214** (0.032)	0.218** (0.033)	0.216** (0.033)	0.090** (0.034)	0.091** (0.035)	0.473* (0.212)	0.416 (0.219)
Ana no / 4 friends yes	0.282** (0.032)	0.288** (0.033)	0.282** (0.033)	0.040 (0.034)	0.036 (0.035)	0.062 (0.209)	0.034 (0.219)
Ana no / 6 friends yes	0.318** (0.032)	0.312** (0.033)	0.310** (0.033)	0.098** (0.033)	0.095** (0.035)	0.420* (0.205)	0.453* (0.214)
Ana no / 8 friends yes	0.365** (0.031)	0.376** (0.032)	0.374** (0.032)	0.066* (0.033)	0.073* (0.034)	0.360 (0.205)	0.362 (0.211)
Ana no / 10 friends yes	0.421** (0.025)	0.422** (0.026)	0.424** (0.026)	0.068* (0.028)	0.072* (0.029)	0.275 (0.173)	0.261 (0.180)
Constant	0.215** (0.016)	-0.144 (0.164)	0.197* (0.091)	0.538** (0.020)	0.265 (0.190)	3.204** (0.120)	0.212 (0.525)
Controls	N	Y	Y	N	Y	N	Y
Control * Treat. Interactions	N	N	Y	N	N	N	N
Observations	2,620	2,422	2,422	2,572	2,378	2,353	2,182
R-squared	0.102	0.117	0.132	0.005	0.014	0.004	0.020
t-tests for equality of coefficients:							
4 yes = 2 yes	0.082	0.089		0.199	0.172	0.0915	0.133
6 yes = 2 yes	0.007	0.021		0.837	0.915	0.824	0.880
8 yes = 2 yes	0.000	0.000		0.532	0.655	0.639	0.830
10 yes = 2 yes	0.000	0.000		0.510	0.597	0.354	0.485
6 yes = 4 yes	0.350	0.540		0.132	0.137	0.133	0.0937
8 yes = 4 yes	0.031	0.026		0.502	0.346	0.210	0.183
10 yes = 4 yes	0.000	0.000		0.412	0.299	0.312	0.307
8 yes = 6 yes	0.226	0.112		0.400	0.574	0.801	0.709
10 yes = 6 yes	0.002	0.001		0.363	0.509	0.486	0.376
10 yes = 8 yes	0.087	0.175		0.956	0.981	0.681	0.635

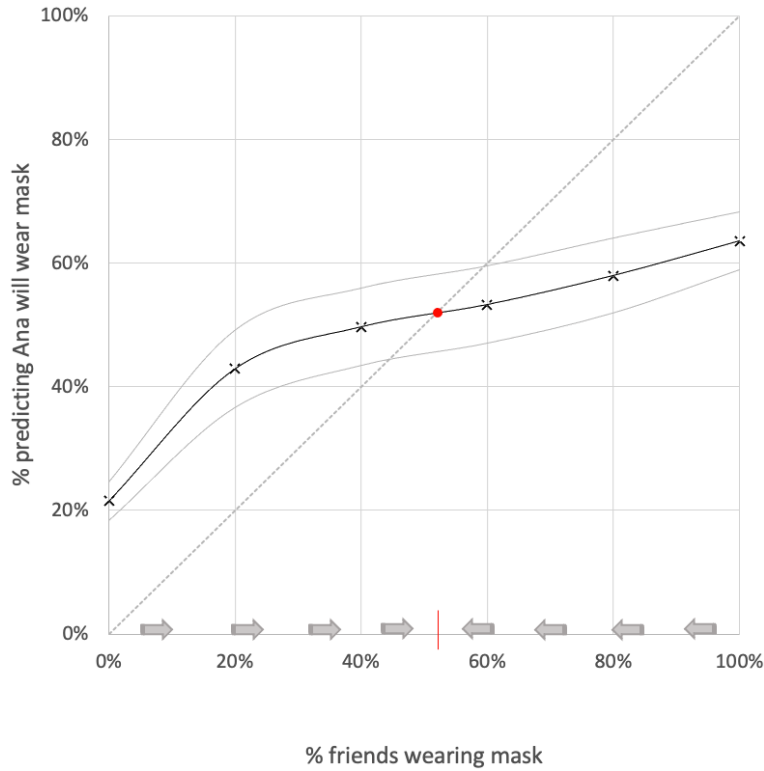
Robust standard errors in parentheses. Omitted category is: ‘Ana no / 0 friends yes.’

** p<0.01, * p<0.05

A typical marginal-effect design would compare two points on the curve. For example, if Ana initially believes that 60% of her friends wear masks, but learns that 80% do, the probability that she will wear one increases by approximately 5 pp. Comparisons of this kind estimate the causal effect of a descriptive-norms nudge without ongoing feedback about population-average behavior or over-time adjustment of behavior by individuals.

Nevertheless, because Figure 2 depicts the full dose-response curve, it can be used to estimate population dynamics. We make the simplifying assumption that the curve represents the population response function (as in Panel B of Figure 1), where the vertical axis depicts the share of the population who choose to wear a mask as a function of the perceived share

Figure 2: Main Results
 Effect of Share Wearing Mask on Predicted Likelihood That Ana Would Wear One



Notes: Crosshairs denote intent-to-treat point estimates of predicted likelihood that Ana would put on a mask at the gathering, as a function of the randomly-assigned proportion of attendees wearing one. Estimates correspond to column 1 in Table 1. Curved lines interpolate point estimates (black) and 95% confidence intervals (light gray). Red dot denotes the only stable equilibrium point under dynamic adjustment. The dashed line is the 45-degree line. Based on sample of adults in Barranquilla, Colombia.

who are already wearing one (horizontal axis).¹² Under this assumption, the curve shows that the share of people who choose to wear a mask is greater than the perceived share wearing one when the latter is 0%, 20% and 40%, and smaller when it is 60%, 80%, and 100%. The red dot denotes the crossing with the 45-degree line, which occurs at the 52% mark. To the right of the crossing point, the pattern is one of weak nonconformity: the curve is everywhere increasing, but it lies below the 45-degree line. This implies that, whenever the actual share of people wearing a mask is greater than 52%, a policy that renders such

¹²Because the curve summarizes the responses of thousands of Colombians, it is natural to understand it as embodying the average behavior of people like Ana. For illustrative purposes, we consider Ana to be an average Colombian. In follow-up research, one might additionally elicit predictions about average Colombians with different sociodemographic characteristics to investigate possible heterogeneity in response curves and population dynamics.

information public will cause a *decrease* in the prevalence of mask-wearing. Thus, as in the example of Figure 1, we find a divergence between one-shot marginal effects—which are everywhere *positive*—and society-level adjustment dynamics—which push mask-wearing in the *negative* direction whenever the prevalence of mask-wearing exceeds 52%. Publicizing the fact that a majority of people wear masks would, thus, fail to further increase adoption of mask-wearing. It would likely have the opposite effect.

It bears emphasizing that when the rate of mask-wearing is below 52%, mask-wearing would *increase* if the descriptive norm were publicized. Contrary to the intuition that nudging with descriptive norms is effective only when a majority of the population initially espouses the desired behavior, this application suggests that, in the context under study, such nudges would be effective only if a minority of the population (more precisely, less than 52%) initially wore masks, but not if a majority did.

2.4 Robustness

As a placebo test for experimenter demand bias, we asked participants whether Ana would wear a mask the day after the gathering and again whether she would do so a week after.¹³ Were responses to be driven by experimenter demand, we would expect the bias to be operative whether one asked about mask wearing at the party, the following day or the week after. However, we do not observe any difference between treatment arms when the question concerns the day or week after the gathering (Table 1, columns 4 to 7 and Figure A2 and Figure A3 in the Online Appendix.)

We further validate our estimates of the relationship between perceived and actual mask-wearing by fielding the survey experiment on a separate auxiliary sample of 1,400 college students at Universidad del Norte (UniNorte), a university in the city of Barranquilla. Results from the UniNorte sample are consistent with those from our main sample. The predicted probability that Ana will put on a mask at the gathering ranges between 6% (when no attendees are wearing one) to 53% (when all attendees are wearing one), and the increase is again monotonic.¹⁴ Overall, predicted levels of mask-wearing are considerably lower in the student sample in comparison with the main sample. This is what one would expect in a sample of younger students who have lower risks of complications from COVID-19.

3 Discussion

Our study’s main contribution is to highlight the importance of social adjustment dynamics when considering the potential effects of publicizing on an ongoing basis information about social rates of behavior, either for scholarly or policy purposes. In so doing, our approach complements existing work on the challenges of scaling up norms nudges. Where such work

¹³For recent evidence on the importance of experimenter demand bias, see (Mummolo and Peterson, 2019; de Quidt et al., 2018).

¹⁴Although the point estimate dips once, the null hypothesis of monotonicity (i.e., that every subsequent coefficient is equal to or greater than the preceding one) cannot be rejected.

has emphasized contextual and social heterogeneity and the mode of delivery (Bicchieri and Dimant, 2022; Soman and Mazar, 2022; Linos, 2022), instead we emphasize the central role of social adjustment dynamics. On a more abstract level, we hope to contribute to the project of bridging insights from theoretical evolution with a large literature on conformism from other fields, in the spirit of Efferson et al. (2008), Morgan and Laland (2012), and Kendal et al. (2018).

Public policy based on nudging ought to place social dynamics front and center, as these could undo or reverse intended effects. Indeed, our empirical findings about mask-wearing call into question the idea that majority behavior must breed conformity: the opposite is true for a wide range of initial rates of mask-wearing in the context we study, and the strongest effect of norms nudging arises when the descriptive norm (i.e., the content of the nudge) is low (0% to 20%).

Given the fundamental influence of empirical evidence on policymaking in normal times and during crises, we encourage scholarship and policy work on norms nudges to complement marginal-effect designs with evidence capable of shedding light on social adjustment dynamics. Our empirical analysis can be regarded as illustrating a simple approach to studying adjustment dynamics. In general terms, our approach consists of: (a) eliciting the response curve linking the societal prevalence of a behavior with the individual likelihood of adopting it, and (b) applying a basic coordination model to the data.¹⁵ This procedure could be rendered more sophisticated and realistic, for instance, by eliciting response curves from a richer set of subsets of the population. Future research might also investigate the implications for nudging dynamics of cultural traits, such as how individualism vs. collectivism influences nudge dynamics, and of the substantive realm (e.g., health vs. tax compliance vs. energy use).

¹⁵A handful of studies have elicited similar mappings with varying levels of granularity—albeit not with the purpose of studying social adjustment dynamics (Coultras, 2004; Efferson et al., 2008).

References

- Alcott, H. and Rogers, T. (2014). The short -run and long- run effects of behavioral interventions: Experimental evidence from energy conservation. *American Economic Review*, 104(10):3003–3037.
- Alexander, C. S. and Becker, H. J. (1978). The use of vignettes in survey research. *Public opinion quarterly*, 42(1):93–104.
- Allcott, H. (2011). Social norms and energy conservation. *Journal of Public Economics*, 95(9-10):1082–1095.
- Alpizar, F., Carlsson, F., and Johansson-Stenman, O. (2008). Anonymity, reciprocity, and conformity: Evidence from voluntary contributions to a national park in costa rica. *Journal of Public Economics*, 92:1047–106.
- Axelrod, R. (1981). The emergence of cooperation among egoists. *American Political Science Review*, 75(2):306–318.
- Bergquist, M. and Nilsson, A. (2018). Using social norms in smart meters: the norm distance effect. *Energy Efficiency*, 11:2101—2109.
- Bicchieri, C. (2006). *The Grammar of Society: The Nature and Dynamics of Social Norms*. Cambridge University Press, Cambridge, UK.
- Bicchieri, C. (2023). Norm nudging and twisting preferences. *Behavioral Public Policy*, 7(SI 4):914–923.
- Bicchieri, C. and Dimant, E. (2022). Nudging with care: The risks and benefits of social information. *Public choice*, 191(3-4):443–464.
- Bicchieri, C., Lindemans, J. W., and Jiang, T. (2014). A structured approach to a diagnostic of collective practices. *Frontiers in psychology*, 5:1418.
- Boyd, R. and Richerson, P. (1982). Cultural transmission and the evolution of cooperative behavior. *Human Ecology*, 10:325–351.
- Boyd, R. and Richerson, P. J. (1985). *Culture and the evolutionary process*. University of Chicago Press.
- Bursztyn, L., González, A. L., and Yanagizawa-Drott, D. (2020). Misperceived social norms: Women working outside the home in saudi arabia. *American economic review*, 110(10):2997–3029.
- Castro, L. and Scartascini, C. (2015). Tax compliance and enforcement in the pampas evidence from a field experiment. *Journal of Economic Behavior & Organization*, 116(C):65–82.

- Chater, N. and Loewenstein, G. (2022). The i-frame and the s-frame: How focusing on individual-level solutions has led behavioral public policy astray. *Behavioral and Brain Sciences*, 46.
- Cialdini, R. B., Reno, R. R., and Kallgren, C. A. (1990). A focus theory of normative conduct: recycling the concept of norms to reduce littering in public places. *Journal of personality and social psychology*, 58(6):1015.
- Coleman, S. (2007). The minnesota income tax compliance experiment: replication of the social norms experiment. *Available at SSRN 1393292*.
- Coultas, J. (2004). When in rome... an evolutionary perspective on conformity. *Group Processes Intergroup Relations*, 7(4):317–331.
- de Quidt, J., Haushofer, J., and Roth, C. (2018). Measuring and bounding experimenter demand. *American Economic Review*, 108(11):3266–3302.
- Efferson, C., Lalive, R., and Fehr, E. (2008). The coevolution of cultural groups and ingroup favoritism. *Science*, 321(5897):1844–1849.
- Ennett, S. T., Tobler, N. S., Ringwalt, C. L., and Flewelling, R. L. (1994). How effective is drug abuse resistance education? a meta-analysis of project dare outcome evaluations. *American journal of public health*, 84(9):1394–1401.
- Fielding, K. S., Spinks, A., Russell, S., McCrea, R., Stewart, R., and Gardner, J. (2013). An experimental test of voluntary strategies to promote urban water demand management. *Journal of environmental management*, 114:343–351.
- Finch, J. (1987). The vignette technique in survey research. *Sociology*, 21(1):105–114.
- Fisher, R. J. (1993). Social desirability bias and the validity of indirect questioning. *Journal of Consumer Research*, 20(2):303–315.
- Gerber, A. S. and Rogers, T. (2009). Descriptive social norms and motivation to vote: Everybody’s voting and so should you. *The Journal of Politics*, 71(1):178—191.
- Hainmueller, J., Hangartner, D., and Yamamoto, T. (2015). Validating vignette and conjoint survey experiments against real-world behavior. *Proceedings of the National Academy of Sciences*, 112(8):2395–2400.
- Hallsworth, M., List, J. A., Metcalfe, R. D., and Vlaev, I. (2017). The behavioralist as tax collector: Using natural field experiments to enhance tax compliance. *Journal of Public Economics*, 148:14 – 31.
- Kendal, R. L., Boogert, N. J., Rendell, L., Laland, K. N., Webster, M., and Jones, P. L. (2018). Social learning strategies: Bridge-building between fields. *Trends in Cognitive Sciences*, 22(7):1364–6613.

- Krumhuber, E. G., Tsankova, E., and Kappas, A. (2018). Examining subjective and physiological responses to norm violation using text-based vignettes. *International Journal of Psychology*, 53(1):23–30.
- Kuang, J., Delea, M., Thulin, E., and Bicchieri, C. (2020). Do descriptive norms messaging interventions backfire? protocol for a systematic review of the boomerang effect. *Systematic Reviews*, 9(267).
- Latané, B. (1996). Dynamic social impact: The creation of culture by communication. *Journal of communication*, 46(4):13–25.
- Linos, E. (2022). When governments use nudges: Measuring impact “at scale”. In Mazar, N. and Soman, D., editors, *Behavioral Science in the Wild*. University of Toronto Press.
- Lopez-Luzuriaga, A. and Scartascini, C. (2022). Willing but unable to pay? the role of gender in tax compliance. Unpublished manuscript.
- Luttmer, E. F. P. and Singhal, M. (2014). Tax morale. *Journal of Economic Perspectives*, 28(4):149–68.
- Mascagni, G. (2017). From the lab to the field: A review of tax experiments. *Journal of Economic Surveys*, pages n/a–n/a.
- Mazar, N. and Soman, D. (2022). *Behavioral Science in the Wild*. Behaviorally Informed Organizations Series. University of Toronto Press.
- Morgan, T. and Laland, K. (2012). The biological bases of conformity. *Frontiers in Neuroscience*.
- Mummolo, J. and Peterson, E. (2019). Demand effects in survey experiments: An empirical assessment. *American Political Science Review*, 113(2):517–529.
- Paluck, E. L., Shepherd, H., and Aronow, P. M. (2016). Changing climates of conflict: A social network experiment in 56 schools. *Proceedings of the National Academy of Sciences*, 113(3):566–571.
- Peabody, J. W., Luck, J., Glassman, P., Jain, S., Hansen, J., Spell, M., and Lee, M. (2004). Measuring the quality of physician practice by using clinical vignettes: a prospective validation study. *Annals of internal medicine*, 141(10):771–780.
- Prentice, D. and Paluck, E. (2020). Engineering social change using social norms: lessons from the study of collective action. *Current Opinion Psychology*, 35:138–142.
- Schelling, T. C. (1960). *The Strategy of Conflict*. Harvard University Press.
- Schultz, P. W., Nolan, J. M., Cialdini, R. B., Goldstein, N. J., and Griskevicius, V. (2007). The constructive, destructive, and reconstructive power of social norms. *Psychological Science*, 18(5):429–434.

- Smith, A. (2010). *The theory of moral sentiments*. Penguin.
- Smith, S., Windmeijer, F., and Wright, E. (2015). Peer effects in charitable giving: Evidence from the (running) field. *The Economic Journal*, 125:1053–1071.
- Soman, D. and Mazar, N. (2022). The science of translation and scaling. In Mazar, N. and Soman, D., editors, *Behavioral Science in the Wild*. University of Toronto Press.
- van Teunenbroek, C., Bekkers, R., and Beersma, B. (2020). Look to others before you leap: A systematic literature review of social information effects on donation amounts. *Nonprofit and Voluntary Sector Quarterly*, 49(1):53—73.
- Viana-Cárdenas, E., Triana, A., Mendoza, H., Buendia, E., and Viasus, D. (2022). Epidemiology of 4963 deaths associated with covid-19 during three pandemic waves in a latin american city with a high mortality rate, 2020–2021. *Tropical Medicine & International Health*, 27(2):158–164.

Online Appendix

Table A1: Barranquilla: Balance on Predetermined Covariates

Treatment branch	(1) Age group	(2) Female	(3) Educ.	(4) Exposed	(5) Know death	(6) Adult \geq 65 in hh	(7) Preex. in hh	(8) SES	(9) Pr. infected	(10) Pr. hospital
Ana no / 2 friends yes	-0.102 (0.060)	-0.003 (0.030)	-0.010 (0.043)	-0.007 (0.033)	0.017 (0.032)	0.014 (0.033)	0.010 (0.033)	-0.107 (0.077)	-0.365 (1.934)	-0.261 (1.775)
Ana no / 4 friends yes	-0.014 (0.059)	-0.004 (0.030)	-0.019 (0.045)	-0.015 (0.033)	0.014 (0.031)	0.058 (0.033)	0.065* (0.033)	-0.054 (0.079)	0.807 (2.037)	-0.922 (1.845)
Ana no / 6 friends yes	-0.063 (0.060)	0.007 (0.030)	-0.090* (0.045)	-0.054 (0.033)	-0.025 (0.032)	0.051 (0.033)	-0.003 (0.033)	-0.204** (0.077)	-0.829 (2.047)	1.912 (1.829)
Ana no / 8 friends yes	-0.003 (0.061)	-0.002 (0.030)	-0.035 (0.044)	0.003 (0.033)	0.025 (0.031)	0.039 (0.033)	0.022 (0.033)	-0.169* (0.074)	-0.356 (2.022)	-0.923 (1.816)
Ana no / 10 friends yes	-0.021 (0.048)	0.017 (0.024)	-0.023 (0.037)	-0.014 (0.027)	0.009 (0.026)	0.040 (0.027)	0.069* (0.027)	-0.061 (0.066)	-0.558 (1.599)	0.917 (1.493)
Constant	2.540** (0.035)	0.719** (0.017)	2.575** (0.026)	0.594** (0.019)	0.663** (0.018)	0.403** (0.019)	0.566** (0.019)	2.183** (0.047)	37.436** (1.147)	41.012** (1.057)
Observations	2,669	2,678	2,656	2,623	2,679	2,667	2,662	2,668	2,605	2,587
R-squared	0.001	0.000	0.002	0.001	0.001	0.002	0.004	0.004	0.000	0.001

Robust standard errors in parentheses. Omitted category is Ana no / 0 friends yes. The constant represents the mean value for the omitted category.

** p<0.01, * p<0.05

Table A2: Uninorte: Balance on Predetermined Covariates

Treatment branch	(1) Age group	(2) Female	(3) Educ.	(4) Exposed	(5) Know death	(6) Adult \geq 65 in hh	(7) Preex. in hh	(8) Estrato	(9) Prob. infected	(10) Prob. hospital
Ana no / 2 friends yes	0.230 (0.131)	-0.073 (0.062)	0.058 (0.098)	-0.025 (0.059)	0.087 (0.061)	-0.007 (0.061)	-0.028 (0.063)	-0.200 (0.189)	-2.487 (3.553)	0.553 (3.172)
Ana no / 4 friends yes	0.083 (0.114)	-0.001 (0.058)	0.046 (0.094)	0.029 (0.054)	0.007 (0.059)	-0.093 (0.056)	-0.032 (0.059)	-0.175 (0.171)	1.338 (3.352)	1.296 (2.807)
Ana no / 6 friends yes	0.147 (0.119)	-0.039 (0.058)	0.064 (0.094)	-0.046 (0.055)	0.013 (0.058)	-0.089 (0.055)	-0.066 (0.059)	-0.122 (0.161)	-1.269 (3.250)	-1.043 (2.884)
Ana no / 8 friends yes	0.194 (0.123)	0.064 (0.058)	0.099 (0.098)	-0.000 (0.055)	0.059 (0.060)	0.029 (0.060)	0.023 (0.060)	-0.105 (0.168)	-3.011 (3.212)	1.537 (3.051)
Ana no / 10 friends yes	0.082 (0.120)	0.023 (0.059)	0.069 (0.098)	-0.019 (0.057)	0.037 (0.061)	-0.044 (0.059)	0.004 (0.061)	-0.050 (0.173)	0.567 (3.347)	-3.320 (2.806)
Constant	1.577** (0.083)	0.620** (0.042)	2.620** (0.066)	0.720** (0.039)	0.585** (0.043)	0.372** (0.041)	0.607** (0.042)	3.602** (0.117)	38.139** (2.417)	36.847** (2.069)
Observations	804	814	812	789	806	811	797	792	814	814
R-squared	0.006	0.007	0.001	0.003	0.004	0.010	0.004	0.002	0.003	0.005

Robust standard errors in parentheses. Omitted category is Ana no / 0 friends yes. The constant represents the mean value for the omitted category.

** p<0.01, * p<0.05

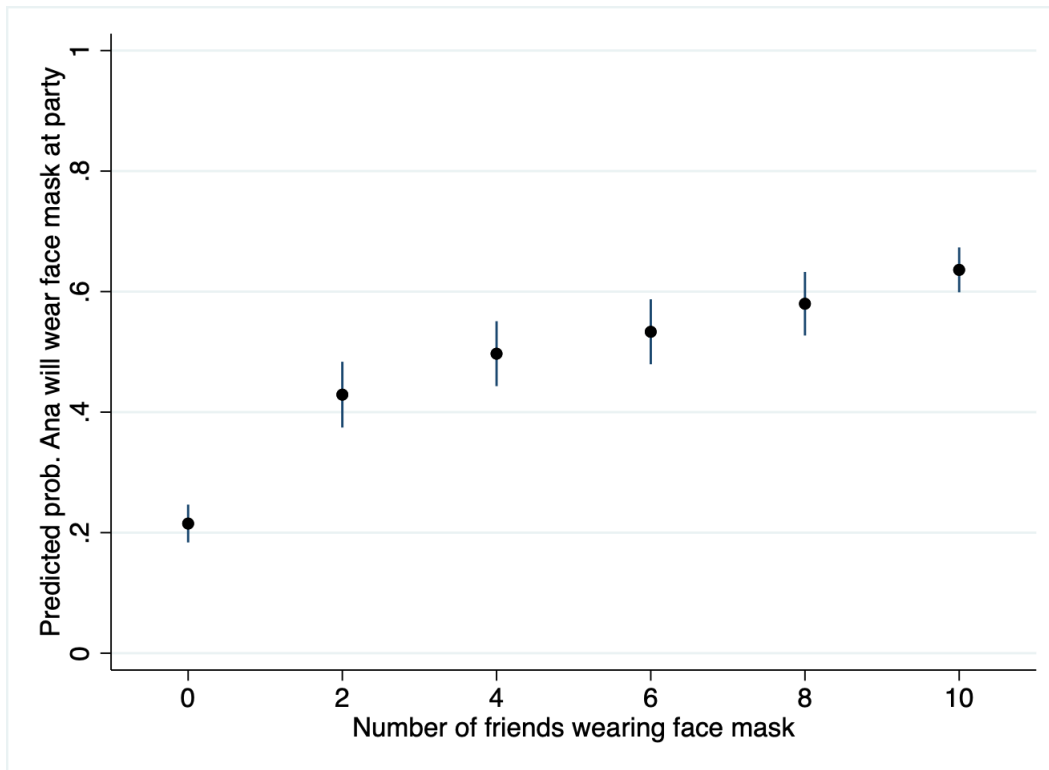
Table A3: Uninorte Treatment Effects: Main Analysis

	Main results:			Placebo results:			
	(1)	At party (2)	(3)	Following day (4)	(5)	Following week (6)	(7)
Ana no / 2 friends yes	0.307** (0.051)	0.312** (0.055)	0.334** (0.059)	0.085 (0.065)	0.092 (0.070)	0.184 (0.259)	-0.029 (0.277)
Ana no / 4 friends yes	0.250** (0.046)	0.262** (0.048)	0.275** (0.050)	0.076 (0.061)	0.112 (0.064)	0.344 (0.261)	0.313 (0.277)
Ana no / 6 friends yes	0.396** (0.047)	0.377** (0.048)	0.381** (0.049)	0.101 (0.060)	0.110 (0.063)	0.584* (0.262)	0.569* (0.275)
Ana no / 8 friends yes	0.407** (0.049)	0.394** (0.052)	0.422** (0.053)	0.132* (0.062)	0.163* (0.065)	0.398 (0.270)	0.408 (0.288)
Ana no / 10 friends yes	0.458** (0.050)	0.449** (0.053)	0.437** (0.053)	0.009 (0.063)	0.015 (0.066)	0.392 (0.259)	0.228 (0.273)
Constant	0.074** (0.022)	0.121 (0.132)	0.197* (0.091)	0.424** (0.043)	-0.052 (0.142)	2.406** (0.172)	0.977 (0.629)
Controls	N	Y	Y	N	Y	N	Y
Control * Treat. Interactions	N	N	Y	N	N	N	N
Observations	796	732	732	759	701	550	514
R-squared	0.100	0.143	0.172	0.009	0.039	0.010	0.041
t-tests for equality of coefficients:							
4 yes = 2 yes	0.350	0.439		0.885	0.780	0.563	0.231
6 yes = 2 yes	0.147	0.315		0.811	0.794	0.148	0.043
8 yes = 2 yes	0.114	0.225		0.478	0.320	0.451	0.153
10 yes = 2 yes	0.018	0.044		0.254	0.278	0.448	0.361
6 yes = 4 yes	0.010	0.051		0.681	0.983	0.389	0.378
8 yes = 4 yes	0.008	0.032		0.364	0.428	0.849	0.752
10 yes = 4 yes	0.000	0.002		0.287	0.139	0.862	0.767
8 yes = 6 yes	0.853	0.782		0.608	0.411	0.518	0.594
10 yes = 6 yes	0.309	0.249		0.141	0.140	0.487	0.238
10 yes = 8 yes	0.419	0.400		0.054	0.027	0.981	0.548

Robust standard errors in parentheses. Omitted category is: 'Ana no / 0 friends yes.'

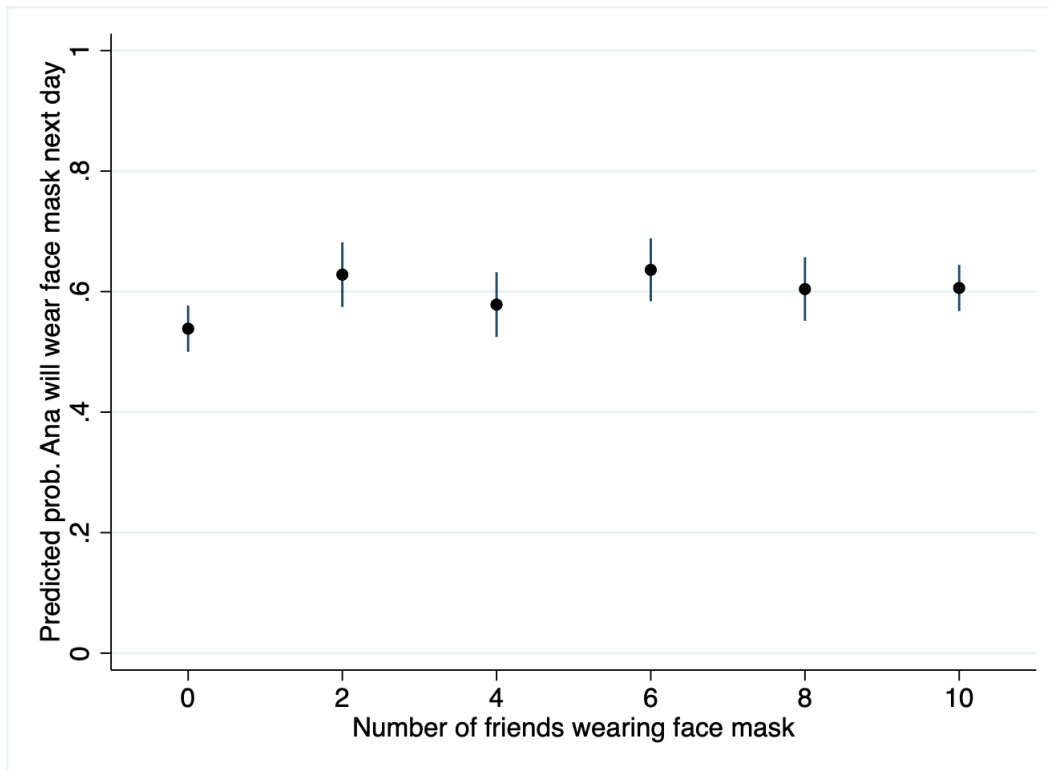
** p<0.01, * p<0.05

Figure A1:
Barranquilla Treatment Effects: At Party



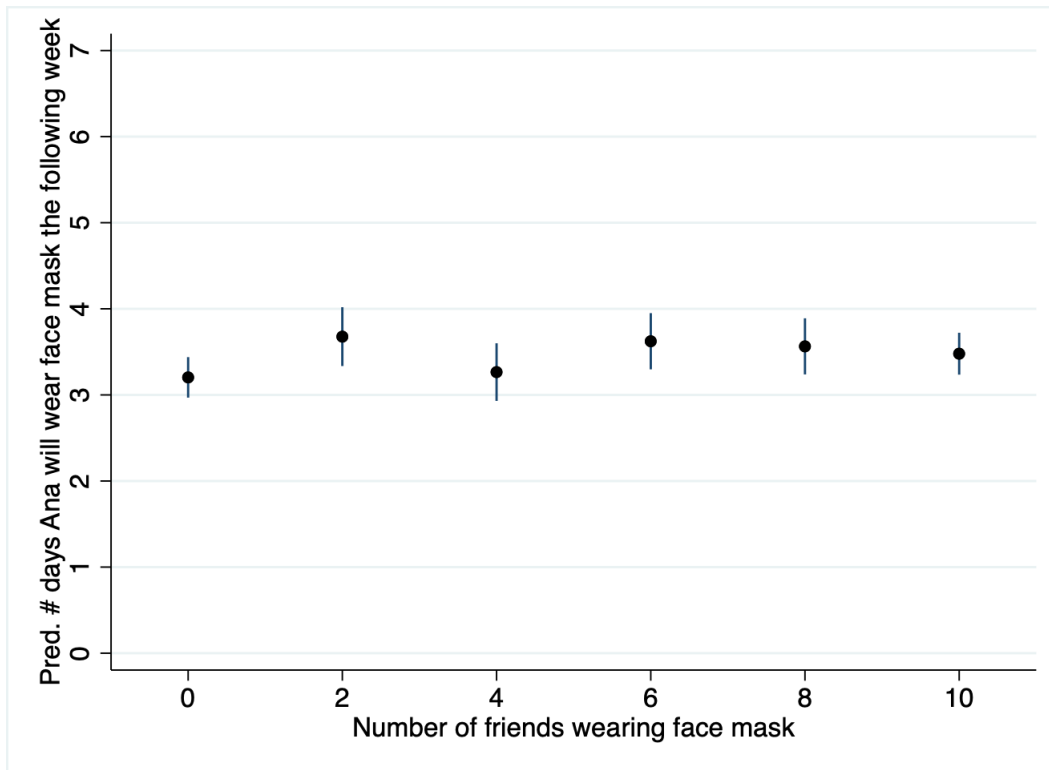
Notes: Treatment effect point estimates shown with 95% confidence bars, corresponding to column 1 in Table 1. Data from Barranquilla survey.

Figure A2:
Barranquilla Treatment Effects: Following Day



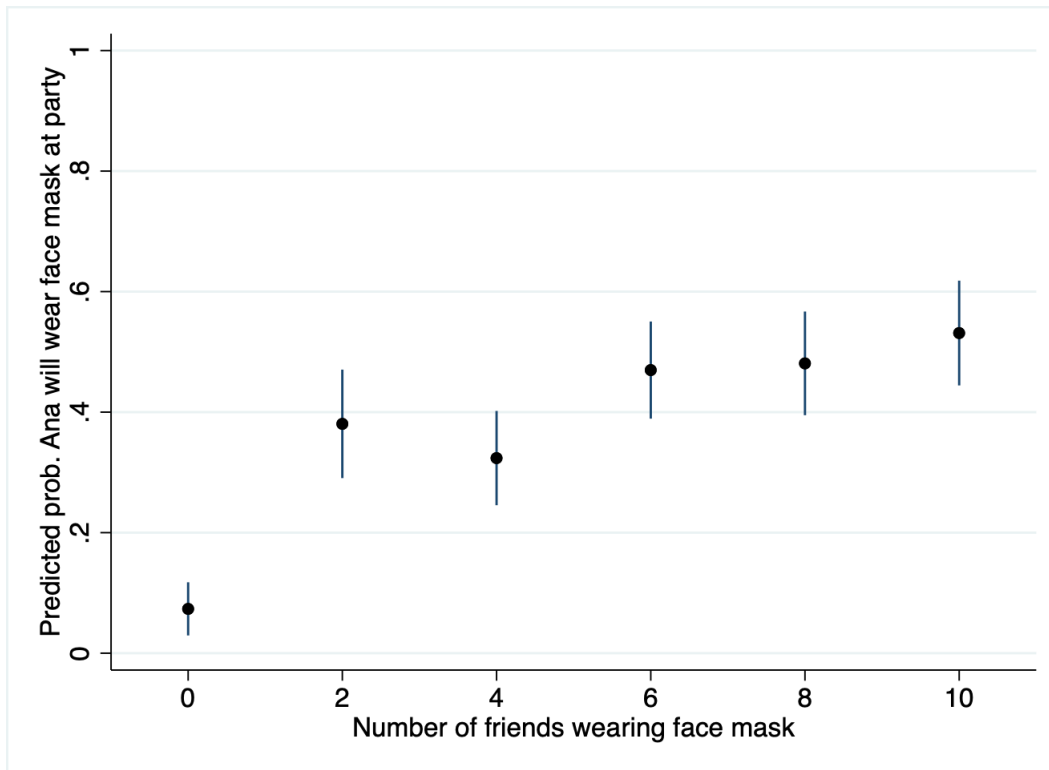
Notes: Treatment effect point estimates shown with 95% confidence bars, corresponding to column 4 in Table 1. Data from Barranquilla survey.

Figure A3:
Barranquilla Treatment Effects: Following Week



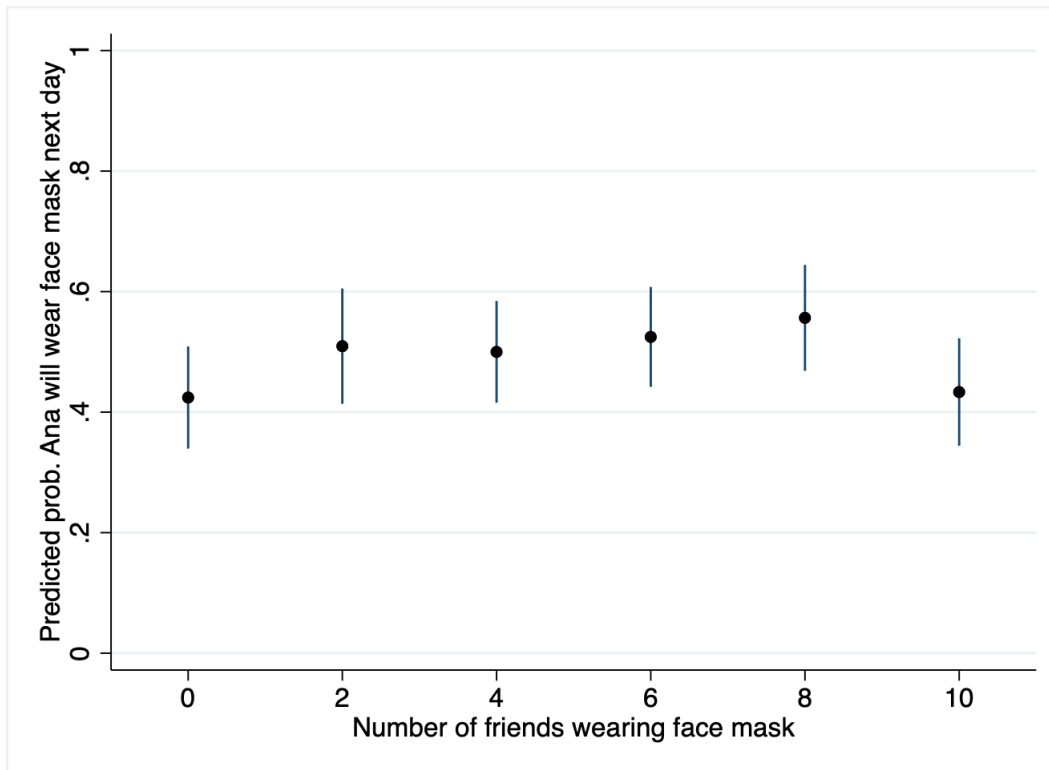
Notes: Treatment effect point estimates shown with 95% confidence bars, corresponding to column 6 in Table 1. Data from Barranquilla survey.

Figure A4:
Uninorte Treatment Effects: At Party



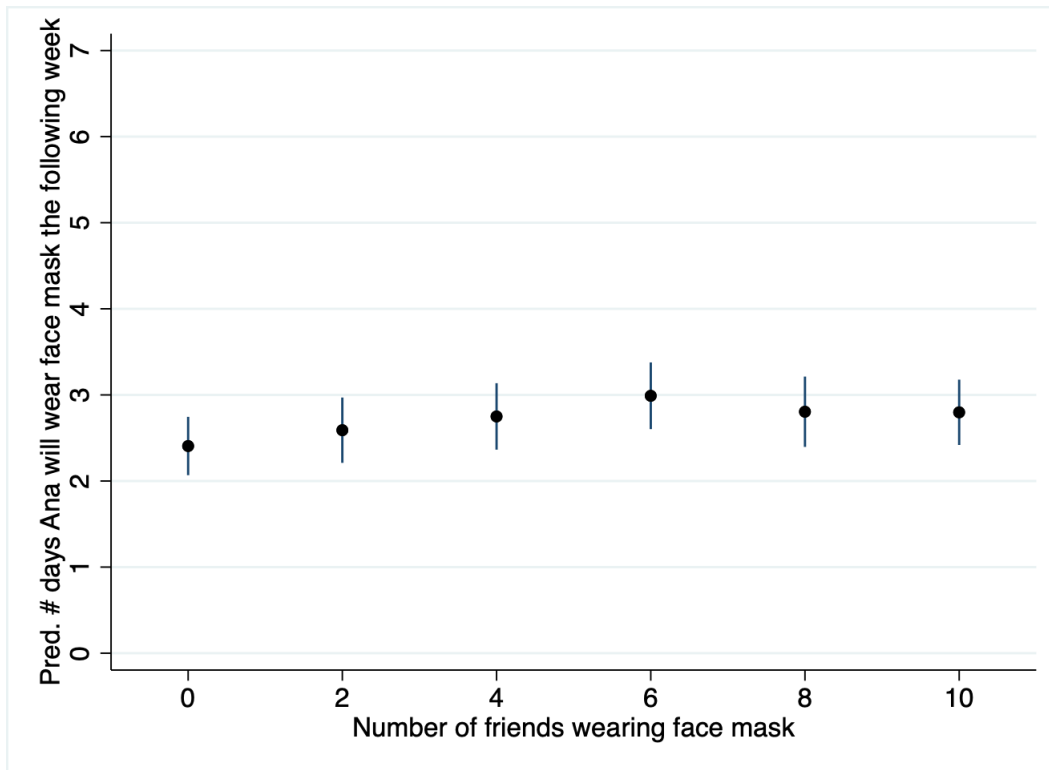
Notes: Treatment effect point estimates shown with 95% confidence bars, corresponding to column 1 in Table A3. Data from Uninorte survey.

Figure A5:
Uninorte Treatment Effects: Following Day



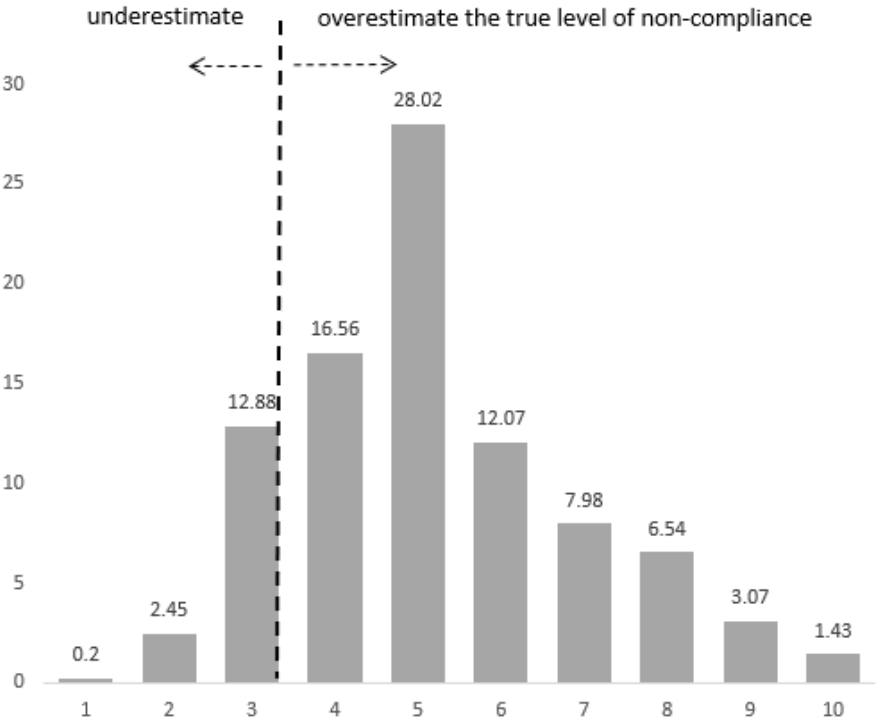
Notes: Treatment effect point estimates shown with 95% confidence bars, corresponding to column 4 in Table A3. Data from Uninorte survey.

Figure A6:
Uninorte Treatment Effects: Following Week



Notes: Treatment effect point estimates shown with 95% confidence bars, corresponding to column 6 in Table A3. Data from Uninorte survey.

Figure A7: Beliefs about tax compliance in the City of Junin, Argentina.
 Percentage of people answering that the share of taxpayers not paying their tax is (out of 10 people)...



Notes: This figure shows the histogram of answers to the question: “Out of 10 people in the City of Junin, how many do you think do not pay the tax?” Each bar shows the share of people answering that the share of not paying is x. For example, 28% of respondents answer that 5 out of 10 people do not pay their tax. Lopez-Luzuriaga and Scartascini (2022) report the results of the survey, which was carried out after the intervention described in (Castro and Scartascini, 2015).

Questionnaire

Variable	Value in Qualtrics	Preguntas y Respuestas	Questions and Answers
Welcome		¡Bienvenido/a y gracias por participar!	Welcome and thank you for participating!
Intro		<p>”Este es un estudio llevado a cabo por la Alcaldía de Barranquilla y la Universidad del Norte que nos ayudará a comprender mejor la epidemia del Coronavirus.</p> <p>Tus respuestas serán un insumo importante para formular soluciones a los retos de la pandemia.</p> <p>El cuestionario toma 10 minutos. Todas tus respuestas son confidenciales y se utilizarán exclusivamente para propósitos de investigación científica. Tu información de contacto solamente se usará para fines del estudio, se guardará de manera encriptada y segura, y se borrará cuando termine el estudio.</p> <p>Tu participación es voluntaria y la puedes terminar en cualquier momento y por cualquier razón. Al final de esta breve encuesta tendrás oportunidad de elegir si deseas participar en la siguiente fase del estudio.</p> <p>Si tienes alguna duda puedes comunicarte con Alexander Villarraga, coordinador del estudio, al correo electrónico covid19baq@uninorte.edu.co</p> <p>Al hacer click sobre la flecha que aparece abajo, confirmas tener 18 o más años de edad.</p> <p>¡Muchas gracias por participar!”</p>	<p>This is a study carried out by the Mayor’s Office of Barranquilla and the Universidad del Norte that will help us better understand the Coronavirus epidemic. Your responses will be an important input in formulating solutions to the challenges of the pandemic.</p> <p>The questionnaire takes 10 minutes. All your answers are confidential and will be used exclusively for scientific research purposes. Your contact information will only be used for study purposes, will be kept encrypted and secure, and will be erased when the study is over.</p> <p>Your participation is voluntary and can be terminated at any time and for any reason. At the end of this short survey, you will have the opportunity to choose if you want to participate in the next phase of the study</p> <p>If you have any questions, you can contact Alexander Villarraga, study coordinator, at the email covid19baq@uninorte.edu.co</p> <p>By clicking on the arrow below, you confirm that you are 18 years of age or older.</p> <p>Thank you very much for participating!</p>
Female		¿Cuál es tu género?	What is your gender?
	1	Femenino	Female
	2	Masculino	Male
	5	Otro	Other
	6	No sé / prefiero no responder	I don’t know / I prefer not to answer
Age (group)		¿Cuál es tu edad?	How old are you?
	1	18-24	18-25
	2	25-39	25-40
	3	40-55	40-56
	4	55-64	55-65
	6	65+	+65
	7	No sé / prefiero no responder	I don’t know / I prefer not to answer
Depto/ Municipality		¿En qué departamento y municipio vives?	In which department and municipality do you live?
	1	Departamento	Department
	2	Municipio (conditional on department)	Municipality
Barrio		¿En qué barrio vives?	What neighborhood do you live in?
	1	Barrio	Neighborhood
Estrato		¿Cuál es el estrato del lugar en que reside?	What is the stratum of the place where you reside?
	1	Estrato 1	Stratum 1
	2	Estrato 2	Stratum 2
	3	Estrato 3	Stratum 3
	4	Estrato 4	Stratum 4
	5	Estrato 5	Stratum 5
	6	Estrato 6	Stratum 6
	7	No sé / prefiero no responder	I don’t know / I prefer not to answer

Education		¿Cuál fue el último nivel educativo que completaste?	What was the highest level of education you completed?
	1 2 3 4 5 6 7	No fui a la escuela Primaria Secundaria Bachillerato Superior o universitaria Maestría u otro nivel más avanzado No sé / prefiero no responder	I did not go to school Primary Secondary High School Higher or university Master's degree or another more advanced level I don't know / I prefer not to answer
Older 65		Incluyéndote a ti, ¿en este momento vive en tu hogar algún adulto mayor de 65 años?	Including you, is there an adult over 65 living in your household at this time?
	1 2 3	Sí No No sé / prefiero no responder	Yes No I don't know / I prefer not to answer
Pre-existing condition		¿Tú o alguien que vive en tu hogar tiene alguna enfermedad preexistente que los ponga en alto riesgo si se contagian de Coronavirus?	Do you or someone who lives in your home have a pre-existing illness that puts you at high risk if they catch Coronavirus?
	1 4 6	Sí No No sé / prefiero no responder	Yes No I don't know / I prefer not to answer
Diarrea		En los últimos 15 días, ¿tú o alguien en tu hogar sufrió de diarrea o intoxicación del estómago?	In the past 15 days, did you or anyone in your household suffer from diarrhea or stomach poisoning?
	1 2 3	Sí No No sé / prefiero no responder	Yes No I don't know / I prefer not to answer
Prob. Infection		En tu opinión, ¿qué tan probable es que tú te contagies de Coronavirus en los siguientes 6 meses?	In your opinion, how likely is it that you will get Coronavirus in the next 6 months?
	0-100	Barra deslizante (qualtrics) : variable continua Pregunta abierta (Uninorte): variable continua 0 = nada probable 100 = Sumamente probable Barra deslizante: 0-100	Sliding bar (qualtrics): continuous variable Open question (Uninorte): continuous variable 0 = Not likely 100 = Highly probable Sliding bar: 0-100
Prob. Hospital		En tu opinión, si una persona de tu edad se contagia de Coronavirus, ¿qué tan probable es que termine hospitalizado/a?	In your opinion, if a person your age is infected with Coronavirus, how likely is it that they will end up hospitalized?
	0-100	Barra deslizante (qualtrics) : variable continua Pregunta abierta (Uninorte): variable continua 0 = nada probable 100 = Sumamente probable Barra deslizante: 0-100	Sliding bar (qualtrics): continuous variable Open question (Uninorte): continuous variable 0 = Not likely 100 = Highly probable Sliding bar: 0-100
Time to Keep Health Measures		¿Por cuánto tiempo más crees que deberás seguir las medidas de salud para evitar el contagio del coronavirus? Por medidas de salud, nos referimos al constante lavado de manos, sana distancia y uso de tapabocas. Elige la respuesta que mas se acerque a lo que piensas	For how long do you think you should follow health measures to avoid the spread of the Coronavirus? By health measures we mean constant hand washing, healthy distance and use of face masks. Choose the answer that is closest to what you think
	1 2 3 5 6 10 11 12 13 14 15 16 17 20 21 22 24	1 mes 2 meses 3 meses 4 meses 5 meses 6 meses 7 meses 8 meses 9 meses 10 meses 11 meses 1 año 2 años 3 años 4 años 5 años No sé / prefiero no responder	1 month 2 months 3 months 4 months 5 months 6 months 7 months 8 months 9 months 10 months 11 months 1 year 2 years 3 years 4 years 5 years I don't know / I prefer not to answer

Exposed COVID-19		¿Tú o algún amigo, familiar o compañero de trabajo tuyo han tenido Coronavirus?	Have you or a friend, relative or colleague of yours had Coronavirus?
	1 2 4	Sí No No sé / prefiero no responder	Yes No I don't know / I prefer not to answer
Dead COVID-19		¿Conoces a alguien que haya muerto por Coronavirus	Do you know someone who has died from Coronavirus
	1 2 4	Sí No No sé / prefiero no responder	Yes No I don't know / I prefer not to answer
Symptoms Know		Selecciona dos síntomas comunes del Coronavirus (COVID-19)	Select two common symptoms of Coronavirus (COVID-19)
		Tos seca Dificultad para respirar Fiebre (38 grados centígrados o más) Dolor estomacal Dificultad para ver bien No sé / prefiero no responder	Dry cough Difficulty breathing Fever (38 degrees Celsius or higher) Stomachache Difficulty seeing well I don't know / I prefer not to answer
Asymptomatic Contagion		En tu opinión, ¿una persona que no presenta síntomas puede contagiar a otros de Coronavirus?	In your opinion, can a person who does not have symptoms spread Coronavirus to others?
	1 2 3	Sí No No sé / prefiero no responder	Yes No I don't know / I prefer not to answer
Young Risk		En tu opinión, ¿la gente menor a 40 años puede enfermarse de Coronavirus?	In your opinion, can people under 40 years of age get sick from Coronavirus?
	1 2 3	Sí No No sé / prefiero no responder	Yes No I don't know / I prefer not to answer
Minimum Distance		¿Cuál es la distancia mínima que se recomienda mantener de otras personas cuando uno está fuera de casa?	What is the recommended minimum distance from other people when you are away from home?
		0.5 metros 1 metro 1.5 metros 2 metros 2.5 metros 3 metros 4 metros No sé / prefiero no responder	0.5 meters 1 meter 1.5 meters 2 meters 2.5 meters 3.5 meters 4 meters I don't know / I prefer not to answer
Facemask Know		Cuando usas máscara o tapabocas, ¿es necesario mantener distancia física de otras personas para evitar el contagio?	When you wear a mask or mask, is it necessary to maintain physical distance from other people to avoid contagion?
	1 2 3	Sí No No sé / prefiero no responder	Yes No I don't know / I prefer not to answer
Prevent Know		En tu opinión, ¿cuáles de las siguientes acciones ayudan a prevenir el contagio del Coronavirus?	In your opinion, which of the following actions help prevent the spread of Coronavirus?
		Selecciona todas las opciones de respuesta que apliquen.	Select all the answer options that apply.
	1 3 4 6 7 8	Lavarse las manos con jabón por 20 segundos Usar tapabocas o máscara fuera de la casa Tomar antibióticos Tomar mucha vitamina C Comer ajo No sé / prefiero no responder	Wash your hands with soap for 20 seconds Wear a mask or mask outside the house Take antibiotics Take lots of vitamin C Eat garlic I don't know / I prefer not to answer
Risky Inside Restaurant		Ahora piensa en el riesgo de contagio. ¿Qué tan riesgoso crees que es ir a comer a un restaurante cerrado?	Now think about the risk of contagion. How risky do you think it is to eat at an indoor restaurant?
	1 2 3 4	Riesgo alto Riesgo medio Riesgo bajo No sé / prefiero no responder	High risk Medium risk Low risk I don't know / I prefer not to answer

Risky Inside Office		Ahora piensa en el riesgo de contagio. ¿Qué tan riesgoso crees que es ir a trabajar a la oficina con todos compañeros de trabajo?	Now think about the risk of contagion. How risky do you think it is to go to work at the office with all your colleagues?
	1	Riesgo alto	High risk
	2	Riesgo medio	Medium risk
	3	Riesgo bajo	Low risk
	4	No sé / prefiero no responder	I don't know / I prefer not to answer
Risky Inside Gym_Barranquilla		Ahora piensa en el riesgo de contagio. ¿Qué tan riesgoso crees que es ir a un banco o tienda concurrida?	Now think about the risk of contagion. How risky do you think it is to go to a busy bank or store?
	1	Riesgo alto	High risk
	2	Riesgo medio	Medium risk
	3	Riesgo bajo	Low risk
	4	No sé / prefiero no responder	I don't know / I prefer not to answer
Visit others		En los últimos 7 días, ¿tú o alguien en tu hogar realizaron alguna de las siguientes actividades? Asistir a una reunión o fiesta con más de 10 personas	In the last 7 days, did you or someone in your household perform any of the following activities? Attend a meeting or party with more than 10 people
	1	Sí	Yes
	2	No	No
Attend Party		En los últimos 7 días, ¿tú o alguien en tu hogar realizaron alguna de las siguientes actividades? Visitar a parientes o amigos en su casa.	In the last 7 days, did you or someone in your household perform any of the following activities? Visit relatives or friends at home
	1	Sí	Yes
	2	No	No
Hand Wash		En promedio, ¿cuántas veces al día te lavas las manos?	On average, how many times a day do you wash your hands?
	1	0-2	0-3
	2	3-4	3-5
	3	5-6	5-6
	4	7-9	7-9
	5	10 o más	10 o más
	6	No sé / prefiero no responder	I don't know / I prefer not to answer
Social Distance		Cuando estás fuera de tu casa, ¿qué tan frecuentemente mantienes la distancia física adecuada de otras personas?	When you are away from home, how often do you keep the proper physical distance from other people?
	1	Siempre	Always
	2	Casi siempre	Almost always
	3	A veces sí y a veces no	Sometimes yes and sometimes no
	4	Casi nunca	Almost never
	5	Nunca	Never
Facemask Use	6	No sé / prefiero no responder ¿Qué tan frecuentemente usas tapabocas cuando sales de tu casa?	I don't know / I prefer not to answer How often do you wear a face mask when you leave your house?
	1	Siempre	Always
	2	Casi siempre	Almost always
	3	A veces sí y a veces no	Sometimes yes and sometimes no
	4	Casi nunca	Almost never
	5	Nunca	Never
	7	No sé / prefiero no responder	I don't know / I prefer not to answer
Facemask Peers		Pensando en tus vecinos y conocidos, ¿dirías que en general toman o no toman las siguientes medidas? Usar máscara o tapabocas	Thinking of your neighbors and acquaintances, would you say that in general they do or do not take the following measures?: Use facemasks
	5	Sí	Yes
	6	No	No
Distance Peers		Pensando en tus vecinos y conocidos, ¿dirías que en general toman o no toman las siguientes medidas? Mantener sana distancia de otras personas	Thinking of your neighbors and acquaintances, would you say that in general they do or do not take the following measures? Keep distance with others
	5	Sí	Yes
	6	No	No

Intro to VignetteA_friends		Piensa con cuidado en la siguiente situación hipotética:	Think carefully about the following hypothetical situation:
		Ana vive en Barranquilla. Una amiga cumple años e invitó a Ana, junto con otros 10 amigos cercanos , a asistir a una reunión dentro de su casa.	Ana lives in Barranquilla. A friend has a birthday and invited Ana, along with 10 other close friends , to attend a get together inside her home.
VignetteA_yn		Ana llega al cumpleaños de su amiga usando tapabocas, pero ninguno de sus amigos está usando tapabocas.	Ana comes to her friend's birthday wearing a mask, but none of her friends are wearing masks.
VignetteA_ny		Ana llega al cumpleaños de su amiga sin tapabocas, pero todos sus amigos están usando tapabocas.	Ana comes to her friend's birthday without mask, but all of her friends are wearing masks.
VignetteA_nn		Ana llega al cumpleaños de su amiga sin tapabocas, pero ninguno de sus amigos están usando tapabocas.	Ana comes to her friend's birthday without mask, but none of her friends are wearing masks.
VignetteA_yy		Ana llega al cumpleaños de su amiga usando tapabocas, y todos de sus amigos está usando tapabocas.	Ana comes to her friend's birthday wearing a mask, and all of her friends are wearing masks.
VignetteA_n2y		Ana llega al cumpleaños de su amiga, sin tapabocas pero 2 de sus amigos sí están usando tapabocas.	Ana comes to her friend's birthday without mask, but 2 of her friends are wearing masks.
VignetteA_n4y		Ana llega al cumpleaños de su amiga, sin tapabocas pero 4 de sus amigos sí están usando tapabocas.	Ana comes to her friend's birthday without mask, but 4 of her friends are wearing masks.
VignetteA_n6y		Ana llega al cumpleaños de su amiga, sin tapabocas pero 6 de sus amigos sí están usando tapabocas.	Ana comes to her friend's birthday without mask, but 6 of her friends are wearing masks.
VignetteA_n8y		Ana llega al cumpleaños de su amiga, sin tapabocas pero 8 de sus amigos sí están usando tapabocas.	Ana comes to her friend's birthday without mask, but 8 of her friends are wearing masks.
VignetteB_acquaintances		Piensa con cuidado en la siguiente situación hipotética:	Think carefully about the following hypothetical situation:
		Ana vive en Barranquilla. Una amiga cumple años e invitó a Ana a asistir a una reunión dentro de su casa. La amiga le dice a Ana quién estará en la fiesta: asistirán 10 invitados ademas de Ana, de los cuales Ana conoce a 6. Ana llega al cumpleaños de su amiga sin tapabocas Los 6 invitados que Ana conoce están usando tapabocas y los 4 que no conoce están sin tapabocas.	Ana lives in Barranquilla. A friend has a birthday and invited Ana to attend a get together inside her house. The friend tells Ana who will be at the party: 10 guests will attend in addition to Ana, of which Ana knows 6. Ana comes to her friend's birthday without a mask. The 6 guests that Ana knows are wearing masks and the 4 she does not know are without masks.
VignetteC_strangers		Piensa con cuidado en la siguiente situación hipotética:	Think carefully about the following hypothetical situation:
		Ana vive en Barranquilla. Una amiga cumple años e invitó a Ana a asistir a una reunión dentro de su casa. La amiga le dice a Ana quién estará en la fiesta: asistirán 10 invitados ademas de Ana, de los cuales Ana conoce a 4. Ana llega al cumpleaños de su amiga sin tapabocas Los 6 invitados que Ana no conoce están usando tapabocas y los 4 que si conoce están sin tapabocas.	Ana lives in Barranquilla. A friend has a birthday and invited Ana to attend a get together inside her house. The friend tells Ana who will be at the party: 10 guests will attend in addition to Ana, of which Ana knows 4. Ana comes to her friend's birthday without a mask. The 6 guests that Ana does not know are wearing masks and the 4 she does know are without masks.
Facemask_wear_1		Si tuvieras que adivinar, ¿qué crees que hará Ana durante el resto de la fiesta?	If you had to guess, what do you think Ana will do for the rest of the party?
	1	Usará tapabocas	Will wear a mask
	2	No usará tapabocas	Will not wear a mask
	3	No sé/ prefiero no responder	I don't know / I prefer not to answer
Facemask_wear_2		¿Crees que Ana usará tapabocas al día siguiente al salir de su casa?	Do you think Ana will wear a mask the next day when she leaves her house?
	1	Usará tapabocas	Will wear a mask
	5	No usará tapabocas	Will not wear a mask
	4	No sé/ prefiero no responder	I don't know / I prefer not to answer

Facemask_wear_week		Pensando en la semana después de la fiesta, ¿cuántos días crees que Ana usará tapabocas?	Thinking back to the week after the party, how many days do you think Ana will wear a mask?
	1	0	0
	2	1	1
	3	2	2
	4	3	3
	5	4	4
	6	5	5
	7	6	6
	8	7	7
	11	No sé / prefiero no responder	I don't know / I prefer not to answer
Vignette_App_Facebook		Facebook es la plataforma social más usada en Colombia y el mundo. A través de su aplicación móvil, los usuarios pueden mantenerse en contacto con amigos y familia desde cualquier lugar y en cualquier momento. ¿Estás de acuerdo que la versión móvil de Facebook facilita el contacto con tus seres queridos?	Facebook is the most used social platform in Colombia and the world. Through its mobile application, users can keep in touch with friends and family from anywhere and at any time. Do you agree that the mobile version of Facebook makes contact with your loved ones easier?
	1	Sí	Yes
	2	No	No
	4	No sé / prefiero no responder	I don't know / I prefer not to answer
Vignette_Online_Paperwork		El gobierno de Colombia ha ido pasando muchos trámites que antes eran presenciales a plataformas en línea. Además, gracias a las aplicaciones móviles muchos trámites se pueden realizar desde cualquier lugar. Por ejemplo, ahora los colombianos podemos afiliarnos a la seguridad social en línea. ¿Estás de acuerdo que poder hacer trámites en línea mejora la vida de los colombianos?	The Colombian government has switched many procedures that were previously face-to-face to online platforms. In addition, thanks to the mobile applications, many procedures can be carried out from anywhere. For example, now Colombians can join social security online. Do you agree that being able to do paperwork online improves the life of Colombians?
	1	Sí	Yes
	2	No	No
	4	No sé / prefiero no responder	I don't know / I prefer not to answer
Vignette_Data_Privacy		Asegurar la privacidad de los ciudadanos es lo más importante para los gobiernos y Colombia no se ha quedado atrás. La privacidad de datos de los colombianos es una prioridad para nuestro gobierno. ¿Estás de acuerdo que el gobierno tiene como prioridad proteger tu privacidad?	Ensuring the privacy of citizens is the most important thing for governments and Colombia has not been left behind. Colombian data privacy is a priority for our government. Do you agree that the government has a priority to protect your privacy?
	1	Sí	Yes
	2	No	No
	4	No recuerdo / No sé	I don't remember / I don't know
Vignette_Trust		El Gobierno Colombiano se comprometió a llevar conectividad a todos los rincones del país y cumplió. A la fecha, se instalaron más de 1000 Zonas Digitales con internet gratuito y se conectaron cerca de 100 mil hogares de estratos 1 y 2 a internet. ¿Confías que el Gobierno Nacional cumple con lo que promete?	The Colombian Government promised to bring connectivity to all corners of the country and it complied. To date, more than 1,000 Digital Zones 100,000 households in strata 1 and 2 have been connected to the internet. Do you trust that the National Government complies with what it promises?
	7	Sí	Yes
	8	No	No
	9	No recuerdo / No sé	I don't remember / I don't know
App_knows		El gobierno nacional creó una aplicación móvil para tu teléfono, llamada CoronApp, que te permite saber si tienes algún síntoma de coronavirus y te dice qué hacer, sin costo y sin consumir datos. ¿Conoces el CoronApp?	The national government created a mobile application for your phone, called CoronApp, that lets you know if you have any symptoms of coronavirus and tells you what to do, free of charge and without consuming data. Do you know the CoronApp?
	1	Sí	Yes
	2	No	No
	4	No recuerdo / No sé	I don't remember / I don't know

App_symptoms_		¿La instalarías en tu teléfono?	Would you install it on your phone?
install	1	Seguro sí	Definitely yes
	2	Creo que sí	I think so
	3	Creo que no	I don't think so
	4	Seguro no	Definitely not
	5	No sé / prefiero no responder	I don't know / I prefer not to answer
App_notifications		Si además de lo anterior, esa aplicación móvil también te alerta si estás en contacto con una persona infectada de coronavirus, y les notifica a las personas que estuvieron en contacto cercano contigo (sin compartir nombres de nadie), ¿La instalarías en tu teléfono?	If in addition to the above, that mobile application also alerts you if you are in contact with a person infected with coronavirus, and notifies the people who were in close contact with you (without sharing anyone's names), Would you install it on your phone?
	1	Seguro sí	Definitely yes
	2	Creo que sí	I think so
	5	Creo que no	I don't think so
	3	Seguro no	Definitely not
	4	No sé / prefiero no responder	I don't know / I prefer not to answer
Diagnostic application		Si hubiera una aplicación móvil del gobierno federal para tu teléfono que te permitiera saber si tienes algún síntoma de coronavirus y te dijera qué hacer, sin costo y sin consumir datos, ¿la instalarías en tu teléfono?	If a federal government app were available for your smartphone that could help you to identify coronavirus symptoms, and inform you what to do at no cost, and with no data usage, would you download it to your phone?
	1	Seguro sí	Definitely yes
	2	Creo que sí	I think so
	5	Creo que no	I don't think so
	3	Seguro no	Definitely not
	4	No sé / prefiero no responder	I don't know / I prefer not to answer
Contact Tracing application		Si además de lo anterior, esa aplicación también te alertara si estuviste en contacto por más de 15 minutos con una persona infectada de coronavirus, y les notificara a las personas que estuvieron en contacto cercano contigo, sin identificar ningún nombre, ni el tuyo ni el de las otras personas, ¿la instalarías en tu teléfono?	If, in addition to the previously-described features, the app could also alert you if you had been in contact for more than 15 minutes with an infected person, and it notified the people who were near you if you became infected, without identifying personal information (yours or others'), would you download the app?
	1	Seguro sí	Definitely yes
	2	Creo que sí	I think so
	5	Creo que no	I don't think so
	3	Seguro no	Definitely not
	4	No sé / prefiero no responder	I don't know / I prefer not to answer
Follow Up		Muchas gracias por haber completado esta encuesta. Para contribuir a entender la epidemia y reducir el contagio, ¿desearías participar en una breve encuesta de seguimiento en algunas semanas?	Thank you very much for completing this survey. To help understand the epidemic and reduce contagion, Would you like to participate in a short follow-up survey in a few weeks?
	4	Si	Yes
	5	No	No
Email		Correo electrónico:	Email:
Whatsapp_not_mob		Escribe tu número de WhatsApp de 10 dígitos (opcional):	Write your 10-digit WhatsApp number (optional):

Notas		<p>Si compartiste tu número de WhatsApp, en los próximos días recibirás un mensaje de confirmación del número dedicado a este estudio: 304 6189073. ¡Toma nota por favor!</p> <p>Te recordamos que tu información de contacto solamente se usará para fines del estudio, se guardará de manera encriptada y segura, y se borrará cuando termine el estudio.</p>	<p>If you shared your WhatsApp number, in the next few days you will receive a confirmation message of the number dedicated to this study: 304 6189073. Please take note!</p> <p>We remind you that your contact information will only be used for study purposes, it will be stored in an encrypted and secure manner, and will be deleted when the study ends.</p>
Recommend		<p>¿Te gustaría ofrecerle la oportunidad de participar en el estudio a amigos o conocidos?</p> <p>Si sí, por favor ingresa una o más direcciones de correo electrónico (opcional)</p>	<p>Would you like to offer friends or acquaintances the opportunity to participate in the study?</p> <p>If yes, please enter one or more email addresses (optional)</p>
Satisfaction		<p>Por último, quisiéramos saber cómo fue tu experiencia con esta encuesta. ¿Qué tan amena te pareció la encuesta?</p>	<p>Finally, we would like to know how was your experience with this survey. How enjoyable did you find the survey?</p>
	1 2 5 3 4 6	<p>Muy amena Algo amena Ni amena ni aburrida Poco amena Aburrida No sé / prefiero no responder</p>	<p>Very enjoyable Somewhat pleasant Neither enjoyable not boring Little pleasant Boring I don't know / I prefer not to answer</p>
Calidad		<p>Por último, te pedimos tu sincera opinión. ¿Nos recomendaría utilizar sus respuestas como parte del cuidado o no leiste las preguntas al responder, por favor selecciona "No utilizar" para evitar afectar la calidad del estudio. No habrá ninguna consecuencia de ningún tipo para ti.</p>	<p>Finally, we ask for your honest opinion. Would you recommend using your answers as part of the study? not read the questions when answering, please select "Do not use" to avoid affecting the quality of the study. There will be no consequence of any kind for you.?</p>
	1 6	<p>Sí utilizar No utilizar</p>	<p>Yes use Do not use</p>
Good_quality		<p>Por último, te pedimos tu sincera opinión. ¿Nos recomendaría utilizar sus respuestas como parte del estudio? Si por alguna razón no respondiste con cuidado o no leiste las preguntas al responder, por favor selecciona "No utilizar" para evitar afectar la calidad del estudio. No habrá ninguna consecuencia de ningún tipo para ti.</p>	<p>Finally, we ask for your honest opinion. Would you recommend us to use your answers as part of the study? If for any reason you did not answer carefully or did not read the questions when answering, please select "Do not use" to avoid affecting the quality of the study. There will be no consequence of any kind for you.</p>
	1 2	<p>Sí No</p>	<p>Yes No</p>
End_Uninorte Only		<p>Gracias por dedicarle tiempo a esta encuesta. Tu respuesta se ha registrado. Si tienes alguna consulta sobre el estudio, puedes contactar a Alexander Villarraga quien lidera el estudio desde Uninorte.covid19baq@uninorte.edu.co Estudio Coronavirus - Alcaldía de Barranquilla y Universidad del Norte - 2020</p>	<p>Thank you for spending time on this survey. Your response has been recorded. If you have any questions about the study, you can contact Alexander Villarraga who leads the study from Uninorte.covid19baq@uninorte.edu.co Coronavirus Study - Barranquilla Mayor's Office and Universidad del Norte - 2020</p>