Overcoming Digital Barriers: Evidence from Venezuelan Migrants in Colombia

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Abstract

Unprecedented migration flows demand effective strategies for integrating migrants into the public systems of their host countries. The rapid digitalization of services creates new opportunities for inclusion, but limited internet access, digital literacy challenges, and weak social networks remain significant barriers. In collaboration with Innovations for Poverty Action and using administrative data from Colombia's National Planning Department, we design and implement a randomized controlled trial to reduce these barriers among Venezuelan migrants in Colombia. We test whether providing unlimited mobile data for a month and information about public benefits, delivered individually or within moderated WhatsApp groups, improves access to social services and other integration outcomes. We find that information provision, particularly via WhatsApp groups, significantly increased verified enrollment in Portal Ciudadano, the country's social services platform. Networked participants also demonstrated greater interest in government services and a stronger ability to complete digitally demanding tasks, which are increasingly important in today's digital environment. By contrast, we find no effects on outcomes such as employment, and even observe some negative effects on well-being. This study advances our understanding of migrant integration, highlighting WhatsApp's potential to activate networks and assist migrants in navigating host societies, while also revealing the ongoing challenges in achieving broader integration outcomes.

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An estimated 281 million people live outside their country of origin, 110 million of whom are forcibly displaced, with 85% hosted in the Global South [United Nations, 2020, Blair et al., 2022]. As migration rises, governments encounter the challenge of integrating hard-to-reach populations. They face a dilemma: expanding access may put additional pressure on state resources, but providing individuals with access can help integrate them into society and formal state structures. For governments and agencies that seek the integration route, enhancing navigational integration among the migrant community [Harder et al., 2018] – the ability to access key resources in a host country – is vital. A paradox of social safety nets is that people most in need are also the most likely to lack the resources or information to access available services. This issue is especially acute for migrants, who lack local knowledge and social connections that could provide support. Particularly as governments shift to online provision of services, this community faces a trifecta of barriers – access to internet, accurate information, and reliable social networks.

In this paper, we assess a randomized controlled trial to address these barriers through three treatment arms: providing mobile data, offering direct information about government services, and facilitating group communication among migrants via WhatsApp.[1] We theorize about the role of informal "loose-tie" networks in helping migrants navigate government services and achieve broader integration outcomes, and demonstrate how WhatsApp can be leveraged to activate these networks. Our focus is on one of the largest displacement crises in recent history, where latest figures suggest that over 6.8 million Venezuelans fled the country as refugees and migrants [Venezuelan Refugees and Migrants in the Region, 2025], whether due to dire economic situations or political persecution and violence [Salas-Wright et al., 2022]. More than a third emigrated to Colombia, where many are eligible to access the same public services as native Colombians. However, despite this eligibility, millions of Venezuelans still lack access to social services. This phenomenon is consistent with broader research on non-take-up of benefits, where vulnerable

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[1]This study was pre-registered, and information about the pre-analysis plan can be found in the supplementary material.

populations fail to enroll in programs due to process costs, or digital literacy challenges [Ko and Moffitt, 2024].

Our intervention targets engagement with Portal Ciudadano, an online platform launched in 2021 to connect users with Colombia's Sisbén program, which assesses social service eligibility for low-income individuals. The portal allows users to check their Sisbén status, access information, request updates, and explore available services. Collaborating with an international NGO, *Innovations for Poverty Action Colombia*, and with support from the *Department of National Planning (DNP)*, the Colombian government agency responsible for coordinating and supporting public policy planning, we are able to reach the community of Venezuelan migrants in Colombia who are registered with Sisbén but not yet enrolled on the online portal, Portal Ciudadano. Within this group, we study the subset who lack access to computers and have limited to no internet connectivity. This is a particularly vulnerable population, and one which an increasingly digitized state has special difficulty in "seeing".

We design an experiment that deploys a progressive treatment, with each component aimed at addressing a key barrier to integration identified by Dávalos et al. [2023]: resource (data) limitations, lack of information, and lack of social capital. These components are implemented across the experimental treatment arms as follows: (1) one month of unlimited mobile phone data to reduce connectivity barriers; (2) direct WhatsApp messages about Portal Ciudadano to address knowledge gaps; and (3) moderated WhatsApp groups of around 30 migrants to leverage peer networks for navigating digital services. These groups serve a dual purpose: providing participants with reliable information about Portal Ciudadano while also activating connections that could enable information exchange and mutual support. We measure impacts on knowledge of and enrollment in Portal Ciudadano, alongside broader integration outcomes including trust in government, labor market success, and subjective well-being.

We find that the provision of internet access and targeted information can significantly

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enhance government program uptake among migrants. In particular, our primary result shows that receiving data and information about social programs, both directly and through WhatsApp groups, significantly increased Portal Ciudadano registrations. Those in WhatsApp groups also demonstrated greater factual knowledge of the programs and stronger ability to engage in tasks demanding digital skills. Qualitative analysis of the WhatsApp group discussions shows that participants actively exchanged answers, instructions, and personal experiences, demonstrating the power of even ad hoc networks in circulating information and enabling the completion of digital tasks.

Beyond program uptake, we examine additional outcomes related to integration and trust. While interest in government programs surged in both the first and the third treatment arm, this did not lead to increased trust in the government. Employment outcomes remained unchanged, although participants in the networked treatment arm reported pursuing additional training opportunities. Finally, treated participants reported lower optimism and greater frustration, particularly in the arm combining data with direct information, which raises questions about the psychological impacts that can accompany efforts to digitize service delivery.

This study contributes to several distinct bodies of literature: the scholarship on migrant integration [Fouka, 2024, Harder et al., 2018, Hotard et al., 2019, Graham et al., 2020, Zhou et al., 2023]; research on communication technologies and their role in expanding access to public services [Moorena et al., 2020, Batista and Vicente, 2018, Suri and Jack, 2016, Lee et al., 2021, Aker et al., 2012, Lashitew et al., 2019]; work on digital literacy in mobile and WhatsApp-based contexts in the Global South [Guess et al., 2020, Correa et al., 2022]; and the literature on administrative burden [Moynihan et al., 2015, Herd and Moynihan, 2025]. Perhaps the most promising result of our experiment, both theoretically and for policy, arises from the novel group-based information provision. This intervention highlights the important role that even ad hoc networks can play in facilitating public benefit uptake. Such "loose-tie" networks can operate as a force multiplier

for government efforts, particularly when working with populations with uneven levels of digital literacy. By providing migrants with access to peers facing similar challenges, our design demonstrates how these connections can enhance individuals' ability to navigate host-country resources. On a practical level, this research illustrates the value of collaboration between researchers, NGOs, and government agencies in shaping policy. Our partnership with the DNP in Colombia granted us access to Venezuelan migrants and enabled us to measure behavioral outcomes – such as actual enrollment in a national public benefits portal – that are typically difficult to capture and are often inferred from self-reports in prior work.

Digital Barriers to Public Benefits among Migrants

With increasing immigration within the Global South, ensuring that migrants can navigate and integrate into host societies remains a critical policy challenge. Migrant integration is multidimensional, encompassing psychological, economic, political, social, linguistic, and navigational domains [Harder et al., 2018]. This paper focuses on navigational integration, defined as migrants' ability to access information and resources in the host country [Harder et al., 2018]. Achieving this requires not only access to accurate information as a precondition, but also the skills and capacities to act on it. We design and evaluate an intervention to improve navigational integration outcomes, specifically knowledge of social benefit programs, the ability to navigate digitized environments, and registration on the online portal used to keep personal information up to date and engage with social benefits information. Because navigational integration is closely linked to success in other dimensions of integration, we also examine downstream effects on labor market outcomes, trust in the host government, and subjective well-being.

Navigational integration challenges are particularly evident in the domain of social benefits programs, where these difficulties often translate into concrete disadvantages, such as

incomplete uptake. Incomplete uptake is a well-documented issue globally [Currie, 2004, Ko and Moffitt, 2024, Yasenov et al., 2019], where eligible individuals do not enroll in or access the benefits to which they are entitled. The more onerous the experience of policy implementation is, the lower the take-up, with the strongest effects falling on groups with the fewest resources [Moynihan et al., 2015]. The literature on administrative burden, i.e., the costs associated with interacting with government policy, identifies three main categories of administrative burden: learning costs (time and effort required to understand the policy and service), compliance costs (provision of information and documentation needed to access services, as well as other costs associated with accessing them), and psychological costs (stigma, frustration, and the stress arising from uncertainty or fear) [Herd and Moynihan, 2025].

To reduce costs and improve access, many governments now deliver public services digitally, asking individuals to complete forms, register for programs or, as in this study, use online web portals to update information that determines benefit eligibility. Expectations regarding the effects of digitalization on administrative burden point to a double-edged sword. On the one hand, digital service can make accessing services and information faster and easier, and the anonymity it affords may lower the psychological costs of engaging with public benefit programs [Madsen et al., 2022]. On the other hand, digitalization can deepen existing burdens by raising the technical skills and access requirements needed to find and navigate information [Madsen et al., 2022]. After initial optimism about digital delivery, there is an increasing recognition that technological shifts can also create new risks and barriers for high-need populations [Linos et al., 2022, Lindgren et al., 2019]. Summarizing 98 articles on digital inclusion in public services, Liu et al. [2025] note how vulnerable groups still spend substantial time enrolling in systems, facing compliance and learning costs that can translate into psychological burdens such as frustration and stress. Digitization provides opportunities, but is not a cure-all, especially for vulnerable groups. In designing our intervention, we draw on the administrative burden framework and apply

it to one of the largest displacement crises in recent history. We adapt the framework to the digital environment and incorporate social media to reduce burdens – a combination that, to our knowledge, has not yet been explored in this line of research.

Venezuelan migrants in Colombia face barriers across dimensions of administrative burden, with a recent survey highlighting institutional challenges, limited access to information, and lack of social networks as key obstacles to service uptake [Dávalos et al., 2023]. In our study, all respondents have regularized status, so there are no immediate legal or institutional barriers. This narrows the focus to limited access to information and weak social networks as the main barriers. Limited information access refers both to the availability of information and to participants' ability to access it. Our approach to improving navigational integration therefore begins with a necessary condition in digital contexts: reliable access to online resources. In an increasingly digitized environment, "a good internet connection is indispensable" [Moloney, 2021], yet limited mobile data often prevent users from accessing online services. This challenge is illustrated in a study by Moya et al. [2023], who conducted a WhatsApp-based digital information experiment encouraging Venezuelan migrants in Colombia to complete a regularization step. Surprisingly, take-up rates were eight percentage points *lower* among those who received the intervention videos compared to the control group, largely because individuals – often older or with limited internet access – were frustrated by receiving videos they could not load. To address this constraint of limited access, our first treatment arm provides one month of unlimited mobile data, with all participants owning a mobile phone.

Connectivity alone, however, is insufficient without knowledge of where and how to access accurate information. This gap reflects learning costs, i.e. the effort required to acquire information about public programs and determine its relevance. Imperfect information and low awareness of available programs have long been recognized as key drivers of incomplete benefit take-up [Chetty and Saez, 2013]. A recent systematic review of behavioral interventions synthesized 93 interventions from 35 field experiments conducted

over nearly 20 years, mostly in the U.S. [Daigneault et al., 2025], and found that information provision increased program application in 60.9% of cases, with positive take-up effects in 69.2% of studies.[2] Our second treatment arm combines unlimited mobile data with weekly WhatsApp messages, delivered over a month, that provide clear instructions on the Portal Ciudadano registration process and highlight the benefits of enrollment. We pre-registered the expectation that this treatment arm would outperform the pure control group across all outcomes. We further hypothesized that it could be particularly effective in increasing trust in government, as personalized direct messaging may update beliefs about the state as responsive, competent, and sufficiently attentive to acknowledge citizens on an individual level.

Connectivity and information may still be insufficient if individuals lack the means to act on it. Writing on the digital divide, Dewan and Riggins [2005] distinguish between first-order effects (inequality in access) and second-order effects (difficulty using technology even when access is available). Prior research has addressed second-order effects through assistance from trained facilitators or bureaucrats [Daigneault et al., 2025], social infrastructure such as libraries [Giest and Samuels, 2023], or paid intermediaries. While these approaches can reduce learning, compliance, and psychological costs,they do not come without a cost: For example, Alshallaqi and Al-Mamary [2024] point out that while these actors can facilitate digital inclusion, they also benefit from sustaining digital dependence. Our third treatment arm instead examines whether peer networks can provide similar support without these costs.

Peer networks can improve navigational integration outcomes through two main pathways. While these mechanisms are not unique to migrants, we expect them to be especially powerful for this population given their more limited networks compared to native residents. The first pathway is the activation of communal expertise-sharing. Access to

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[2]Both this review and related research [Herd and Moynihan, 2025], however, note significant heterogeneity across studies, and conclude that there is mixed evidence on the effectiveness of low-cost nudges.

accurate information is a precondition for integrating into any society [Caidi and Allard, 2005]. The individually directed arm reflects traditional conceptions of digital literacy: participants receive information via WhatsApp and mobile data, but must independently use a standard browser to access the Portal Ciudadano, search for jobs or training, and navigate other online resources. In contrast, the group-based arm introduces a distinct mechanism for using the same resources. Drawing on Papacharissi [2015b,a], we apply the concept of digital orality, which emphasizes that most online communication is many-to-many (like a dinner party or campfire), rather than one-to-one (a book) or one-to-many (a broadcast). Within this setting, peer networks can provide practical help with digitally demanding tasks and support collaborative information processing particularly important in situations requiring complex literacies.

The second pathway through which data and networked information may improve navigational outcomes relates to psychological and social costs. As the administrative burden literature highlights, such costs include stigma, frustration, and stress [Herd and Moynihan, 2025]. These pressures are compounded for migrants who often face limited support networks [Caidi and Allard, 2005] and are especially vulnerable to migrant-related stigma. Approaching government officials can feel intimidating, carrying fears of making mistakes [Beardall et al., 2024] or jeopardizing one's status. Similarly, seeking help from natives may feel uncomfortable or expose migrants to prejudice. By contrast, access to fellow migrants can offer a lower-stress and more trusted avenue for information and support. Bonding networks tend to provide reassurance and can serve as a safety net that helps individuals overcome uncertainty in navigating public services [El-Bialy et al., 2023]. In our setting, activating networks around a shared, practical task helps migrants learn from one another, reduce psychological barriers, and build confidence in engaging with government systems. While natives may rely more comfortably on institutional channels, migrants often depend on informal networks to access and act on information about public services.

In sum, the first ("Data") and second ("Data + Information") arms reduce constraints by adding resources but remain individually oriented and are likely to have additive effects. In contrast, third treatment arm ("Data + Information with Peer Networks") introduces a peer network component that alters the context in which information is processed and acted upon, rather than simply adding another resource. As a result, the effects of the second and third treatment arm are likely to be interactive, with networks amplifying or reshaping the influence of data and information. Our theoretical interest lies in identifying both the contribution of each treatment arm relative to the control group and the differences in their effects relative to one another.

Treatment Arm	Description
T1: Data	One month of unlimited mobile data.
T2: Data + Information	T1 + Direct WhatsApp messages about Portal Ciudadano.
T3: Data + Information with Peer Networks	T2 + Participation in moderated WhatsApp groups with other migrants.

Table 1: Description of Treatment Conditions

Beyond Uptake: Effects on Employment, Government Trust, and Well-Being

Improved navigational integration may generate downstream effects across other dimensions of integration. To test this, we pre-registered expectations for treatment effects on employment, trust in government, and subjective well-being, as proxies for economic, political, and social integration.

We considered employment to be a downstream outcome of improvements in navigational integration. In our preregistration, we noted that employment is a complex outcome, unlikely to shift substantially in the short term, but we anticipated small positive effects among all treated subjects. This expectation draws on prior research: Hjort and Poulsen [2019] find that fast internet access increases the likelihood of skilled employ-

ment, while studies on refugee integration and labor market matching show that limited online access raises search costs and leads to poorer job matches, as individuals miss opportunities advertised online [Åslund et al., 2014, Abebe et al., 2021, Bazzi et al., 2021, Battisti et al., 2019]. These challenges are heightened for migrants navigating an unfamiliar labor market. Our intervention – particularly the WhatsApp group arm – seeks to reduce these barriers by expanding participants networks and access to job opportunities. While substantial employment gains are unlikely within a four-week period, we track job search activity and participation in training programs as intermediate indicators of labor market engagement.

We also considered that the intervention might influence trust in and interest in the government if participants attribute the benefits of the program to government action. The concern in our context is that many migrants are unaware of existing government programs. By providing them with information and greater control over their own records, we expect these migrants to become more interested in, and possibly more supportive of, the Colombian government. In the broader e-government literature, satisfaction with government websites is positively associated with trust in government [Welch et al., 2005], and improving the delivery of information about government programs or public services can increase process-based trust and citizens' perceptions of government responsiveness [Tolbert and Mossberger, 2006, Buell et al., 2021]. Online platforms that streamline interactions and reduce bureaucratic friction may also signal competence, integrity, and transparency, all of which are core components of institutional trust. Building on these insights, we hypothesize that all treatment arms will increase interest in and trust toward government by updating beliefs about state capacity, responsiveness, and the transparency of administrative processes. We expect particularly strong effects for the second treatment arm, given the personalized nature of direct messaging. Such communication may be interpreted as coming directly from the government rather than being mediated by peers, which would strengthen the attribution of the intervention to government action.

Finally, to capture the psycho-social dimension, we measure subjective well-being. Our expectation is that enhanced access to mobile data, whether accompanied by additional program information or not, would lead to more positive self-reported feelings and moods within this group. The literature on the effects of increased internet usage is mixed, suggesting that such access can plausibly influence well-being in either direction. Berg [2025] writes about digital exclusion, due to limited Internet connectivity among others, as a form of othering for refugees which can negatively impact their sense of belonging, psychological well-being and reinforce their marginalized status. We also considered that the intervention may reduce frustrations associated with limited connectivity and administrative burdens [Moynihan et al., 2015, Herd and Moynihan, 2025]. Second, learning more about the available programs and gaining greater control over one's information, while avoiding the time and potential stress of in-person office visits, may translate into more positive moods. Finally, higher quality of access relates to higher digital inclusion; this allows for social inclusion particularly if improved digital access is used in ways that support overall well-being [Helsper, 2008].

Research Context: Venezuelan Migrants in Colombia

Almost seven million Venezuelans have fled their country's economic and humanitarian crisis. Colombia is the primary destination for these migrants, making their integration a critical issue [Ham et al., 2022, Bahar and Dooley, 2019]. Our intervention is conducted in collaboration with the *Department of National Planning (DNP)*, the Colombian government agency responsible for coordinating and supporting public policy planning. The DNP also administers Sisbén (Identification System for Potential Beneficiaries of Social Programs), established in 1995 to classify populations in poverty and facilitate their access to government benefits. This system has been extended to include Venezuelan migrants, helping them access services such as subsidized health insurance or housing benefits.

As of 2022, over 27 million people (about half of Colombia's population) were registered in Sisbén, primarily those in poverty and needing state support. The accompanying online portal, Portal Ciudadano, launched in November 2021 to allow individuals to more easily access Sisbén and update their data without needing to visit municipality offices. Municipalities also sometimes refer individuals to Portal Ciudadano, yet they lack the capacity to guide users through the steps required to set up a profile. Accessing the portal requires an initial sign-up using a valid identification number (from a national ID card, passport, or refugee permit) and completing an email verification process. Instructions are provided for those who need help creating an email account. Once registered, citizens gain the ability to update their Sisbén information (e.g., adding household members or reporting a change of address), request a new in-person survey, and consult their Sisbén classification to verify eligibility for social programs and subsidies, such as cash transfers, support for students or access to subsidized health insurance. The portal also helps reduce in-person visits, saving time and transportation costs, while offering a user-friendly interface to locate local offices and obtain accurate contact details (Appendix F).

However, our interviews with the DNP officials and one of the main designers of the portal reveal several challenges that are particularly salient for the migrant community:

> "Some people might not even know that the Citizen Portal exists, because they do not have internet, they do not have people who are connected." (Interview with a DNP official, 2024)

One official shared with us that, although there was an active communication campaign during the launch of the portal, it has been de-prioritized since, with little to no budget for communication initiatives. This affects the migrant community disproportionately:

> "Sisbén is so imprinted into Colombians' know-hows, especially if you are in a low or middle-income household. Even if you do not know how it works, you know it is in your best interest to be in the program so that you can access the

programs. But the thing is, for migrants, they do not have that know-how."
(Interview with a former DNP official, 2024)

They also identified data access and digital literacy challenges that prevent individuals from taking advantage of the existing resources:

"People don't know how to use the Internet. I mean, people don't use applications, they use Facebook pages, those kinds of things, and suddenly, the problem is that, for example, one day, that they have to open an email, they have to enter the portal, they have to do this, they have to do that. The process is not difficult, but it is not basic either. People say 'No, I don't know about that. I'd rather ask someone.'" (Interview with one of the designers of Portal Ciudadano, 2024)

This creates opportunities for intermediaries to exploit the situation. While they offer assistance, they do so for a fee and oftentimes, whether intentionally or not, spread misinformation. This dynamic then creates a significant need to facilitate the spread of accurate, reliable information in a way that takes advantage of the tools individuals are comfortable with – here WhatsApp – and maximizes its potential to serve the migrant community.

The simplicity and accessibility of WhatsApp has allowed the baseline integration of populations who would otherwise be unable to cross the digital divide. Government, social and commercial services in the Global South have found ways to communicate via WhatsApp where their counterparts in the Global North would be more likely to use phone apps or websites. Indeed, both the surveys and the informational interventions deployed in this study are delivered via WhatsApp, as is increasingly common in related studies in the region [Guess et al., 2020, Diaz et al., 2023]. On the other hand, not *everything* can be done via WhatsApp. This is why it is so important that Venezuelan migrants be able to use the online platform Portal Ciudadano for ongoing, direct communication with Colombian state services.

Recruitment and Sample Description

The *Innovations for Poverty Action* provided us with access to a Sisbén database of 67,714 Venezuelan migrants in Colombia with the following characteristics: aged 18 or older, heads of households, with limited or no internet or computer access, registered in Sisbén but not on Portal Ciudadano, and residing in five major cities (Bogotá, Medellín, Cali, Barranquilla, and Cúcuta). All participants held Temporary Protection Permits, granting them temporary legal status and access to essential services. A random subsample of those with valid WhatsApp numbers received a screening survey. From the screening responses, 3,030 baseline surveys were distributed, with 2,156 completed (71%) between September 8 and 17, 2023 (SI, Section C). Among those who completed the baseline, approximately 65% lacked mobile internet, 61% lacked WiFi access, and 38% had neither. The incentive was mobile data credit ($\approx$ 30,000 COP/7 USD) delivered via a service enabling large-scale top-ups across providers, giving participants unlimited social media access and extra navigation data.

The final sample consisted of 1,727 participants who completed both the baseline and endline surveys. Attrition rate considering all surveys sent was 19.9%. We assessed differential attrition and found it generally balanced across arms (Appendix, Table D.2), with no systematic covariate imbalances (Appendix, Tables D.3-D.6) and no evidence from an F-test (Appendix, Section D.3) or weighted estimates (Appendix, Table D.7) that attrition biased the results. In our case, providing a relevant incentive (mobile data), working with non-professional survey takers, delivering a treatment salient to their daily life, and ensuring professional implementation likely contributed to strong engagement and compliance. Table A.1 in the Appendix presents descriptive statistics for the sample. Overall, 61.2% participants are women and the average age is 37.6. The majority of participants, 64.6%, reported having middle or high school education, and only 36.4% reported being employed at baseline. WhatsApp is unsurprisingly the most widely used social media platform among participants, who report spending more time on WhatsApp than with family,

friends, or non-tech activities. This underscores the potential of WhatsApp for reaching and engaging the migrant population with services that might be useful for them.

Treatment Assignment

Our sample of 2,156 participants (1,727 complete surveys) was randomly assigned to one of four treatment groups:

T1. Data: One month of unlimited mobile data

T2. Data+Information: Mobile data and direct messages about social programs

T3. Data+Information with Peer Networks: Mobile data and messages within WhatsApp groups with other (up to 30) participants

C. Control: Mobile data and direct information *after* the endline survey

IPA provided mobile phone credits of around 15 gigabytes for a month to participants in the three treatment arms, which is estimated to allow one to browse the internet for around 180 hours. Participants in the second and third treatment arms – "Data+Info" and "Data+Networked Info" – received government information about Portal Ciudadano and Sisbén as well as the 15 gigabytes of data.[3] However, while the second treatment arm received these direct messages on WhatsApp about social programs, the third treatment arm received the messages within WhatsApp groups with other participants.

The third treatment arm involved connecting migrants into 18 WhatsApp groups of approximately 30 participants each, assigned through stratified randomization based on gender, age, and educational level. A moderator, hired by IPA and trained by the National Planning Department, was responsible for sending three weekly messages, including videos and information related to Sisbén and Portal Ciudadano. While participants

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[3]Following IRB protocols, this same set of 12 messages was also sent to 441 individuals from the control group who responded to the endline survey, after study completion.

were encouraged to ask questions and interact with each other, the moderator maintained a passive role, only responding to inquiries and ensuring no hateful or misleading speech was involved, to allow for spontaneous interaction among participants. The intervention was carried out from August to October 2023 as summarized in the Appendix, Figure C.1.

Empirical Strategy and Data

Our data comes from three different sources. First, we use administrative data from the DNP's Sisbén. Sisbén has detailed baseline demographic information about Venezuelan migrants, including gender, education, and marital status. Second, we designed screening and baseline surveys to retrieve information about internet use, data access, and phone plans. In the endline, we added a series of questions divided into five large groups: i) interest and knowledge in public benefits programs (Portal Ciudadano), ii) job market outcomes, iii) trust in institutions, iv) well-being and v) battery of questions to capture digital literacy. All the questions are in the Appendix, Section M. Third, we merged the two previous databases with validated behavioral enrollment in the DNP's Portal Ciudadano, which allows us to capture whether the participation in this intervention led to higher sign up rates.

The unit of randomization is the individual. We implement block randomization by location to minimize differences between units in each treatment condition. We estimate treatment effects using an ordinary least squares (OLS) specification in which the treatment indicator variables represent assignment to each of the three treatment arms: *Data*, *Data+Info*, and *Data+Networked Info*:

$$Y_i = \alpha + \sum_{k=1}^{3} \beta_k D_{ik} + \epsilon_i \tag{1}$$

where outcome Y_i denotes the outcome for participant i, and D_{ik} are indicator variables for assignment to each treatment arm. The main specification includes no baseline controls

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or fixed effects; results incorporating controls are reported in Appendix (Table K.1-K.5).

Although the pre-analysis plan specified that the main analysis would pool all the treatment arms together (Appendix J.1), we present the results in two panels to differentiate between all combinations of treatments and clarify the distinct effects of each intervention arm. For each of the results tables, Panel A presents the main treatment effects relative to the control group. Panel B provides the pairwise comparisons between treatment arms, which help clarify the mechanisms driving the observed effects. These comparisons allow us to isolate the marginal contributions of the different intervention components. First, we compare any information provision (pooling Data+Info and Data+Networked Info) to Data alone to assess whether targeted information about government programs, in any delivery form, yields benefits beyond data access. Second, we compare Data+Info to Data alone to estimate the effect of providing information directly to participants. Third, we compare Data+Networked Info to Data alone to estimate the combined effect of information provision and networked delivery. Finally, we compare Data+Networked Info to Data+Info to isolate the marginal effect of the networking component, that is, whether facilitating information exchange through WhatsApp groups adds value beyond direct information provision.

Results

Primary Outcomes: Engagement with Government Assistance Programs

Our main outcome is navigational integration into the social benefits system, captured through engagement with Portal Ciudadano. We assess this through two primary measures: factual knowledge of the portal and behavioral enrollment in it. While understanding the portal and registering are initial steps, fully maximizing public benefits necessitates engagement in tasks demanding higher digital literacy. Therefore, we also gauge participants' ability to retrieve online links and find answers to our questions online.

One way in which participant knowledge was measured was by asking multiple-choice questions about what Sisbén is, procedures participants can perform in Portal Ciudadano, and the legal minimum wage in Colombia. The latter is less directly connected to government assistance programs, but we include it as an example of information that is frequently distributed to ensure that migrants are informed about policies relevant to their experience. We code 1 for correct responses and 0 for incorrect responses, and create a sum index as the average of correct responses. Overall, 75.8% of participants were able to respond to at least one of these questions correctly, with only 12.5% accurately responding to all three questions.[4] As expected, the treatment arm that combined the data with information have increased participants' factual knowledge about assistance programs, though the effect is most precisely estimated for those who have received this information within WhatsApp groups (Table 3). The effect is stronger when excluding the question about minimum wage, the least clearly connected to assistance programs.

Factual knowledge about existing assistance programs and the portal is important, but the most important manifestation of this knowledge is whether participants actually enrolled in the portal.[5] None of the participants who took part in this project were registered in Portal Ciudadano at the start of their participation. Two weeks after the project ended, the DNP merged our participant database with the Portal Ciudadano registry. They provided us with a database detailing which participants had registered, along with their registration dates. Using these dates, we create an indicator of whether a participant registered during the intervention window (from the date the intervention started to the day after the endline survey).

As shown in Table 2, participants who received information about Sisbén and Portal

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[4]The overall accuracy rate for each question is 39.5% (baseline 33.3%), 26.5% (baseline 20%), and 24.8% (baseline 25%). Accuracy on the first two questions is thus notably higher than chance, while the latter is identical to chance, as is to be expected for this kind of "surveillance knowledge" [Munger et al., 2022].

[5]This analysis is not part of our pre-analysis plan, as we did not know at the time of submission that we would be able to obtain this data.

Ciudadano via WhatsApp messages and groups for one month, namely Treatment 2 and 3, registered for Portal Ciudadano at rates that were 25.5 percentage points and 26.8 percentage points higher, respectively, compared to the control group ($\beta = 0.255$, SE $= 0.022$; $\beta = 0.268$, SE $= 0.021$). The pairwise comparisons in Panel B of Table 2 indicate that information provision is the primary driver of increased registration. Comparing any information provision (combining Data+Info and Data+Networked Info) to Data alone shows a significant increase in registration, suggesting that the lack of information about Portal Ciudadano, rather than connectivity alone, may be the binding constraint. The effects of Data+Info and Data+Networked Info are statistically indistinguishable (25.3 and 26.8 percentage points, respectively), and the direct comparison between the two treatments yields a positive but nonsignificant difference. This implies that information provision, i.e. delivering the factual details needed to register, is beneficial to migrants in completing procedural steps, whether that information comes through individual delivery or through peer networks.

Drawing from our theory about the "loose-tie" networks of migrants assisting with digitally demanding tasks and collaborative information processing, we expect the effects to be stronger among groups where such information exchange was more active. To test this, we differentiate between the top half and bottom half of WhatsApp groups based on their level of interaction, i.e., the sum of messages and multimedia exchanged. Higher levels of interaction (Appendix, Figure I.2.1) are indeed associated with the stronger treatment effects compared to groups with lower levels of interaction. Heterogeneous effects by age (Appendix, Table H.1), recency of migration (Appendix, Table H.2), education (Appendix, Table H.3), and gender (Appendix, Table H.4) are reported in Appendix H as exploratory, non-preregistered tests. The only consistent evidence of heterogeneity is by age: both informational treatment arms were less effective among older participants (Appendix, Table H.1).

We cannot track what participants do once on the portal for ethical and data security

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Table 2: Effects on Portal Ciudadano Registrations

	Registered in PC
Panel A: Treatment vs. Control	
Data	0.000
	(0.021)
Data + Info	0.254***
	(0.022)
Data + Networked Info	0.268***
	(0.021)
N	1,727
R^2	0.146
Panel B: Pairwise Comparisons	
Any Info vs. Data	0.261***
(T2+T3 - T1)	(0.022)
Data + Info vs. Data	0.253***
(T2 - T1)	(0.022)
Data + Networked Info vs. Data	0.268***
(T3 - T1)	(0.022)
Data + Networked Info vs. Data + Info	0.014
(T3 - T2)	(0.030)

Notes: *p$<$0.1; **p$<$0.05; ***p$<$0.01. Panel A reports treatment-control contrasts from equation (1); Panel B reports pairwise treatment comparisons. Sample sizes vary slightly by outcome due to item non-response. Sample sizes by treatment: Control=442; Data=423; Data+Info=403; Data+Networked=459.

reasons. However, taking full advantage of the resources the portal provides requires engaging in tasks that require a level of digital literacy. We thus created a set of measures to empirically evaluate how our treatment arms affect participants' ability to engage in digitally mediated tasks. We measure this as an outcome rather than a pre-treatment variable as initially planned in our PAP; for other deviations, see Appendix, Section L. Table 3 illustrates that treated subjects who received data and were also added to WhatsApp groups were significantly more likely to retrieve online information successfully. Following Guess and Munger [2023], we asked individuals a set of factual questions which were

easily found with a simple web search but which people were unlikely to know off the top of their head; in our case, the information was related to the Social Safety Net (SSN). Given our practical interest in the outcome of navigating to specific websites, we added a modified version of the task involving retrieving specific URLs (Appendix, Section M).

Table 3: Effects on Information and Link Retrieval

	SSN Info Index	Link Retrieval Index
Panel A: Treatment vs Control		
Data	-0.004	0.030
	(0.018)	(0.031)
Data + Info	0.024	-0.011
	(0.018)	(0.031)
Data + Networked Info	0.042**	0.103***
	(0.017)	(0.030)
N	1,708	1,562
R^2	0.005	0.011
Panel B: Pairwise Comparisons		
Any Info vs. Data	0.037**	0.021
(T2+T3 - T1)	(0.016)	(0.027)
Data + Info vs. Data	0.028	-0.041
(T2 - T1)	(0.018)	(0.032)
Data + Networked Info vs. Data	0.045**	0.073**
(T3 - T1)	(0.018)	(0.029)
Data + Networked Info vs. Data + Info	0.017	0.114***
(T3 - T2)	(0.018)	(0.030)

Notes: *p<0.1; **p<0.05; ***p<0.01. Panel A reports treatment-control contrasts from equation (1); Panel B reports pairwise treatment comparisons. Sample sizes vary slightly by outcome due to item non-response. The SSN Information Index (0-1) measures correct knowledge of three facts about social safety net. The Link Retrieval Index (0-1) measures ability to correctly provide three website links. Sample sizes by treatment: Control=442; Data=423; Data+Info=403; Data+Networked=459.

We find that the third treatment arm caused a significant and sizeable increase in subjects' ability or willingness to complete these tasks, but that neither of the other treatment arms had any effect. This aligns with our expectations about the networked treatment

arms, and suggests how digital literacy may operate differently in this more networked context. We also find that the effects on link retrieval specifically were higher (Appendix, Figure H.2) among the high interaction group, although the difference does not reach significance. Qualitatively, some participants shared their answers, and one even recorded a voice note explaining her approach to the questions. This illustrates the potential value of enabling individuals to pose questions and access an archive of others' inquiries and responses, particularly from people facing similar challenges.

The pairwise comparisons in Panel B help identify which barriers are most constraining for information acquisition. Comparing any information provision (combining Data+Info and Data+Networked Info) to Data alone shows a significant increase in SSN knowledge, indicating that access to information, rather than connectivity alone, is a binding constraint. Additionally, an interesting result emerges when comparing Data+Networked Info to Data+Info: networked information delivery increases link retrieval relative to direct information provision, while producing no additional gains in factual knowledge. This pattern suggests that, while both delivery mechanisms can convey factual information, peer networks are particularly effective at facilitating practical, actionable skills (such as website navigation in this context) that may require more contextualized guidance or hands-on support that migrants can share through their WhatsApp groups.

Secondary Outcomes: Job Market, Government Trust and Well-Being

Our second hypothesis was that the intervention would have positive effects on employment and training opportunities, whether due to increased access to online opportunities or the information provided through the portal. However, these are complex real-world outcomes that are difficult to influence with interventions, like ours, on the scale of a single month. For this reason, our outcome survey captures both the results and the efforts to secure employment or additional training. We ask participants about the time they spent working in the past four weeks (subtracting this from their baseline response to

measure any increase in work hours), the time spent receiving training in the last month, and whether they made any attempts to find a paid job.

Table 4: Effects on Job Market Outcomes

	Working	Job Search	Gov. Program Search	Additional Training
Panel A: Treatment vs Control				
Data	-0.010	0.018	0.045	0.020
	(0.033)	(0.031)	(0.034)	(0.029)
Data + Info	-0.012	-0.008	-0.035	-0.003
	(0.033)	(0.031)	(0.034)	(0.030)
Data + Networked Info	-0.024	0.025	0.041	0.068**
	(0.032)	(0.030)	(0.033)	(0.029)
N	1,727	1,726	1,724	1,726
R^2	0.000	0.001	0.004	0.004
Panel B: Pairwise Comparisons				
Any Info vs. Data	-0.009	-0.008	-0.040	0.015
(T2+T3 - T1)	(0.028)	(0.027)	(0.030)	(0.026)
Data + Info vs. Data	-0.002	-0.026	-0.080**	-0.022
(T2 - T1)	(0.033)	(0.031)	(0.035)	(0.030)
Data + Networked Info vs. Data	-0.015	0.008	-0.004	0.049
(T3 - T1)	(0.032)	(0.030)	(0.034)	(0.030)
Data + Networked Info vs. Data + Info	-0.013	0.034	0.076**	0.071**
(T3 - T2)	(0.033)	(0.031)	(0.034)	(0.030)

Notes: *p<0.1; **p<0.05; ***p<0.01. Panel A reports treatment-control contrasts from equation (1); Panel B reports pairwise treatment comparisons. Sample sizes vary slightly by outcome due to item non-response. "Working" denotes self-reported employment; "Job Search" indicates active job search; "Gov. Program Search" indicates searching through government programs; "Additional Training" denotes enrollment in or completion of training programs. Sample sizes by treatment: Control=442; Data=423; Data+Info=403; Data+Networked=459.

We do not find an effect on employment, regardless of how it is operationalized. However, participants in the third treatment arm ("Data+Networked Info") reported spending significantly more time seeking additional training opportunities. In their open-text responses, they mentioned courses in English language, cooking, beauty, and cosmetology. We interpret this as evidence that conversations within the WhatsApp groups, particularly when participants learned about others experiences, may have motivated some to pursue

additional training and search opportunities (Appendix, Figure I.4). That said, the effect is modest and does not remain statistically significant at the 0.05 level after correcting for multiple hypothesis testing, though it provides suggestive evidence at the 0.10 level.

The pairwise comparisons in Panel B also highlight the distinctive role of the networking component for labor market engagement. Comparing Data+Networked Info to Data+Info shows significant increases in both government program job search (7.6 percentage points, p<0.05) and enrollment in additional training programs (7.1 percentage points, p<0.05). This suggests that peer networks facilitate access to job training opportunities and government employment services in ways that direct, individual-only information provision does not – potentially through shared experiences navigating application processes or through collective problem-solving around bureaucratic requirements.

We also evaluate the impact of the intervention on attitudes toward government, focusing on trust and interest in the programs they sponsor. Trust in the government is believed to reduce administrative costs, encourage compliance with laws and regulations [Tolbert and Mossberger, 2006], improve public cooperation, and strengthen the relationship between the state and society [Askvik et al., 2011, Rosenberg, 2021]. We hypothesized that the intervention, by enhancing the visibility of the portal designed to facilitate individuals' access to their own information and the most up-to-date government and social services, might still signal a commitment to migrant well-being and improved living conditions. This, in turn, could translate into more positive attitudes toward the government. Our findings on this dimension are mixed: Table 5 shows that the intervention led to a significant increase in interest in the government and its programs among the third group, but this increase in interest did not translate into any effects on trust in the government. Political interest is considered one of the strongest predictors of political behaviors that sustain democracy [Prior, 2010], so an increase in interest in government programs still represents a positive first step toward participants' potential engagement with these programs.

The pairwise comparisons in Panel B suggest a decline in trust among participants

assigned to the Data+Info arm, although this difference is not statistically significant at conventional levels. The comparison between Data+Networked Info and Data+Info indicates that the networking component may partially offset this decline associated with individual-only information provision. For interest in government programs, the positive effect of Data+Networked Info is consistent across specifications, yielding a marginally significant 0.132-point increase relative to Data+Info.

Table 5: Effects on Trust and Interest in Government

	Trust Government	Interest Government
Panel A: Treatment vs Control		
Data	0.100	0.129*
	(0.069)	(0.073)
Data + Info	-0.034	0.063
	(0.070)	(0.074)
Data + Networked Info	0.031	0.194***
	(0.067)	(0.072)
N	1,720	1,721
R^2	0.002	0.005
Panel B: Pairwise Comparisons		
Any Info vs. Data	-0.100	0.004
(T2+T3 - T1)	(0.061)	(0.064)
Data + Info vs. Data	-0.135*	-0.066
(T2 - T1)	(0.072)	(0.077)
Data + Networked Info vs. Data	-0.070	0.065
(T3 - T1)	(0.068)	(0.071)
Data + Networked Info vs. Data + Info	0.065	0.132*
(T3 - T2)	(0.071)	(0.073)

Notes: *p<0.1; **p<0.05; ***p<0.01. Panel A reports treatment-control contrasts from equation (1); Panel B reports pairwise treatment comparisons. Sample sizes vary slightly by outcome due to item non-response. Trust in Government and Interest in Government are measured on 6-point Likert scales. Sample sizes by treatment: Control=442; Data=423; Data+Info=403; Data+Networked=459.

Initially, we anticipated that the intervention might positively influence participant well-being. Our original framework envisioned the treatment as a means to alleviate the

often frustrating barrier faced by participants with limited mobile credit. We hypothesized that the additional support, particularly access to a moderator and the provided messages, could lead to more positive outcomes. Contrary to these expectations, most coefficients are negative, although the effect on the composite well-being index reaches statistical significance only for the second treatment arm. The direction of the effects suggests that those who received the mobile data, regardless of whether they were informed about assistance programs or not, reported feeling more frustrated and less optimistic about the future (Table 6). Although the mechanisms have not been precisely identified, these findings are consistent with recent "deactivation" experiments (of which Allcott et al. [2025] is the largest-scale to date) which find that experimentally reducing access to certain social media platforms can improve emotional well-being.

Panel B of Table 6 reveals no differences in well-being measures across any of the pairwise treatment comparisons. The negative effects on psychological well-being observed in Panel A for the Data and Data+Info arms do not differ significantly from each other, nor do they differ significantly from the Data+Networked Info arm. We thus do not find evidence that psychological costs associated with increased awareness of available programs and navigation challenges differ meaningfully across intervention modalities. In the Supplementary Material, we present results on the impact of receiving unlimited mobile credits (aggregating Treatments 1, 2, and 3; Appendix, Table J.1-J.5).

WhatsApp Group Dynamics and Intervention Effects

The third treatment arm consisted of setting up 18 WhatsApp groups of approximately 30 participants, with assignment stratified by gender, age, and education. IPA hired a trained moderator to send three weekly messages (one of which was a video) about Sisbén and the Citizen Portal, and respond to participants' questions. Messages were designed and approved by the National Planning Department as part of its official communication strategy. The interactions across WhatsApp groups varied significantly, ranging from 35 to 635

Table 6: Effects on Self-Reported Well-Being

	Joyful	Not Frustrated	Optimistic
Panel A: Treatment vs Control			
Data	0.013	-0.157*	-0.083
	(0.083)	(0.093)	(0.080)
Data + Info	-0.066	-0.167*	-0.170**
	(0.084)	(0.094)	(0.081)
Data + Networked Info	0.033	-0.130	-0.092
	(0.081)	(0.091)	(0.078)
N	1,724	1,721	1,727
R^2	0.001	0.002	0.003
Panel B: Pairwise Comparisons			
Any Info vs. Data	-0.027	0.010	-0.046
(T2+T3 - T1)	(0.074)	(0.082)	(0.070)
Data + Info vs. Data	-0.079	-0.010	-0.087
(T2 - T1)	(0.087)	(0.096)	(0.082)
Data + Networked Info vs. Data	0.020	0.028	-0.009
(T3 - T1)	(0.084)	(0.093)	(0.079)
Data + Networked Info vs. Data + Info	0.099	0.037	0.078
(T3 - T2)	(0.084)	(0.094)	(0.082)

Notes: *p<0.1; **p<0.05; ***p<0.01. Panel A reports treatment-control contrasts from equation (1); Panel B reports pairwise treatment comparisons. Sample sizes vary slightly by outcome due to item non-response. Joyful, Not Frustrated, and Optimistic are self-reported measures collected using 6-item Likert scales. Sample sizes by treatment: Control=442; Data=423; Data+Info=403; Data+Networked=459.

messages. Overall, the proportion of interactions from the moderator ranged from 4.9% to 51.4%, but, as shown in Figure 1, the content was predominantly driven by participants.
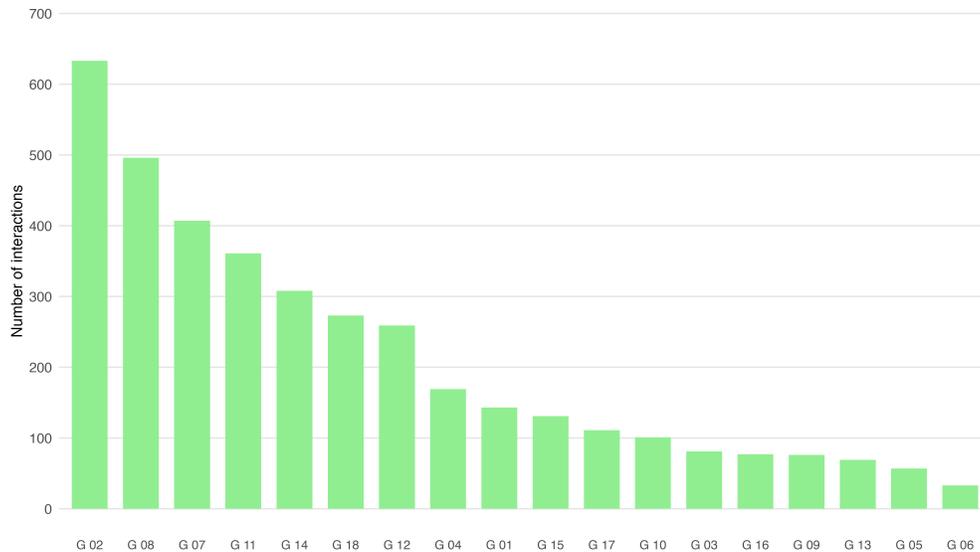
Figure 1: Total number of interactions exchanged within WhatsApp groups

User interactions revealed four primary themes: intervention queries, access to social programs, concerns about Sisbén, and customer-service issues (Appendix, Section E), with some discussions also touching on employment and emotional support. Participant engagement varied; we classified participation into high, medium, and low levels. Among active participants, 51.4% had low interaction levels (1-14 messages), 10.3% medium (15-41 messages), and 3.7% high (>41 messages).

Additionally, 25% of participants were inactive (stayed in groups, but did not produce content), and 9.6% withdrew from the groups before the endline survey. We also observed that employed participants tended to send fewer but longer messages, while older participants more frequently used emotive icons and multimedia.

We do not have access to full chat transcripts; instead, IPA prepared anonymized and aggregated topic codes at the group level to preserve participant confidentiality. Based on these codes, we identified the WhatsApp groups in which intervention-relevant topics (Sisbén, access to social programs, and public services) appeared more frequently. We
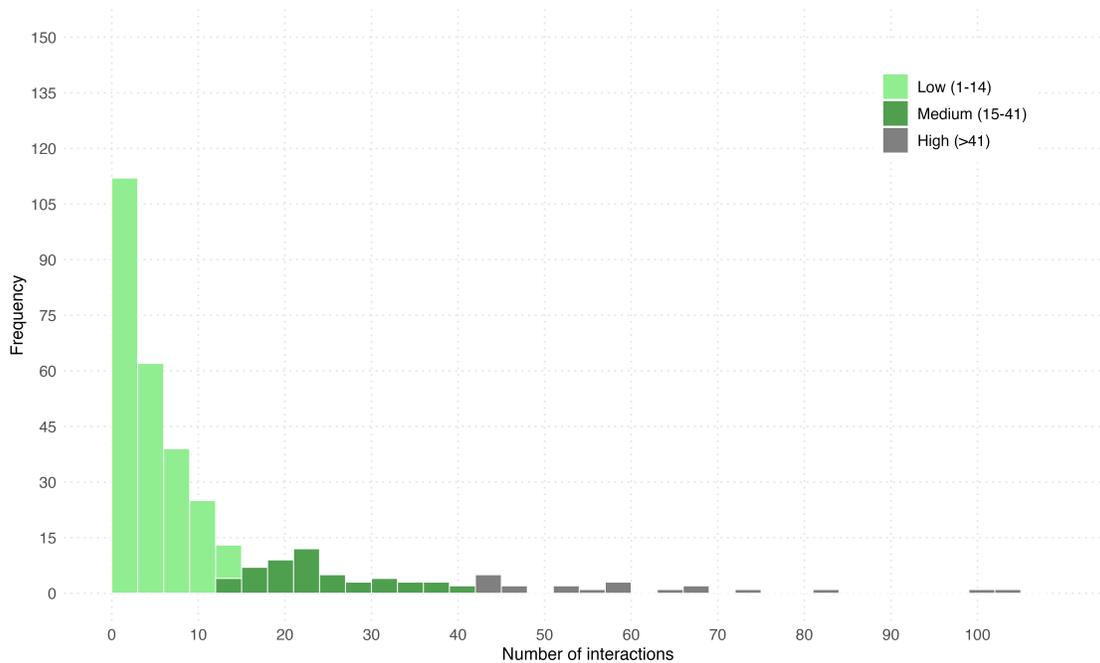
Figure 2: Participant engagement levels based on message frequency distribution

then compared outcomes between these groups and all remaining groups using simple differences in means (Appendix H). These post-treatment exploratory associations indicate that participants in groups where these topics were more prominent reported higher trust in government (β = 0.24, SE = 0.10, p = 0.015) and higher registration rates (β = 0.14, SE = 0.04, p < 0.001). By contrast, groups centered on emotional support showed large gains in well-being (β = 0.49, SE = 0.19, p < 0.01) but lower registration (β = -0.21, SE = 0.09, p = 0.02). Employment-focused groups (excluding emotional support) showed weaker, mixed patterns: somewhat lower well-being (β=0.20, SE=0.12, p=0.092) and somewhat higher trust in government (β=0.24, SE=0.12, p=0.060). These estimates did not reach conventional significance levels, reflecting the fact that we had power only to detect effects of moderate to large magnitude.

To examine how group composition shapes our main outcome of portal registration, we assess how the proportion of short-term migrants within each WhatsApp group affects registration behavior. Conceptually, groups with few long-term migrants may have less information circulating, while groups with many long-term migrants may be less effective in

increasing registration rates if those individuals have already accessed the benefits available in the host country. Empirically, we operationalize group composition using the share of recent migrants as those who arrived in Colombia within the past year. For each WhatsApp group, we calculate the proportion of recent migrants (with alternative thresholds shown in Appendix, Figure I.4.1) and estimate the association between this group-level measure and registration outcomes. The estimated association is large ($\beta = 1.80$, SE = 0.593, p = 0.003), indicating that groups with a higher share of participants who migrated within the past year had substantially higher registration rates than groups composed primarily of individuals who migrated more than a year ago. Given the small number of participants who migrated within the past year (largely because all individuals in our sample have regularized their status and are included in the Sisbén system, which very recent migrants are less likely to be), we also vary the definition of a "recent migrant" from one to five years since migration and re-estimate the relationship between group composition and registration. The direction of the effect remains stable across thresholds (Appendix, Figure I.4.1). These findings suggest that WhatsApp groups were more effective in groups with larger shares of recent migrants, likely because these individuals had stronger incentives to act on new information, whereas long-term migrants – having already navigated benefit systems or chosen not to register – were less responsive.

On the other hand, one might expect groups with more long-term migrants to share more information, given their larger accumulated experience navigating local systems. Using the number of exchanged messages as a proxy for information circulation, we find that groups with more long-term migrants exchanged more messages on average (Appendix, Figure I.4.2) and discussed somewhat different topics. Groups with fewer long-term migrants were coded as focusing more on Customer Service, Emotional Support, and Intervention, whereas groups with higher shares of long-term migrants more often discussed Employment, Sisbén, and State Services. These estimates are imprecise, but align with the expectation that long-term migrants may contribute more information about institutional

programs and work-related matters, and point to pathways for further exploration.

Discussion & Conclusion

Equipping migrants with the tools to thrive is crucial both for their well-being and the stability of host countries. As government services become increasingly digitized, we examine the obstacles migrants face and design an intervention to reduce them. In collaboration with Innovations for Poverty Action, we conducted a randomized controlled trial with Venezuelan migrants holding regularized status and eligible for public services. Accurate targeting of public services requires up-to-date information. To facilitate this, the government established Portal Ciudadano, a one-stop portal where individuals can update their information and access the resources available to them.

Our intervention had three treatment arms: (1) unlimited data credit; (2) data credit along with informational WhatsApp messages about social assistance; and (3) data credit, information, and a WhatsApp group of 30 with a trained moderator to encourage peer support and information sharing. We find that providing data access and information increased enrollment in Portal Ciudadano, with the strongest effects when information was delivered via WhatsApp groups. The third treatment arm (i.e. information provided in ad hoc, loose-tie networks) was particularly effective in helping individuals complete digitally mediated tasks. Participants in this arm also scored significantly higher on online information retrieval tasks, suggesting that group-based information sharing facilitated skill acquisition. This mechanism may also explain the higher rates of additional training and greater interest in government programs in this group.

These benefits came with potential costs. Group-based sharing sometimes caused distraction or irritation, particularly from off-topic notifications. Although we did not directly test this mechanism, we observe a slight increase in hostility toward other Venezuelans in the third group, consistent with qualitative evidence (Appendix, Section E). Across all

treatment arms, participants expressed greater interest in government programs, but this did not translate into increased trust in government or short-term improvements in job market outcomes. Our one-month intervention, while longer than many studies, likely captures only the initial stages of integration processes. The observed increase in program knowledge and link retrieval capacity could be important intermediate outcomes with pathways to broader integration benefits. For example, better knowledge of available programs and the ability to retrieve relevant information can facilitate more timely uptake of service, smoother navigation of bureaucratic processes, and improved access to benefits. Similarly, the increase in interest in government may signal a greater openness to engaging with institutions, though the extent to which this translates into civic participation or a stronger sense of belonging is outside of the scope of this study. The most consistent negative effect was on self-reported well-being, with treated groups reporting higher frustration and lower optimism, contrary to our expectations but consistent with recent social media deactivation studies. Taken together, our study bridges insights from the literature on administrative burden and social media, showing how WhatsApp can function not only as a channel for conveying relevant information but also for activating peer networks that improve migrants' engagement with public service systems, a core component of navigational integration. The activation of loose-tie digital networks via WhatsApp groups reveals the underappreciated role of peer-to-peer assistance in navigating bureaucratic systems, particularly among populations with varied digital literacy. More broadly, they highlight how networked, low-cost digital interventions can shape migrant-state relations with implications for how to build social capital in low-resource settings.

We study a policy intervention, a pragmatic or indeed technocratic approach to immigrant integration. But the binding constraint is often political: migrant access to benefits is politically sensitive and may be resented by natives and perceived as costly or burdensome. Alesina and Tabellini [2024] review the economic and non-economic factors [6] shaping the

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[6]There is a third parameter: the desire to appeal to migrants as future voters. In Colombia, for example, migrants with regularized status can apply for citizenship after a

political effects of migration and the natives' political discontent, and conclude that "the empirical regularities observed across a variety of settings point toward the higher importance of noneconomic factors [compared to economic factors]" (p7). The Venezuelan migration into Colombia is one of the largest migration events in modern history, triggered by an acute initial crisis, with later waves reflecting broader political, economic, and human rights pressures. The large number of new migrants imposes significant short-run financial costs, which would ordinarily be expected to cause backlash and limit government support. However, the cultural similarity between natives and the migrant population, along with Colombia's own history of Venezuela welcoming Colombian migrants in the 1970s [Rossiasco et al., 2023], created a more favorable context for migrant integration and for supportive policy interventions.

We argue that, given the appropriate political conditions for governments to prefer to increase migrant benefit takeup, a universalist frame is likely to be the most successful. The portal at the center of our intervention can be understood and promoted as a tool that improves service delivery for all vulnerable Colombians. By enabling individuals to update their information and correct errors, the portal helps ensure that benefits reach the right people more efficiently. Because both Sisbén and Portal Ciudadano are universal programs that serve hosts and migrants alike, framing this and similar policies as one that strengthen state capacity and improve delivery for everyone may enhance both their political feasibility and long-term sustainability.

On the other hand, for migration events in which migrants share less cultural similarity with natives, or in which governments anticipate nativist backlash for reasons unrelated to economics, governments are likely to shift to more exclusionary approaches. When both perceived nativist backlash and economic costs are high, office-holders may act to prioritize resource allocation towards natives. Consider a case involving migrants perceived as

period of legal residence – typically five years, but one year for nationals of other Latin American/Caribbean countries. For some migrants then, eligibility to vote in national elections can be reached in about five years.

culturally dissimilar and the presence of costly government programs: the UK in the 2010s, where the Conservative government implemented data-sharing policies designed to create a "hostile environment for migrants" and decrease migrant takeup of the National Health Service [Hiam et al., 2018].

This paper has limitations that warrant attention in future work. For privacy reasons, we cannot track participant activity after portal registration, which limits our ability to link usage to specific outcomes. We also cannot capture the precise downstream effects of registration. However, having behavioral data about actual registrations is rare, as most studies rely on self-reports. Once individuals are in the system, it becomes much easier for them to connect with public service providers and learn about the opportunities that might benefit them.

We cannot rule out spillover effects, which would dilute the observed outcomes. However, given the blocked randomization, the fact that participants come from five major cities, and that we did not include more than one participant per household, the possibility of participants knowing and communicating with one another is less of a concern in this study.[7] Future work could, however, explore how spillover effects might enhance the effectiveness of similar interventions. Finally, our findings suggest trade-offs: increased connectivity can improve enrollment and knowledge but also heighten frustration or in-group tension, as seen in the third arm. Future work should aim to balance these trade-offs to optimize group-based interventions.

More fundamentally, the goal of integration transcends any one outcome or sign-up. The past two decades have demonstrated the power of digital social networks in every realm of human activity. At a basic theoretical level, migration entails the disruption of existing networks in the country of origin. We demonstrate one way in which platforms like WhatsApp, widely used and accessible, can be used to activate these networks and deliver accurate information to hard-to-reach populations. There are many possible iterations of

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[7]If there were spillovers, we would expect to see an increase in registration among the control group which we do not observe.

our intervention and there are numerous ways it can be adapted for other integration outcomes, which we believe presents a promising avenue for future research. Finally, our work highlights the power of collaborations – between researchers, government, and the non-governmental sector – to maximize learning and inform policy. Given the complex nature of migration issues and the need to support migrant communities in navigating host societies, stronger partnerships are essential to address these pressing challenges.

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Appendices

A Sample Descriptives

General characteristics	N	Mean	SD	Min	Max
Gender (=1 if female)	1727	0.612	0.487	0	1
Age	1727	37.615	11.263	18	96
None/Preschool/Elementary	1727	0.130	0.337	0	1
Middle/High School	1727	0.646	0.478	0	1
Technical/Diploma	1727	0.105	0.307	0	1
Under/Post-graduate	1727	0.081	0.273	0	1
Married/Cohabiting	1726	0.508	0.500	0	1
Divorced/Separated/Widowed	1727	0.122	0.328	0	1
Single/Never-married	1726	0.357	0.479	0	1
Working (Baseline)	1726	0.364	0.481	0	1
Origin state: Zulia/Carabobo/Lara/Aragua	1727	0.515	0.500	0	1
Origin state: Other	1727	0.481	0.500	0	1
Entry place: Cúcuta	1725	0.325	0.469	0	1
Entry place: Barranquilla/Bogotá/Cali/Medellín	1727	0.603	0.489	0	1
Baseline: Internet use					
Time spent on Facebook (0-4)	1727	2.243	1.158	0	4
Time spent on Instagram (0-4)	1727	0.876	1.151	0	4
Time spent on WhatsApp (0-4)	1726	3.173	0.870	0	4
Time spent on Family and Friends (0-4)	1725	3.081	1.250	0	4
Time spent using internet for getting in contact (0-4)	1724	2.916	1.127	0	4
Time spent using internet for reading the news (0-4)	1727	2.281	1.310	0	4
Time spent using internet for entertainment (0-4)	1726	2.539	1.288	0	4
Time spent using internet to look for a job (0-4)	1721	1.848	1.610	0	4
Time spent using internet for help programs (0-4)	1724	1.477	1.434	0	4
Endline: Internet use					
Time spent on Facebook (0-4)	1727	2.382	1.102	0	4
Time spent on Instagram (0-4)	1727	0.997	1.222	0	4
Time spent on WhatsApp (0-4)	1727	3.250	0.832	0	4
Time spent on Family and Friends (0-4)	1727	3.175	1.193	0	4
Time spent using internet for getting in contact (0-4)	1726	2.979	1.099	0	4
Time spent using internet for reading the news (0-4)	1727	2.247	1.319	0	4
Time spent using internet for entertainment (0-4)	1725	2.590	1.238	0	4
Time spent using internet to look for a job (0-4)	1725	1.977	1.582	0	4
Time spent using internet for help programs (0-4)	1722	1.463	1.401	0	4
Most used webpages/apps					
News	1685	0.027	0.161	0	1
Other	1686	0.086	0.280	0	1
None/Blank	1686	0.163	0.370	0	1
Government, NGOs, training, job, health, etc.	1686	0.118	0.323	0	1
Social media	1686	0.638	0.481	0	1

Table A.1: Descriptive characteristics

B Baseline Characteristics

Table B.1 reports the baseline characteristics and shows that, on average, they are well balanced across the treatment and control groups.

Table B.1: Baseline Characteristics

Characteristic	Treatment 1	Treatment 2	Treatment 3	Total	Control	T-Test
Female	0.605	0.598	0.598	0.600	0.598	0.002
	(0.018)	(0.018)	(0.018)			
Age	36.980	37.009	37.160	37.050	37.387	-0.337
	(0.413)	(0.407)	(0.426)			
Married/Cohabit	0.487	0.511	0.512	0.503	0.488	0.016
	(0.022)	(0.021)	(0.021)			
Time on Facebook	4.248	4.260	4.272	4.260	4.290	-0.030
	(0.051)	(0.050)	(0.049)			
Time on WhatsApp	5.171	5.153	5.207	5.177	5.182	-0.004
	(0.038)	(0.039)	(0.033)			
Data Usage: News	4.353	4.306	4.284	4.314	4.205	0.109*
	(0.059)	(0.056)	(0.055)			
Data Usage: Job Search	3.763	3.838	3.867	3.823	3.901	-0.078
	(0.071)	(0.069)	(0.069)			
Data Usage: Communication	4.922	4.926	4.901	4.916	4.950	-0.034
	(0.050)	(0.048)	(0.048)			

Note: The value displayed for t-tests are the differences in means across groups. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively.

Table B.2 reports p-values from t-tests comparing each characteristic by treatment condition. Just 1 of the 48 comparisons are significant at p< .10, none at p< .05; without statistical adjustments for multiple comparisons, this is what we would expect to arise by chance.

Variable	Comparison	P value
Female	Data vs. Data+Info	0.7652
Female	Data vs. Data+Networked Info	0.7889
Female	Data vs Control	0.7888
Female	Data+Info vs. Data+Networked Info	0.9767
Female	Data+Info vs Control	0.9741
Female	Data+Networked Info vs Control	0.9977
Age	Data vs. Data+Info	0.9600
Age	Data vs. Data+Networked Info	0.7611
Age	Data vs Control	0.4893
Age	Data+Info vs. Data+Networked Info	0.7972
Age	Data+Info vs Control	0.5177
Age	Data+Networked Info vs Control	0.7047
Married/Cohabit	Data vs. Data+Info	0.4304
Married/Cohabit	Data vs. Data+Networked Info	0.4143
Married/Cohabit	Data vs Control	0.9784
Married/Cohabit	Data+Info vs. Data+Networked Info	0.9798
Married/Cohabit	Data+Info vs Control	0.4389
Married/Cohabit	Data+Networked Info vs Control	0.4224
Time on Facebook	Data vs. Data+Info	0.8665
Time on Facebook	Data vs. Data+Networked Info	0.7291
Time on Facebook	Data vs Control	0.5550
Time on Facebook	Data+Info vs. Data+Networked Info	0.8569
Time on Facebook	Data+Info vs Control	0.6676
Time on Facebook	Data+Networked Info vs Control	0.8014
Time on WhatsApp	Data vs. Data+Info	0.7492
Time on WhatsApp	Data vs. Data+Networked Info	0.4684
Time on WhatsApp	Data vs Control	0.8430
Time on WhatsApp	Data+Info vs. Data+Networked Info	0.2893
Time on WhatsApp	Data+Info vs Control	0.6081
Time on WhatsApp	Data+Networked Info vs Control	0.6137
Data Usage: News	Data vs. Data+Info	0.5625
Data Usage: News	Data vs. Data+Networked Info	0.3907
Data Usage: News	Data vs Control	0.0711*
Data Usage: News	Data+Info vs. Data+Networked Info	0.7812
Data Usage: News	Data+Info vs Control	0.2078
Data Usage: News	Data+Networked Info vs Control	0.3159
Data Usage: Job Search	Data vs. Data+Info	0.4462
Data Usage: Job Search	Data vs. Data+Networked Info	0.2915
Data Usage: Job Search	Data vs Control	0.1619
Data Usage: Job Search	Data+Info vs. Data+Networked Info	0.7676
Data Usage: Job Search	Data+Info vs Control	0.5205
Data Usage: Job Search	Data+Networked Info vs Control	0.7284
Data Usage: Communication	Data vs. Data+Info	0.9565
Data Usage: Communication	Data vs. Data+Networked Info	0.7615
Data Usage: Communication	Data vs Control	0.6905
Data Usage: Communication	Data+Info vs. Data+Networked Info	0.7128
Data Usage: Communication	Data+Info vs Control	0.7235
Data Usage: Communication	Data+Networked Info vs Control	0.4736

Table B.2: Pairwise t-test p-values for baseline characteristics

C Implementation Details

Below, we describe the intervention in detail, including the treatment conditions, activity timelines, mobile credits, messages, and WhatsApp groups.

C.1 Timeline

The intervention was carried out from August to October 2023, as summarized in Figure C.1 . After the screening process, the baseline survey was implemented before participants received data phone credits or information. Participants in T1, T2, and T3 received data recharges at different times in the first weeks of the intervention, depending on the phone operator they use. Between September 15 and October 15, participants in T2 and T3 received information about Sisbén and Portal Ciudadano through WhatsApp messages individually or in groups, respectively. The endline survey was implemented roughly a month after the baseline. Participants in the control conditions received phone credit top-ups and information after the endline survey was completed.

Figure C.1: Timeline
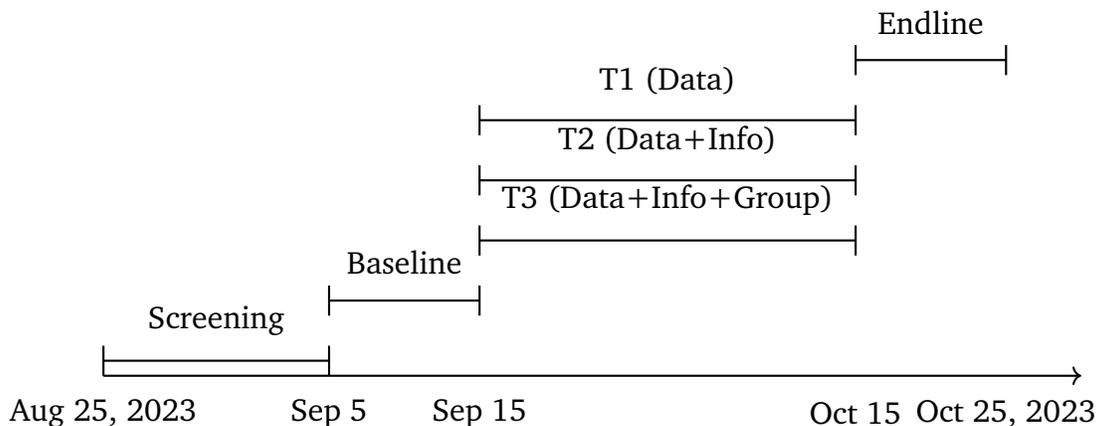
C.2 Internet Access

We ended up sending 3030 baseline surveys, and obtained 2156 complete surveys. 64.6% of these participants reported having no mobile internet.

C.2.1 Mobile credits

Mobile data credits were distributed among participants across three treatment conditions. Over 90% of participants used one of the three major operators in the country: Claro, Tigo, and Movistar.

4

Access to internet		Wi Fi		
		Yes	*No*	*TOTAL*
Mobile Internet	*No Plan*	26.3%	38.2%	**64.6%**
	1-5 GB	07.2%	13.2%	20.4%
	5-10 GB	05.3%	09.7%	15.0%
	TOTAL	38.9%	**61.1%**	100% (2,156)

Figure C.2: Participant mobile plans

C.2.2 Messages

IPA sent a series of WhatsApp messages via Twilio over the four-week intervention period. The list below presents the content of each message.

1. Hello [name]. We are IPA Colombia. Did you know that the Sisbén survey makes you visible for potential benefits of social programs? Request this survey through the Sisbén Citizen Portal. If you already have your Sisbén survey, you can check the information through the Citizen Portal.

2. Did you know that Sisbén has a virtual assistance channel? Get to know the Citizen Portal, register, and request your survey. If you already have your survey, you can check your information. Please note that being registered on the portal is not the same as being registered in the Sisbén database. Make sure you have the survey done at your home and have your Sisbén classification.

3. Click on the following link to watch a video and learn about Sisbén: bit.ly/3Rp32iD.

4. Hello [name]. We are IPA Colombia. Take advantage of the benefits of the Sisbén Citizen Portal, which is a website where you can carry out various procedures related to Sisbén quickly, free of charge, and without the need to go to any office. All you have to do is register on the portal and you're done.

5. If you have children under 6 years old who were not registered in your Sisbén survey, you can easily and quickly include them through the Sisbén Citizen Portal. Register at https://portalciudadano.Sisbén.gov.co/.

6. Click on the following link to watch a video and learn about the Sisbén Citizen Portal: http://bit.ly/3r3r0p6.

7. Hello again [name]. We are IPA Colombia. Remember that the Sisbén survey makes you visible for potential benefits of social programs. Request this survey through the Sisbén Citizen Portal. If you already have your Sisbén survey, you can check the information through the Citizen Portal.

8. Click on the following link to watch a video and learn about Sisbén: https://bit.ly/3r9Lz39.

9. Now you can access your Sisbén information from the Citizen Portal. Register on the Sisbén virtual assistance channel and download your household form quickly and for free. Visit https://portalciudadano.Sisbén.gov.co/.

10. We are IPA Colombia! Click on the following link to watch a video and learn about how Sisbén is used to select beneficiaries for social programs: https://bit.ly/3EE8NRT.

11. If you already have the Sisbén classification, use the Citizen Portal to see the information recorded in your survey. Visit https://portalciudadano.Sisbén.gov.co/.

12. Remember that the Sisbén survey makes you visible for potential benefits of social programs. Request this survey through the Sisbén Citizen Portal. If you already have your Sisbén survey, you can check the information through the Citizen Portal.

C.2.3 WhatsApp Groups

Participants in the third treatment condition were divided into 18 groups of roughly 30 participants each. WhatsApp group assignment was conducted through stratified randomization using characteristics such as gender, age, and educational level to ensure balanced representation across treatments. To manage this intervention, IPA hired a moderator and qualitative analyst who was responsible for sending three weekly messages to each WhatsApp group, which were the same messages delivered to participants in Treatment 2. The moderator was trained by the National Planning Department to accurately address participants inquiries throughout the intervention. Participants were encouraged to ask questions and engage with the information provided. They were also permitted to interact with one another spontaneously, provided that no hateful speech occurred. Aside from sending the weekly messages and responding directly to questions, the moderator maintained a passive role to allow for spontaneous and open interaction among participants. Across the four-week period, participants and the moderator exchanged a total of 4,843 messages within the 18 WhatsApp groups. Total interactions per group ranged from 35 to 635.

D Attrition

Attrition rate considering all surveys sent (2156) was 19.9%.

Table D.1: Endline survey results

	Control	Data	Data & Info	Data & Info & Groups	Total
Surveys sent	562	525	526	543	2156
Complete surveys	442	423	403	459	1727
Survey rate (% sent)	78.6%	80.6%	76.6%	84.5%	80.10%

Challenges to inference would arise if attrition were differential across treatment arms, which we now test. To address this, we first regress an indicator for responding to the endline survey on both a binary treatment indicator and on indicators for each treatment arm. Next, we examine differences in baseline characteristics between participants who attrited and those who completed the survey, presenting the distribution of these characteristics and conducting t-tests of differences within each arm. We also analyze whether baseline covariates predict treatment assignment. Finally, we test for differential attrition by regressing survey response on treatment indicators, baseline covariates, and their interactions, and perform an F-test of the joint significance of the interaction terms.

D.1 Attrition by Treatment Assignment & Covariates

We regress an indicator for responding to the endline survey on both a binary treatment indicator and indicators for each treatment arm. When using the binary treatment indicator, we find no evidence of differential attrition between treated and control participants ($p = 0.315$). When using separate indicators for each treatment arm, we observe no significant differences for the Data or Data+Info arms, but we do find a small but statistically significant increase in attrition for the Data+Networked Info arm (estimate = 0.059, $p = 0.014$). This suggests that, overall, attrition is balanced across treatment and control, with the exception of a modest increase in attrition in the Data+Networked Info arm.

	Estimate	Std. Error	t value	p-Value
Data	0.02	0.02	0.80	0.43
Data+Info	-0.02	0.02	-0.84	0.40
Data+Networked Info	0.06	0.02	2.45	0.01

We also report results from a logistic regression including all covariates and their interactions with treatment. The below table presents the odds ratios and p-values for each interaction term, directly testing whether attrition rates for each baseline characteristic differ by treatment arm.

Table D.2: (Differential Attrition) Interaction Terms from Logistic Regression

Interaction Term	Estimate	SE	z	p-value
Data:Gender	0.037	0.055	0.67	0.50
Data+Info:Gender	-0.040	0.054	-0.73	0.47
Data+Networked Info:Gender	0.032	0.053	0.60	0.55
Data:Age	0.0041	0.0023	1.80	0.072
Data+Info:Age	0.0015	0.0023	0.67	0.50
Data+Networked Info:Age	0.0006	0.0022	0.25	0.80
Data:Education	-0.021	0.042	-0.51	0.61
Data+Info:Education	0.037	0.043	0.86	0.39
Data+Networked Info:Education	-0.0015	0.043	-0.04	0.97
Data:Married/Cohabiting	-0.014	0.051	-0.27	0.79
Data+Info:Married/Cohabiting	-0.090	0.050	-1.79	0.073
Data+Networked Info:Married/Cohabiting	-0.018	0.050	-0.36	0.72
Data:Time on Social Media	0.0014	0.010	0.14	0.89
Data+Info:Time on Social Media	0.0004	0.010	0.04	0.97
Data+Networked Info:Time on Social Media	-0.0041	0.010	-0.40	0.69
Data:Employed	0.046	0.057	0.81	0.42
Data+Info:Employed	0.043	0.056	0.76	0.45
Data+Networked Info:Employed	-0.041	0.056	-0.74	0.46
Data:Using internet for contact with people	0.021	0.028	0.77	0.44
Data+Info:Using internet for contact with people	0.039	0.027	1.45	0.15
Data+Networked Info:Using internet for contact with people	0.044	0.028	1.58	0.12
Data:Using internet for news	-0.0020	0.023	-0.09	0.93
Data+Info:Using internet for news	0.019	0.022	0.85	0.39
Data+Networked Info:Using internet for news	-0.013	0.022	-0.59	0.56
Data:Using internet to find help programs	-0.021	0.019	-1.09	0.27
Data+Info:Using internet to find help programs	-0.017	0.019	-0.88	0.38
Data+Networked Info:Using internet to find help programs	-0.030	0.019	-1.55	0.12
Data:Using internet for entertainment	0.019	0.024	0.80	0.42
Data+Info:Using internet for entertainment	-0.0034	0.024	-0.14	0.89
Data+Networked Info:Using internet for entertainment	0.0012	0.024	0.05	0.96
Data:Using internet for job search	0.0030	0.018	0.17	0.87
Data+Info:Using internet for job search	0.0086	0.018	0.48	0.63
Data+Networked Info:Using internet for job search	0.0064	0.018	0.35	0.73

D.2 Baseline Covariate Balance and Differential Attrition by Covariate

Given the small but statistically significant differential attrition observed in one of the treatment arms, a potential concern is that treatment may have caused attrition to differ by covariates. Below, we present the differences in baseline characteristics between those who completed the survey and those who did not, both for the full sample and within each treatment arm separately.

Table D.3: Attrition Balance for Control

Variable	Mean: Completed	Mean: Dropped	*p*-value
Gender (=*1* if female)	0.592	0.606	0.773
Age	37.124	37.631	0.69
Educ	1.733	1.765	0.566
Married/Cohabiting	0.417	0.505	0.087
Time spent on social media (4-24)	17.733	17.395	0.281
Employed	0.375	0.355	0.692
Time spent using internet for contact with people	5.133	4.898	0.049
Time spent using internet for news	4.308	4.176	0.351
Time spent using internet to find help programs	3.342	3.475	0.363
Time spent using internet for entertainment	4.808	4.503	0.024
Time spent using internet for job search	3.892	3.909	0.917

Table D.4: Attrition Balance for the Data Treatment

Variable	Mean: Completed	Mean: Dropped	*p*-value
Gender (=*1* if female)	0.588	0.617	0.597
Age	34.625	37.824	0.005
Educ	1.804	1.759	0.476
Married/Cohabiting	0.441	0.499	0.297
Time spent on social media (4-24)	17.422	17.39	0.93
Employed	0.343	0.367	0.648
Time spent using internet for contact with people	4.961	4.92	0.756
Time spent using internet for news	4.373	4.355	0.908
Time spent using internet to find help programs	3.578	3.483	0.572
Time spent using internet for entertainment	4.637	4.589	0.753
Time spent using internet for job search	3.824	3.74	0.635

Table D.5: Attrition Balance for the Data+Info Treatment

Variable	Mean: Completed	Mean: Dropped	*p*-value
Gender (=*1* if female)	0.626	0.596	0.544
Age	36.465	37.526	0.341
Educ	1.732	1.814	0.177
Married/Cohabiting	0.537	0.507	0.573
Time spent on social media (4-24)	17.333	17.442	0.723
Employed	0.358	0.402	0.375
Time spent using internet for contact with people	4.846	4.953	0.362
Time spent using internet for news	4.171	4.35	0.196
Time spent using internet to find help programs	3.463	3.486	0.883
Time spent using internet for entertainment	4.626	4.563	0.623
Time spent using internet for job search	3.732	3.868	0.403

Table D.6: Attrition Balance for the Data+Networked Info Treatment

Variable	Mean: Completed	Mean: Dropped	*p*-value
Gender (=*1* if female)	0.524	0.627	0.083
Age	36.422	37.485	0.449
Educ	1.738	1.743	0.941
Married/Cohabiting	0.452	0.519	0.268
Time spent on social media (4-24)	17.619	17.275	0.312
Employed	0.452	0.338	0.054
Time spent using internet for contact with people	4.952	4.898	0.694
Time spent using internet for news	4.452	4.255	0.202
Time spent using internet to find help programs	3.667	3.464	0.278
Time spent using internet for entertainment	4.783	4.508	0.059
Time spent using internet for job search	3.81	3.873	0.745

D.3 F-Test of Joint Significance of Treatment-Covariate Interactions

To test for differential attrition by covariate, we regressed survey response on treatment indicators, baseline covariates, and their interactions. An F-test of the joint significance of all interaction terms yields F = 0.83, p = 0.74, indicating no evidence that attrition differs by baseline covariates across treatment arms.

D.4 IPW test

To assess the robustness of treatment effects to differential attrition, we estimated inverse probability weights (IPW) based on a logistic model predicting survey response using baseline covariates and treatment indicators. These weights were then applied to re-estimate treatment effects on the primary outcomes. Results were qualitatively similar to the unweighted ones, and treatment effects remained statistically and substantively unchanged, suggesting that attrition is unlikely to bias the main findings.

Table D.7: IPW Regression Results

	Dependent variable:
	Portal Ciudadano Sign-Ups
Data Only	-0.0001
	(0.022)
Data+Info	0.258***
	(0.022)
Data+Info+Group	0.271***
	(0.021)
Observations	1,715
R^2	0.149
Adjusted R^2	0.148
Note:	*p<0.1; **p<0.05; ***p<0.01

E   WhatsApp Interactions

Variable	N	age	gender (1 = female)	Education level			
				Preschool-Elementary	Middle/High School	Technical - Diploma	Under/Post-graduate
Total sample	543	37,3	0,61	0,14	0,64	0,10	0,12
Group 1	30	35,8	0,69	0,12	0,73	0,08	0,08
Group 2	31	37,0	0,63	0,25	0,54	0,13	0,08
Group 3	30	38,2	0,67	0,17	0,50	0,11	0,22
Group 4	30	37,1	0,62	0,05	0,76	0,19	0,00
Group 5	30	35,1	0,63	0,06	0,56	0,25	0,13
Group 6	30	36,9	0,67	0,11	0,89	0,00	0,00
Group 7	31	41,2	0,68	0,18	0,59	0,05	0,18
Group 8	30	41,2	0,63	0,21	0,63	0,17	0,00
Group 9	30	36,7	0,56	0,22	0,56	0,17	0,06
Group 10	30	37,8	0,65	0,17	0,74	0,00	0,09
Group 11	30	38,5	0,60	0,16	0,68	0,08	0,08
Group 12	30	39,5	0,61	0,04	0,74	0,13	0,09
Group 13	30	36,3	0,55	0,30	0,60	0,05	0,05
Group 14	30	34,5	0,57	0,17	0,48	0,04	0,30
Group 15	30	37,0	0,61	0,06	0,78	0,06	0,11
Group 16	30	45,6	0,63	0,25	0,69	0,00	0,06
Group 17	31	38,2	0,75	0,05	0,60	0,15	0,20
Group 18	30	35,7	0,56	0,24	0,72	0,04	0,00

Figure E.1: Participant characteristics within groups

Example of interactions from proactive users:

```
''Hi, I am G14-P63828. I am from Cabimas, State of Zulia.
Happy day to the whole group. And I am here in Cucuta.
I have been here for five years. Likewise, she is a user who usually greets:
Happy day to all; God bless you pleasantly. And she asks when he sees it necessary:
I also tried (referring to entering the Citizen Portal),
and it does not open the page; what do we do?"

"Stop arguing and talking unnecessary things, this group was
created in order to give (INFORMATION) only for this purpose. Thank you'".
```

E.1 Intervention

These types of questions relate to the intervention and study, including: What is the purpose of the WhatsApp groups? What information will participants receive in the groups? When will the follow-up survey be conducted? Additionally, questions about the intervention concern mobile data top-ups and the raffle announced at the beginning of the intervention. Some textual examples are provided below:

```
G15-P37876: "I have a question: what will we do in this group?
Just receive information, and that is it? Isn't it necessary to answer?"

601-P63479: "When do the surveys start? Good morning."

G03-P24593: "Finally, when is the bonus draw?"
```

E.2 Sisbén

This type of interaction can be grouped into two main categories based on the information that people request. First, questions about the system regarding family or personal issues. These include:

E.2.1 Inclusion of new household members to the Sisbén survey

Requests to add people to their households survey, such as children, mother, partner, siblings, and mother-in-law. For example:

```
G14-P26481: "Hello, good afternoon. In my case, they visited me and did the survey,
but  at that time, my son did not have PPT and did not register him.
What should I do now?"
```

E.2.2 Excluding Former Household Members from Survey Records

This category of questions reflects participants' concerns about removing former family members from their Sisbén survey records following household breakdown or separation.

G12-P26080: "Good afternoon, my Venezuelan daughter had two children here;
they are nationals; she has been in Sisbén since 2019 when she still lived
with the children's father, and she is the one who appears as the head
of the household, she has requested exclusion a couple of times to make
another survey for her and the two children, but it has not been possible
because they tell her that the man must request it and he does not live in
this State, how would she do it in that case?"

E.2.3 Change of Address

This category includes questions about updating their address in the Sisbén survey due to
changes in their residence.

G06-P61688: I am already registered in the Citizen Portal and my Sisbén appears
in Cali, how do I change the address? I am in Medellín.

E.2.4 Status of Household Members in the Survey

This category includes questions about why some household members appear with alert,
verification, or review comments within the citizen portal, as shown below:

G03-P10221: "Hello, good morning. My eldest son has a Colombian civil registry,
and I got a red alert in Sisbén for documents. How could I update that data?"

E.3 Access to Social Programs

This category of questions relates to how to apply for social programs. It also includes
complaints about not receiving social aid despite being registered in Sisbén (for example,
the Ingreso Solidario cash transfer). This reflects the common understanding that Sisbén
registration enables access to other government aid programs, which operate according to
specific targeting criteria.

G18-P49017: "I have Sisbén in extreme poverty, and they have not given me any help.
That is no longer due to high or low scores; I believe it was due to luck now.
That is why they give it to those who do not need it."

E.4 Customer Service

This category of questions relates to problems with registering for or interacting with the
Citizen Portal. For example:

G04-P17368: User sent a screenshot showing that he entered the data incorrectly
to register; however, he asked for help.

E.5 Miscellaneous Requests

Finally, to a lesser extent, there are three additional types of requests that do not fit into any of the previous four categories:

E.5.1 Help to Get a Job

This category includes comments that revealed participants' unemployment situations, as shown below:

```
G02-P32362: "Good afternoon, excuse me for being bold, it is urgent,
do you by chance  not know of a job here in Cucuta?
I'm desperate; I would appreciate it."
```

E.5.2 Support to Understand the Sisbén Information Being Sent

This category includes requests to explain the intervention messages in simpler terms:

```
G18-P15519: "I really would like you to help me more; I have to ask for help
to fill out all those things that they sometimes ask for because I do not know how
to do it, I do not know how to read well or write well.
I have a hard time understanding many words and how they are said. Thank you".
```

E.5.3 Add New Members to a WhatsApp Group

This category includes requests to add family members to the WhatsApp groups in which participants were enrolled:

```
G10-P43590: Hello, please add this phone number in the IPA group [...].
The man wants to participate; he is Venezuelan.
A question: What can I do or what do I have to do to seek help?
```

F Registration in Portal Ciudadano

The registration process on Portal Ciudadano is designed to be user-friendly. It requires an initial sign-up using identification documents such as a national ID card (cédula de ciudadanía), passport, or refugee permit (salvoconducto para refugiado), and an email account is needed to confirm the registration. For users without an email account, the portal provides clear instructions on how to create one. Once logged in, users can update their Sisbén information, register to request a new in-person survey, search for general information about Sisbén benefits, and check the addresses of local offices. Completing a survey request involves four steps, as illustrated in the below figure. Although advanced skills are not necessary, the most challenging part is identifying the location where the survey can be conducted and providing accurate location details to determine which office is responsible for carrying out the survey. Based on our interviews with Colombian bureaucrats, the process is generally straightforward, but some users find navigating the location-specific details or creating an e-mail address cumbersome.

Figure F.1: Portal Ciudadano Web Page to Request a New Sisbén Survey

G Additional Results

To gain a comprehensive understanding of the effects of our intervention, we also estimated the effects on polarization toward other migrants and the members of the host community. We did not preregister a directional hypothesis. The strongest effect we observe is the effect on attitudes toward Venezuelan migrants in the third treatment arm, where those who received information and data within WhatsApp groups reported more negative attitudes toward other Venezuelans compared to the control group (β=-3.55, SE=2.09, p=0.089). The effect is not robust to the exclusion of outliers.

H Heterogeneous Treatment Effects

Table H.1: Heterogeneous Effects by Age

	Dependent variable:						
	PC Registration (1)	Link Retrieval (2)	Info Retrieval (3)	Trust in Gov (4)	Interest in Gov (5)	Well-being (6)	Training (7)
Data Only	−0.025 (0.075)	0.001 (0.107)	0.142 (0.090)	0.186 (0.241)	0.154 (0.255)	0.092 (0.219)	0.074 (0.103)
Data+Info	0.425*** (0.076)	−0.083 (0.108)	0.015 (0.091)	−0.210 (0.244)	−0.203 (0.259)	0.151 (0.222)	0.014 (0.104)
Data+Networked Info	0.477*** (0.073)	0.137 (0.104)	0.243*** (0.089)	−0.037 (0.236)	−0.014 (0.250)	0.309 (0.215)	0.070 (0.101)
Data:Age	0.001 (0.002)	0.001 (0.003)	−0.003 (0.002)	−0.002 (0.006)	−0.001 (0.006)	−0.004 (0.006)	−0.001 (0.003)
Data+Info:Age	−0.005** (0.002)	0.002 (0.003)	−0.001 (0.002)	0.005 (0.006)	0.007 (0.007)	−0.008 (0.006)	−0.0005 (0.003)
Data+Networked Info:Age	−0.006*** (0.002)	−0.001 (0.003)	−0.004* (0.002)	0.002 (0.006)	0.006 (0.006)	−0.010* (0.005)	−0.00005 (0.003)
Observations	1,727	1,562	1,642	1,720	1,721	1,719	1,726
R^2	0.163	0.024	0.028	0.005	0.014	0.006	0.011
Adjusted R^2	0.160	0.020	0.024	0.001	0.010	0.002	0.007

Note: *p<0.1; **p<0.05; ***p<0.01

Table H.2: Heterogeneous Effects by Recency of Migration

	Dependent variable:						
	PC Registration (1)	Link Retrieval (2)	Info Retrieval (3)	Trust in Gov (4)	Interest in Gov (5)	Well-being (6)	Training (7)
Data Only	−3.659 (26.785)	−28.567 (39.759)	−21.384 (33.372)	−65.609 (85.513)	−5.692 (91.049)	14.915 (80.264)	−57.333 (36.643)
Data+Info	−0.911 (26.271)	−0.568 (38.837)	30.373 (32.647)	−43.773 (84.090)	−29.941 (89.580)	36.316 (78.942)	−65.551* (35.939)
Data+Networked Info	17.344 (24.353)	29.705 (35.965)	34.202 (30.510)	−51.224 (77.773)	−66.031 (82.838)	−79.637 (73.472)	−81.605** (33.315)
Data:Recency of Migration	0.002 (0.013)	0.014 (0.020)	0.011 (0.017)	0.033 (0.043)	0.003 (0.045)	−0.007 (0.040)	0.029 (0.018)
Data+Networked Info:Recency of Migration	0.001 (0.013)	0.0003 (0.019)	−0.015 (0.016)	0.022 (0.042)	0.015 (0.045)	−0.018 (0.039)	0.033* (0.018)
Data+Networked Info:Recency of Migration	−0.008 (0.012)	−0.015 (0.018)	−0.017 (0.015)	0.026 (0.039)	0.033 (0.041)	0.040 (0.037)	0.041** (0.017)
Observations	1,727	1,562	1,642	1,720	1,721	1,719	1,726
R^2	0.147	0.015	0.013	0.004	0.006	0.007	0.008
Adjusted R^2	0.143	0.010	0.009	0.0004	0.002	0.003	0.004

Note: *p<0.1; **p<0.05; ***p<0.01

Table H.3: Heterogeneous Effects by Education

	Dependent variable:						
	PC Registration (1)	Link Retrieval (2)	Info Retrieval (3)	Trust in Gov (4)	Interest in Gov (5)	Well-being (6)	Training (7)
Data Only	−0.012 (0.067)	0.121 (0.096)	0.088 (0.081)	−0.059 (0.214)	−0.136 (0.227)	−0.041 (0.196)	0.199** (0.092)
Data+Info	0.218*** (0.070)	−0.055 (0.099)	−0.024 (0.084)	0.060 (0.223)	0.275 (0.236)	−0.172 (0.204)	0.171* (0.095)
Data+Networked Info	0.205*** (0.066)	0.124 (0.094)	0.112 (0.081)	−0.027 (0.213)	0.334 (0.225)	0.155 (0.193)	0.108 (0.091)
Data:educ	0.007 (0.036)	−0.051 (0.052)	−0.039 (0.043)	0.090 (0.115)	0.151 (0.122)	−0.020 (0.105)	−0.102** (0.049)
Data+Info:educ	0.020 (0.037)	0.022 (0.052)	0.001 (0.045)	−0.051 (0.118)	−0.119 (0.125)	0.019 (0.108)	−0.098* (0.051)
Data+Info+Networked Info:educ	0.036 (0.036)	−0.012 (0.051)	−0.019 (0.043)	0.033 (0.115)	−0.080 (0.122)	−0.128 (0.104)	−0.022 (0.049)
Observations	1,727	1,562	1,642	1,720	1,721	1,719	1,726
R^2	0.147	0.020	0.015	0.003	0.009	0.004	0.011
Adjusted R^2	0.143	0.015	0.011	−0.001	0.005	0.00002	0.007

Note: *p<0.1; **p<0.05; ***p<0.01

Table H.4: Heterogeneous Effects by Gender

	Dependent variable:						
	PC Registration (1)	Link Retrieval (2)	Info Retrieval (3)	Trust in Gov (4)	Interest in Gov (5)	Well-being (6)	Training (7)
Data Only	0.000 (0.035)	0.002 (0.049)	0.035 (0.042)	−0.011 (0.110)	0.084 (0.117)	−0.067 (0.100)	0.026 (0.047)
Data+Info	0.252*** (0.034)	0.005 (0.049)	−0.018 (0.042)	0.028 (0.110)	0.158 (0.117)	−0.133 (0.100)	0.043 (0.047)
Data+Networked Info	0.234*** (0.034)	0.085* (0.048)	0.097** (0.041)	−0.005 (0.109)	0.239** (0.116)	0.018 (0.099)	0.114** (0.047)
Data:Female	0.0002 (0.044)	0.044 (0.063)	−0.025 (0.053)	0.182 (0.141)	0.070 (0.150)	−0.014 (0.128)	−0.011 (0.060)
Data+Info:Female	0.004 (0.044)	−0.027 (0.063)	−0.003 (0.054)	−0.106 (0.142)	−0.159 (0.151)	−0.006 (0.129)	−0.075 (0.061)
Data+Info+Networked Info:Female	0.054 (0.043)	0.027 (0.061)	−0.031 (0.052)	0.060 (0.139)	−0.074 (0.147)	−0.134 (0.126)	−0.076 (0.059)
Observations	1,727	1,562	1,642	1,720	1,721	1,719	1,726
R^2	0.148	0.013	0.014	0.005	0.007	0.012	0.008
Adjusted R^2	0.145	0.009	0.009	0.001	0.003	0.007	0.004

Note: *p<0.1; **p<0.05; ***p<0.01

I Heterogeneous Effects by Interaction Level and Type within WhatsApp Groups

We do not have full transcripts of the chats; instead, the data were coded and prepared for us by the IPA team to preserve the privacy and confidentiality of respondents. The aggregate information nevertheless allows us to provide some insights into how effects vary depending on patterns of interaction. The following results were not pre-registered; they should be interpreted as post-treatment exploratory analyses.

I.1 Heterogeneous Effects by Discussion Topic

Outcome	Coefficient	Std. Error	p-value
Registered Portal Ciudadano	0.145	0.042	0.001
Links clicked	-0.000	0.040	0.993
Information retrieved	-0.044	0.034	0.195
Knowledge of programs	-0.005	0.026	0.843
Interest in NGOs	-0.074	0.096	0.440
Trust in NGOs	0.164	0.094	0.081
Trust in government	0.236	0.096	0.015
Interest in government	0.028	0.098	0.777
Well-being index	-0.115	0.090	0.203
Interest in job training	-0.037	0.044	0.397
Change in employment	-0.076	0.042	0.074

Table I.1.1: Post-treatment exploratory analyses: Groups with content related to social services vs. other groups in Treatment Arm 3.

Outcome	Coefficient	Std. Error	p-value
Registered Portal Ciudadano	-0.211	0.088	0.017
Links clicked	0.093	0.083	0.263
Information retrieved	0.043	0.070	0.541
Knowledge of programs	-0.021	0.054	0.699
Interest in NGOs	-0.027	0.197	0.890
Trust in NGOs	0.075	0.194	0.698
Trust in government	0.186	0.200	0.352
Interest in government	0.109	0.202	0.589
Well-being index	0.487	0.185	0.009
Interest in job training	0.039	0.091	0.670
Change in employment	-0.005	0.088	0.958

Table I.1.2: Post-treatment exploratory analyses: Group with content related to emotional support vs. other groups in Treatment Arm 3.

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Outcome	Coefficient	Std. Error	p-value
Registered Portal Ciudadano	-0.087	0.049	0.077
Links clicked	0.037	0.046	0.423
Information retrieved	0.004	0.039	0.920
Knowledge of programs	-0.022	0.030	0.466
Interest in NGOs	0.013	0.110	0.905
Trust in NGOs	0.176	0.108	0.105
Trust in government	0.247	0.111	0.027
Interest in government	-0.001	0.113	0.991
Well-being index	-0.005	0.104	0.962
Interest in job training	0.003	0.051	0.956
Change in employment	-0.030	0.049	0.540

Table I.1.3: Post-treatment exploratory analyses: Groups with content related to employment vs. other groups in Treatment Arm 3.
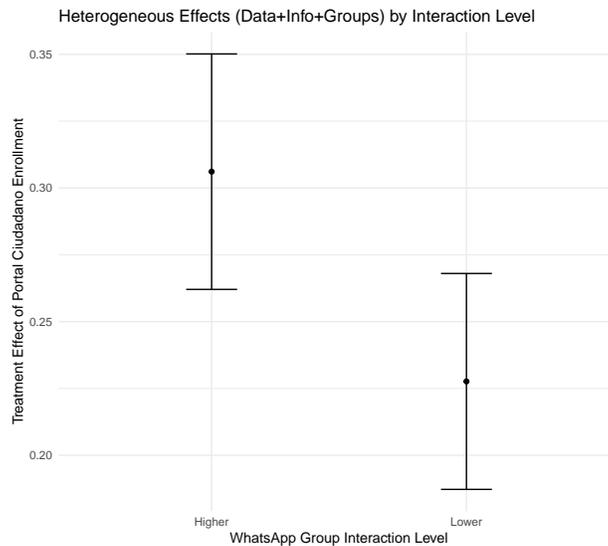
I.2 Heterogeneous Effects by Interaction Intensity

Figure I.2.1: Effects on portal enrollment by levels of interactions exchanged within WhatsApp groups.

(a) Figure I.2.2: Effects on informational retrieval by levels of interactions exchanged within WhatsApp groups.

(b) Figure I.2.3: Effects on link retrieval by levels of interactions exchanged within WhatsApp groups.

(a) Figure I.2.4: Effects on trust in government by levels of interactions exchanged within WhatsApp groups.
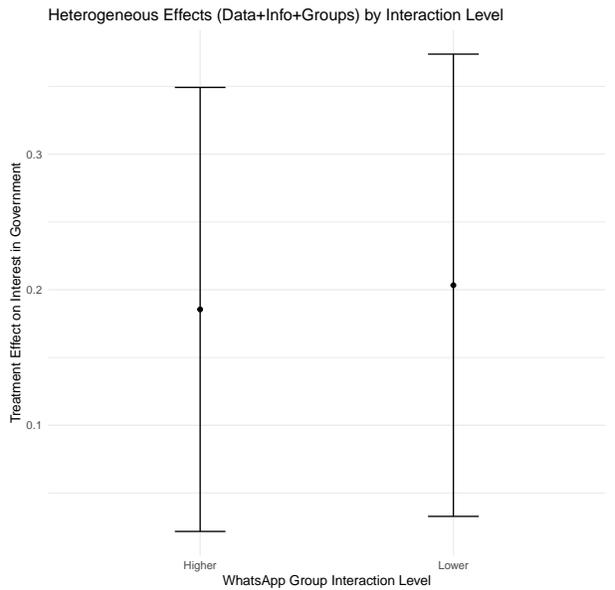
(b) Figure I.2.5: Effects on interest in government by levels of interactions exchanged within WhatsApp groups.

Heterogeneous Effects (Data+Info+Groups) by Interaction Level
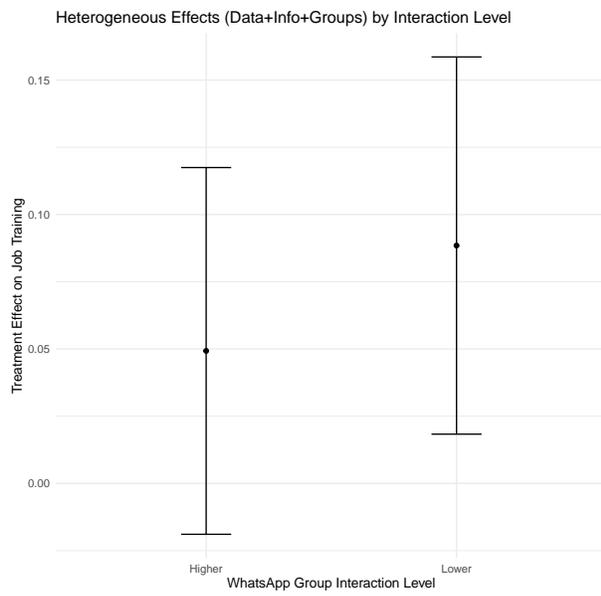
(a) Figure I.2.6: Effects on job training opportunities taken by levels of interactions exchanged within WhatsApp groups.
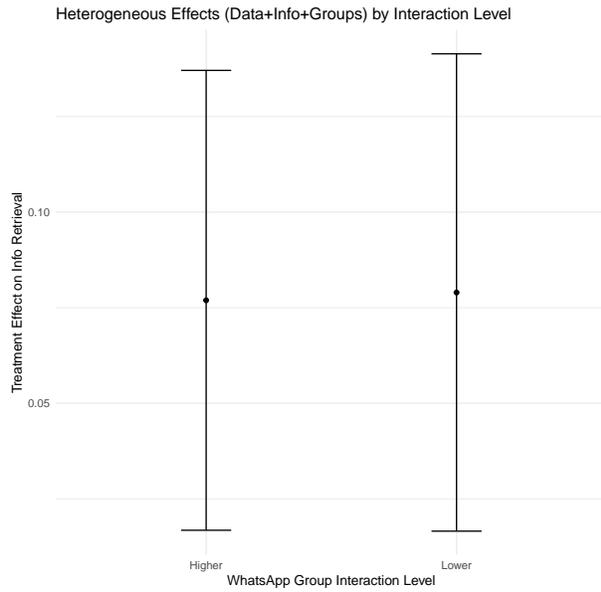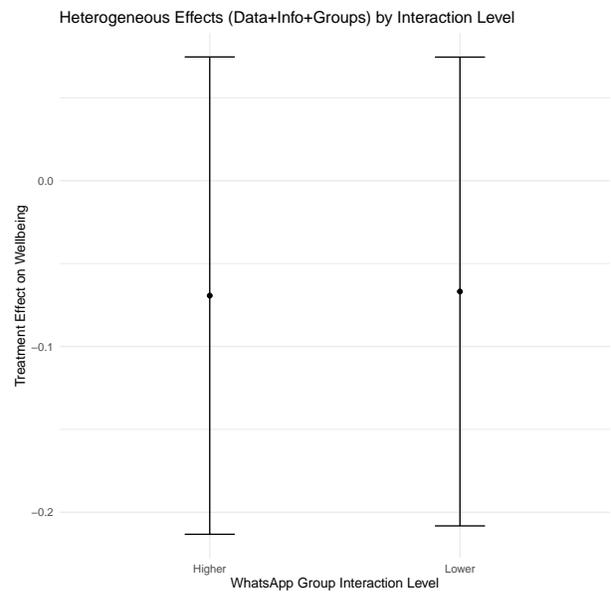
(b) Figure I.2.7: Effects on well-being by levels of interactions exchanged within WhatsApp groups.

I.3 Heterogeneous Effects by Frequency of Meaningful Messages

We differentiate between the top 9 WhatsApp groups in terms of the level of interaction ("Higher") and bottom half ("Lower").
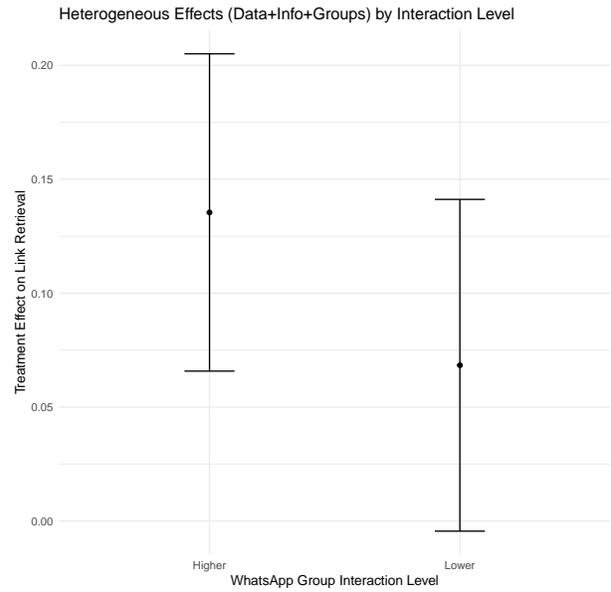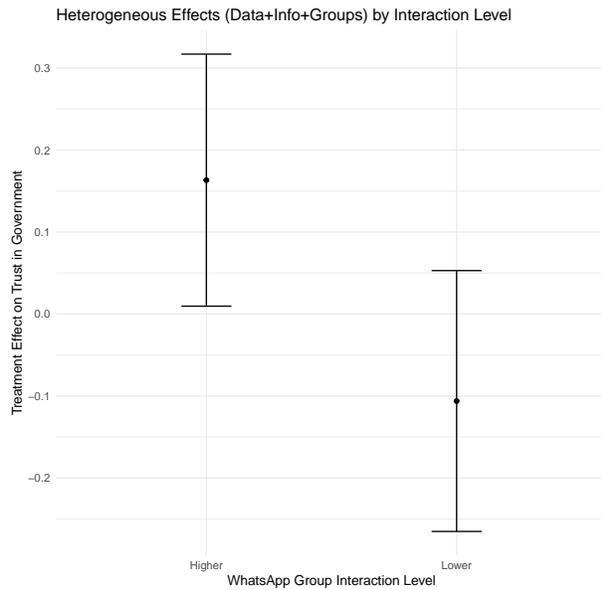

Figure I.3.1: Effects on portal enrollment by levels of meaningful messages exchanged within WhatsApp groups.

(a) Figure I.3.2: Effects on link retrieval by levels of meaningful messages exchanged within WhatsApp groups.

(b) Figure I.3.3: Effects on information retrieval by levels of meaningful messages exchanged within WhatsApp groups.

Data+Info+Groups Effects by Level of Meaningful Messages Exchanged

(a) Figure I.3.4: Effects on training opportunities by levels of meaningful messages exchanged within WhatsApp groups.

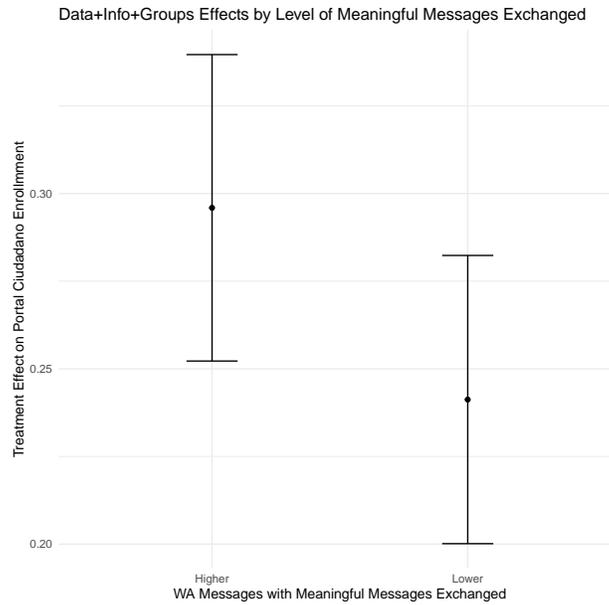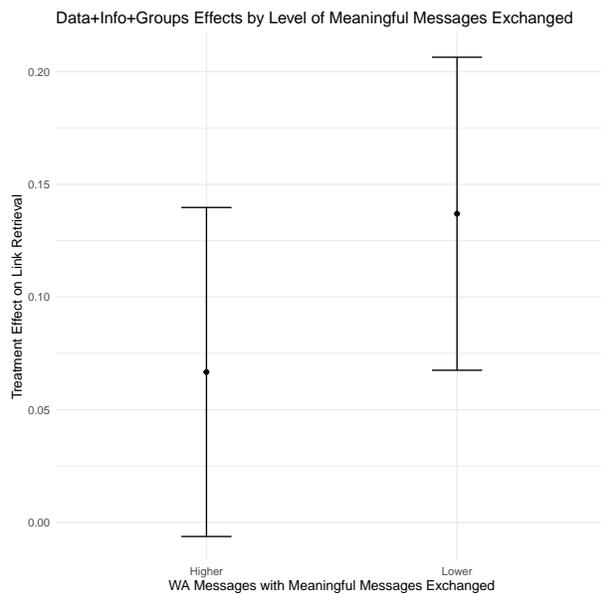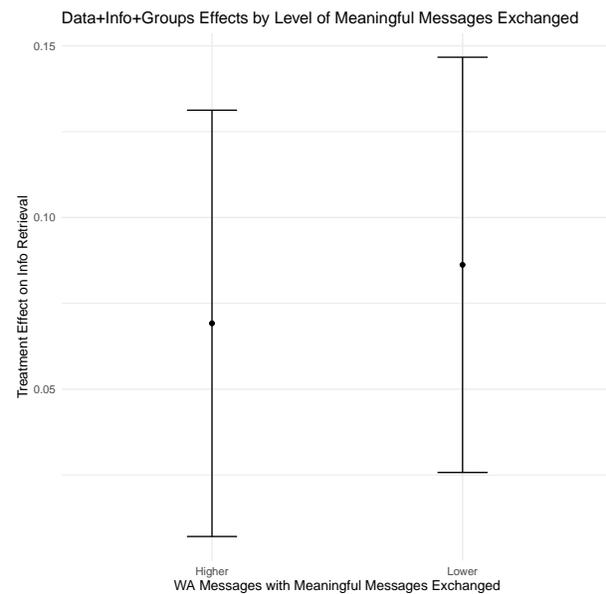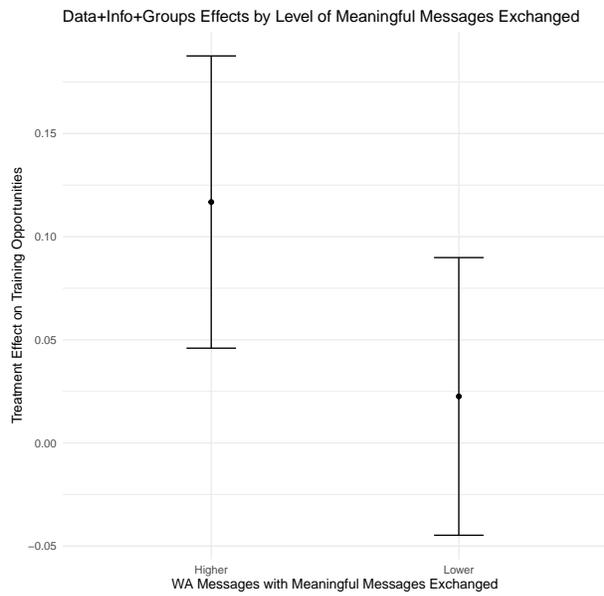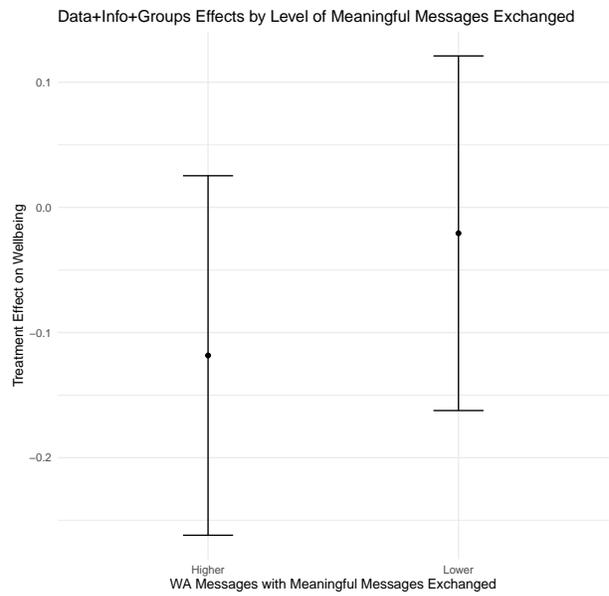(b) Figure I.3.5: Effects on well-being by levels of meaningful messages exchanged within WhatsApp groups.

I.4 Heterogeneous Effects by Group Composition

We examine whether variation in group composition influenced the effectiveness of the intervention, focusing on how the share of recent versus long-term migrants within each WhatsApp group relates to registration behavior and interaction patterns. Although not pre-registered, this analysis is motivated by the expectation that groups with very few long-term immigrants may be less informative (because there is less experience to share), while groups with many long-term immigrants may be less effective at encouraging registration (because these individuals are likely to have already taken advantage of available benefits in the host country).[8] For each WhatsApp group we calculated the share of members who had migrated to Colombia within the past year (with alternative thresholds shown on the x-axis in the figure below) and estimated the association between this group-level measure and registration rates within the Data + Information with Peer Networks treatment arm. The regression results show that WhatsApp groups with a higher proportion of recent immigrants indeed had higher registration rates, supporting the interpretation that these nudges are likely more effective among such groups compared to those with long-term immigrants. Importantly, no one in the sample was registered for the portal at the start of the study although all were eligible. It is likely that long-term migrants have either taken advantage of other available benefits or have stronger reasons for not registering, making it harder for peer information to influence their decisions.
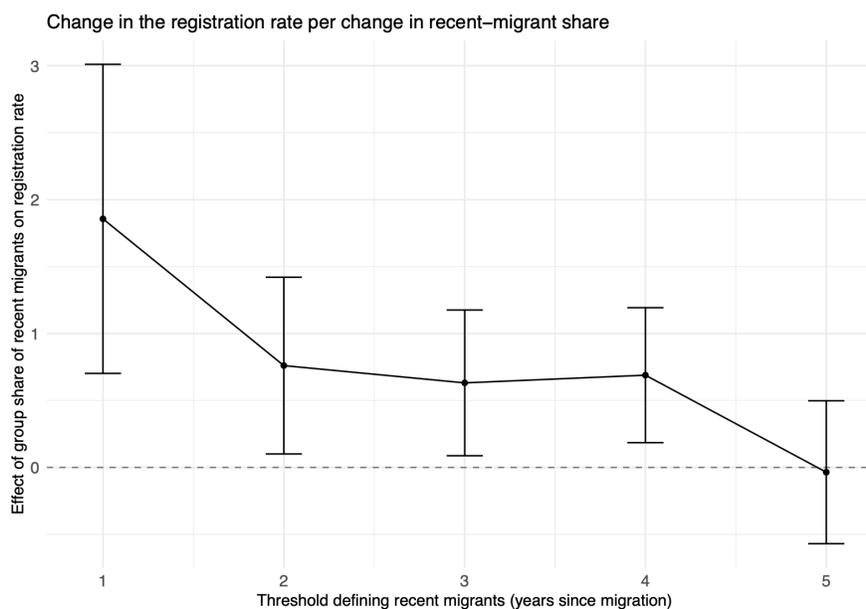
I.4.1: Association between registration rate and WhatsApp group composition (recent immigrant share)

One could also expect that very few long-term immigrants might make the chat less informative due to limited information to circulate. To proxy for information in circulation and because group size was held constant across chats, we look at the number of messages

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[8]We thank the Editor for this point.

(interactions) within each group. We find some evidence that groups with higher proportions of long-term immigrants exhibit more interactions. This pattern could suggest that long-term residents contribute to more discussion within the chats, possibly by sharing experiences or responding to newer members' questions. These differences, however, are not statistically significant and given the limited variation in group composition, we cannot draw firm conclusions.
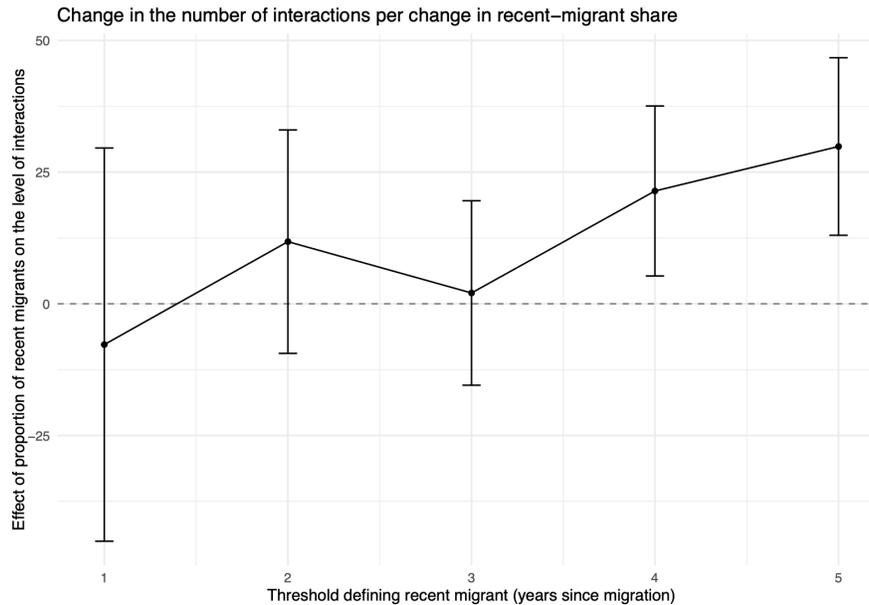
I.4.2: Association between WhatsApp interactions and group composition (recent immigrant share)

Regarding topics, we have the coded information on the dominant discussion topics for WhatsApp groups. For each group, we calculate the proportion of long-term immigrants, and compare these proportions across topic categories to examine whether certain themes were more prevalent in groups with newer or longer-settled participants. For simplicity, we classify participants as either below or at/above the sample median of five years since migration. The descriptive results indicate that groups with relatively fewer long-term immigrants focused more on topics that the IPA team coded qualitatively as being about Customer Service (mean share of long-term participants = 0.40), Emotional Support (0.42), and Intervention (0.44). In contrast, groups with somewhat higher shares of long-term immigrants focused on Employment (0.56), Sisbén (0.51), and State Services (0.51), possibly because longer-term migrants had more insights to provide about institutional programs and work-related issues.

J Treatment Effects: Aggregated and Treatment-Specific Comparisons

This section compares treatment effects relative to the pure control group, which only completed the surveys. We first present results that aggregate all treatment arms into a single indicator (any treatment, binary, versus pure control). We then report the effects of each individual treatment compared to the pure control.

J.1 Aggregated Treatment Effects: Mobile Credit vs. Pure Control

In this section, we present results pooling all individuals who received unlimited mobile credit. Registration levels increased as a result of the intervention, but well-being indicators declined. As discussed in the main text, we find no detectable effects on job market outcomes or levels of trust.

Table J.1: (Aggregated Results) Portal Ciudadano Registration

	Dependent variable:
	Registration PC
Any Treatment (Binary)	0.080***
	(0.022)
Observations	1,726
R^2	0.029
Adjusted R^2	0.024
Note:	*p<0.1; **p<0.05; ***p<0.01

Table J.2: (Aggregated Results) Knowledge of Existing Assistance Programs

	Dependent variable:			
	Sisbén	Portal Ciudadano	Minimum Wage	Knowledge Index
	(1)	(2)	(3)	(4)
Any Treatment (Binary)	0.016	0.058**	−0.021	0.020
	(0.026)	(0.024)	(0.024)	(0.014)
Observations	1,725	1,714	1,719	1,707
R^2	0.042	0.012	0.016	0.023
Adjusted R^2	0.037	0.006	0.010	0.018
Note:				*p<0.1; **p<0.05; ***p<0.01

Table J.3: (Aggregated Results) Job Market Outcomes

| | Dependent variable: | | | |
| | Working | Look Job | Additional Training | Gov. Programs |
	(1)	(2)	(3)	(4)
Any Treatment (Binary)	−0.013	0.012	0.032	0.017
	(0.025)	(0.025)	(0.024)	(0.027)
Observations	1,726	1,725	1,725	1,723
R^2	0.096	0.010	0.016	0.014
Adjusted R^2	0.091	0.005	0.011	0.009

Note: *p<0.1; **p<0.05; ***p<0.01

Table J.4: (Aggregated Results) Trust in Host Government

| | Dependent variable: | |
| | Trust in Government | |
	(1)	(2)
Any Treatment (Binary)	0.028	0.129**
	(0.056)	(0.059)
Observations	1,719	1,719
R^2	0.009	0.009

Note: *p<0.1; **p<0.05; ***p<0.01

Table J.5: (Aggregated Results) Well-being

| | Dependent variable: | | |
| | Joyful | Not Frustrated | Optimistic |
	(1)	(2)	(3)
Any Treatment (Binary)	−0.001	−0.151**	−0.108*
	(0.067)	(0.075)	(0.064)
Observations	1,723	1,720	1,726
R^2	0.016	0.009	0.011
Adjusted R^2	0.011	0.003	0.005

Note: *p<0.1; **p<0.05; ***p<0.01

J.2 Treatment-Specific Effects: Each Treatment vs. Control

In this section, we present the results for each treatment relative to the control group. We report estimates with and without control variables. Including controls (age, gender, education level, marital status, and municipality) can increase precision by reducing residual variance and helps address potential baseline imbalances across treatment arms. The estimated effects remain comparable across all specifications.

Table J.6: Intervention effects on sign-ups for Portal Ciudadano

	Dependent variable:	
	Portal Ciudadano Sign-Ups	
	(1)	(2)
Data	0.0002	0.003
	(0.021)	(0.021)
Data + Info	0.254***	0.255***
	(0.022)	(0.022)
Data + Networked Info	0.268***	0.268***
	(0.021)	(0.021)
Controls	No	Yes
Observations	1,727	1,726
R^2	0.146	0.159
Adjusted R^2	0.145	0.154
Note:	*p<0.1; **p<0.05; ***p<0.01	

Table J.7: Intervention effects on the successful retrieval of online information

		Dependent variable:		
	SSN Info Index		Link Retrieval Index	
	(1)	(2)	(3)	(4)
Data	−0.004	−0.005	0.030	0.032
	(0.018)	(0.017)	(0.031)	(0.031)
Data + Info	0.024	0.025	−0.011	−0.012
	(0.018)	(0.018)	(0.031)	(0.031)
Data + Networked Info	0.042**	0.039**	0.103***	0.103***
	(0.017)	(0.017)	(0.030)	(0.030)
Controls	No	Yes	No	Yes
Observations	1,708	1,707	1,562	1,562
R^2	0.005	0.027	0.011	0.030
Adjusted R^2	0.004	0.021	0.009	0.023
Note:			*p<0.1; **p<0.05; ***p<0.01	

Table J.8: Intervention effects on labor market outcomes

	Working		Job Search		Gov. Program Search		Additional Training	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Data	−0.010	−0.005	0.018	0.017	0.045	0.041	0.020	0.023
	(0.033)	(0.031)	(0.031)	(0.031)	(0.034)	(0.034)	(0.029)	(0.029)
Data + Info	−0.012	−0.016	−0.008	−0.008	−0.035	−0.037	−0.003	−0.002
	(0.033)	(0.031)	(0.031)	(0.031)	(0.034)	(0.034)	(0.030)	(0.030)
Data + Networked Info	−0.024	−0.016	0.025	0.023	0.041	0.040	0.068**	0.068**
	(0.032)	(0.030)	(0.030)	(0.030)	(0.033)	(0.033)	(0.029)	(0.029)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1,727	1,726	1,726	1,725	1,724	1,723	1,726	1,725
R^2	0.0003	0.096	0.001	0.011	0.004	0.018	0.004	0.019
Adj. R^2	−0.001	0.090	−0.001	0.004	0.002	0.012	0.003	0.013

Note: *p<0.1; **p<0.05; ***p<0.01

Table J.9: Intervention effects on trust and interest in government

	Trust in Government		Interest in Government	
	Dependent variable:			
	(1)	(2)	(3)	(4)
Data	0.100	0.089	0.129*	0.126*
	(0.069)	(0.069)	(0.073)	(0.073)
Data + Info	−0.034	−0.040	0.063	0.060
	(0.070)	(0.070)	(0.074)	(0.074)
Data + Networked Info	0.031	0.031	0.194***	0.193***
	(0.067)	(0.067)	(0.072)	(0.071)
Controls	No	Yes	No	Yes
Observations	1,720	1,719	1,721	1,720
R^2	0.002	0.011	0.005	0.017
Adjusted R^2	0.001	0.005	0.003	0.011

Note: *p<0.1; **p<0.05; ***p<0.01

Table J.10: Intervention effects on self-reported well-being

	Joyful		Not Frustrated		Optimistic	
	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Data	0.013	0.017	−0.157*	−0.160*	−0.083	−0.076
	(0.083)	(0.082)	(0.093)	(0.093)	(0.080)	(0.080)
Data + Info	−0.066	−0.066	−0.167*	−0.175*	−0.170**	−0.161**
	(0.084)	(0.083)	(0.094)	(0.094)	(0.081)	(0.081)
Data + Networked Info	0.033	0.039	−0.130	−0.122	−0.092	−0.090
	(0.081)	(0.081)	(0.091)	(0.091)	(0.078)	(0.078)
Controls	No	Yes	No	Yes	No	Yes
Observations	1,724	1,723	1,721	1,720	1,727	1,726
R^2	0.001	0.017	0.002	0.009	0.003	0.011
Adjusted R^2	−0.001	0.011	0.001	0.002	0.001	0.005

Note: *p<0.1; **p<0.05; ***p<0.01

K Pairwise Comparisons *Between* Treatment Arms

In this section, we present the results of the direct pairwise comparisons between treatment arms. While the pre-analysis plan focused on contrasts between each treatment and the control group, we also examine differences across the treatments themselves. Each table reports results for four contrasts, shown in separate columns, with and without controls for additional precision:

- Data vs. Any Information (Data+Info and Data+Networked combined)

- Data vs. Data+Info

- Data vs. Data+Networked Info

- Data+Info vs. Data+Networked Info

Where we include controls (Model 2), the estimating equation is:

$$Y_{im} = \alpha + \beta_i Treatment_i + \lambda X_i + \mu_m + \epsilon_i \tag{2}$$

where outcome Y_{im} represents the outcome for participant i within a municipality m and is regressed on $Treatment_i$ indicators (i.e., assignment to Data, Data+Information, Data+Networked Information, or Control group), X_i a vector of individual controls measured at baseline (age, education, gender, and marital status), and μ_m is a municipality-specific fixed effect.

We also provide post-hoc power analyses by reporting the minimum detectable effects (MDEs) for each comparison. These calculations are based on the actual sample sizes in each case (as shown in the following tables) and conventional assumptions of $\alpha = 0.05$ and power$= 0.80$.

Table K.1: SSN Knowledge & Link Retrieval (All Comparisons)

| | *Dependent variable: SSN Information Index* | | | | | | | |
| | T1 vs. T2 + T3 | | T1 vs. T2 | | T1 vs. T3 | | T2 vs. T3 | |
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Data vs. Any Info	0.037**	0.037**						
	(0.016)	(0.016)						
Data vs. Data+Info			0.028	0.030*				
			(0.018)	(0.018)				
Data vs. Data+Networked Info					0.045**	0.045**		
					(0.018)	(0.018)		
Data+Info vs. Data+Networked Info							0.017	0.015
							(0.018)	(0.018)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1,272	1,271	817	816	873	873	854	853
R^2	0.004	0.034	0.003	0.035	0.007	0.038	0.001	0.035
Adjusted R^2	0.004	0.027	0.002	0.024	0.006	0.028	−0.0001	0.024
	Dependent variable: Link Retrieval Index							
	T1 vs. T2 + T3		T1 vs. T2		T1 vs. T3		T2 vs. T3	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Data vs. Any Info	0.021	0.018						
	(0.027)	(0.026)						
Data vs. Data+Info			−0.041	−0.043				
			(0.032)	(0.032)				
Data vs. Data+Networked Info					0.073**	0.071**		
					(0.029)	(0.029)		
Data+Info vs. Data+Networked Info							0.114***	0.117***
							(0.030)	(0.030)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1,165	1,165	741	741	802	802	787	787
R^2	0.001	0.018	0.002	0.016	0.008	0.029	0.018	0.044
Adjusted R^2	−0.0003	0.011	0.001	0.004	0.006	0.018	0.017	0.033

Note: $^*p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

For the knowledge and link retrieval outcomes (Table K.1), the study was powered to detect effects of about 4-5- percentage points. For SSN Knowledge, we see statistically significant effects roughly 3-4 percentage points in the "Data vs. Any Info" and in the "Data vs. Data+Networked Info" contrasts. The "Data" vs. "Data+Info" contrast is borderline, while "Data+Info" vs. "Networked Info" is underpowered. Consistent with the discussion in the paper, for Link Retrieval, the contrasts involving Networked Info (vs. "Data", vs. "Data+Info") are powered, providing some confidence that networked information improves digital navigation.

Table K.2: Portal Ciudadano Sign-Ups (All Comparisons)

	T1 vs. T2 + T3		T1 vs. T2		T1 vs. T3		T2 vs. T3	
	Dependent variable: Sign-Ups							
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Data vs. Any Info	0.261***	0.258***						
	(0.022)	(0.022)						
Data vs. Data+Info			0.253***	0.253***				
			(0.022)	(0.022)				
Data vs. Data+Networked Info					0.268***	0.264***		
					(0.022)	(0.022)		
Data+Info vs. Data+Networked Info							0.014	0.011
							(0.030)	(0.030)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1,285	1,284	826	825	882	882	862	861
R^2	0.102	0.119	0.143	0.153	0.145	0.162	0.0003	0.029
Adjusted R^2	0.101	0.113	0.142	0.144	0.144	0.153	−0.001	0.018

For the behavioral outcome capturing registrations in Portal Ciudadano, the study was powered to detect moderate effects (MDE $\approx$ 6-7pp). The large effects observed for "Data vs. Data+Info" and "Data" vs. "Data+Networked Info" are well above this threshold and significant. By contrast, the difference between "Data+Info" and "Data+Networked Info" is small and falls below the MDE.

For employment and job search outcomes, reported in first panel of table K.3, observed effects are small and fall below the MDEs ($\approx$ 7–9pp), leaving the study underpowered. By contrast, program search and training outcomes, reported in the second panel of K.3, show effects of 7–8pp for "Data+Networked Info" vs. "Data+Info", which are at or near detectable levels and statistically significant.

Table K.3: Working, Job Search, Government Program Search, and Training (H2)

| | _Dependent variable: Working_ | | | | | | | |
| | T1 vs. T2 + T3 | | T1 vs. T2 | | T1 vs. T3 | | T2 vs. T3 | |
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Data vs. Any Info	−0.009	−0.012						
	(0.028)	(0.027)						
Data vs. Data+Info			−0.002	−0.010				
			(0.033)	(0.032)				
Data vs. Data+Networked Info					−0.015	−0.013		
					(0.032)	(0.031)		
Data+Info vs. Data+Networked Info							−0.013	0.001
							(0.033)	(0.032)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1,285	1,284	826	825	882	882	862	861
R^2	0.0001	0.085	0.00000	0.105	0.0002	0.080	0.0002	0.081
Adjusted R^2	−0.001	0.078	−0.001	0.095	−0.001	0.070	−0.001	0.071

| | _Dependent variable: Job Search_ | | | | | | | |
| | T1 vs. T2 + T3 | | T1 vs. T2 | | T1 vs. T3 | | T2 vs. T3 | |
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Data vs. Any Info	−0.008	−0.008						
	(0.027)	(0.027)						
Data vs. Data+Info			−0.026	−0.024				
			(0.031)	(0.031)				
Data vs. Data+Networked Info					0.008	0.007		
					(0.030)	(0.030)		
Data+Info vs. Data+Networked Info							0.034	0.031
							(0.031)	(0.031)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1,284	1,283	826	825	881	881	861	860
R^2	0.0001	0.015	0.001	0.024	0.0001	0.019	0.001	0.017
Adjusted R^2	−0.001	0.008	−0.0004	0.013	−0.001	0.009	0.0002	0.006

| | _Dependent variable: Government Program Search_ | | | | | | | |
| | T1 vs. T2 + T3 | | T1 vs. T2 | | T1 vs. T3 | | T2 vs. T3 | |
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Data vs. Any Info	−0.040	−0.038						
	(0.030)	(0.030)						
Data vs. Data+Info			−0.080**	−0.077**				
			(0.035)	(0.035)				
Data vs. Data+Networked Info					−0.004	−0.004		
					(0.034)	(0.034)		
Data+Info vs. Data+Networked Info							0.076**	0.078**
							(0.034)	(0.034)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1,283	1,282	824	823	882	882	860	859
R^2	0.001	0.019	0.006	0.025	0.00002	0.023	0.006	0.023
Adjusted R^2	0.001	0.012	0.005	0.014	−0.001	0.013	0.005	0.013

| | _Dependent variable: Additional Training_ | | | | | | | |
| | T1 vs. T2 + T3 | | T1 vs. T2 | | T1 vs. T3 | | T2 vs. T3 | |
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Data vs. Any Info	0.015	0.013						
	(0.026)	(0.026)						
Data vs. Data+Info			−0.022	−0.021				
			(0.030)	(0.030)				
Data vs. Data+Networked Info					0.049	0.044		
					(0.030)	(0.030)		
Data+Info vs. Data+Networked Info							0.071**	0.071**
							(0.030)	(0.030)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1,284	1,283	826	825	881	881	861	860
R^2	0.0003	0.012	0.001	0.015	0.003	0.017	0.006	0.019
Adjusted R^2	−0.001	0.005	−0.001	0.004	0.002	0.007	0.005	0.009

Note: *p<0.1; **p<0.05; ***p<0.01

Table K.4: Trust in Government (All Comparisons; H3)

	T1 vs. T2 + T3		T1 vs. T2		T1 vs. T3		T2 vs. T3	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Dependent variable: Trust in Government								
Data vs. Any Info	−0.100	−0.092						
	(0.061)	(0.061)						
Data vs. Data+Info			−0.135*	−0.129*				
			(0.072)	(0.072)				
Data vs. Data+Networked Info					−0.070	−0.050		
					(0.068)	(0.068)		
Data+Info vs. Data+Networked Info							0.065	0.067
							(0.071)	(0.071)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1,279	1,278	824	823	877	877	857	856
R^2	0.002	0.010	0.004	0.021	0.001	0.022	0.001	0.006
Adjusted R^2	0.001	0.003	0.003	0.010	0.0001	0.011	−0.0002	−0.005
Dependent variable: Interest in Government								
	T1 vs. T2 + T3		T1 vs. T2		T1 vs. T3		T2 vs. T3	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Data vs. Any Info	0.004	0.006						
	(0.064)	(0.064)						
Data vs. Data+Info			−0.066	−0.066				
			(0.077)	(0.077)				
Data vs. Data+Networked Info					0.065	0.073		
					(0.071)	(0.071)		
Data+Info vs. Data+Networked Info							0.132*	0.125*
							(0.073)	(0.074)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1,280	1,279	823	822	879	879	858	857
R^2	0.00000	0.013	0.001	0.015	0.001	0.023	0.004	0.015
Adjusted R^2	−0.001	0.006	−0.0003	0.004	−0.0002	0.013	0.003	0.004

Note: *p<0.1; **p<0.05; ***p<0.01

The study is not powered to detect modest effects on trust (MDE ≈7–8 pp; observed differences −0.1 to +0.07). By contrast, the 12–13 pp increase in interest in government for Data+Networked info vs. Data+Info exceeds the MDE and is significant at the 10% level.

Table K.5: Well-being (All Comparisons; H4)

	Dependent variable: Joyful							
	T1 vs. T2 + T3		T1 vs. T2		T1 vs. T3		T2 vs. T3	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Data vs. Any Info	−0.027	−0.026						
	(0.074)	(0.073)						
Data vs. Data+Info			−0.079	−0.082				
			(0.087)	(0.087)				
Data vs. Data+Networked Info					0.020	0.025		
					(0.084)	(0.083)		
Data+Info vs. Data+Networked Info							0.099	0.109
							(0.084)	(0.083)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1,284	1,283	825	824	881	881	862	861
R^2	0.0001	0.018	0.001	0.013	0.0001	0.025	0.002	0.032
Adjusted R^2	−0.001	0.012	−0.0002	0.002	−0.001	0.015	0.0005	0.022

	Dependent variable: Not Frustrated							
	T1 vs. T2 + T3		T1 vs. T2		T1 vs. T3		T2 vs. T3	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Data vs. Any Info	0.010	0.014						
	(0.082)	(0.082)						
Data vs. Data+Info			−0.010	−0.021				
			(0.096)	(0.096)				
Data vs. Data+Networked Info					0.028	0.043		
					(0.093)	(0.093)		
Data+Info vs. Data+Networked Info							0.037	0.052
							(0.094)	(0.095)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1,280	1,279	823	822	880	880	857	856
R^2	0.00001	0.007	0.00001	0.013	0.0001	0.011	0.0002	0.008
Adjusted R^2	−0.001	0.0002	−0.001	0.003	−0.001	0.001	−0.001	−0.003

	Dependent variable: Optimistic							
	T1 vs. T2 + T3		T1 vs. T2		T1 vs. T3		T2 vs. T3	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Data vs. Any Info	−0.046	−0.045						
	(0.070)	(0.070)						
Data vs. Data+Info			−0.087	−0.083				
			(0.082)	(0.082)				
Data vs. Data+Networked Info					−0.009	−0.007		
					(0.079)	(0.079)		
Data+Info vs. Data+Networked Info							0.078	0.074
							(0.082)	(0.082)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1,285	1,284	826	825	882	882	862	861
R^2	0.0003	0.011	0.001	0.006	0.00002	0.015	0.001	0.020
Adjusted R^2	−0.0005	0.004	0.0001	−0.005	−0.001	0.005	−0.0001	0.010

Note: *p<0.1; **p<0.05; ***p<0.01

Finally, with MDEs around 8-9 percentage points, the observed effects on joy, frustration, and optimism are smaller and imprecise. The study is underpowered to detect differences below this threshold across treatments; we view these as also being unlikely to carry practical importance.

L Pre-Registered Hypotheses and Tests

We filed our pre-registration in August 2023. All the analyses proposed in the pre-analysis plan are tested in the main paper or in the Appendix. The main difference with respect to the pre-analysis plan is that we did not pre-register the behavioral outcome – registrations in Portal Ciudadano – because we did not believe that we would have access to that data at the time of pre-registration. We pre-registered the expectation that the treatment would lead to the increase of knowledge about the portal, and the actual enrollment is a behavioral measure of that test.

In the main paper, we focus on the disaggregated results for each of the treatment arms rather than aggregating all individuals who received unlimited mobile credit (data, information, and group treatments). We believe that disaggregating the results allows for a more nuanced understanding of the interventions and provides deeper insights into their effects. In this particular case, it better reflects what we learn about these types of interventions through the way we distribute information. We do not find support for all of our expectations from the pre-registration, which we note in the text. The appendices include several tests that were not pre-registered but were added to better understand the results: heterogeneity analyses by demographic characteristics (Appendix H) and by individual interaction levels (Appendix H), as well as a deeper analysis of WhatsApp groups, including how the level of interaction and group composition shape the outcomes (Appendix I.4).

Finally, we did not examine whether the ability to detect misinformation moderates the effects, as we did not end up including a measure of digital literacy in our baseline survey nor did we measure the ability to detect misinformation. Collaborations like ours, involving government agencies, researchers, and NGOs, often require adaptability. We made this change for two reasons: first, upon learning that we would have access to data on enrollment in the citizen portal, we recognized the importance of understanding participants' ability to engage in tasks demanding higher digital literacy skills. This led us to focus on capturing the full extent of their interaction with the portal and evaluate the ability to complete digitally mediated tasks (digital literacy) as an outcome rather than a moderator. We also note that there was a modification to the internet navigation task, which we explain in the manuscript. Second, we had to reduce the number of questions in the baseline for logistical and implementation reasons and decided to make this change to maximize the insights we can gain from the project.

Bridging the Digital Divide: Data Access and Integration of Venezuelan Migrants in Colombia

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Abstract

The humanitarian crisis and violence in Venezuela have forced nearly two million Venezuelans to flee to Colombia (USAID 2020). Despite the Colombian government's growing efforts to provide support, forcibly displaced and migrant populations continue to encounter significant legal, economic, and social barriers. One of these barriers is limited internet access, which restricts the amount of information financially constrained migrants can obtain about government programs or economic opportunities. It also hampers their ability to expand or sustain their social ties. In this study, supported by Innovations for Poverty Action Colombia and in collaboration with the National Planning Department of Colombia, we aim to assess the impact of enhanced data access on migrants' knowledge and interest in existing migrant assistance programs, trust in the government, success in the labor market, and level of self-reported well-being. We do so by providing mobile data credits to a sample of Venezuelan migrants in Colombia who currently have no internet access. Additionally, a subgroup of the sample will receive WhatsApp messages from the Colombian government, providing accurate information about existing social programs and encouraging sign-ups for the online portal that facilitates these programs. We also investigate the role of digital literacy, measured with a novel set of literacy measures, on shaping the intervention effects. Analyzing this intervention's impact can inform policies to strengthen connections between migrant communities and host countries, leveraging widespread WhatsApp use for enhanced public service delivery.

1 Introduction

More than 6 million Venezuelans fled the country as refugees and migrants, constituting one of the largest external displacement crises in recent history (2022, UNHCR). While many emigrated due to dire economic situation and in search of work opportunities and stability, others had to flee their homes due to political persecution and violence (Salas-Wright et al., 2022). More than a third emigrated to Colombia, presenting various challenges and opportunities for country's already fragile social, economic, health systems and infrastructure. In collaboration with local and international organizations, the Colombian government implemented several initiatives and integration programs to assist Venezuelan migrants in adapting to their host community. One of the most notable initiatives is granting the migrants Temporary Protection Status (TPS) for a certain period, which offers Venezuelan migrants access to essential services like health and education, along with a legal pathway to remain and work in the country. As of 2022, 1.6 million of Venezuelans have a temporary protection permit, with 2.5 million Venezuelans having completed a pre-registration for temporary protection status (UNHCR, 2022). Evaluating the effectiveness of the Colombian approach in assisting Venezuelan migrants is beyond the scope of this paper. Instead, we focus on exploring the significance of data access limitations for Venezuelan migrants. Specifically, we examine how this access – or the lack thereof – relates to their engagement with the services provided by the host community, their trust in the government, success in the labor market, and overall well-being.

Migrants encounter a multitude of potential challenges while navigating life within their new community, whether arising from the disruption of their social networks, barriers to entering the labor market, or even discrimination from members of the host society (Safdar et al., 2023). As they navigate numerous uncertainties, having access to accurate information is invaluable. While much of such information is available online, navigating through the plethora of (mis)information about government programs can be daunting, especially for a significant percentage of mobile users in Colombia who have limited phone

plans, offering a restricted amount of data to use (Colombian Ministry of Information Technologies and Communications). The number is unknown but presumed to be even more higher among Venezuelan migrants. At the same time, even limited phone plans in Colombia usually provide unrestricted access to platforms like WhatsApp and Facebook. This comes with many advantages: they provide users with an opportunity to stay connected to their networks and expand their ties, with reports also describing migrants communicating about distances or shelter availability (Chang, 2020). Alongside these advantages, these platforms also come with significant dangers. WhatsApp, in particular, has been identified as a potent tool for spreading rumors, fake news, disinformation, and misinformation (Javed et al., 2020; Elías and Catalan-Matamoros, 2020). For policymakers striving to implement effective social programs, the limited ability of users with restricted data plans to verify the truthfulness of received information, and access accurate information, poses an additional barrier.

In this paper, we aim to address the following questions: What is the impact of enhanced mobile data access on forcibly displaced and migrant communities – their levels of knowledge and interest about government programs, trust in the government, success in the labor impact, and reported well-being? To what extent are migrants misinformed or not informed about social programs and opportunities in the host country, and how does this vary depending on their levels of digital literacy? How does data access shape the delivery of public services? Collaborating with the *Innovations for Poverty Action Colombia* and the *National Planning Department of the Government of Colombia*, we are able to reach the community of Venezuelan migrants in Colombia who have registered to Sisbén (Identification System for Potential Beneficiaries of Social Programs), but have not registered on the online portal, Portal Ciudadano. Sisbén collects data on economic and social status to guide social protection programs; Portal Ciudadano is a user-friendly online platform linked to Sisbén, facilitating user engagement and data management. Among the Venezuelan migrants who registered for Sisbén but not for Portal Ciudadano, we focus on

a subset of those who have no computer nor internet access. This is the group for which our enhanced data access treatment would be most meaningful.

To investigate the impact of breaking data access barrier for this population, we are conducting a randomized controlled trial in which we provide subjects with mobile phone credits (equivalent to an unlimited monthly plan). In addition to the primary treatment of the unlimited monthly plan, our design includes two additional arms: one where participants receive a monthly plan along with direct messages about Portal Ciudadano; the other where participants are included in moderated WhatsApp groups, segmented into subgroups, where they receive accurate information about social programs and registration instructions. These groups serve the dual purpose of providing users with legitimate information but also facilitating connections among migrants, enabling information exchange and feedback. We also investigate the role of digital literacy in this context, using a novel set of literacy measures. Understanding how digital literacy levels influence the effects of enhanced data access will can inform initiatives related to digital inclusion and well-being of the migrant community.

This study holds the potential to make contributions to the literature concerning the role of communication technology in public service delivery; our understanding of digital literacy outside of the US; and links between labor market success and digital inclusion within migrant communities. Furthermore, it could offer valuable insights for policymaking concerning forcibly displaced communities and the host countries that accommodate them. First, it will allow us to characterize how migrants navigate the online environment and the extent to which they are (mis)informed about social and economic programs, job opportunities, and other aspects of the host country through the survey data we will collect. Secondly, the experimental part of our study will provide causal evidence of the impact that reducing data access constraints can have on the overall success of integration, encompassing various aspects of migrants' lives. Lastly, by combining the provision of mobile data with access to moderated WhatsApp groups, we hope to provide practi-

cal insights on how to channel the widespread use of WhatsApp toward improving public service delivery.

## 2 Migration, Public Service Delivery & Digital Literacy

Violence and the lack of essential services has led several millions of Venezuelans to flee the country, with this humanitarian crisis characterized as "the largest and most underfunded in modern history" (Bahar and Dooley, 2019). Nearly two million Venezuelans have fled to Colombia (USAID 2020), where the government has started a process of regularization of Venezuelan refugees and migrants that includes providing them with a Temporary Protection Status that allows access to basic services including the national health system and the job market (UNHCR-IOM, 2021). However, various barriers persist, made even more challenging by the lack of access to accurate information. The challenges related to data access not only limit the financially constrained migrants' ability to access vital information about economic and other opportunities but also hinder their ability to verify the credibility of the information they receive.

Our approach draws inspiration and insights from research on the role of communication technology (ICT) in public service delivery, digital literacy, and migrant integration. A growing body of research finds that increased mobile phone access facilitates the use of remittances (Moorena et al., 2020), improves consumption smoothing (Batista and Vicente, 2018) and reduces the number of households in extreme poverty (Suri and Jack, 2016; Lee et al., 2021). Furthermore, mobile phone access has shown promise in enhancing education outcomes (Aker, Ksoll and Lybbert, 2012) and promoting financial inclusion (Lashitew, van Tulder and Liasse, 2019), particularly when accompanied by training in money services or mobile platforms. Mobile phone access also leads to a reduction of search costs in labor markets, which should increase workers' reservation wage and job arrival rate, while reducing unemployment. Despite its potential, limitations surrounding mobile data pre-

vent users from taking full advantage of the possible benefits of mobile phone access. The impact of such limitations is hard to quantify, particularly because it is challenging to identify which individuals would particularly benefit from phone credit interventions. We are able to overcome this problem through our collaboration with the Innovations for Poverty Action, allowing us to directly target a population that is facing known data restrictions and could clearly benefit from the specific information (e.g., about essential services and the job market) accessible through mobile services.

This population is also substantively important in that they have little connection to the state in the territory in which they live. Declining state institutional legitimacy is widespread; the reasons for this decline are varied, but there is now interest in understanding the process of cultivating legitimacy. An intriguing intervention involves the provision of information about the functioning of government services. Barnes et al. (2018) demonstrate that providing UK citizen's with a "Taxpayer's Receipt" about the true breakdown of government spending made citizens became more knowledgeable about government spending. Buell, Porter and Norton (2021) expands this theme to include a field experiment in which a municipal government sent photographs of their employees addressing specific complaints by citizens. This intervention increased both citizens' use of government services and their trust in government. The concern in our context is that many migrants are unaware of existing government programs. By providing them with information and an outlet for other migrants to share their experiences accessing these programs, we expect to find that these migrants are then more supportive of the Colombian government.

Our research design also centers the importance of the concept of digital literacy. Recent work tests how survey measures compare with digital trace measures in differentiating between respondents drawn from high and low-information literacy samples ▨▨▨
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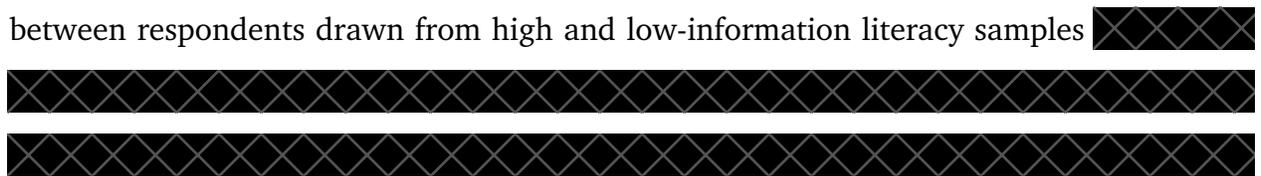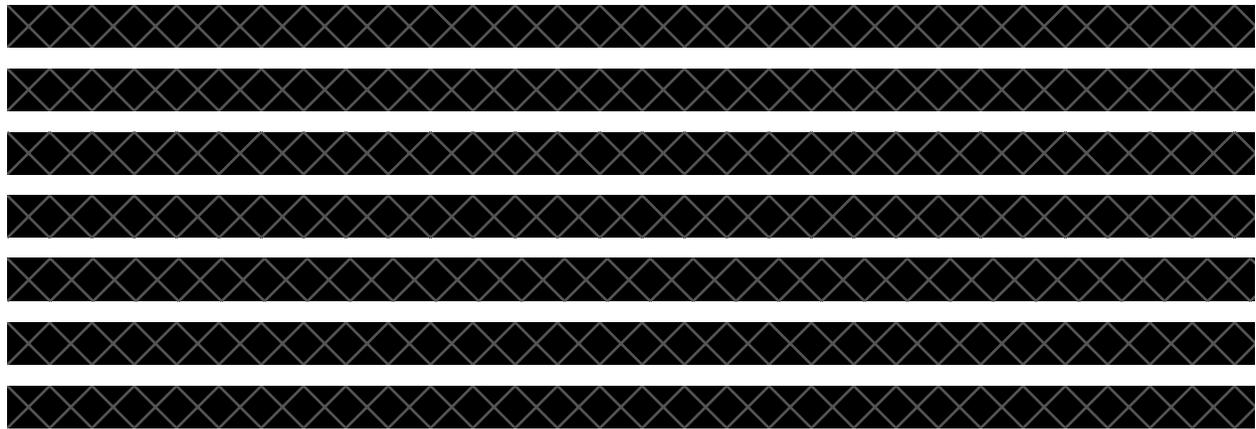
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████████████████████████ Treré (2020) explains WhatsApp's appeal in these contexts:

> "*[I]ts simplicity, reliability and accessibility are some of its core selling points, especially for people in the Global South where online services are accessed mainly through cellphones and several connectivity and bandwidth issues are often thwarting a rapid and fluid digital experience.*"

This has important implications for the way that digital literacy is operationalized; we follow their recommendation to focus on the specific affordances of WhatsApp, the most-used social media platform in both Mexico and Colombia. This includes the battery of specific "WhatsApp knowledge" questions that explicitly ask how well respondents understand the affordances of this platform, including the technical limits around re-sharing and image sharing. We hope to expand on this growing research, by moving away from participants that have unconstrained access to computers, are based in the US, and face no data limitations. We expect a large variation in digital literacy within the sample we are working with, especially given that a lot of Venezuelan migrants were members of a professional and highly-educated workforce that experienced a large negative wealth shock due to the collapse of the Venezuelan economy.

Finally, this study also contributes to the growing literature on the economic integration of refugees and labor market matching (Åslund, Hensvik and Skans, 2014; Abebe et al., 2021; Bazzi et al., 2021; Battisti, Giesing and Laurentsyeva, 2019). Individuals with lower access to online spaces face higher search costs, as they are much less likely to be exposed

to job postings or job-related information which is increasingly advertised online or spread through online networks. This results in various inefficiencies, from poorer matching of employers' needs with employees skills to delays in the time it takes for a job-seeker to find suitable opportunities. These problems are exacerbated in communities like the one at the center of our research, where individuals need to navigate the employment search in a new host-country labor market together with all the uncertainties and complexities of migration. Increased data access may thus facilitate a more efficient worker-job matching process. Our study aims to evaluate a comprehensive set of outcomes, among which, we will closely examine the participants' success in the job market. Additionally, we will assess any other career training or opportunities that they might have been able to capitalize on as a result of our intervention. Through our study, we hope to provide evidence of a short-term policy intervention that significantly enhances the information ecosystem of the forcibly displaced and migrant community, facilitating a set of positive socio-economic outcomes.

3   Hypotheses

We will test the following hypotheses:

H1: Participants who receive unlimited mobile credit (treated subjects) will report higher level of knowledge about the existing assistance programs.

  – **H1a:** The positive treatment effect will be most pronounced for participants who receive unlimited mobile credit and participate in moderated WhatsApp groups (treatment arm 3).

H2: Participants who receive unlimited mobile credit (treated subjects) will report improved job market outcomes.

H3: Participants who receive unlimited mobile credit (treated subjects) will report stronger trust in the host government.

- **H3a:** The positive treatment effect will be most pronounced for participants who receive unlimited mobile credit and receive direct message (treatment arm 2).

H4: Participants who receive unlimited mobile credit (treated subjects) will report improved subjective well-being.

The reasoning behind H1a is that participants might learn more about the existing assistance programs from the comments and questions of others within WhatsApp groups (treatment arm 1). In this case, this would strengthen the positive effect of the treatment. The reasoning behind H3a is that participants might update about government capacity and feel stronger connections as a consequence of a more personalized approach involving receiving direct messages (treatment arm 2).

We will also test whether the ability to detect misinformation moderates the effects. We anticipate that individuals who demonstrate a higher ability to detect misinformation will also exhibit a greater treatment effect on their knowledge about the existing assistance programs and more positive job market outcomes. We do not hold any specific expectations regarding how it might moderate subjective well-being, and we present that analysis as exploratory.

4 Research Design

To assess whether limited data access is a binding constraint facing forcibly displaced and migrant populations in their information seeking and verification process, we plan to conduct a randomized controlled trial in which we provide subjects with access to internet and

government information. This evaluation is being conducted together with the Departamento Nacional de Planeacion (DNP), the Colombian government agency that coordinates, articulates, and supports the planning of short, medium, and long-term public policies in the country. The National Planning Department is also the government organization in charge of administering Sisbén, and particularly, its online portal Portal Ciudadano.

Sisbén, which stands for *Sistema de Seleccion de Beneficiarios Para Programas Sociales*, is a system for selecting beneficiaries for social programs in Colombia. Any individual with valid identification and residing in private households can register in the Sisbén database. Registration involves responding to a survey and providing a set of socio-economic information about oneself. This database, certified by the National Planning Department (DNP), then serves as a reference for government entities to determine who is eligible to access social programs and allocate benefits accordingly. Sisbén's accompanying online portal, the "Citizen Portal" (Portal Ciudadano), was created to enhance users' understanding of Sisbén and their engagement with various programs they can benefit from. Within this user-friendly interface, registered users can access the information they provided in the Sisbén database, make different requests, or learn about Sisbén and its operations. Registering for the Portal Ciudadano is not a mandatory component of the Sisbén registration process. However, the National Planning Department is interested in ensuring that citizens update their Portal Ciudadano frequently (to facilitate better national planning and public service delivery) and that users are aware of the benefits of engaging with this online platform, and consequently Sisbén-related information and services.

The criteria for selection of participants in our sample is as follows: individuals who are above 18 years old, who migrated from Venezuela to Colombia at least a year ago, who are registered in Sisbén, yet not registered for Portal Ciudadano. All participants in the sample have Temporary Protection Permit, i.e. temporary protection, legal status, access to essential services and rights for a specified period. The National Planning Department of the Government of Colombia provided our team with access to this population, with

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participant communication going through the Innovations for Poverty Action. Importantly, the dataset shared with us does not include names of individuals nor any sensitive information, and participants agreed (when signing up for the portal) that they may be contacted. The dataset – which we are using for randomizing participants – only has information on users' age, sex, education level and municipality coed. Every aspect of this study will take place online. Innovations for Poverty Action Colombia, experienced team will handle sending of the mobile credit to our participants, as well as the process of sending surveys via WhatsApp.

	Component	Activity	AUG	SEP	OCT	NOV	DEC	JAN	FEB
Current project	Preparation	Sample selection	▨						
		Survey pilots + corrections	▨						
		Adjust Twilio survey based on pilots	▨						
	Data collection	Survey		▨					
		Mobile credit recharges		▨					
		Incentives raffle		▨					
		Send messages		▨					
	Analysis	Databases cleaning			▨				
		Databases analysis and processing results			▨	▨			
		Write-up				▨			

Figure 1: Our project timeline

4.1   Treatment

Treatment consists of enhanced data access, which we operationalize by providing users who did not have unlimited access to data with unlimited monthly data plan (i.e. mobile credit which can be easily transferred online to whatever phone number of choice). Access to mobile credit is relatively inexpensive compared to other economic assistance programs. In countries like Colombia, where a 12GB plan for a month costs only $10 USD, providing mobile data credits becomes a feasible approach to empower migrants if it comes with improved access to online information and services. In addition to the enhanced data access, two other treatment arms ("data+direct messages"; and "data+messages in What-

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sApp groups") will receive government information about Portal Ciudadano on behalf of the National Planning Departament /Innovations for Poverty Action Colombia. Accessing Portal Ciudadano allows citizens to – among other activities – virtually request a Sisbén survey, update information, or include other household members. Being part of Sisbén allows the government to identify the population of interest for various social and economic integration programs, and make plans or target groups accordingly. For this reason, it is very important yet hard to achieve that people keep their information up to date in the Sisbén dataset.

Within the third treatment arm, participants will receive this information within WhatsApp groups with several other participants. Although WhatsApp can be used for one-to-one messaging, participation in large group conversations with previously unknown people, like the one in this treatment condition, is not uncommon in Colombia. ▨▨▨▨ ▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨ ▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨ This list summarizes the treatment conditions:

- **Treatment Group A:** Receives phone credit, equivalent to an unlimited monthly plan.

- **Treatment Group B ["data+direct messages"]:** Receives phone credit and direct messages from our partners (Innovations for Poverty Action Colombia) on behalf of the Colombian government.

- **Treatment Group C ["data+messages in WhatsApp groups"]:** Receives phone credit and messages from our partners every two days (Innovations for Poverty Action Colombia) on behalf of the Colombian government within a WhatsApp group with several other participants.

  – A member of the Innovations for Poverty Action Colombia, team will be included in the Whatsapp group. This group is envisioned as providing participants with

space to communicate and connect with one another if so they choose. The role of the Innovations for Poverty Action Colombia, member would be to merely observe interactions and, in case that the conversations become uncivil for any reason, block the participant (exclude them from this group) or remind them of the rules of interactions within the group (which we would outline). If they raise questions, the Innovations for Poverty Action Colombia, member would remind participants to send a direct e-mail to our research e-mail address or remind them of the National Planning Departament website where they can check out Q&A or relevant contact personnel.

– Introductory message: *"Hello! I am a member of the research team, and I will be at your disposal for any questions you may have about the information shared in this group. I may not have all the answers immediately, but I will do my best to find the information you need. I will make sure to attend to your question within 24 hours at most. The other members in this group may also have useful experiences to share, so we encourage you to connect here and share your experiences or thoughts. Please note that no discriminatory, hateful, or toxic speech is permitted. Rest assured that your privacy will be protected – at no point will your name or phone number be shared in connection with any of the messages."*

– Daily message: *"Please be reminded that I am at your disposal for any questions you may have about the programs described in our earlier message. You are also welcome to share here your experiences with this or similar programs with members of this group – we would love to hear from you!"*

1. **Message 1:** "Hi [name], did you know that Sisbén has a virtual service channel? Discover the Citizen Portal, sign up, and request your survey. If you already have your survey, you can check your information. Please note that being registered on the portal is not the same as being registered in the Sisbén database. Make sure to have your survey conducted at your

residence and get your Sisbén classification. Visit

https://portalciudadano.sisben.gov.co/"

2. **Message 2:** "Hi [name]. We are Innovations for Poverty Action Colombia. Now you can access your Sisbén information through the Citizen Portal. Register on the virtual Sisbén service channel and quickly download your household's record. Visit

https://portalciudadano.sisben.gov.co/"

3. **Message 3:** "Hi [name], If you already have your Sisbén classification, use the Citizen Portal to access the information recorded in your survey. If your information has changed, you can request a free and quick update. Visit https://portalciudadano.sisben.gov.co/"

4. **Message 4:** "Hi [name]. We are Innovations for Poverty Action Colombia. Is someone in your household missing the Sisbén survey? Don't worry! If a new member has joined your household or someone has just received their PPT (Priority Targeting Program), you don't need to request a new survey. Include them through the Citizen Portal Sisbén, completely free. Register at https://portalciudadano.sisben.gov.co/"

5. **Message 5:** "Hi [name]. We are Innovations for Poverty Action Colombia. Did you know that the Sisbén survey makes you eligible for potential social program benefits? Request this survey through the Citizen Portal Sisbén at https://portalciudadano.sisben.gov.co/. If you already have your Sisbén survey, you can use the Citizen Portal to check your survey information and update it if necessary."

6. **Message 6:** "Hi [name]. We are Innovations for Poverty Action Colombia. If you have children under 6 years old, siblings, parents, or other household members who were not registered in your Sisbén survey, you can easily and quickly include them through the Citizen Portal Sisbén. Register at

https://portalciudadano.sisben.gov.co/"

7. **Message 7:** "Hi [name], Take advantage of the benefits of the Citizen Portal Sisbén, a website where you can carry out various Sisbén-related procedures quickly, for free, and without the need to visit any office. All you have to do is register on the portal, and you're good to go. Remember that Venezuelans can also use the Citizen Portal Sisbén. Register by clicking here: https://portalciudadano.sisben.gov.co/"

- **Control Group:** Continue their activities as usual during the research period; after the final survey, they will also receive mobile credit so that all participants directly benefit equally from the research.

Following the treatment, we will ask participants to respond to a survey with questions assessing participants' levels of knowledge, interest and attitudes toward government and social programs; and their subjective well-being. We will also collect behavioral data (measured through a set of novel online tasks) that quantifies users' ability to detect fake news and overall levels of digital literacy.

4.2 Randomization

Given the pre-treatment information available from Sisbén, we conduct a block randomization by age, gender, education level, and city. In the Sisbén sample shared with us, there are 67,439 individuals from five municipalities, all of whom have temporary stay permits. Of the total sample, 64.22% are female, while 35.78% are male. The mean age is 36.82, with a median age of 34.35. Furthermore, 25.68% of the sample has an elementary school education level or no formal schooling, 61.18% has a high school education, and 13.14% holds a university degree or higher.

4.3   Outcomes

Included in the surveys are the following outcomes: knowledge of government programs; interest in government programs; trust in the host government; ability to retrieve info or detect misinformation; success in the job market; well-being; and the outcomes characterizing participant usage of data access for exploratory analysis. The hypotheses that we are mentioning above refer to the outcomes that we are going to analyze by making an index, for each one, based on the questions in the Endline Survey table below.

5   Survey Instruments

5.1   Screening Questions

Variable name	Question [ENG]
welcome	Hello! We are Innovations for Poverty Action Colombia, Colombia. Sisbén shared your contact information with us to invite you to participate in a survey for an Innovations for Poverty Action Colombia, study. If you end up taking part in this study, you will receive an internet top-up to your cell phone and you will be entered in a raffle for a market voucher worth 200,000 COP. In addition, we will contact the winners in two weeks and announce the results to all participants. In order to participate and answer these questions correctly, please read the instructions carefully and answer with the number associated with your answer for the single-choice questions.

verif_1	Are you [name]? Answer:
	
	  - 1: if YES, it is you
	  - 0: if NO

verif_reminder	It's been a while, we want to know if we are communicating with [name].
verif_2	Do you know [name]? What is the relationship between the owner of this cell phone and [name]?
verif_3	Is this the best phone number to contact [name]?
verif_dob_1	To validate that we are communicating with you, [name], please enter your year of birth. Sisbén provided us with this information, so we will validate your identity with your year and month of birth. Please enter below only the year in which you were born, in numbers, without periods (.) or commas (,). For example: 1990.

5.2 Baseline Survey

Variable name	Question [ENG]
welcome	Hello again [name]! We are Innovations for Poverty Action Colombia, Colombia. Considering that you agreed to participate in the study of access to information on social programs for Venezuelans in Colombia, we will ask you a few questions that will take you no more than XX minutes to answer, if you agree to continue participating in the study. You will receive an internet top-up to your cell phone, and you will be entered in a raffle for a market voucher worth 200,000 COP. In addition, we will contact the winners in two weeks and announce the results to all participants.
verif_1	Are you [name]? Answer:
verif_2	Do you know [name]? What is the relationship between the owner of this cell phone and [name]?
verif_3	Is this the best phone number to contact [name]?
verif_4	Could you please give this cell phone to [name] to answer a few brief questions to participate in a survey? ([name] can continue to answer at any time today).
verif_dob_1	To validate that we are communicating with you, [name], please enter your year of birth. Sisbén provided us with this information, so we will validate your identity with your year and month of birth. Please enter below only the year in which you were born, in numbers, without periods (.) or commas (,). For example: 1990
verif_6	What is the telephone number to contact [name]?
education_st	What is the highest level of education you completed?
marital_st	What is your current marital status?
employment_st	In which activity did you spend the most time last week?
state_ven	In which state of Venezuela did you reside before moving to Colombia? (if you have lived in more than one, please answer with the one you lived in the longest)
place_entry	What was the first place of residence in Colombia to which you arrived when you immigrated from Venezuela?
place_entry_o	Can you please specify the first place of residence in Colombia to which you arrived when you immigrated from Venezuela? Answer only with the name of the city or municipality in Colombia.
time_fb	On average, how much time do you spend on Facebook during a typical week?
time_ig	On average, how much time do you spend on Instagram during a typical week?
time_wa	On average, how much time do you spend on WhatsApp during a typical week?
time_ff	On average, how much time do you spend on Family and friends (offline) during a typical week?
time_nt	On average, how much time do you spend on Non-tech activities during a typical week?
1_internet_use	How much do you use the internet to stay in touch with friends and family?

Variable name	Question [ENG]
2_internet_use	How much do you use the internet to read the news?
3_internet_use	How much do you use the internet for entertainment?
4_internet_use	How much do you use the internet to look for paid jobs?
5_internet_use	How much do you use the internet to look for government or other assistance programs?
education_st	What is the highest level of education you completed?
marital_st	What is your current marital status?
employment_st	In which activity did you spend the most time last week? Answers: working; job searching; studying; own household chores/caregiver in the household; permanently unable to work; pensioned/retired; other activity; no answer (omit)
state_ven	In which state of Venezuela did you reside before moving to Colombia? (if you have lived in more than one, please answer with the one you lived in the longest)
place_entry	What was the first place of residence in Colombia to which you arrived when you immigrated from Venezuela?

5.3 Endline Survey

Variable name	Question [ENG]
welcome	Hello again [name]! We are Innovations for Poverty Action Colombia. Considering that you agreed to participate in the study of access to information on social programs for Venezuelans in Colombia, we will ask you a few questions that will take you no more than 20 minutes to answer, if you agree to continue participating in the study. You will receive an internet top-up to your cell phone and you will be entered in a raffle for a market voucher worth 200,000 COP. In addition, we will contact the winners in two weeks and announce the results to all participants.
verif_1	Are you [name]?
Consent	[name], we would like to invite you to continue participating in the next stages of the study whose objective is to improve access to information on social programs for Venezuelans in Colombia. The next stages of the study include XX and YY [Here should go what these stages of the study are in terms of messages and surveys that will be sent to the participant]. We will send you these surveys and messages within the next month. By participating, you will be eligible for other bonus raffles. By taking part in this survey you will participate in the raffle of a market bonus, worth 200,000 Colombian pesos. We will contact the winners in two weeks and announce to all participants the results. You may stop answering at any time, or skip any question you do not wish to answer by typing 77, or omit, and you will not be affected. All of your information will be encrypted to be protected. For more information about this informed consent, please click on this link: [Baseline consent link]
1_program	What is Sisbén? Answer: - 1 if a health insurance - 2 if a socioeconomic assistance agency - 3 if it is a socio-economic characterization survey - 4 don't know - 5 no answer (omit)
2_program	Portal ciudadano provides information about the Sisbén, do you know which procedures you can perform in the Portal ciudadano? Answer: - 1 if requesting and following up on the Sisbén survey - 2 if Requesting prioritization for subsidies - 3 if Affiliation to the health system - 4 if All of the above - 5 if None of the above - 99 Don't know - 77 No answer (omit)
3_program	How much is the minimum wage in Colombia (without transportation subsidy) for 2023? Answer: - 1 1,300,000 COP per month - 2 1,000,000 COP per month - 3 960,000 COP per month - 4 1,160,000 COP per month - 99 Don't know - 77 No answer (omit)

Variable name	Question [ENG]
1_interest	How much interest do you have in migrant assistance programs provided by the Colombian government? Answer: - 1 if Very strong interest - 2 if Strong interest - 3 if Moderate interest - 4 if Low interest - 5 if No interest - 99 Don't know - 77 No answer (omit)
1_interest$_{spec}$	Can you please specify why you have little or no interest in the Colombian government's migrant assistance programs?
2_interest	How much interest do you have in migrant assistance programs provided by international NGOs? Answer: - 1 if Very strong interest - 2 if Strong interest - 3 if Moderate interest - 4 if Low interest - 5 if No interest - 99 Don't know - 77 No answer (omit)
2_interest_spec	Can you please specify why you have little or no interest in the international NGOs' migrant assistance programs?
1_trust	How much do you trust the Colombian government to do what is right for Venezuelan migrants? Answer: - 1 if Very strong trust - 2 if Strong trust - 3 if Moderate interest - 4 if Low trust - 5 if No trust - 99 Don't know - 77 No answer (omit)
1_trust_spec	Can you please specify why you have little or no interest in the Colombian government's migrant assistance programs?
2_trust	How much do you trust international organizations to do what is right for Venezuelan migrants? Answer: - 1 if Very strong trust - 2 if Strong trust - 3 if Moderate interest - 4 if Low trust - 5 if No trust - 99 Don't know - 77 No answer (omit)

Variable name	Question [ENG]
2_trust_spec	Can you please specify why you have little or no interest in the international NGOs' migrant assistance programs?
1_retrieve	Who is the Prime Minister of Japan?
2_retrieve	What is the tallest mountain in North America?
3_retrieve	What car brand had the most sales in the world last year?
1_link	Send us the webpage of the Colombian Ministry of Health.
2_link	Send us the official webpage of the Sisbén.
3_link	Send us the official webpage of the FC Barcelona.
rumor_vc	True or false. Sisbén will guarantee you access to all the government aids and social programs.
employment_st	In which activity did you spend the most time last week? Answer: - 1 Working - 2 Job searching - 3 Studying - 4 Own household chores/caregiver in the household - 5 Permanently unable to work - 6 Pensioned/retired - 66 Other activity - 77 No answer (omit)
1_find_job	During the past 4 weeks have you tried in any way to find a paid job?
2_find_job	How successful were these attempts? Answer: - 1 if I did not find a job - 2 if I did not find a job yet, but found some potential opportunities - 3 if I am in the process of interviewing - 4 if I found a job - 77 No answer (omit)
1_r_training	Compared to previous months, have you tried to receive any additional training or education during the last month?
2_r_training	Can you please give examples or specify additional training or education you have received (or have attempted to receive) during the last month.
3_r_training	Is there a specific reason why you do not want, or are not seeking, additional training or education?
1_a_programs	Have you tried seeking government assistance programs for the past 4 weeks?
1_wellb	Over the past 30 days, how often have you felt: satisfied, joyful, fulfilled, or happy? Answer: - 1 if Much more than before - 2 if More than before - 3 if Same as before - 4 if Less than before - 5 if Much less than before - 99 Don't know - 77 No answer (omit)

Variable name	Question [ENG]
2_wellb	Over the past 30 days, how often have you felt: frustrated, nervous, bored, or lonely? Answer: - 1 if Much more than before - 2 if More than before - 3 if Same as before - 4 if Less than before - 5 if Much less than before - 99 Don't know - 77 No answer (omit)
3_wellb	Over the past 30 days, how optimistic have you been feeling about the future? Answers: - 1 if Much more than before - 2 if More than before - 3 if Same as before - 4 if Less than before - 5 if Much less than before - 99 Don't know - 77 No answer (omit)
meta_stereo	How do you think Colombian citizens perceive Venezuelan migrants? Answer: - 1 if Very positively - 2 if Positively - 3 if Neither positively nor negatively - 4 if Negatively - 5 if Very negatively - 99 Don't know - 77 No answer (omit)
1_polariz_scale	How do you feel about Venezuelans in Colombia? Please answer only with a number between a scale of 1 - 100 (with 0 being negative/cold and 100 positive/warm).
2_polariz_scale	How do you feel about Colombians in Colombia?Please answer only with a number between a scale of 1 - 100 (with 0 being negative/cold and 100 positive/warm).
app_internet	Over the last 4 weeks, what websites/apps do you visit online most frequently? Please respond, in a single brief message, with the names of the websites or apps you visit the most.
time_fb	On average, how much time do you spend on Facebook over the last 4 weeks?
time_ig	On average, how much time do you spend on Instagram over the last 4 weeks?
time_wa	On average, how much time do you spend on WhatsApp over the last 4 weeks?
time_ff	On average, how much time do you spend on Family and friends (offline) over the last 4 weeks?
time_nt	On average, how much time do you spend on Non-tech activities over the last 4 weeks?
1_internet_use	How much do you use the internet to stay in touch with friends and family over the last 4 weeks?
2_internet_use	How much do you use the internet to read the news over the last 4 weeks?
3_internet_use	How much do you use the internet for entertainment over the last 4 weeks?
4_internet_use	How much do you use the internet to look for paid jobs over the last 4 weeks?
5_internet_use	How much do you use the internet to look for government or other assistance programs over the last 4 weeks?

5.4 Power Analysis

We rely on studies using similar treatments to the one of our interest (Aker, Ksoll and Lybbert, 2012). The analysis we have conducted suggests that we need a sample of 1,396 participants to detect an effect size of 0.15 standard deviations from a standardized outcomes (mean 0, s.d. 1), with 80% power. This calculation is based on the primary treatment of enhanced phone data access on knowledge and learning about social programs outcomes. For our study, we hope to have a sample of more or less 2,200 participants, which represents a sample similar to other studies on access to information (for example, Beber (2023)), and larger than other studies on internet access and information (Aggarwal, Brailovskaya and Robinson, 2020; Beber and Scacco, 2022).

6 Analysis

This field experiment deploys a relatively understudied type of treatment. For reasons of statistical power, our design and analysis plan aims to trade off the establishment of our central treatment effect of interest with enriching details about mechanisms and moderators. For this reason, our primary test will pool the three treatment conditions and compare them with the control group.

There are many other outcomes of interest, and given the relative ease of collecting these additional measurements compared to conducting the intervention itself, we will perform additional tests. Notably, these include downstream of our knowledge measure: well-being and employment. These are the outcomes which the assistance program itself aims to improve; however, these are complex real-world outcomes which are difficult to manipulate. We anticipate that we will see positive improvements on both of these outcomes, though their magnitude is likely to be small. We will test whether subjects for whom the treatment switched their knowledge status from 0 to 1 will also show an effect of the treatment on these downstream outcomes. In particular, we expect that those who have become more knowledgeable about the government programs will also report higher well-being and more success in the job market (NB: our measure of job market success also includes training and education opportunities users engaged in).

The unit of randomization is the individual, for those participants that are registered with DNP and have limited internet access. We will have around 2,000 participants that can be assigned to the four treatment conditions. We plan to impalement a matched block randomization to minimize differences between units in each of the treatment conditions along a number of dimensions. We plan to use block randomization based on predeter-

mined available covariate: each participant will be assigned to a block of size 8 and then split into blocks of size 4. The unit of observation for the analysis is also the individual (Venezuelna migrants). We plan to estimate the effects with OLS regressions in which the treatment indicator variables represent assignment to the *Data access* (Data versus control), *Information* (Reminders about Sisben vs. only data) within Data access assignment, and *Discussion* (WhatsApp groups vs. only reminders), within the Information assignment. We mostly rely on our random sampling and treatment assignment to control for potential cofounders and plan to estimate the following specification:

$$Y_i = \alpha_b + \beta_1 Treatment_i + \epsilon_i$$

where outcome Y_i represents the outcome for participant i ans is regressed on randomization block fixed effects α_b, and the $Treatment$ variables that represents Data assignment (vs. control), Information assignment (vs. data without messages), and Discussion assignment (vs. messages without WhatsApp groups).

The crucial moderator, for our test, will be the subjects' digital literacy, operationalized in a variety of ways. This construct is still being honed in the context of the US and Europe, with significantly less work done in the Global South. While our theory predicts an important role for digital literacy, then, these is still no scholarly consensus on how best to measure it. Given the relative costs of operationalizing this construct through multiple survey batteries, we will perform our test of statistical moderation using each of them separately.

7   Ethics

Our research team has worked on randomized controlled trials around vulnerable populations or sensitive topics, ▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨ ▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨ ▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨ ▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨ ▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨▨. Our design aims to minimize downsides of expanded internet access among vulnerable populations. Our target population already uses WhatsApp, a major vector for misinformation; given the semi-private and encrypted nature of the platform, it is difficult for governments or other actors to prevent this spread. Our design explicitly directs users to high-quality government websites and demonstrates their usefulness, which we expect to cultivate better

internet habits in the future.

The arm of our design which provides only phone credits could plausibly be used for malign purposes, but we would argue that this is true of literally any cash transfer program to analogous populations. We are in general hesitant to withhold resources to vulnerable populations out of fear that they use them in ways that we do not like. The partner organization we are working with, Innovations for Poverty Action Colombia, has made enormous progress in the location and implementation of projects with Venezuelan migrants in the last three years and its capacity allows us to have confidence in the contact with the migrant population and the implementation of the project in the proposed places. Also, the National Planning Departament has been successful in increasing the number of Venezuelan migrants registered in Sisbén, both through digital and in person campaigns. Given their experience in the region, we have been communicating with them all our design choices to ensure that any ethical or safety-related risks are minimized.

M   Survey Instruments

Screening Questions

Variable name	Question [ENG]
welcome	Hello! We are Innovations for Poverty Action Colombia, Colombia. Sisbén shared your contact information with us to invite you to participate in a survey for an Innovations for Poverty Action Colombia, study. If you end up taking part in this study, you will receive an internet top-up to your cell phone and you will be entered in a raffle for a market voucher worth 200,000 COP. In addition, we will contact the winners in two weeks and announce the results to all participants. In order to participate and answer these questions correctly, please read the instructions carefully and answer with the number associated with your answer for the single-choice questions.

verif_1	Are you [name]? Answer:
	
	  - 1: if YES, it is you
	  - 0: if NO

verif_reminder	It's been a while, we want to know if we are communicating with [name].
verif_2	Do you know [name]? What is the relationship between the owner of this cell phone and [name]?
verif_3	Is this the best phone number to contact [name]?
verif_dob_1	To validate that we are communicating with you, [name], please enter your year of birth. Sisbén provided us with this information, so we will validate your identity with your year and month of birth. Please enter below only the year in which you were born, in numbers, without periods (.) or commas (,). For example: 1990.

Baseline Survey

Variable name	Question [ENG]
welcome	Hello again [name]! We are Innovations for Poverty Action Colombia, Colombia. Considering that you agreed to participate in the study of access to information on social programs for Venezuelans in Colombia, we will ask you a few questions that will take you no more than XX minutes to answer, if you agree to continue participating in the study. You will receive an internet top-up to your cell phone, and you will be entered in a raffle for a market voucher worth 200,000 COP. In addition, we will contact the winners in two weeks and announce the results to all participants.
education_st	What is the highest level of education you completed?
marital_st	What is your current marital status?
employment_st	In which activity did you spend the most time last week?
state_ven	In which state of Venezuela did you reside before moving to Colombia? (if you have lived in more than one, please answer with the one you lived in the longest)
place_entry	What was the first place of residence in Colombia to which you arrived when you immigrated from Venezuela?
place_entry_o	Can you please specify the first place of residence in Colombia to which you arrived when you immigrated from Venezuela? Answer only with the name of the city or municipality in Colombia.
time_fb	On average, how much time do you spend on Facebook during a typical week?
time_ig	On average, how much time do you spend on Instagram during a typical week?
time_wa	On average, how much time do you spend on WhatsApp during a typical week?
time_ff	On average, how much time do you spend on Family and friends (offline) during a typical week?
time_nt	On average, how much time do you spend on Non-tech activities during a typical week?
1_internet_use	How much do you use the internet to stay in touch with friends and family?
2_internet_use	How much do you use the internet to read the news?
3_internet_use	How much do you use the internet for entertainment?
4_internet_use	How much do you use the internet to look for paid jobs?
5_internet_use	How much do you use the internet to look for government or other assistance programs?
education_st	What is the highest level of education you completed?
marital_st	What is your current marital status?
employment_st	In which activity did you spend the most time last week? Answers: working; job searching; studying; own household chores/caregiver in the household; permanently unable to work; pensioned/retired; other activity; no answer (omit)
state_ven	In which state of Venezuela did you reside before moving to Colombia? (if you have lived in more than one, please answer with the one you lived in the longest)
place_entry	What was the first place of residence in Colombia to which you arrived when you immigrated from Venezuela?

Endline Survey

Variable name	Question [ENG]
welcome	Hello again [name]! We are Innovations for Poverty Action Colombia. Considering that you agreed to participate in the study of access to information on social programs for Venezuelans in Colombia, we will ask you a few questions that will take you no more than 20 minutes to answer, if you agree to continue participating in the study. You will receive an internet top-up to your cell phone and you will be entered in a raffle for a market voucher worth 200,000 COP. In addition, we will contact the winners in two weeks and announce the results to all participants.
verif_1	Are you [name]?
Consent	[name], we would like to invite you to continue participating in the next stages of the study whose objective is to improve access to information on social programs for Venezuelans in Colombia. The next stages of the study include XX and YY [Here should go what these stages of the study are in terms of messages and surveys that will be sent to the participant]. We will send you these surveys and messages within the next month. By participating, you will be eligible for other bonus raffles. By taking part in this survey you will participate in the raffle of a market bonus, worth 200,000 Colombian pesos. We will contact the winners in two weeks and announce to all participants the results. You may stop answering at any time, or skip any question you do not wish to answer by typing 77, or omit, and you will not be affected. All of your information will be encrypted to be protected. For more information about this informed consent, please click on this link: [Baseline consent link]
1_program	What is Sisbén? Answer: - 1 if a health insurance - 2 if a socioeconomic assistance agency - 3 if it is a socio-economic characterization survey - 4 don't know - 5 no answer (omit)
2_program	Portal ciudadano provides information about the Sisbén, do you know which procedures you can perform in the Portal ciudadano? Answer: - 1 if requesting and following up on the Sisbén survey - 2 if Requesting prioritization for subsidies - 3 if Affiliation to the health system - 4 if All of the above - 5 if None of the above - 99 Don't know - 77 No answer (omit)
3_program	How much is the minimum wage in Colombia (without transportation subsidy) for 2023? Answer: - 1 1,300,000 COP per month - 2 1,000,000 COP per month - 3 960,000 COP per month - 4 1,160,000 COP per month - 99 Don't know - 77 No answer (omit)

Variable name	Question [ENG]
1_interest	How much interest do you have in migrant assistance programs provided by the Colombian government? Answer: - 1 if Very strong interest - 2 if Strong interest - 3 if Moderate interest - 4 if Low interest - 5 if No interest - 99 Don't know - 77 No answer (omit)
1_interest$_{spec}$	Can you please specify why you have little or no interest in the Colombian government's migrant assistance programs?
2_interest	How much interest do you have in migrant assistance programs provided by international NGOs? Answer: - 1 if Very strong interest - 2 if Strong interest - 3 if Moderate interest - 4 if Low interest - 5 if No interest - 99 Don't know - 77 No answer (omit)
2_interest_spec	Can you please specify why you have little or no interest in the international NGOs' migrant assistance programs?
1_trust	How much do you trust the Colombian government to do what is right for Venezuelan migrants? Answer: - 1 if Very strong trust - 2 if Strong trust - 3 if Moderate interest - 4 if Low trust - 5 if No trust - 99 Don't know - 77 No answer (omit)
1_trust_spec	Can you please specify why you have little or no interest in the Colombian government's migrant assistance programs?
2_trust	How much do you trust international organizations to do what is right for Venezuelan migrants? Answer: - 1 if Very strong trust - 2 if Strong trust - 3 if Moderate interest - 4 if Low trust - 5 if No trust - 99 Don't know - 77 No answer (omit)

Variable name	Question [ENG]
2_trust_spec	Can you please specify why you have little or no interest in the international NGOs' migrant assistance programs?
1_retrieve	Who is the Prime Minister of Japan?
2_retrieve	What is the tallest mountain in North America?
3_retrieve	What car brand had the most sales in the world last year?
1_link	Send us the webpage of the Colombian Ministry of Health.
2_link	Send us the official webpage of the Sisbén.
3_link	Send us the official webpage of the FC Barcelona.
rumor_vc	True or false. Sisbén will guarantee you access to all the government aids and social programs.
employment_st	In which activity did you spend the most time last week? Answer: - 1 Working - 2 Job searching - 3 Studying - 4 Own household chores/caregiver in the household - 5 Permanently unable to work - 6 Pensioned/retired - 66 Other activity - 77 No answer (omit)
1_find_job	During the past 4 weeks have you tried in any way to find a paid job?
2_find_job	How successful were these attempts? Answer: - 1 if I did not find a job - 2 if I did not find a job yet, but found some potential opportunities - 3 if I am in the process of interviewing - 4 if I found a job - 77 No answer (omit)
1_r_training	Compared to previous months, have you tried to receive any additional training or education during the last month?
2_r_training	Can you please give examples or specify additional training or education you have received (or have attempted to receive) during the last month.
3_r_training	Is there a specific reason why you do not want, or are not seeking, additional training or education?
1_a_programs	Have you tried seeking government assistance programs for the past 4 weeks?
1_wellb	Over the past 30 days, how often have you felt: satisfied, joyful, fulfilled, or happy? Answer: - 1 if Much more than before - 2 if More than before - 3 if Same as before - 4 if Less than before - 5 if Much less than before - 99 Don't know - 77 No answer (omit)

Variable name	Question [ENG]
2_wellb	Over the past 30 days, how often have you felt: frustrated, nervous, bored, or lonely? Answer: - 1 if Much more than before - 2 if More than before - 3 if Same as before - 4 if Less than before - 5 if Much less than before - 99 Don't know - 77 No answer (omit)
3_wellb	Over the past 30 days, how optimistic have you been feeling about the future? Answers: - 1 if Much more than before - 2 if More than before - 3 if Same as before - 4 if Less than before - 5 if Much less than before - 99 Don't know - 77 No answer (omit)
meta_stereo	How do you think Colombian citizens perceive Venezuelan migrants? Answer: - 1 if Very positively - 2 if Positively - 3 if Neither positively nor negatively - 4 if Negatively - 5 if Very negatively - 99 Don't know - 77 No answer (omit)
1_polariz_scale	How do you feel about Venezuelans in Colombia? Please answer only with a number between a scale of 1 - 100 (with 0 being negative/cold and 100 positive/warm).
2_polariz_scale	How do you feel about Colombians in Colombia?Please answer only with a number between a scale of 1 - 100 (with 0 being negative/cold and 100 positive/warm).
app_internet	Over the last 4 weeks, what websites/apps do you visit online most frequently? Please respond, in a single brief message, with the names of the websites or apps you visit the most.
time_fb	On average, how much time do you spend on Facebook over the last 4 weeks?
time_ig	On average, how much time do you spend on Instagram over the last 4 weeks?
time_wa	On average, how much time do you spend on WhatsApp over the last 4 weeks?
time_ff	On average, how much time do you spend on Family and friends (offline) over the last 4 weeks?
time_nt	On average, how much time do you spend on Non-tech activities over the last 4 weeks?
1_internet_use	How much do you use the internet to stay in touch with friends and family over the last 4 weeks?
2_internet_use	How much do you use the internet to read the news over the last 4 weeks?
3_internet_use	How much do you use the internet for entertainment over the last 4 weeks?
4_internet_use	How much do you use the internet to look for paid jobs over the last 4 weeks?
5_internet_use	How much do you use the internet to look for government or other assistance programs over the last 4 weeks?

N Ethical Consideration

This project complies with APSA's Principles and Guidance on Human Subject Research. The project was reviewed and approved by an Institutional Review Board (IRB). The treatments were discussed with several local experts working with Venezuelan migrants in Colombia. We declare no ethical issues or conflicts of interest in this research; no ethical issues arose during the implementation of the study. Participation in the project was voluntary. We recruited participants as described in the paper through the Colombian government. The research team did not collect subjects' names or any identifying information for future research. We obtained participants' consent at the beginning of the study, and participants had the option to withdraw from the study at any time. We used a standard consent form recommended by the IRB. No deception was involved in this study. We did not anticipate any risks of harm beyond those encountered in everyday life, and none were reported.