In their Shoes: Empathy through Information *

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Abstract

We explore the mechanics of empathy. We show that information about an outgroup can potentially activate and magnify empathy when presented in conjunction with an experience simulating their struggles. This response increases the willingness to help the struggling group, but it is only activated when the information comes *before* the experience and not after. We provide evidence for this effect in a immersive virtual reality experiment where participants ("witnesses") simulate the struggle of unauthorized migrants ("protagonists"). These results are then replicated in a series of controlled lab experiments. We show that this effect operates through an increase in interpersonal similarity, or *relatability*. Information shifts perceptions of relatability, which changes people's experience when witnessing the protagonist's struggles; it magnifies their empathetic response and drives them to engage in more prosocial behavior. Together, our evidence suggests that the ability to put oneself in the shoes of another person or group can be enhanced by activating empathy through simple information provision.

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Introduction

Humans experience hardship, from natural disasters to ethnic conflicts, to unsafe or abusive labor conditions. The eventual circumstances of the group experiencing hardship ('protagonists') often depend on the response of others who witness those struggles ('witnesses'). If witnessing hardship breeds empathy, then others will be moved to help through charitable donations, collective mobilization, and voting for policies to support the struggling group. If empathy is absent, then those who are struggling are unlikely to get help. How is empathy built? Why do different people witnessing the same episodes of struggles by others respond differently? Is there scope for policy to facilitate the ability to put oneself in the shoes of others?

This paper explores the mechanics of empathy and tools that can be used to enhance it. We show that information about a struggling group can potentially activate and magnify empathy when presented in conjunction with an experience simulating the struggles of that group. This empathetic response increases the willingness to help the struggling group, but it is only activated when the information comes *before* the experience and not after. We first show this in a field experiment where subjects witness the plight of migrants crossing the US Southern border in an immersive virtual reality experience. This immersive virtual reality piece, called Carne y Arena® and created by Academy Award® winner director Alejandro González Iñárritu, is the closest to a real-life experience we could hope for.[1] Including statistical information about unauthorized immigration enhances the empathetic response to the experience—but only when it is included before rather than after it. This is reflected in more positive attitudes and prosocial behavior towards immigrants. To probe the robustness and generalizability of our findings, we ran additional pre-registered experiments in an easily replicable lab setting. The setup mirrors the Carne y Arena environment: participants are given information about a disadvantaged group either before or after witnessing that group experience hardship. They then make a choice of how much to donate to a member of the disadvantaged group. We replicate the results from the field: information presented before simulating the experience of the group activates empathy and increases donation amounts relative to a condition where the same information is presented after the experience.

We then go one step further and shed light on a potential mechanism underlying this magnification of empathy: shifts in perceptions of interpersonal similarity, or *relatability.* We develop a framework where information received before witnessing the struggles of a protagonist induces the witness to shift attention to attributes that they can relate to. The increase in relatability activates the empathetic response when seeing the protagonist's struggles; it allows the witness to experience the hardship as

[1] Carne y Arena received a special Academy Award, the only time such an award was given to a virtual reality piece.

if in the protagonist's shoes. This leads to an increase in prosocial behavior toward the protagonist. We present two studies that provide evidence consistent with the proposed mechanism. The first experimental study measures and manipulates relatability directly and confirms our pre-registered hypothesis that relatability mediates the impact of information on prosocial behavior. The second study uses observational data to present additional, suggestive evidence for the mechanism. We now turn to a detailed description of our findings.

We begin by building intuition with a simple conceptual framework (section 1). A witness observes a protagonist going through an unpleasant or painful experience. We assume that the witness will have a stronger empathetic response if, when observing the protagonist's struggles, they focus their attention on attributes of the protagonist that they share and can relate to. This suggests a new channel for the role of information in shaping empathy: in addition to the direct impact its informational content may have, if information induces the witness to shift their attention on different attributes of the protagonist, it will change the empathetic response to the experience of witnessing the struggles of others. This simple conceptual framework has two important implications. First, it predicts an asymmetric empathetic response depending on whether information is received *before* or *after* the experience of witnessing the struggles of others: information acquired before can shift the attention of the witness and alter the nature of the perceived experience; information acquired after, which is not top of mind at the time of the experience, does not alter how it is perceived. Second, this framework suggests a way to measure the role of information in shaping the experience of witnessing the struggles of others: shifts in the witness' attention towards (away from) attributes they share with the protagonist, will be accompanied by increases (decreases) in the witness' perceived *relatability* towards the protagonist.

To bring this conceptual framework to the data, we proceed in two steps. In a first step (section 2), we show evidence that information enhances the empathetic response to the experience of witnessing the struggles of the protagonist if it comes *before* the experience, but not if it comes *after*—the main prediction from our conceptual framework. In a second step (section 3), we show evidence that this empathy-enhancing role of information operates through an increase in *relatability* towards the protagonist—the main assumption of our conceptual framework. We describe each step in turn.

In a controlled field experiment, we recruit subjects (the witnesses) whom we randomly confront with ordered combinations of two treatments: the immersive virtual reality experience Carne y Arena from director Alejandro González Iñárritu showing the struggles of unauthorized migrants (the protagonists),[2] and statistical information on unauthorized immigration in the US. After participants have

[2]The immersive museum experience Carne y Arena is described in details in section 2.

been exposed to both treatments, in a randomized order, we measure their empathy response with targeted charitable donations and policy views. Compared to an untreated control group, attitudes towards immigration improve by 70% (p-value < 0.01) when information precedes Carne y Arena, substantially more than the 36% increase (p-value < 0.01) when information comes after Carne y Arena. The difference between the two treatment effects is large and significant (p-value < 0.01).

In a pre-registered conceptual replication of the Carne y Arena study, we reproduce the main finding—the asymmetric effect of receiving information *before* versus *after* witnessing the struggles of others on empathetic responses. We recruit India-based subjects (the protagonists), and US and UK-based subjects (the witnesses) who have a chance to receive a bonus payment. The Indian subjects are assigned a task both tedious and arduous: counting ones and zeros in large matrices. The US and UK subjects are told about the work Indian participants were asked to do and are presented with a series of samples of this tedious and arduous task. They are also shown statistical information about Indian citizens, either before or after simulating the experience of the Indian workers by viewing samples of the task. To measure the empathetic response of the US and UK subjects, we ask them how much of their bonus payment they would want to share with a randomly selected Indian worker. This lab experiment reproduces the finding of our field experiment: US and UK subjects give 28% more of their bonus payment if presented with information before the experience compared to after (p-value < 0.01).

Our conceptual framework suggests that the novel result we document—information magnifies empathy if it comes *before* relative to *after* the experience of witnessing the struggles of others—is due to shifts in the attention of the witness, before entering the experience, towards attributes of the protagonist that the witness can relate to, making the witness better able to relate to the circumstances of the protagonist.

To show evidence for the proposed mechanism, we run a similar pre-registered study where we ask the US and UK subjects, after they make their donation decisions, "To what extent do you feel like you understand and relate to the circumstances of the Indian workers?". We designed this question based on the psychology literature on interpersonal similarity—*relatability* (Byrne, 1961; Echterhoff et al., 2009; Schomerus et al., 2024)—to measure shifts in this construct as a function of when information is received. We use a mediation model (Baron and Kenny, 1986) to test the extent to which shifts in relatability can explain the behavioral effect of our treatments. Results show that the effect on donations of receiving information before witnessing the struggles of others is primarily mediated through relatability: information received before the witness' experience increases self-reported relatability, which in turn increases donations; controlling for relatability, the direct

effect of information on donations becomes smaller and is no longer significant. This suggests that the treatment effect on donations of information received *before* the witness' experience operates primarily through an increase in relatability to the protagonist.

Finally, we show suggestive evidence that a similar mechanism may also operate in observational data. We study a setting that is similar to our experimental framework where we analyze charitable donations from donors across US counties, using data extracted from Bursztyn et al. (2024). The 'protagonists' are people in three countries devastated by natural disasters, Haiti, Japan, and the Philippines. The 'witnesses' are residents in US counties. We measure the empathy response to witnessing the suffering of those three countries as charitable donations in the aftermath of these disasters. The observational analogue to the information treatment in our experimental framework is a measure of the likelihood of inter-personal contact with people from those three countries, computed from a new large-scale survey ($n = 2,400$) across US counties. Motivated by the evidence in Bursztyn et al. (2024) who show that contact with Arab-Muslims induces better knowledge of information about Arab-Muslims and Islam, we conjecture that a high (low) likelihood of contact is equivalent to an intense (mild) information treatment. To isolate plausibly exogenous variations in contact across county-country pairs we use quasi-random historical immigration shocks from Burchardi et al. (2019). Finally, to measure our hypothetized mediating factor, *relatability*, survey participants answer a short personality test (McCrae and Costa, 1987) and are then incentivized to guess how many personality traits they share with a person from Haiti, Japan, or the Philippines. We conjecture that this measure reflects perceived similarity, or *relatability*, in the absence of any specific context. We show, first, that plausibly exogenous variations in contact increase charitable donations to Haiti, Japan, or the Philippines, replicating the finding in Bursztyn et al. (2024) for Arab-Muslims countries.[3] We then adapt the mediation analysis with instrumental variables from Dippel et al. (2020), and show that contact increases perceived relatability, which in turn increases charitable donations; controlling for both contact and relatability, only relatability has a significant impact on donations. This suggests that the effect of contact on donations operates primarily through an increase in relatability, consistent with our conceptual framework.

Related literature. This paper contributes to several strands of literature. First, it relates to an extensive body of work on intergroup contact and empathy, dating back to Allport (1954) (see Pettigrew and Tropp, 2006; Paluck et al., 2019; Lowe, 2024, for meta-analyses). A key focus of this literature has been the evaluation of interventions—experimental or quasi-experimental—that facilitate

[3]With a single foreign origin group, Bursztyn et al. (2024) cannot control for county fixed effect. With data on three countries and many counties, we are able to control for both county and country fixed effects when predicting contact.

interactions between groups, such as cooperative tasks, school integration, or mixed housing policies (Lowe, 2021; Mousa, 2020; Bazzi et al., 2019; Corno et al., 2022; Rao, 2019; Kaplan et al., 2024). This body of work highlights the importance of conditions like equal status and shared goals in achieving positive outcomes, consistent with Allport's original "contact hypothesis."[4] Beyond contact, a number of studies suggest positive effects of perspective-taking interventions, where individuals are encouraged to imagine the world through the point of view of the outgroup (Alan et al., 2021; Adida et al., 2018; Broockman and Kalla, 2016; Kalla and Broockman, 2020, 2023). We advance this literature by proposing and providing evidence for a mechanism through which contact and perspective-taking may shift attitudes—via relatability. Additionally, we add to a growing literature on information provision—see, for example, the recent review by Haaland et al. (2023), and in the context of immigration Haaland and Roth (2020) and Alesina et al. (2023)—and bring a new channel through which information, even information not explicitly designed to be persuasive, can change attitudes.

Second, our work also contributes to a longstanding literature in social psychology, and more recently, in neuroscience, on the role of perceptions of others in building empathy (see for example Krebs, 1975; Davis, 1994).[5] Recent studies have focused on lab experiments manipulating labels of in-groups versus out-groups, e.g., Vaughn et al. (2018) who examine neural responses to observing pain in others, or Hagenbach and Kranton (2024) who measure whether one subject is able to remember information about shared traits with another, depending on whether they compete or cooperate. We use practical measures of relatability and empathetic responses; consider a commonly-used policy tool—information provision; study policy-relevant, empathy-inducing events, such as unauthorized migrations or natural disasters; and we bring the question to natural settings.

Third, our research contributes to the literature in psychology on how perceptions of interpersonal similarity foster empathy. Byrne (1961) first proposed the similarity-attraction effect, where perceptions of interpersonal similarity engender more positive attitudes toward the target. Work on homophily is consistent with this hypothesis, finding that people with similar traits are more likely to trust and support one another (McPherson et al., 2001). For example, people are more likely to express empathy towards others' struggles as perceived interpersonal similarity increases (Wei and Liu, 2020). We build on this work, showing that perceptions of interpersonal similarity can be shifted through information provision, which then prompts a greater empathetic response.

Fourth, this paper relates to research in media and communication studies that aims to explain why and how audiences engage with entertainment narratives. In line with our framework, 'affective

[4] Enos (2014), Hangartner et al. (2019) and Lowe (2021) show that contact can backfire in settings where these conditions are not met.

[5] More broadly, our work belongs to a long tradition in economics of modeling altruism (Becker, 1974).

disposition theory' links dispositions initially formed toward characters with the emotional reactivity to the subsequent plights of those characters. This ultimately drives the viewer's hedonic response to the resolution of the narrative (Zillman and Cantor, 1977; Raney, 2004, 2017).

The rest of the paper is structured as follows. Section 1 provides a simple conceptual framework to guide the interpretation of our empirical setup and results. Section 2 presents experimental evidence for our main finding: information magnifies the empathy response to the experience of witnessing the struggles of an outgroup if it comes *before* the experience, relative to *after*—the main prediction from our conceptual framework. Section 3 shows evidence suggesting that information amplifies empathy by increasing perceptions of *relatability* to the outgroup—the main assumption of our conceptual framework.

1 Conceptual framework: the mechanics of empathy

We propose a simple conceptual framework to help guide the interpretation of our empirical results. We are interested in how a specific experience of witnessing the struggles of an outgroup can induce empathy towards that group, and how factors such as information can amplify this empathic response.

A witness—labeled w—will have to decide whether they want to help a protagonist—labeled p—after they observe p going through an unpleasant or painful experience. We propose a framework to characterize the strength of the empathetic response of the witness while observing the protagonist.

The witness is characterized by a vector of attributes, $\mathbf{a}(w) = (a_1(w), \cdots, a_N(w))$, with $a_n(w) \in \{0, 1\}$. $a_n(w) = 1$ means that the witness possesses attribute n, and $a_n(w) = 0$ that they do not.[6] Similarly the witness perceives the protagonist as characterized by a vector of attributes, $\mathbf{a}(p(w)) = (a_1(p(w)), \cdots, a_N(p(w)))$.

Following Nosofsky et al. (1992), we introduce bounded attention across attributes in the form of attribute-specific weights. Specifically, let $\alpha = (\alpha_1, \ldots, \alpha_N)$ correspond to the attention weights allocated across the attributes, with $\alpha_n \in [0, 1]$. A greater α_n indicates that more attention is allocated to attribute n. The vector α distorts the attention paid to different attributes. Formally, we define the attention-weighted set of attributes of the witness, $\mathbf{a}_\alpha(w)$, as the element-wise product between the attention vector, $\alpha(w)$, and the attributes vector, $\mathbf{a}(w)$,

$$\mathbf{a}_\alpha(w) \equiv \alpha(w) \odot \mathbf{a}\,(w) = (\alpha_1(w)a_1(w), \cdots, \alpha_N(w)a_N(w)) \tag{1}$$

[6] We present our conceptual framework with binary values for attributes, $a_n(w) \in \{0, 1\}$, for simplicity. This can readily be extended to attributes as a continuous variable in the interval $[0, 1]$, where $a_n(w) > a_n(w)$ means that attribute n is more prominent than attribute m. The choice of non-negative values is without loss of generality, as negative attributes can simply be encoded as their opposite. With finitely many attributes, the choice of a bounded interval is also without loss of generality, allowing for any relative prominence.

Similarly $\mathbf{a}_\alpha(p(w)) \equiv \boldsymbol{\alpha}(w) \odot \mathbf{a}\left(p(w)\right)$ is the attention-weighted vector of attributes that the witness w believes the protagonist p to possess, either in the sense that p truly possesses those attributes, or in the sense that they are attributes w believes p to possess, and focuses their attention on.

The attention vector, α, can be driven by bottom-up factors such as salience or top-down factors such as importance or other goal-oriented factors (Bordalo et al., 2024b). The attention-weighted vector, $\mathbf{a}_\alpha(w)$, corresponds to the set of attributes that 'come to mind' (Gennaioli and Shleifer, 2010) when w thinks about themselves. One interpretation is that it represents the way the witness views their own identity (Akerlof and Kranton, 2000). For instance, a young parent may view themselves as someone who cares about children, because child-rearing is top of their mind; and the same parent, once older, may no longer view themselves primarily as caring about children, as children become a less salient aspect of their life. Importantly, this specification of attention-weighted attributes implies that perceptions of identity can be shifted through experience or information: for instance, after reading a book about children an older parent may simulate their prior experience of raising children and thus (temporarily) feature this attribute prominently in their identity.

We assume that empathy depends on perceived interpersonal similarity—termed *relatability*—which is captured by the overlap in attention-weighted attributes between the witness and the protagonist. This overlap increases the ease with which one can put themselves 'in the shoes' of another when witnessing their struggles. Specifically, as w witnesses the struggles of p, it is easier for them to simulate themselves going through the same struggles the more they view p as similar to them—the more w can *relate* to p (Byrne, 1961; Wei and Liu, 2020). This generates empathy.

Formally, empathy increases with the dot product of the attention-weighted vectors of attributes of the witness and the protagonist,

$$\mathbf{a}_\alpha(w) \cdot \mathbf{a}_\alpha\left(p(w)\right) = \sum_{n=1}^{N} \alpha_n a_n\left(w\right) \times \alpha_n a_n\left(p(w)\right). \tag{2}$$

With binary attributes, the dot product $\mathbf{a}_\alpha(w) \cdot \mathbf{a}_\alpha\left(p(w)\right)$ is simply the number of attributes shared between the witness and the protagonist, weighted by the attention paid by the witness to those attributes. Following the literature on empathy (Hoffman, 2008), we assume that greater empathy translates into more pro-social behavior towards p.

This conceptual framework provides a simple structure for the mechanics of empathy. Defining $\theta_{w,p} \in [0, \pi/2]$ as the angle, in absolute value, between the two vectors $\mathbf{a}_\alpha\left(w\right)$ and $\mathbf{a}_\alpha\left(p(w)\right)$, we can decompose the strength of the empathetic response into three plausible components,

$$\mathbf{a}_\alpha(w) \cdot \mathbf{a}_\alpha\left(p(w)\right) = ||\mathbf{a}_\alpha(w)|| \times ||\mathbf{a}_\alpha\left(p(w)\right)|| \times \cos\left(\theta_{w,p}\right). \tag{3}$$

First, empathy is stronger the larger $||\mathbf{a}_\alpha(w)||$, which corresponds to a witness who is intrinsically more 'universalist' (Enke et al., 2022), and therefore likely to feel empathy towards any protagonist. Second, it is stronger the larger $||\mathbf{a}_\alpha(p(w))||$, which corresponds to a protagonist who is, conditional on the attention weights, intrinsically more 'likable', and therefore likely to receive empathy from any witness. Third, it is stronger the lower the angle $\theta_{w,p}$, which corresponds to a tighter alignment between the attributes of the witness and those of the protagonist, based on the set of attributes the witness pays attention to.[7]

This conceptual framework allows us to characterize how information received before witnessing the struggles of the protagonist may alter the witness' empathy by shifting their attention to shared attributes. We denote by $\mathcal{I}$ the information set available to the witness upon witnessing the struggles of the protagonist. With information $\mathcal{I}$, the attention weights become $(\alpha|\mathcal{I})$, the vector of attributes of the witness becomes $\mathbf{a}(w|\mathcal{I})$, that of the protagonist becomes $\mathbf{a}(w(p)|\mathcal{I})$, and the strength of the empathetic response becomes $\mathbf{a}_{\alpha|\mathcal{I}}(w|\mathcal{I}) \cdot \mathbf{a}_{\alpha|\mathcal{I}}(p(w)|\mathcal{I}) = ((\alpha|\mathcal{I}) \odot \mathbf{a}(w|\mathcal{I})) \cdot ((\alpha|\mathcal{I}) \odot \mathbf{a}(p(w)|\mathcal{I}))$. By construction, information received after the experience has no impact on the intensity of the experience, as it is not part of the information set available to the witness when entering this experience. This asymmetry is the main prediction of our conceptual framework, and our main empirical result (section 2).

Information received before the experience of witnessing the struggles of the protagonist can alter the witness' empathy through three channels. First, information can change how the witness views themselves, $\mathbf{a}(w|\mathcal{I})$. For instance, a strong friendship, a formative life experience, a passionate political discourse, or a striking book can contain information which changes one's own sense of identity. Second, information can alter the perception that the witness has of the attributes of the protagonist, $\mathbf{a}(p(w)|\mathcal{I})$. Finally, information may shift the attention of the witness, $(\alpha|\mathcal{I})$, towards attributes of the protagonist they can relate to.[8]

This suggests a simple way to test the mechanism by which information can amplify empathy: if information shifts the witness' attention to attributes that they share with the protagonist—a tighter alignment corresponding to a lower angle $\theta_{w,p}$—then they should perceive the protagonist as more relatable, or more similar to them. This implies that they should be more likely to respond positively to the question "To what extent do you feel like you understand and relate to the circumstances of the [protagonist]?", our first measure of relatability, where the protagonist corresponds to specific Indian workers in section 3.1; they should also say that they share more personality traits with the

[7] Those three components are not fully independent. For instance, if $||\mathbf{a}_\alpha(w)|| = N \Leftrightarrow \alpha_n a_n(w) = 1, \forall n$, and if the perceived attributes of the protagonist are uniformly distributed, then the angle $\theta_{w,p}$ is smaller in expectation than if $||\mathbf{a}_\alpha(w)|| < 1$. We also note that the angle $\theta_{w,p}$ is not defined if $\alpha_n a_n(w) = 0, \forall n$, or if $\alpha_n a_n(p(w)) = 0, \forall n$. But in those knife-edge cases the dot product remains well defined, $\mathbf{a}_\alpha(w) \cdot \mathbf{a}_\alpha(p(w)) = 0$.

[8] Empathy may increase or decrease. It increases if $\alpha_n a_n(w) < (\alpha|\mathcal{I})_n a_n(w|\mathcal{I})$ or if $\alpha_n a_n(p(w)) < (\alpha|\mathcal{I})_n a_n(p(w)|\mathcal{I}) = 1$.

protagonist, our second measure of interpersonal similarity, where the protagonist is a hypothetical person from Haiti, Japan, or the Philippines in section 3.2. The first measure, *relatability*, quantifies interpersonal similarity directly after a subject witnesses the struggle of a specific protagonist. The second measure, perceived similarity, is more abstract and meant to capture latent interpersonal similarity in the absence of any context.

To conclude, despite having few restrictive features, our simple conceptual framework entails one key testable prediction: if information magnifies the empathy response to the experience of witnessing the struggles of the protagonist, then this magnification should operate only if information comes *before* the experience, not *after*. The main assumption behind this prediction is that the empathy response will be stronger—measured as an increase in altruistic actions in favor of the protagonist—the more the witness focuses their attention on attributes of the protagonist they can relate to—measured as relatability. At some level, "feeling like one understands and relates to the circumstances of a [protagonist]" may almost sound like the definition of empathy. However it does not tautologically imply that such stated feelings translate into prosocial behavior, or altruistic actions in favor of the protagonist. The empirical results that follow show that, when exposed to information about an outgroup before witnessing their struggles, people increase their prosocial behavior, i.e. undertake more costly altruistic actions (section 2), and that this increase in prosocial behavior is primarily mediated through an increase in relatability (section 3).

Before presenting our empirical findings, we discuss some limits of our conceptual framework. First, we recognize that experience and information may also affect empathy through a classical Bayesian updating channel. In that case, the ordering of information and experience should not matter for the strength of the empathetic response they induce. By comparing two experimental treatment arms, one where information comes before experience and one where it comes after, we can control for any such Bayesian updating channel. Second, we focus solely on the mechanics of empathy *during* the experience of witnessing the struggles of a protagonist. It is possible that similar mechanics operate before the experience, when subjects imagine a future experience, or after, when subjects remember a past experience. If they do so then our main result—that information received before an experience induces a stronger empathetic response than information received after—simply requires that these forces operate at a lower intensity after than during the experience. Third, we note that our conceptual framework abstracts from many other relevant features of empathy. For instance, the strength of the empathetic response presumably depends on the intensity of the suffering of the protagonist, or on the talent of the person telling their story. Since neither our experimental protocols nor our observational setting allow us to quantify variations in the intensity of the witness' experience or in the quality of

the story telling, we do not explicitly model them.

2 Information magnifies empathy

We first present our main finding: statistical information about an outgroup magnifies the empathetic response of a person viewing the experienced struggles of this outgroup if it is presented *before* the experience, compared to if it is presented *after*. We show evidence for this asymmetric impact of information both in a controlled in-the-field experiment (section 2.1) for which the hypothesis we test was not pre-registered;[9] and in a controlled laboratory experiment (section 2.2) which was pre-registered.[10]

2.1 Experimental evidence in the field: The Carne y Arena immersive experience

Experimental protocol. Our in-the-field experiment features two main treatments, a virtual reality immersive experience treatment—Carne y Arena—where subjects witness the struggles of unauthorized migrants crossing the Southern border and being apprehended by border patrol; and an information treatment where subjects learn about statistics related to unauthorized immigration to the US. Our outcome variable is a measure of attitudes in favor (or against) immigration. By randomly varying the ordering of the Carne y Arena and information treatments, we are able to test whether information, if it comes before, modifies the impact of the Carne y Arena experience on attitudes in favor of immigration.

Carne y Arena is an Academy Award-winning museum-based virtual reality piece created by director Alejandro González Iñárritu.[11] The visitor to the museum is immersed in the experience of unauthorized migrants crossing the US Southern border, based on true accounts. The exhibit has three stages. First, the visitor enters a room which is a replica of the cells where unauthorized migrants apprehended at the US border are held. They are invited to remove their shoes and wait several minutes. The room is cold and contains artifacts from migrants recovered in the Southern border deserts: backpacks, shoes, water bottles. Second, they enter, barefoot, a large space covered with the same rough sand as the Southern border deserts, and are fitted with a virtual reality set. In this virtual reality, they are immersed with a group of unauthorized migrants crossing the US Southern border, and live through a series of interactive scenes that end with the migrants being apprehended and processed by border patrol. The migrants are tired, one of them is injured, and they are terrified. The

[9] AEA registry for randomized control trials (AEARCTR-0009194 on 6/8/2022, Andries et al., 2022) and approval from the University of Chicago Social and Behavioral Sciences Institutional Review Board (IRB22-0551).

[10] Wharton Credibility Lab registry, AsPredicted #204323, 12/12/2024, https://aspredicted.org/md7z-trrj.pdf.

[11] See https://phi.ca/en/carne-y-arena/.

visitor can move around the protagonists as if they were there. If they walk 'through' a protagonist, they can hear their heart beat. The virtual reality (VR) experience culminates with a final scene where an armed border patrol officer orders the visitor themselves to kneel, pointing his weapon directly at them. Third, having left the VR space and recovered their shoes, the visitor is told the virtual reality piece was created to reproduce the actual experience of a real group of migrants and border patrol officers, and is invited to read through their short testimonies. The visit lasts about 15 minutes.

Our information treatment presents participants with statistics about unauthorized immigration to the US. It consists of a series of 12 exhibits containing information about border crossings to the US (e.g. "In the fiscal year 2020, U.S. Customs and Border Protection apprehended a total of 400,651 people on the Southwest border"), about the economic conditions in the migrants' origin countries (e.g. "The average standard of living in the top four origin countries of migrants apprehended on the Southwest border is 6 times lower than that in the U.S"), and about their living conditions once in the US (e.g. "In Texas, unauthorized immigrants are 55% less likely than U.S. born citizens to be arrested for a violent crime").[12] While our information treatment is not designed to be persuasive or to make all attributes of migrants be viewed more favorably, we conjecture that it will have a positive impact on relatability because it induces subjects to focus their attention on attributes of immigrants they share or perceive as important: caring for children, for education, seeking better economic conditions, fleeing violence, etc. It is possible, naturally, that our information treatment may not be perceived as neutral, and may also induce subjects to update their priors, positively or negatively. By comparing the impact on participants exposed to information *before* versus *after* Carne y Arena—each receiving the same informational content—we control for such information updating channel.

To measure attitudes in favor of immigration we construct an index combining six components. We first ask participants to choose their preferred policies from a list containing two pro-immigration policies—the DREAM Act and asylum policies—and policies unrelated to immigration. Selecting pro-immigration policies reveals positive attitudes (for each, we assign value 1 if selected, 0 otherwise). We then ask them to rank their preferred policies, and record their ranking of the DREAM Act and asylum policies, if selected: a higher rank for either reveals positive attitudes (we assign a score from 1 to 8, least to most preferred). We then ask participants to choose their preferred policy among anti- and pro-immigration policies: selecting a pro-immigration policy reveals positive attitudes (we assign scores from 1 for the most anti-immigration policy—deport all unauthorized migrants—to 5 for the most pro-immigration policy—grant full citizenship to all unauthorized migrants). Finally, we ask subjects to choose a charitable donation to be made on their behalf to a charity supporting immigrants,

[12] See appendix B for the full list of information exhibits.

animal welfare, or environmental projects: choosing the immigrant charity reveals positive attitudes (we assign value 1 if selected, 0 otherwise). Each of the six components (support the DREAM Act or not, support asylum policy or not, the rank of the DREAM Act if selected, the rank of asylum policy if selected, immigration policy views, and donate to the immigrant support charity) is individually standardized (mean zero and std. dev. one). Our final index is the standardized sum of those six components.[13] The standardizations are made for the control group so that coefficient estimates are expressed as percentages of a standard deviation within the control group.

Our experimental protocol is designed to measure the impact of the ordered interaction of our information and immersive experience treatments on attitudes in favor of immigration. Participants are randomly assigned to one of four groups.[14] For the 'Baseline' group—our control group—we measure attitudes before any treatment. For the 'CyA' group we measure attitudes just after participants go through Carne y Arena. For the 'Info *before* CyA' group we measure attitudes after participants have received our information treatment and then gone through Carne y Arena, in that order. And for the 'Info *after* CyA' group, we measure attitudes after subjects have gone through Carne y Arena and then received our information treatment, in that order. We recruit participants who visited the Carne y Arena art installation on site ($n = 718$): at Fair Park in Dallas, Texas (May-June 2022), and at Kaneko in Omaha, Nebraska (June-September 2022). We present results with both locations combined as our baseline but also show robust results for each location separately in the Appendix. We keep only data from respondents who reach the end of the survey. The data collection and randomization are done using Qualtrics^{XM}.[15] The observable characteristics of respondents are balanced between randomized groups, except for gender in some of the smaller Omaha groups (see summary statistics in appendix table A2, and balance tests in appendix table A3).

Our experimental protocol is designed to minimize any form of experimenter demand, or 'Hawthorne' effects. All respondents are selected among the same group of museum-goers, all fill out one part of our survey before entering the exhibit and the other part after. Only the ordering of questions varies between treatment arms. Respondents are told that our survey is designed to study "The Power of Art"[16] which, in our view, given that all respondents are visitors to an art exhibit, does not reveal information about the hypotheses we aim to test. We also minimize any form of 'John Henry' effect: only one person at a time is allowed to go through Carne y Arena, so friends cannot communicate about the survey until after they have completed it and exited the exhibit hall; we directly instruct

[13] Combining outcomes into an index increases precision by decreasing survey measurement error and limits the potential for biases from multiple hypothesis testing (Broockman et al., 2017; Bursztyn et al., 2017).

[14] Our experimental design features additional treatment arms which we do not use in this study. See appendix table A1 for a description of the protocol.

[15] https://www.qualtrics.com/.

[16] We thank Katie Cutright from the Emerson Collective for suggesting this choice of words.

visitors not to communicate with friends or partners about their questionnaire; and respondents answer questions on an individual tablet in a dark and quiet space in a secluded waiting area, under a solemn atmosphere, so that they are unlikely to be influenced by others.[17]

Importantly we note that the main hypothesis we test here—information magnifies empathy if it comes before the experience of witnessing the struggles of others compared to if it comes after—was not pre-registered. We used the Carne y Arena immersive experience as a unique setting to explore the interaction of experience and information. This revealed a novel, and unanticipated, finding that statistical information can act as a treatment that alters the experience and its effect on empathy. We reproduce this finding below in a pre-registered laboratory experiment which mimics the Carne y Arena in-the-field setting (see section 2.2).

Results. We estimate the effect of the experiment on attitudes towards immigration,

$$Attitudes_i = \alpha + \beta \cdot Treatment_i + \epsilon_i, \tag{4}$$

where $Treatment_i$ takes values zero or one according to which experimental arm individual i is assigned to, and β measures the impact of a given treatment on attitudes towards immigration. For instance for $Treatment_i = 0$ if $i \in$ 'Baseline' and $Treatment_i = 1$ if $i \in$ 'CyA,' β measures the impact of Carne y Arena on attitudes towards immigration, expressed as a percentage of a std. dev. of our attitude index among the control group ('Baseline'). We measure attitudes for the control group ('Baseline') before they have gone through the Carne y Arena immersive experience. Their attitudes therefore correspond to the unconditional attitudes among the selected group of museum goers who chose to visit the Carne y Arena exhibit. For the treatment group ('CyA'), we measure attitudes after they went through the Carne y Arena exhibit. This population is ex ante identical to the control group, the only difference being their randomized exposure to the immersive Carne y Arena experience.

The results are presented in table 1. We first show that the Carne y Arena experience alone improves attitudes towards immigration by 32% of a std. dev. (column 1, p-value < 0.01). While this result is not the main focus of our paper, it is interesting on its own, suggesting that an immersive experience can have a large impact on attitudes.[18] It also confirms that our in-the-field experimental setting is well suited to study the interaction between a striking experience and information.

[17] The physical setting in Dallas (May-June 2022) and in Omaha (June-September 2022) allowed us to run the before and after sections of our survey without interference: visitors both enter and exit the Carne y Arena virtual reality experience in a quiet and dark space inside the exhibit hall. We attempted to run the same experiment in Richmond, CA but as visitors exited into the crowded space of another exhibit and a restaurant and bar, it proved physically impossible to implement our experimental protocol there.

[18] The effect of Carne y Arena is also persistent. Appendix table A4 shows that attitudes are 41% higher two months after visiting the exhibit compared to before seeing the exhibit. Unfortunately, we have too few follow-up respondents to statistically distinguish the long-term effect of the ordering of information and Carne y Arena.

Table 1: Information, Carne y Arena, and Attitudes

	(1) Attitudes	(2) Attitudes	(3) Attitudes
CyA	0.319***		
	(0.106)		
Info *after* CyA		0.361***	
		(0.103)	
Info *before* CyA			0.703***
			(0.124)
Constant	-0.000	-0.000	-0.000
	(0.078)	(0.078)	(0.077)
p-value Robust S.E.	< 0.01	< 0.01	< 0.01
p-value Wild Bootstrap	< 0.01	< 0.01	< 0.01
p-value Permutation test	< 0.01	< 0.01	< 0.01
Observations	347	326	228

Notes: This table shows estimates of various specifications of equation (4). The dependent variable is an index of attitudes in favor of migrants, normalized to mean zero and std. dev. one for the control group. The control group is always 'Baseline.' The treatment groups are: 'CyA' in column 1; 'Info *after* CyA' in column 2; 'Info *before* CyA' in column 3. Robust standard errors are in parentheses. *p*-values using robust standard errors, wild bootstrap (Wu, 1986), and a permutation test (Young, 2019).
*** p<0.01, ** p<0.05, * p<0.1.

Our main finding is presented in columns 2 and 3 of table 1, where we compare the treatment effect of information *before* (column 3) versus *after* (column 2) Carne y Arena. The impact of Carne y Arena is magnified if a subject receives our information treatment before Carne y Arena, compared to after: attitudes improve by 70% of a std. dev. relative to the control group if respondents received information before witnessing Carne y Arena (column 3, p-value < 0.01), substantially more that the 36% increase if respondents receive information after witnessing Carne y Arena (column 2, p-value < 0.01). The latter is statistically indistinguishable from Carne y Arena alone. The difference between information *before* versus *after* Carne y Arena is significant (p-value < 0.01). The magnification when information comes before is large, approximately doubling the already sizable effect of Carne y Arena. Our interpretation is that information focuses people's attention to traits they share with migrants, inducing them to perceive migrants as more relatable and changing the way they experience Carne y Arena, as if they were 'in the shoes' of the protagonists, and making it even more immersive and impactful. If instead information comes after, subjects 'missed out' on an cricical aspects of living through the more transformative experience.

We replicate this finding in a pre-registered experiment (section 2.2), and show evidence that

the magnification of empathy when information comes before an experience is mediated through an increased ability to relate to the experience of an outgroup and perceive them as similar, in a pre-registered experiment (section 3.1), and in observational data (section 3.2).

Robustness and additional results. By comparing the impact of information *before* versus *after* witnessing Carne y Arena, both exposed to the same information, we have some confidence that our results are not confounded by a separate impact that information updating may have on attitudes. We confirm in appendix table A5 that participants who receive information before versus after Carne y Arena are equally successful at answering a quiz on the information they received. This suggests that they pay equal attention to information, irrespective of when they receive it.

Appendix table A6 shows our results are robust to using only respondents in Dallas, or only in Omaha. In Dallas, we can only measure the treatment effect of Carne y Arena, and of information *after* Carne y Arena; they are statistically indistinguishable. In Omaha, we can compare all treatment effects: Carne y Arena is statistically indistinguishable from information *after* Carne y Arena, and both are statistically smaller than information *before* Carne y Arena.

Appendix table A7 compares our treatment effects for different types of respondents: Hispanics versus non-Hispanics, foreign versus native born, and liberal versus conservative. Not surprisingly, all treatment effects are weaker, although with the same rankings, for Hispanics and for foreign born respondents—the majority of whom are of Hispanic origin—presumably because they are more likely to hold attitudes favorable to immigration, which leaves less room for a sizeable treatment effect, and because they may already know personally of the experience of unauthorized migrants, diluting the treatment effects. More interesting is the comparison of liberal versus conservative respondents. Liberal respondents have a strong reaction to Carne y Arena in all treatments, with a stronger effect if information comes *before* Carne y Arena. Conservative respondents on the other hand have a weak and insignificant reaction to Carne y Arena alone, or information *after* Carne y Arena; but they react as strongly as liberal respondents to information *before* Carne y Arena. This suggests that conservative respondents at baseline perceive unauthorized migrants as less relatable and are therefore less responsive to the Carne y Arena experience; if they receive information *before* the immersive experience of Carne y Arena, they are induced to relate more to unauthorized migrants, which activates their empathy when they witness their struggles in Carne y Arena.

2.2 Conceptual Replication

The Carne y Arena study shows that information about a disadvantaged group has the potential to activate and magnify empathy when presented in conjunction with a simulation of that group's

experience. This empathetic response increases the willingness to help the disadvantaged group, but critically, in the Carne y Arena study, the magnification is only activated when the information comes *before* the experience but not *after*, a novel and striking result. Two legitimate concerns affect our Carne y Arena study, however. First, this ordering effect was not pre-registered and may turn out to be a false positive. Second, it may lack external validity given the specific field setting. For example, if information's magnification of empathetic responses operates only when combined with an immersive virtual reality experience, the policy relevance of our study as a potential intervention may be lower.

To address these concerns, we ran a pre-registered experiment in a different setting that provides a conceptual replication of our main finding.[19] The setup of the study mirrored the Carne y Arena setting: participants were given information about a disadvantaged group either before or after witnessing that group experience hardship. They then made a choice of how much to donate to a member of the disadvantaged group. We predicted that seeing the information before the experience of witnessing the group's struggles would activate empathy and increase donation amounts relative to the condition where the same information was presented after the experience.[20]

Methods. We recruited participants from two different online subject pools: one from India on CloudResearch and the other from the US/UK on Prolific. The first group was asked to complete a tedious and arduous task for over an hour and be paid a flat fee.[21] Specifically, 100 workers were recruited to each complete 60 effort tasks. One effort task involved counting the number of zeros in a large, randomly generated table of zeros and ones; this paradigm was used in Falk and Kosfeld (2006), Abeler et al. (2011), and Imas et al. (2022), among others, as a costly effort task to estimate labor supply decisions. Pre-testing showed that each table took about 1 minute to complete. Workers saw one table at a time and could not proceed to the next one before entering the correct answer.

Our primary study concerns the behavior of the group recruited from Prolific. Participants earned a base fee above the minimum wage of the respective countries (study payment was set at approximately \$20/hr); importantly, however, this wage was substantially greater than the wage paid to the Indian workers. Each could also potentially earn an additional bonus in the form of a \$100 Amazon gift card through a lottery.[22] After learning their own payment information, participants were given a brief description of the task given to the Indian workers and the amount they stood to earn—which was substantially less than their own. They were then randomized into one of two conditions: 'Info *before*'

[19] For pre-registration, see AsPredicted #204323 (https://aspredicted.org/md7z-trrj.pdf).
[20] See appendix C and D for the full questionnaire and list of information exhibits.
[21] The flat fee was substantially above the prevailing average wage in the country. Study payment was approximately \$7/hr compared to a minimum wage of between \$2-\$6 per day, depending on the region.
[22] Each Prolific participant was entered into a lottery for the prospect of winning one of two \$100 gift cards.

and 'Info *after*.'

The 'Info *before*' condition was designed to mimic the same treatment as in the Carne y Arena study. Each participant was first presented with statistical information about the social and economic conditions in India through 12 statements sourced from the World Bank and Gallup. Statements included "According to the 2021 World Risk Poll, nearly one in four (23%) Indians were "very worried" that the water they drink could cause them serious harm," "In 2022, 85% of Indian population felt that children in the country have the chance to learn and grow every day," and "India's young women are just as optimistic about their local job prospects as men of the same age." As in the Carne y Arena study, these statements were meant to induce subjects to focus their attention on attributes of Indian workers they can relate to—caring about health, education, gender equality, etc.— and increase perceived similarity through relatability. After viewing the 12 statements, participants went through a simulation of the Indian workers' experience: each was presented with 10 of the tasks on separate pages. They were also asked to imagine the experience of having to complete the tasks themselves but, importantly, were not required to do so. The 'Info *after*' condition was identical to 'Info *before*' except that the simulation of the experience preceded the informational component.

Participants in both conditions then completed a multiple choice quiz based on the information component (note the timing of the quiz was the same across conditions). Finally, they reported their willingness to donate part of their potential earnings to a randomly-selected Indian worker. Specifically, each responded to the following question using a slider, stating a value between 0 and 100: "If you win the $100 gift card, we will pair you with a randomly selected Indian worker who was recruited to complete the task. You can use some of the $100 gift card to increase the compensation of the Indian worker in the form of a bonus. How much of the $100 gift card would you be willing to give to the worker?". This served as our primary measure of prosocial behavior. Participants then answered questions about their demographics and perceptions of the task (how onerous it is).

Results. First, we examine the number of quiz questions answered correctly to ensure that participants in both conditions spent the same amount of effort attending to the information. There were no significant differences between the 'Info *before*' and 'Info *after*' conditions (average correct of 8.60 versus 8.76 questions, respectively; p-value = 0.69).

Next, we estimate the effect of the treatment manipulation on prosocial behavior (donation amount) using the same specification as in the Carne y Arena study:

$$Donation_i = \alpha + \beta \cdot Treatment_i + \epsilon_i, \tag{5}$$

Table 2: Order Effect on Donations

	(1) Donations	(2) Donations	(3) Donations
Info *before*	9.420**	10.013***	10.888***
	(3.660)	(3.724)	(3.685)
Constant	33.794	25.292	27.970
	(2.535)	(7.011)	(7.232)
p-value Robust S.E.	< 0.01	< 0.01	< 0.01
p-value Wild Bootstrap	< 0.01	< 0.01	< 0.01
p-value Permutation test	< 0.01	< 0.01	< 0.01
Observations	219	219	219
Demographics	N	Y	Y
Task Perception	N	N	Y

Notes: This table shows estimates of various specifications of equation (5). The dependent variable is the amount allocated to the Indian worker. The Constant corresponds to donations in the Info *after* treatment. Column (1) has the treatment variable only; Column (2) includes demographic controls of age, gender, foreign born; Column (3) includes task perception. Robust standard errors are in parentheses. *p*-values using robust standard errors, wild bootstrap (Wu, 1986), and a permutation test (Young, 2019). *** p<0.01, ** p<0.05, * p<0.1.

where $Treatment_i = 1$ corresponds to 'Info *before*' and $Treatment_i = 0$ to 'Info *after*', i.e., donation amounts are regressed on whether information came before or after the simulation of the Indian workers' experience. Results are presented in table 2. Replicating the Carne y Arena results, we see that participants were substantially and significantly more prosocial toward the disadvantaged group if the information came before the experience than after; participants who receive the information before were willing to donate \$43.2 (\$33.8 + \$9.4) of a \$100 bonus, significantly more than \$33.8 for those who receive information after (p-value < 0.01). This provides further evidence that information activates the capacity for empathy, which is then fostered through shared experience. Columns 2 and 3 show that this effect is robust to including demographic controls and perceptions of the penibility of the task itself.

3 Mechanism

The previous section presented behavioral evidence for the hypothesized impact of information on the activation of empathy. In this section we present two studies that provide evidence on the mechanism at play. The first study measures interpersonal similarity—operationalized as *relatability*—and shows it explains the enhancing impact of information on prosocial behavior. This is consistent with the proposed mechanism in the conceptual framework of section 1: information received before witnessing

the struggles of others can alter the attention people pay to attributes of the disadvantaged group whose ordeal they are witnessing, with a shift towards attributes of the group that they share and can relate to. This shift in attention allows the observer to put themselves 'in the shoes' of the person going through the arduous experience and fosters empathy. The first study measures this shift in relatability and shows that it explains the change in prosocial behavior. The second study uses observational data to present additional evidence for the same mechanism.

3.1 Experimental evidence

The pre-registered experiment builds on the paradigm used in section 2.2.[23] We again recruited participants from India on CloudResearch and the US/UK on Prolific. The group recruited from India consisted of a new group of 100 workers who were asked to complete the same 60 effort tasks for the same payment as before.

The group recruited from Prolific earned the same base fee and stood to earn the same potential bonus as before.[24] Also as before, all participants were given a brief description of the Indian workers' task and their payment. They were then randomized into one of three conditions: 'Control,' 'Experience *only*,' and 'Info *before* Experience.' Participants in the 'Control' condition proceeded to choose how much of their potential bonus to donate to a randomly selected worker. They did not see any additional information. Those in the 'Experience *only*' condition saw 10 tasks which simulated the experience of the Indian workers before the donation decision, while those in the 'Info *before* Experience' condition also saw information before the experience—in the form of 12 statistical statements about Indian citizens.[25] These three conditions allowed us to separately identify the impact of the simulated experience from the impact of information preceding the experience, relative to a neutral baseline.

Importantly, after making their donation decisions but before answering demographic questions, each participant was asked to answer a question on the interpersonal similarity—or relatability—of the Indian workers. Namely, they were asked to indicate "To what extent do you feel like you understand and relate to the circumstances of the Indian workers?" on a 1 ('not at all') to 10 ('very much so') scale. This is our measure of the participant's perceptions of interpersonal similarity—*relatability*.[26]

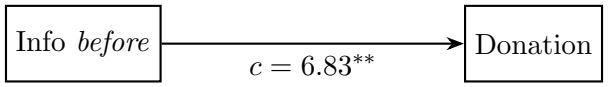
Results. This experiment allows us to test whether changes in perceptions of relatability drove the shift in donation behavior. We do this by estimating a mediation model (Baron and Kenny, 1986),

[23] For pre-registration, see AsPredicted #204985 (https://aspredicted.org/wmdg-6bwj.pdf).

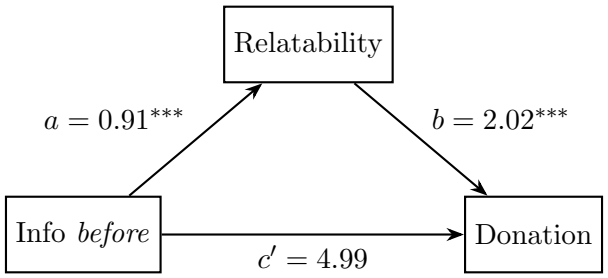
[24] The only difference was that participants were entered into a lottery to win one of three $100 Amazon gift cards.

[25] The protocol of the 'Info *before* Experience' condition is similar to the 'Info *before*' condition of the study in section 2.2; the 'Experience *only*' condition was the same but without the information.

[26] See appendix C and D for the full questionnaire and list of information exhibits.



(A) Total Effect Model (c)



(B) Mediation Model: Direct Effect (c') and Indirect Effect ($a \times b$)

Figure 1: Information, Relatability, and Donations

Notes: Panel A (Total Effect): information before experience has a positive and significant direct effect (c) on donations, without accounting for relatability. Panel B (Mediation Model): this panel decomposes the total effect on donations of receiving information before the experience into a direct effect, and an indirect effect mediated through an increase in relatability. Information before experience has a positive and significant effect on relatability (a). Relatability has a positive and significant relationship with donation behavior (b). The direct effect of information before experience (c') is insignificant when relatability is included in the regression. All comparisons use OLS regressions, comparing the 'Info *before* Experience' condition to the 'Experience *only*' condition. See appendix table A9 for additional details. Results are similar comparing the 'Info *before* Experience' condition to the 'Control' condition (see appendix figure A2 and the corresponding appendix table A10). *** p<0.01, ** p<0.05, * p<0.1.

which decomposes the unconditional effect of introducing information before the simulated experience into the indirect effect that acts through changes in relatability and the direct effect of the information treatment, conditional on changes in relatability. The results of the mediation model are presented in figure 1. Panel A presents the total—unconditional—effect of information received before witnessing the Indian workers' experience on donation behaviors. Panel B decomposes this total effect into the indirect effect which operates through changes in relatability, versus the direct effect of the 'information before experience' treatment conditional on changes in relatability. The mediation model compares the 'Info *before* Experience' condition to the 'Experience *only*' condition. The same model estimated with respect to the 'Control' condition is presented in the appendix figure A2, with similar results.

In panel A, we see that, in line with the study in section 2.2, providing information about the disadvantaged group before the simulated experience has a substantial and significant effect on donation behavior (arrow c). This total effect is decomposed in panel B. Consistent with our hypothesis, and the conceptual framework of section 1, providing information before the experience increases relatability (arrow a). Arrows b and c' show that relatability mediates the impact of adding the information treatment on donation behavior. Including both in a regression, relatability has a large and significant impact on donations (arrow b), whereas the direct effect of information becomes smaller and is no longer significant (arrow c'). This analysis suggests that introducing information before the experi-

ence changed the perception of similarity with the disadvantaged group—a function of attention to overlapping versus non-overlapping attributes. This change in perceived relatability to the outgroup activated the empathetic response to witnessing their struggles and increased the willingness to help through donations.

3.2 Observational evidence

We conclude with suggestive evidence that the mechanism we proposed and verified experimentally—if someone feels similar and is able to relate to an outgroup, they have a stronger empathetic response to witnessing the struggles of that outgroup—can also be found in observational data.

We use four observational measures which are broadly analogous to those in our experimental studies: (*i*) witnessing natural disasters hitting specific foreign countries (Haiti, Japan, and the Philippines), analogous to witnessing the struggles of unauthorized migrants crossing the Southern border (section 2.1) and to the tedious task performed by Indian workers (section 2.2); (*ii*) personal contact with friends, neighbors, or co-workers of Haitian, Japanese, or Filipino origin, analogous to receiving information about outgroups in our experimental treatments (sections 2.1, 2.2, and 3.1); (*iii*) perceived similarity towards Haiti, Japan, and the Philippines, analogous to the notion of relatability to Indian workers (section 3.1); and (*iv*) charitable donations sent to disaster stricken countries, analogous to our measure of attitudes in favor of immigration (section 2.1) and to the sharing of a bonus with Indian workers (sections 2.2 and 3.1).

We measure the impact of the interaction of contact with a given foreign origin country f, and a natural disaster striking f, on charitable donations towards that country. We hypothesize that residents in a domestic county d where they are more likely to be in contact with people of origin f, feel a stronger sense of similarity to people in country f. Consequently, when country f is struck by a natural disaster, they relate more to the struggles of people in f and are, therefore, more likely to send charitable donations to help them. Contact with people from f plays a role analogous to information about country f in our experimental studies.

We note that in our observational setting, there is no equivalent notion of receiving information after a disaster strikes country f, unlike in our experimental studies. Instead, since we use variation in contact induced by slow-moving historical immigration shocks, we postulate that contact pre-dates natural disasters, which corresponds to the 'Info *before*' treatment in our experiments. Our predicted variations in the likelihood of pre-existing contacts with people from f, which induces continuous variations in perceived similarity towards f, is therefore the continuous analogue to the binary 'Info *before*' treatment, and the relatability it induces in our experimental setting.

Method. We extract data on natural disasters hitting Haiti (2010 earthquake and subsequent cholera epidemic), Japan (2011 Tohoku earthquake), and the Philippines (2013 Bohol earthquake and super typhoon Yolanda); and on charitable donations towards those three countries by 55,152 U.S. individual donors over 2010-17 from Bursztyn et al. (2024). To measure perceived similarity and personal contact, we conduct a large-scale survey ($n = 2,400$) of the US population using Prolific.[27] We introduce an incentivized measure of the perceived similarity between a subject and a person from Haiti, Japan, or the Philippines. This measure is analogous to the notion of relatability, but is more appropriate in a survey where Haiti, Japan, or the Philippines are out of any context. Each respondent first answers a short personality test ('big 5 traits,' McCrae and Costa, 1987). They are then told that we asked the same questions to three people, from Haiti, Japan, and the Philippines. We ask them to guess how many personality traits they share with each, offering financial incentives to form the correct guess.[28] We are not interested in whether a respondent is 'right' or 'wrong,' but only whether they perceive people from foreign origins as similar to them or not, on a personal level. The incentive is solely meant to ensure that they are careful in their answers.

For each country, we quantify perceived similarity as the number of personality traits in common, normalized to mean zero and std. dev. one.[29] We then measure contact with Haiti, Japan, or the Philippines as having a friend, neighbor, or co-worker from those origins, as Bursztyn et al. (2024) do for Arab Muslims. Finally, we remove donations to foreign country f if the likely ancestral origin of a donor is f, based on their name as in Bursztyn et al. (2024), and we remove responses on contact and perceived similarity towards f if a respondent is born in f or has at least one parent born in f.[30] $Donations_{d,f}$ is the inverse hyperbolic sine of the number of charitable donations from U.S. domestic county d to foreign country f.[31] $Contact_{i,d,f}$ equals one if individual i, residing in county d, has contact with people from country f, and equals zero otherwise. $Similarity_{i,d,f}$ is the normalized index of perceived similarity between individual i, residing in county d, and country f.

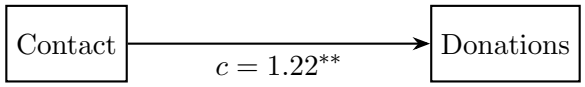
[27] https://www.prolific.co/. See appendix E for the complete survey. We drop respondents we cannot match to a US county of residence, who do not complete the survey, or are younger than 18 (0.4% of observations). Summary statistics are shown in appendix table A2. Our resulting sample is somewhat more feminine, foreign-born, Hispanic, and liberal than the US population (see appendix table A8).

[28] We use the answers from a randomly selected respondent from Haiti, Japan, or the Philippines.

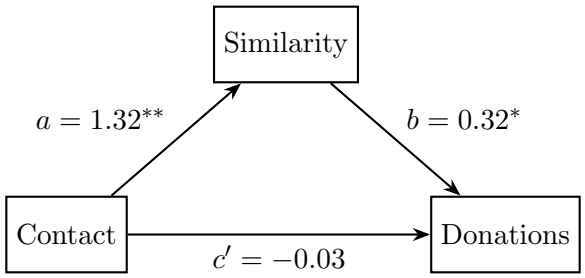
[29] We show in appendix F that this measure captures plausible variations. For instance, conservative respondents perceive all foreign origins as less similar to them compared to liberal respondents, with a more pronounced difference for Haiti and the Philippines which all respondents perceive as less similar.

[30] Contrary to the donation data where we do not have access to the donor list and must rely on names to infer ancestral origin, we could ask respondents in our surveys their direct family connections to country f.

[31] The inverse hyperbolic sine (IHS, or *arcsinh*) function approximates the logarithm function but is well-defined at zero: $IHS(x) = \ln\left(x + \sqrt{x^2 + 1}\right)$. It is commonly used instead of the log function in applied settings with count data that sometimes takes the value zero. It offers an imperfect solution (Chen and Roth, 2023) to the known selection biases arising from selectively dropping zeros (Silva and Tenreyro, 2006).



(A) Total Effect Model (c)



(B) Mediation Model: Direct Effect (c') and Indirect Effect ($a \times b$)

Figure 2: Contact, Perceived Similarity, and Donations

Notes: This figure quantifies the impact of contact between residents in US domestic county d and foreign country f (Haiti, Japan, or the Philippines) on the inverse hyperbolic sine of charitable donations from d to f when f is struck by a natural disaster (panel A), and decomposes the total effect into a direct effect, and an indirect effect mediated through an increase in perceived similarity between residents in county d and country f (panel B). We adapt the mediation analysis with instrumental variables from Dippel et al. (2020). c is the total effect of contact on donations, where contact is instrumented by historical immigration shocks (Burchardi et al., 2019), controlling for country and county fixed effects. a is the effect of contact on perceived similarity, where contact is instrumented by historical immigration shocks, controlling for country and county fixed effects. b and c' are respectively the impact of similarity and contact on donations controlling for country and county fixed effects, where similarity is instrumented by historical immigration shocks, treating contact and country and county fixed effects as controls in the first stage. See appendix table A11 for additional details, and appendix table A12 for results with a single instrument. *** p<0.01, ** p<0.05, * p<0.1.

Identification. Since there are almost no donations in the absence of a natural disaster—see Appendix figure A1—and donations flow only after a disaster strikes, a cross-sectional regression of donations from domestic county d to foreign country f is similar to a difference-in-difference estimate: donations from d to f are approximately the same as the difference between donations after a disaster minus donations before—approximately zero. To identify the causal impact of the interaction of contact and natural disasters, we therefore need plausibly exogenous county-country variations in this interaction term. Natural disasters striking country f are inherently random acts of nature. To isolate plausibly exogenous variations in contact between residents in county d and country f, we control for county and country fixed effects, and use variation in the ethnic composition of US counties induced by quasi-random historical immigration shocks from country f to county d (Burchardi et al., 2019). Finally, to decompose the impact of contact on donations into a direct effect and an indirect effect mediated through perceived similarity, we adapt the mediation analysis with instrumental variables from Dippel et al. (2020), similar to the analysis of figure 1.

Results. The results are presented in figure 2. Panel A shows that the total impact of contact between residents in U.S. domestic county d and foreign country f on donations from d to f is large

and significant (arrow c). Panel B decomposes this total effect into an indirect effect mediated by perceived similarity and a direct effect of contact on donations, conditional on perceived similarity. Contact has a large and significant impact on the measure of similarity (arrow a), which in turns has a large and, somewhat marginally, significant impact on donations (arrow b). Controlling for the indirect effect mediated by perceived similarity, the direct effect of contact on donations is almost nil and statistically insignificant (arrow c').[32] This suggests that the impact of contact on donations is mediated by similarity, a result which mirrors our experimental evidence showing the impact of information on donations is mediated by relatability.

Conclusion

Using a series of field experiments and observational data, we study the mechanics of empathy. We show that a person can have a stronger empathetic response after witnessing the struggles of an outgroup if they have been presented with information about that group before witnessing their struggles, compared to after. Importantly, we show that information activates empathy in our data because it increases *relatability* to the outgroup. Being able to relate to the circumstances of others enables to re-live a simulated experience of their struggles as if one were 'in their shoes.'

In a controlled field experiment, people exposed to statistical information about unauthorized immigrants to the US *before* witnessing the ordeal of unauthorized migrants crossing the Southern border in a virtual reality immersive experience have a stronger empathetic response than if the same information is provided *after*: they are more likely to donate to charities helping migrants and express more positive political attitudes towards immigration. We reproduce this finding in the lab, where subjects previously exposed to statistical information about Indian citizens have a stronger empathetic response to witnessing Indian workers performing an arduous task than subjects who receive the same information later. We also show that the same information package increases respondents' relatability to the circumstances of Indian workers, and that this increased relatability explains their stronger empathetic response. In observational data, residents in counties where they are more likely to be in contact with specific foreign origin groups (from Haiti, Japan, or the Philippines) feel more similar to these groups and have a stronger empathetic response to witnessing those foreign origins devastated by natural disasters: they send more charitable donations to those foreign countries.

Taken together, our results suggest a novel mechanism through which political and private attitudes

[32] With multiple instruments, the decomposition of the total effect into a direct effect of contact on donations, and an indirect effect mediated through similarity does not algebraically sum to 100%. Appendix table A12 shows specifications with a single instrument, immigration shocks in 2000 or in 2010, where this algebraic decomposition holds. In both cases, approximately 100% of the impact of contact on donations is mediated through similarity, while the direct effect is almost nil as in figure 2. Unfortunately, neither instrument is strong on its own.

can be affected: information provision and inter-group contact can improve a person's ability to put themselves in the shoes of others. In particular, we show that, beyond a possible direct informational effect, receiving information about an outgroup can shift people's attention to shared attributes, increasing their perceived relatability, and, in turn, enhancing their empathy—even when people are initially more hostile to the outgroup.

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Online Appendix

"In Their Shoes"

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In this online appendix, we present additional statistics and results (appendix section A), the complete surveys we administered, on the Carne y Arena study (appendix section B), on the conceptual replication studies (appendix sections C and D), and on contact and perceived similarity to foreign origin groups (appendix section E), and a description of the spatial representation of perceived similarity (appendix section F).

A Additional Tables and Figures

Appendix Table A1: Carne y Arena Protocol

Dallas, Texas

	On site (short run)				*Follow-up (long run)*	
'Baseline'	`Attit`	*`Info`*	*`CyA`*	($n = 83$)	`Attit`	($n = 8$)
'CyA'	*`CyA`*	`Attit`	*`Info`*	($n = 99$)	`Attit`	($n = 8$)
'Info *after* CyA'	*`CyA`*	*`Info`*	`Attit`	($n = 87$)	`Attit`	($n = 10$)

Omaha, Nebraska

	On site (short run)				*Follow-up (long run)*	
'Baseline'	`Attit`	*`Info`*	*`CyA`*	($n = 82$)	`Attit`	($n = 29$)
'CyA'	*`CyA`*	`Attit`		($n = 83$)	`Attit`	($n = 34$)
'Info *before* CyA'	*`Info`*	*`CyA`*	`Attit`	($n = 63$)	`Attit`	($n = 28$)
'Info *after* CyA'	*`CyA`*	*`Info`*	`Attit`	($n = 74$)	`Attit`	($n = 24$)
'Info *alone*'	*`Info`*	`Attit`	*`CyA`*	($n = 85$)	`Attit`	($n = 34$)
'Long run'	*`CyA`*			($n = 62$)	`Attit`	($n = 22$)
Total				($n = 718$)		($n = 197$)

Notes: This table shows, across treatment arms, the ordering of *`treatments`* (Carne y Arena, *`CyA`*; and information, *`Info`*) and `measurements` (demographics [upon arrival]; attitudes in favor of migrants, `Attit`; and information retention quiz [right after receiving information]). Follow-up measures of attitudes are collected online approximately two months after the on site visit.

Appendix Table A2: Descriptive Statistics

	Obs.	Mean	Std. Dev.	Median	Min.	Max.
Panel A: Carne y Arena (section 2.1)						
Share correct answers	915	0.473	0.316	0.500	0.000	1.000
Attitude index:						
On site	656	0.297	0.936	0.548	-3.952	1.720
At home	197	0.408	0.806	0.526	-3.287	1.720
Panel B: Conceptual replication (section 2.2)						
Donations	244	37.730	27.910	39.500	0.000	100.000
Panel C: Relatability (section 3.1)						
Relatability	424	5.031	2.874	5.000	0.000	10.000
Donations	426	37.310	25.945	40.000	0.000	100.000
Panel D: Charitable donations and migrations, county d-country f level (section 3.2)						
IHS-transformed number of donations from d to f	12,978	1.967	2.216	0.881	0.000	8.002
Number of immigrants from d to f at t (in 1,000's)	88,370	0.041	0.720	0.000	0.000	95.964
Panel E: Contact and similarity to Haiti, Japan, and the Philippines (section 3.2)						
Perceived similarity:						
All	7,173	0.000	1.000	0.357	-2.327	2.146
Haiti	2,391	-0.223	1.006	-0.538	-2.327	2.146
Japan	2,391	0.196	1.010	0.357	-2.327	2.146
Philippines	2,391	0.026	0.938	0.357	-2.327	2.146
Contact:						
All	7,173	0.283	0.450	0.000	0.000	1.000
Haiti	2,391	0.134	0.341	0.000	0.000	1.000
Japan	2,391	0.435	0.496	0.000	0.000	1.000
Philippines	2,391	0.280	0.449	0.000	0.000	1.000

Notes: The table presents summary statistics for the datasets used in the main analyses. Note that the attitude indices on site (panel A) are normalized to mean zero and standard deviation one for their respective control groups; but as we have induced higher indices in the other treatment groups, the means are higher than zero, and the standard deviations different from one. By contrast, perceived similarity with foreign origins (panel E) is normalized for the entire population, so its mean is zero and standard deviation one by construction.

Appendix Table A3: Balance Test, Carne y Arena

	Baseline	CyA	Info	Info *after* CyA	Info *before* CyA	Long run	Test
Panel A: Dallas							
	83 (30.9%)	99 (36.8%)		87 (32.3%)			
Gender							
Male	31 (37.3%)	44 (44.4%)		35 (40.2%)			0.618
Female	52 (62.7%)	55 (55.6%)		52 (59.8%)			
Birthplace							
US born	43 (51.8%)	45 (45.5%)		44 (50.6%)			0.655
Foreign	40 (48.2%)	54 (54.5%)		43 (49.4%)			
Ethnicity							
Non-Hispanic	55 (66.3%)	56 (56.6%)		47 (54.0%)			0.231
Hispanic	28 (33.7%)	40 (46.0%)		43 (43.4%)			
Ideology							
Conservative	30 (36.1%)	38 (38.4%)		34 (39.1%)			0.919
Liberal	53 (63.9%)	61 (61.6%)		53 (60.9%)			
Panel B: Omaha							
	82 (18.3%)	83 (18.5%)	85 (18.9%)	74 (16.5%)	63 (14.0%)	62 (13.8%)	
Gender							
Male	34 (42.5%)	33 (40.2%)	27 (32.9%)	18 (24.7%)	31 (50.0%)	19 (31.1%)	0.032
Female	46 (57.5%)	49 (59.8%)	55 (67.1%)	55 (75.3%)	31 (50.0%)	42 (68.9%)	
Birthplace							
US born	52 (63.4%)	64 (77.1%)	68 (80.0%)	51 (68.9%)	45 (71.4%)	43 (69.4%)	0.197
Foreign	30 (36.6%)	19 (22.9%)	17 (20.0%)	23 (31.1%)	18 (28.6%)	19 (30.6%)	
Ethnicity							
Non-Hispanic	64 (78.0%)	72 (86.7%)	73 (85.9%)	64 (86.5%)	51 (81.0%)	55 (88.7%)	0.455
Hispanic	18 (22.0%)	11 (13.3%)	12 (14.1%)	10 (13.5%)	12 (19.0%)	7 (11.3%)	
Ideology							
Conservative	30 (36.6%)	34 (41.0%)	28 (32.9%)	27 (36.5%)	15 (23.8%)	15 (24.2%)	0.167
Liberal	52 (63.4%)	49 (59.0%)	57 (67.1%)	47 (63.5%)	48 (76.2%)	47 (75.8%)	

Notes: This table shows the demographic composition (number of respondents and shares in %) for the Carne y Arena experimental subjects, and the p-values from a Pearson test of equality of those demographic shares between treatment arms.

Appendix Table A4: Persistence of Carne y Arena

	(1) only CyA	(2) CyA
Long run *vs* short run	0.410*	0.408***
	(0.221)	(0.095)
Observations	187	362
p-value Robust S.E.	0.065	< 0.01
p-value Wild Bootstrap	0.039	< 0.01
p-value Permutation test	0.060	< 0.01

Notes: This table shows estimates of the treatment effect of Carne y Arena on long-term (2 months) attitudes in favor of migrants. The dependent variable is the attitude index, measured either in a follow-up survey (treatment group) or on site (control group). The control group in both columns is 'baseline,' for which we measure attitudes on site before any treatment. The treatment group in column 1 is 'Long run', a group which only saw the Carne y Arena exhibit but did not receive any other treatment while on site, and for which we measure attitudes in a follow-up survey two months after the Carne y Arena visit. The treatment group for column 2 combines 'long run,' 'CyA,' 'Info,' 'CyA *then* Info,' and 'Info *then* CyA,' all exposed to the Carne y Arena treatment on site, and for which we measure attitudes in a follow-up survey two months after the Carne y Arena visit. Robust standard errors are in parentheses. *p*-values are computed using robust standard errors, wild bootstrap (Wu, 1986), and a permutation test (Young, 2019).
*** p<0.01, ** p<0.05, * p<0.1.

Appendix Table A5: Treatment Effect of Carne y Arena on Information Retention

	(1) All Information	(2) Negative Information	(3) Positive Information	(4) Emotional Information
CyA	0.021	0.009	0.030	0.024
	(0.031)	(0.042)	(0.035)	(0.039)
Dallas	0.084**	0.132***	0.065	0.055
	(0.036)	(0.049)	(0.041)	(0.045)
Constant	0.546***	0.586***	0.526***	0.527***
	(0.018)	(0.023)	(0.020)	(0.022)
p-value Robust S.E.	0.505	0.835	0.393	0.541
p-value Wild Bootstrap	0.489	0.821	0.386	0.524
p-value Permutation test	0.520	0.720	0.580	0.620
Observations	405	405	405	405

Notes: This table shows estimates of various specifications of equation (4), where we estimate the treatment effect of Carne y Arena on the ability of subjects to retain information, controlling for differences between Dallas and Omaha subjects. The control group received information *before* Carne y Arena, and the treatment group received information *after* Carne y Arena. The dependent variable is the share of correct answers on a quiz about all information exhibits in column 1 (12 questions), about a subset of exhibits which we pre-registered as 'negative' information in column 2 (4 questions), as 'positive' information in column 3 (4 questions), and as 'emotional' information in column 4 (4 questions). Robust standard errors are in parentheses. *p*-values are computed using robust standard errors, wild bootstrap (Wu, 1986), and a permutation test (Young, 2019). *** p<0.01, ** p<0.05, * p<0.1.

Appendix Table A6: Information, Carne y Arena, and Attitudes, Dallas vs Omaha

	(1) CyA	(2) Info *after* CyA	(3) Info *before* CyA
Panel A: Dallas and Omaha combined			
Treatment	0.319***	0.361***	0.703***
	(0.106)	(0.103)	(0.139)
Observations	347	326	228
p-value Robust S.E.	< 0.01	< 0.01	< 0.01
p-value Wild Bootstrap	< 0.01	< 0.01	< 0.01
p-value Permutation test	< 0.01	< 0.01	< 0.01
Panel B: only Dallas			
Treatment	0.344**	0.456***	
	(0.138)	(0.134)	
Observations	182	170	
p-value Robust S.E.	0.014	< 0.01	
p-value Wild Bootstrap	0.019	< 0.01	
p-value Permutation test	< 0.01	< 0.01	
Panel C: only Omaha			
Treatment	0.290*	0.250	0.703***
	(0.163)	(0.158)	(0.152)
Observations	165	156	145
p-value Robust S.E.	0.078	0.115	< 0.01
p-value Wild Bootstrap	0.061	0.104	< 0.01
p-value Permutation test	0.020	0.140	< 0.01

Notes: This table shows estimates of various specifications of equation (4) for Dallas and Omaha subjects combined (panel A), for Dallas subjects only (panel B), and for Omaha subjects only. For comparison, panel A is an exact reproduction of table 1 (columns 1-3). The dependent variable is an index of attitudes in favor of migrants. The control group is always 'Baseline.' The treatment groups are: 'CyA' in column 1; 'Info *after* CyA' in column 2; 'Info *before* CyA' in column 3 (see protocol in table A1). Robust standard errors are in parentheses. *p*-values are computed using robust standard errors, wild bootstrap (Wu, 1986), and a permutation test (Young, 2019). *** p<0.01, ** p<0.05, * p<0.1.

Appendix Table A7: Information, Carne y Arena, and Attitudes, Heterogeneity

	(1) CyA		(2) Info *after* CyA		(3) Info *before* CyA	
Baseline:	0.319***	(0.106)	0.361***	(0.103)	0.703***	(0.139)
Hispanic:	0.252	(0.196)	0.293	(0.188)	0.603*	(0.326)
non-Hispanic:	0.338***	(0.124)	0.375***	(0.121)	0.752***	(0.164)
p-value	0.711		0.717		0.685	
Foreign:	0.045	(0.162)	0.139	(0.156)	0.420	(0.263)
Native:	0.524***	(0.136)	0.529***	(0.132)	0.886***	(0.180)
p-value	0.024		0.058		0.146	
Liberal:	0.386***	(0.129)	0.437***	(0.124)	0.633***	(0.172)
Conservative:	0.258	(0.165)	0.258	(0.161)	0.582**	(0.272)
p-value	0.542		0.380		0.876	

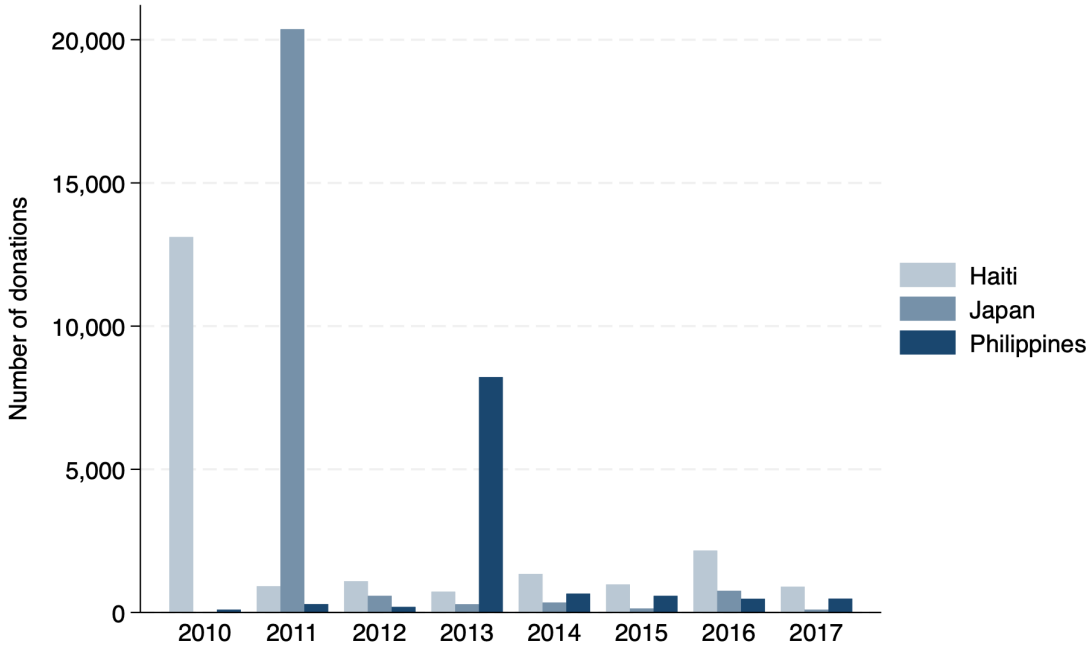
Notes: This table shows estimates of various specifications of equation (4), exploring the heterogeneity of the various treatment effects on attitudes in favor of migrants across types. The control group is always 'Baseline.' The treatment groups are: 'CyA' in column 1; 'Info *after* CyA' in column 2; 'Info *before* CyA' in column 3. The top panel (Baseline) reproduces the results from table 1 for comparison. The other panels present separate regressions for each type: Hispanic versus non-Hispanic respondents, foreign versus US-born respondents, and liberal versus conservative respondents. The p-values are from a test of equality of the treatment effects between types. Robust standard errors are in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

Appendix Table A8: Descriptive statistics, Contact and Similarity Survey

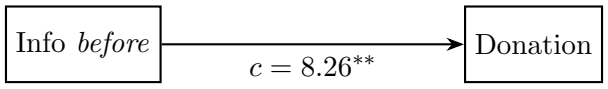
	Summary	CCES shares
	7,173	
Gender		
Female	3,531 (50.3%)	56.7%
Male	3,489 (49.7%)	43.3%
Birthplace		
Foreign	1,551 (21.6%)	17%
US born	5,622 (78.4%)	83%
Ethnicity		
Hispanic	483 (6.7%)	2.8%
Non-Hispanic	6,690 (93.3%)	97.2%
Ideology		
Liberal	3,981 (55.5%)	33.6%
Conservative	3,192 (44.5%)	66.4%

Notes: This table presents descriptive statistics for our online survey on perceived similarity, and compares the demographic composition (number of respondents and shares in %) of our survey respondents to that of the US as a whole, using data from the Cooperative Congressional Election Study (CCES). Note that 153 respondents listed their gender as "other," so that female and male responses do not add up to the total number of responses.

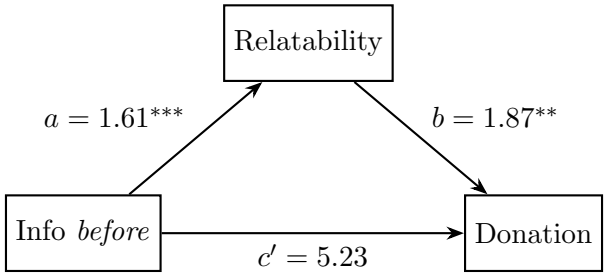
Appendix Figure A1: Total number of donations to each country per year



Notes: This figure shows the total number of charitable donations, from all US counties combined, towards each of the three countries in our sample (Haiti, Japan, and the Philippines), over our sample period, 2010-17. The main events are: for Haiti the 2010 earthquake and subsequent cholera epidemic; for Japan the 2011 Tohoku earthquake, tsunami, and nuclear disaster; and for the Philippines the 2013 Bohol earthquake and super typhoon Yolanda.



(A) Total Effect Model (c)



(B) Mediation Model: Direct Effect (c') and Indirect Effect ($a \times b$)

Appendix Figure A2: Information, Relatability, and Donations (Robustness)

Notes: This figure explores the robustness of the results in figure 1. It shows results for the same mediation model, except that we compare the 'Info *before* Experience' and 'Control' conditions, instead of of 'Info *before* Experience' and 'Experience *only*' conditions in figure 1. See appendix table A10 for additional details.
*** p<0.01, ** p<0.05, * p<0.1.

Appendix Table A9: Information, Relatability, and Donations

	Donations	Relatability	Donations
	(1)	(2)	(3)
Information *before*	6.834**	0.908***	4.994
	(3.232)	(0.333)	(3.208)
Relatability			2.026***
			(0.571)
Constant	35.605***	5.008***	25.458***
	(2.409)	(0.248)	(3.706)
Observations	279	279	279

Notes: This table shows the regression coefficients underlying figure 1. Column 1 gives the total effect of the 'Information *before* Experience' treatment on donations, arrow c in figure 1; column 2 gives the impact of the 'Information *before* Experience' treatment on relatability, arrow a in figure 1; column 3 gives the impact of relatability donations, arrow b in figure 1, and the indirect effect of the 'Information *before* Experience' treatment on donations, arrow c' in figure 1.
*** p<0.01, ** p<0.05, * p<0.1.

Appendix Table A10: Information, Relatability, and Donations (Robustness)

	Donations	Relatability	Donations
	(1)	(2)	(3)
Information *before*	8.258**	1.614***	5.231
	(3.258)	(0.349)	(3.323)
Relatability			1.875***
			(0.559)
Constant	34.181***	4.302***	26.115***
	(2.464)	(0.264)	(3.411)
Observations	271	271	271

Notes: This table shows the regression coefficients underlying figure A2. It use the same mediation model as appendix table A9, except that we compare the 'Info *before* Experience' and 'Control' conditions, instead of of 'Info *before* Experience' and 'Experience *only*' conditions in appendix table A9.
*** p<0.01, ** p<0.05, * p<0.1.

Appendix Table A11: Contact, Perceived Similarity, and Donations

	IHS(# Donations)	Similarity index	IHS(# Donations)
	(1)	(2)	(3)
Contact	1.220**	1.318**	-0.034
	(0.496)	(0.566)	(0.024)
Similarity index			0.319*
			(0.163)
First stage *F-statistic*	5.314	5.314	16.656
Weak IV-robust *p-value*	< 0.01	< 0.01	< 0.01
Observations	6223	6223	6223
First stage model	I	I	II

Model I: $Contact_{i,d,f} = \sum_{t=1880}^{2010} \gamma_t^{Cont.} I_{-r(d),f,t} \frac{I_{d,-c(f),t}}{I_{\cdot,-c(f),t}} + \delta_d^{Cont.} + \delta_f^{Cont.} + \eta_{i,d,f}^{Cont.}$

Model II: $Similarity_{i,d,f} = \sum_{t=1880}^{2010} \gamma_t^{Sim.} I_{-r(d),f,t} \frac{I_{d,-c(f),t}}{I_{\cdot,-c(f),t}} + \gamma^{Sim.} Contact_{i,d,f} + \delta_d^{Sim.} + \delta_f^{Sim.} + \eta_{i,d,f}^{Sim.}$

Notes: This table shows the regression coefficients underlying figure 2. It quantifies the impact of contact between residents in US domestic county d and foreign country f (Haiti, Japan, or the Philippines) on charitable donations from d to f when f is struck by a natural disaster, and decomposes the total effect into a direct effect, and an indirect effect mediated through an increase in perceived similarity between f and residents in d. We adapt the mediation analysis with instrumental variables from Dippel et al. (2020).

In column 1, the dependent variable is the inverse hyperbolic sine of the number of donations from d to f, and contact between f and individual i residing in d is the endogenous variable, instrumented by historical immigration shocks from f to d, controlling for county and country fixed effects. In column 2, the dependent variable is a measure of perceived similarity between individual i in county d and country f, and contact between i in d and f is the endogenous variable, instrumented by historical immigration shocks, controlling for county and country fixed effects. In column 3 donations from d to f is the dependent variable, similarity between i in d and f is the endogenous variable, instrumented by historical immigration shocks, controlling for county and country fixed effects and for contact between i in d and f.

Our excluded instruments are always the $I_{-r(d),f,t} \times I_{d,-c(f),t}/I_{\cdot,-c(f),t}$'s, the interaction of historical immigration in period $t \in 1880, 2010$ from country f towards counties outside the region of county d—an immigration push from country f—with the share of all migrants arriving in period t from countries outside the continent of country f who settle in county d—an immigration pull towards county d.

Interpretation: column 1 gives the total effect of contact on donations, arrow c in figure 2; column 2 gives the impact of contact on similarity, arrow a in figure 2; column 3 gives the impact of similarity on donations, arrow b in figure 2, and the indirect effect of contact on donations, arrow c' in figure 2.

Standard errors, in parentheses, are clustered at the country and county level. We also report weak IV-robust p-values (Andrews et al., 2007). *** p<0.01, ** p<0.05, * p<0.1.

Appendix Table A12: Contact, Perceived Similarity, and Donations (Single Instrument)

	Donations	Similarity	Donations
	(1)	(2)	(3)
Panel A: 2000 immigration instrument			
Contact	0.779	0.781	-0.141
	(0.841)	(0.734)	(0.225)
Similarity			1.178
			(1.727)
First stage *F-statistic*	10.222	10.222	0.920
Observations	6223	6223	6223
First stage model	I	I	II
Model I: $Contact_{i,d,f} = \gamma^{Cont.} I_{-r(d),f,2000} \frac{I_{d,-c(f),2000}}{I_{\cdot,-c(f),2000}} + \delta_d^{Cont.} + \delta_f^{Cont.} + \eta_{i,d,f}^{Cont.}$			
Model II: $Similarity_{i,d,f} = \gamma^{Sim.} I_{-r(d),f,2000} \frac{I_{d,-c(f),2000}}{I_{\cdot,-c(f),2000}} + \gamma^{Sim.} Contact_{i,d,f} + \delta_d^{Sim.} + \delta_f^{Sim.} + \eta_{i,d,f}^{Sim.}$			
Panel B: 2010 immigration instrument			
Contact	1.062	1.230	-0.113
	(0.777)	(0.750)	(0.112)
Similarity			0.956
			(0.833)
First stage *F-statistic*	15.927	15.927	2.670
Observations	6223	6223	6223
First stage model	I	I	II
Model I: $Contact_{i,d,f} = \gamma^{Cont.} I_{-r(d),f,2010} \frac{I_{d,-c(f),2010}}{I_{\cdot,-c(f),2010}} + \delta_d^{Cont.} + \delta_f^{Cont.} + \eta_{i,d,f}^{Cont.}$			
Model II: $Similarity_{i,d,f} = \gamma^{Sim.} I_{-r(d),f,2010} \frac{I_{d,-c(f),2010}}{I_{\cdot,-c(f),2010}} + \gamma^{Sim.} Contact_{i,d,f} + \delta_d^{Sim.} + \delta_f^{Sim.} + \eta_{i,d,f}^{Sim.}$			

Notes: This table replicates the results in table A11 with a single instrumental variable. Our excluded instrument in panel A is $I_{-r(d),f,2000} \times I_{d,-c(f),2000}/I_{\cdot,-c(f),2000}$'s, the interaction of historical immigration in period 2000 from country f towards counties outside the region of county d—an immigration push from country f—with the share of all migrants arriving in period t from countries outside the continent of country f who settle in county d—an immigration pull towards county d. Our excluded instrument in panel B is constructed similarly using immigration in 2010. Standard errors, in parentheses, are clustered at the country and county level. We also report weak IV-robust p-values (Andrews et al., 2007). *** p<0.01, ** p<0.05, * p<0.1.

B Carne y Arena Survey Questionnaire

The printout version of the Carne y Arena questionnaire below corresponds to a respondent assigned to our control group ('Baseline') at Kaneko in Omaha, Nebraska (the questionaire at Fair Park in Dallas, Texas, is identical but for the last page). They answer questions about their attitudes towards immigration first, receive the information treatment second, and visit Carne y Arena third. Across respondents, the ordering of those three blocks is randomized.

Email

Please enter your email address

Demographic Block

What is your gender?

- Male
- Female
- Other

In what year were you born?

What was your TOTAL household income, before taxes, last year?

- $0-$9,999
- $10,000-$14,999
- $15,000-$19,999
- $20,000-$29,999
- $30,000-$39,999
- $40,000-$49,999
- $50,000-$69,999
- $70,000-$89,999
- $90,000-$109,999
- $110,000-$149,999
- $150,000-$199,999
- $200,000+

Please indicate your marital status

- Single
- Married
- Legally separated or divorced
- Widowed

How many children do you have?

- I do not have children
- 1
- 2
- 3
- 4

- ○ 5 or more

What racial or ethnic group best describes you?

- ○ White
- ○ Black or African-American
- ○ Hispanic or Latino
- ○ Asian or Asian-American
- ○ Native American
- ○ Middle Eastern
- ○ Mixed Race
- ○ Other

Were you born in the United States?

- ○ Yes
- ○ No

Where were you born?

Were both of your parents born in the United States?

- Yes
- No

Where was your father born?

Where was your mother born?

What is your ZIP code?

Which category best describes your highest level of education?

- Eighth Grade or less
- Some High School

- ○ High School degree / GED
- ○ Some College
- ○ 2-year College Degree
- ○ 4-year College Degree
- ○ Master's Degree
- ○ Doctoral Degree; Professional Degree (JD, MD, MBA)

What is your current employment status?

- ○ Full-time employee
- ○ Part-time employee
- ○ Self-employed or small business owner
- ○ Unemployed and looking for work
- ○ Student
- ○ Not currently working and not looking for work
- ○ Retiree

What is your current occupation?

Even if you are not currently working, what was latest

occupation?

On policy matters, where do you see yourself on the liberal/conservative spectrum?

- Very liberal
- Liberal
- Moderate
- Conservative
- Very conservative

In politics, as of today, do you consider yourself a Republican, a Democrat or an independent?

- Republican
- Democrat
- Independent

Did you vote in the last presidential election?

- Yes

- ○ No

In the last presidential election, you supported:

- ○ Joe Biden
- ○ Donald Trump
- ○ Other

Even if you did NOT vote, please indicate the candidate that you were most likely to have voted for or who represents your views most closely

- ○ Joe Biden
- ○ Donald Trump
- ○ Other

How often do you visit art exhibitions/events?

- ○ Very frequently
- ○ Frequently
- ○ Occasionally
- ○ Rarely
- ○ Never

Have you experienced Virtual Reality before?

- ○ Yes
- ○ No

Attention check

How many states are there in the U.S.?

- ○ 5
- ○ 50
- ○ 100
- ○ 10

Views on immigration

Consider the policy proposals listed below. Which ones do you think the U.S. government should implement?

Select all that apply.

- ☐ Increase the number of asylum seekers admitted to the U.S.

- [ ] Eliminate the estate tex.
- [ ] Shift from a more family-based to a more merit-based immigration system.
- [ ] Raise the federal minimum wage to $15 an hour.
- [ ] Cap carbon emissions to combat climate change.
- [ ] Allow employers to decline coverage of abortions in insurance plans.
- [ ] Remove barriers to domestic oil and gas drilling.
- [ ] Amend federal laws to prohibit discrimination on the basis of gender identity and sexual orientation.
- [ ] Increase the number of border patrols on the US-Mexican border.
- [ ] Pass the DREAM Act, granting resident status to unauthorized immigrants who entered the US as minors.
- [ ] None of the above.

How would you rank the policies you selected in terms of priority of the U.S. government (where 1 indicates highest priority)?

Drag and drop the items to the desired order. Skip if you only chose 1 item.

» Pass the DREAM Act, granting resident status to unauthorized immigrants who entered the US as minors.

» Amend federal laws to prohibit discrimination on the basis of gender identity and sexual orientation.

» Raise the federal minimum wage to $15 an hour.

» Cap carbon emissions to combat climate change.

» Increase the number of border patrols on the US-Mexican border.

» Eliminate the estate tex.

» Increase the number of asylum seekers admitted to the U.S.

» Remove barriers to domestic oil and gas drilling.

» Shift from a more family-based to a more merit-based immigration system.

» Allow employers to decline coverage of abortions in insurance plans.

» None of the above.

Which of the following policies best represents your views on unauthorized immigration?

- ○ All unauthorized immigrants should be granted full U.S. citizenship, without any conditions.
- ○ All unauthorized immigrants should be given a pathway to earn U.S. citizenship.
- ○ All unauthorized immigrants brought here as children should be given a pathway to earn U.S. citizenship.

- ○ No unauthorized immigrant should be given a pathway to earn U.S. citizenship.
- ○ All unauthorized immigrants should be deported.

We would like to make a donation of $2 on your behalf to a good cause.

Which of the following charities would you like to donate to?

- ○ The **Natural Resources Defense Council** (NRDC):
  Works to safeguard the earth -- its people, its plants and animals, and the natural systems on which all life depends.
- ○ The **Humane Society of the U.S.** (HSUS):
  Works to end the cruelest practices toward all animals, care for animals in crisis and build a stronger animal protection movement.
- ○ The **Refugee and Immigrant Center for Education and Legal Services** (RAICES):
  A nonprofit agency that promotes justice by providing free and low-cost legal services to underserved immigrant children, families, and refugees.

Financial incentive

On the next page, we will show you information related to immigration and border security. You will later be asked to complete a quiz on this information.

If you answer correctly to more than 70% of quiz questions, you will be entered into a lottery for a **$100 Amazon gift card**.

Information Treatment

In this section we will show you information related to the current situation on the Southwest border and the number and characteristics of unauthorized immigrants living in the U.S.

The statistical sources for this information, and the years it refers to, are:

Border apprehensions: **U.S. Customs and Border Protection**, Department of Homeland Security (fiscal years 2015 to 2020).

Number and characteristics of unauthorized immigrants living in the U.S.: **U.S. Census Bureau** and **Migration Policy Institute** (2015 to 2019).

Crime rates in Texas: **Texas Department of Public Safety** (2015 to 2019).

Cross-country living standards: **World Bank** (2020).

Cross-country crime rates: **United Nations Office on Drugs and Crime** (2018).

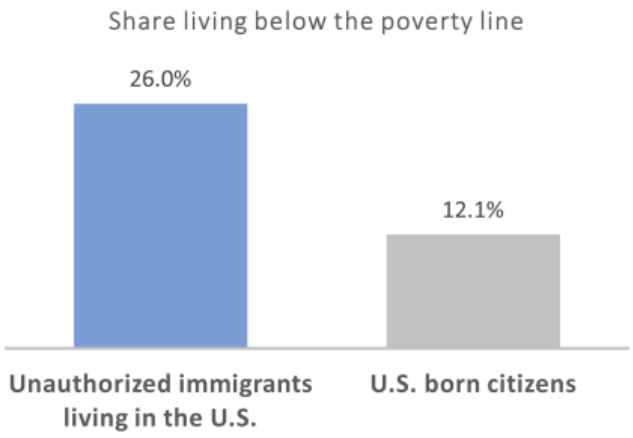
In the fiscal year 2020, U.S. Customs and Border Protection apprehended a total of **400,651 people** on the Southwest border.

In the fiscal year 2020, U.S. Customs and Border Protection seized **287,000 pounds** of drugs on the Southwest border.

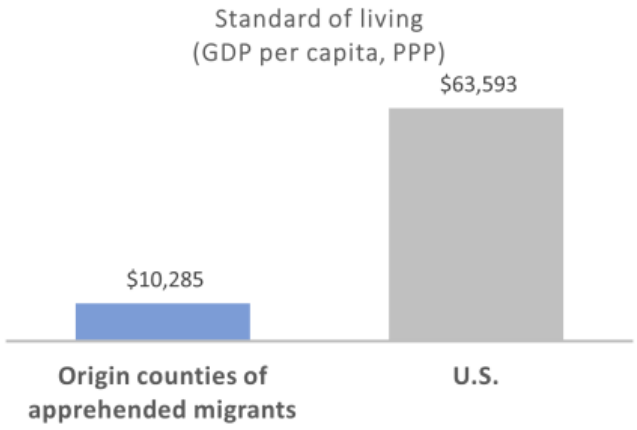
The number of unauthorized immigrants living in the U.S. is about **11 million**.

Unauthorized immigrants living in the U.S. are **2.5 times more likely** than U.S. born citizens to live below the poverty

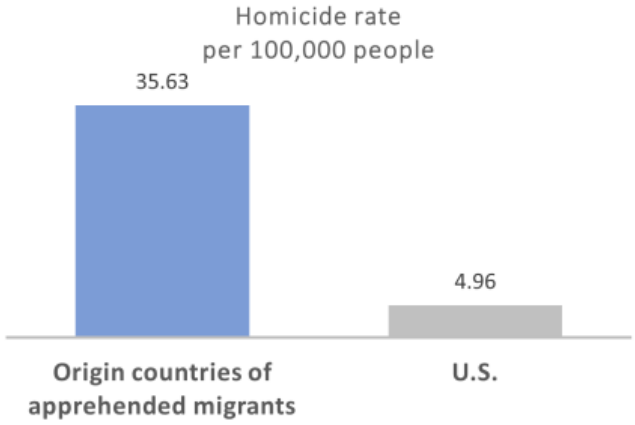
line.



The average standard of living in the top four origin countries of migrants apprehended on the Southwest border is **6 times lower** than that in the U.S.



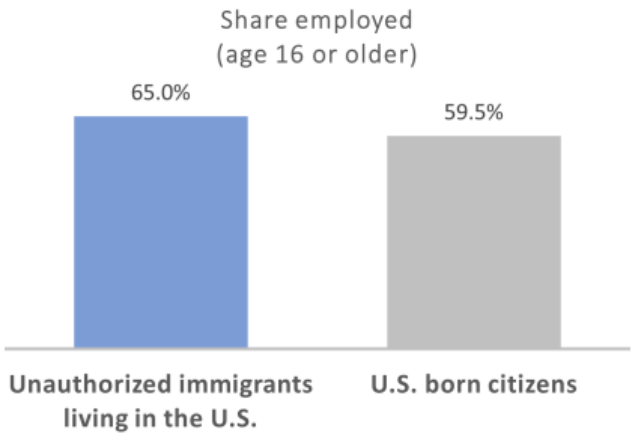
The average homicide rate in the top four origin countries of migrants apprehended on the Southwest border is **7 times higher** than that in the U.S.



In the fiscal year 2020, U.S. Customs and Border Protection apprehended **30,557** unaccompanied children under the age of 18 on the Southwest border.

In the fiscal years 2015 to 2020, U.S. Customs and Border Protection recorded **1,455** deaths on the Southwest border.

Unauthorized immigrants living in the U.S. are **as likely** as U.S. born citizens to be employed.

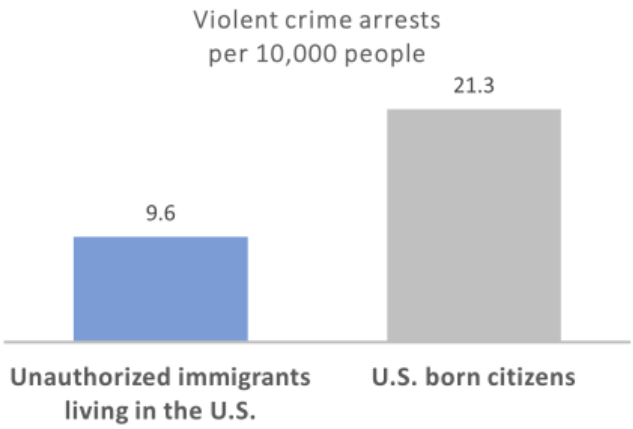


Unauthorized immigrants living in the U.S. have the following rights and obligations:

They are **required to file tax returns and pay taxes** on income earned in the U.S.

They are **NOT eligible** to receive Social Security benefits.

In Texas, unauthorized immigrants are **55% less likely** than U.S. born citizens to be arrested for a violent crime.



About **93%** of unauthorized immigrant children aged 13 to 17 who live in the U.S. are enrolled in high school.

Information Questions

Please answer the following questions based on the information you saw.

In the fiscal year 2020, how many people were apprehended by U.S. Customs and Border Protection on the Southwest border?

- ○ Between 180,000 and 300,000

- ○ Between 340,000 and 460,000
- ○ Between 660,000 and 780,000

In the fiscal year 2020, what was the volume of drugs seized by U.S. Customs and Border Protection on the Southwest border?

- ○ Between 260,000 lbs and 350,000 lbs
- ○ Between 10,000 lbs and 100,000 lbs
- ○ Between 130,000 lbs and 220,000 lbs

What is the number of unauthorized immigrants living in the U.S.?

- ○ Between 9 and 13 million
- ○ Between 18 and 21 million
- ○ Between 5 and 8 million

Which of the following statements is correct?

- ○ Unauthorized immigrants are
  2 times more likely than U.S. born citizens to live below the poverty line.
- ○ Unauthorized immigrants are
  3 times more likely than U.S. born citizens to live below the poverty line.

- Unauthorized immigrants are 4 times more likely than U.S. born citizens to live below the poverty line.

Which of the following statements is correct?

- The standard of living in the origin countries of apprehended migrants is about the same as that in the U.S.
- The standard of living in the origin countries of apprehended migrants is 10 times lower than that in the U.S.
- The standard of living in the origin countries of apprehended migrants is 6 times lower than that in the U.S.

Which of the following statements is correct?

- The homicide rate in the origin countries of apprehended migrants is 11 times higher than that in the U.S.
- The homicide rate in the origin countries of apprehended migrants is 7 times higher than that in the U.S.
- The homicide rate in the origin countries of apprehended migrants is 3 times higher than that in the U.S.

In the fiscal year 2020, how many unaccompanied children under the age of 18 were apprehended by U.S. Customs and Border Protection on the Southwest border?

- ○ Between 26,000 and 35,000
- ○ Between 50,000 and 59,000
- ○ Between 2,000 and 11,000

How many deaths did U.S. Customs and Border Protection record on the Southwest border in the fiscal years 2015 to 2020?

- ○ Between 2,500 and 2,900
- ○ Between 1,300 and 1,700
- ○ Between 1,900 and 2,300

Which of the following statements is correct?

- ○ U.S. born citizens are
  2 times more likely than unauthorized immigrants to be employed.
- ○ Unauthorized immigrants are
  2 times more likely than U.S. born citizens to be employed.
- ○ Unauthorized immigrants are
  as likely as U.S. born citizens to be employed.

Are unauthorized immigrants eligible to receive Social Security benefits?

- ○ Yes
- ○ No

Are unauthorized immigrants required to file tax returns and pay taxes on income earned in the U.S.?

- ○ Yes
- ○ No

Which of the following statements is correct?

- ○ In Texas, unauthorized immigrants are 1.5 times more likely than U.S. born citizens to be arrested for a violent crime.
- ○ In Texas, unauthorized immigrants are 2 times more likely than U.S. born citizens to be arrested for a violent crime.
- ○ In Texas, unauthorized immigrants are 55% less likely than U.S. born citizens to be arrested for a violent crime.

What share of unauthorized immigrant children of age 13 to 17 are enrolled in high school?

- ○ Between 30% and 40%
- ○ Between 70% and 80%
- ○ Over 90%

How sure are you about your answers to the above questions?

- ○ Very sure
- ○ Sure
- ○ Somewhat sure
- ○ Unsure
- ○ Very unsure

Intermediate Carne y Arena Page

You have **completed Part 1**.

You can now enter the Carne y Arena exhibit!

Please remember to **come back for Part 2** after the exhibit.

You can now continue to Part 2.

Emotional Response to Carne y Arena

How would you describe your "Carne y Arena" experience in a few words / sentences?

How strong was your emotional reaction to "Carne y Arena", on a scale from 1 (neutral) to 10 (very strong)?

How would you rate the artistic value of the "Carne y Arena" experience, on a scale from 1 to 10?

End Page: Went to Carne y Arena

We thank you for participating in this study!

As a token of our appreciation, we offer you a chance to receive a **FREE annual membership** to KANEKO.

In about 2 weeks, we will send you an email with a chance to receive a free membership, and we will invite you to answer a few additional questions. Please check your email.





Powered by Qualtrics

C Conceptual Replication Studies Survey Questionnaire

The following printout corresponds to the second conceptual replication study (section 3.1). The questionnaire for first conceptual replication study (section 2.2) is identical, except that no question on relatability is asked on page 3. The following questionnaire corresponds to the "experience *only*" condition.

Study 2 and 3

Bot Screening Please answer the following questions to confirm that you are not a bot.

Please enter your prolific ID here:

_____

We are recruiting workers from India to count the number of objects in a set of pictures. Their data will be used to help researchers validate a task. We will pay this group of workers the average wage on the respective country's platform.

For your help on this survey, in addition to your base payment, you will entered into a lottery for the prospect of winning one of two (three) $100 Amazon gift cards.

Here is some information about the workers recruited from India.

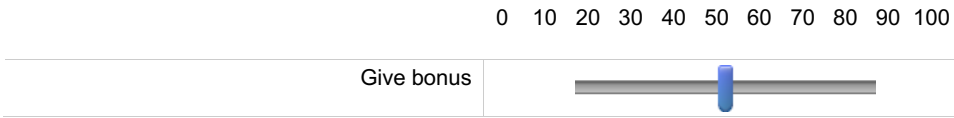
In the following part we will present you with 10 examples of the tasks assigned to Indian workers. In these examples, they are asked to count and report the number of 0's in each of the pictures. **Indian workers will complete 60 of these tasks—which will take between 1 and 2 hours—for a payment of $7.**

Example 1

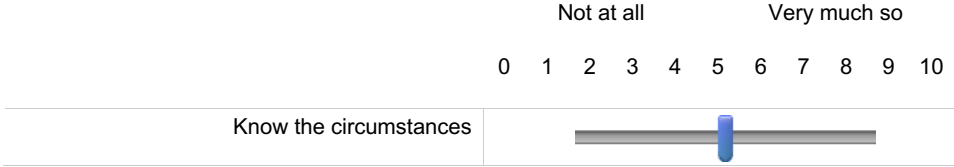
0	0	0	1	0	1	0	0	1	0	1	0	1	1	0
0	1	1	0	0	1	1	0	1	0	1	0	0	1	0
1	0	0	0	1	1	1	0	0	0	1	1	1	0	1
1	0	0	0	1	1	1	1	0	0	0	1	1	0	1
1	1	1	0	1	0	1	0	1	0	1	0	0	1	0
1	0	0	1	0	0	1	1	0	1	1	1	0	0	0
1	0	1	0	0	1	1	1	0	0	0	0	1	0	1
1	1	1	1	1	0	0	1	0	1	1	1	1	0	1
0	0	0	1	0	1	1	0	1	0	0	1	0	0	1
0	1	1	1	0	0	1	1	1	0	0	1	0	1	1

Keep in mind that the workers will actually have to complete 60 of these tasks by counting the number of zeros in each.

Suppose you were entered to win a $100 Amazon gift card. If you win the $100 gift, we will pair you with a randomly selected Indian worker who was recruited to complete the task. You can use some of the $100 gift card to increase the compensation of the Indian worker in the form of a bonus. How much of the $100 gift card would you be willing to give to the worker?



To what extent do you feel like you relate to the circumstances of the Indian workers?



How annoying/draining do you consider the task to be?

	1 = not annoying/draining at all									10 = very annoying/draining
	1	2	3	4	5	6	7	8	9	10
Click and drag the slider										

What is your gender?

- ○ Male
- ○ Female
- ○ Other

In what year were you born?

_____

What was your TOTAL household income, before taxes, last year?

- ○ $0-$9,999
- ○ $10,000-$14,999
- ○ $15,000-$19,999
- ○ $20,000-$29,999
- ○ $30,000-$39,999
- ○ $40,000-$49,999
- ○ $50,000-$69,999
- ○ $70,000-$89,999
- ○ $90,000-$109,999
- ○ $110,000-$149,999
- ○ $150,000-$199,999
- ○ $200,000+

Please indicate your marital status

- ○ Single
- ○ Married
- ○ Legally separated or divorced
- ○ Widowed

What racial or ethnic group best describes you?

- ○ White
- ○ Black or African-American
- ○ Hispanic or Latino
- ○ Asian or Asian-American
- ○ Native American
- ○ Middle Eastern
- ○ Mixed Race
- ○ Other

Were you born in the United States?

- ○ Yes
- ○ No

Where were you born?

▼ Afghanistan ... Zimbabwe

Were both of your parents born in the United States?

- ○ Yes
- ○ No

Where was your father born?

▼ United States ... Zimbabwe

Where was your mother born?

▼ United States ... Zimbabwe

Which category best describes your highest level of education?

- ○ Eighth Grade or less
- ○ Some High School
- ○ High School degree / GED
- ○ Some College
- ○ 2-year College Degree
- ○ 4-year College Degree
- ○ Master's Degree
- ○ Doctoral Degree; Professional Degree (JD, MD, MBA)

What is your current employment status?

- ○ Full-time employee
- ○ Part-time employee
- ○ Self-employed or small business owner
- ○ Unemployed and looking for work
- ○ Student
- ○ Not currently working and not looking for work
- ○ Retiree

What is your current occupation?

_____

Even if you are not currently working, what was latest occupation?

_____

On policy matters, where do you see yourself on the liberal/conservative spectrum?

- ○ Very liberal
- ○ Liberal
- ○ Moderate
- ○ Conservative
- ○ Very conservative

D Information about India Survey Questionnaire

The printout below corresponds to the information treatment, about India, in both conceptual replication studies (sections 2.2 and 3.1). In the first replication study (section 2.2) it is presented to participants in both conditions, 'Information *before*' and 'Information *after*.' In the second replication study (section 3.1) it is presented to participants in the 'Information *before* Experience' condition.

In this section we will show you information related to social and economic conditions in India. The statistical sources for this information are:

World Bank (2021, 2022, 2023) World Risk Poll (2021)

Gallup (2022)

According to the 2021 World Risk Poll, nearly **one in four** (23%) Indians were “very worried” that the water they drink could cause them serious harm.

The proportion of Indians who are finding it “very difficult” on their present household incomes reached **31%** during 2021 and 2022, **almost tripling since 2016** (12%).

In 2022, over **4 in 10** Indians reported struggling to afford food in the past 12 months.

In 2023, the number of internally displaced Indians due to conflict and violence alone was **613,000**.

India’s young women are **just as optimistic** about their local job prospects as men of the same age.

In 2022, **90%** of the Indian population expressed confidence in their financial institutions or banks.

Despite the shocks of COVID-19 and the war in Ukraine, in 2022, **57%** of Indians felt that their living standards were getting better.

In 2022, **85%** of Indian population felt that children in the country have the chance to learn and grow every day.

E Contact and Similarity Survey Questionnaire

Across respondents, for questions on both perceived similarity and contact, the ordering of specific foreign origins is randomized. In the printout below, the respondent answers questions about Japan first, Haiti second, and the Philippines third. Other respondents have different country orderings.

Prolific ID

What is your Prolific ID?
Please note that this response should auto-fill with the correct ID

${e://Field/PROLIFIC_PID}

Demographic Block

What is your gender?

- Male
- Female
- Other

In what year were you born?

What was your TOTAL household income, before taxes, last year?

- $0-$9,999
- $10,000-$14,999
- $15,000-$19,999
- $20,000-$29,999
- $30,000-$39,999
- $40,000-$49,999
- $50,000-$69,999
- $70,000-$89,999
- $90,000-$109,999
- $110,000-$149,999
- $150,000-$199,999
- $200,000+

Please indicate your marital status

- Single
- Married
- Legally separated or divorced
- Widowed

How many children do you have?

- I do not have children
- 1
- 2
- 3
- 4

- ○ 5 or more

What racial or ethnic group best describes you?

- ○ White
- ○ Black or African-American
- ○ Hispanic or Latino
- ○ Asian or Asian-American
- ○ Native American
- ○ Middle Eastern
- ○ Mixed Race
- ○ Other

Were you born in the United States?

- ○ Yes
- ○ No

Where were you born?

Were both of your parents born in the United States?

- Yes
- No

Where was your father born?

Where was your mother born?

Which category best describes your highest level of education?

- Eighth Grade or less
- Some High School
- High School degree / GED
- Some College
- 2-year College Degree
- 4-year College Degree
- Master's Degree

- ○ Doctoral Degree; Professional Degree (JD, MD, MBA)

What is your current employment status?

- ○ Full-time employee
- ○ Part-time employee
- ○ Self-employed or small business owner
- ○ Unemployed and looking for work
- ○ Student
- ○ Not currently working and not looking for work
- ○ Retiree

What is your current occupation?

Even if you are not currently working, what was latest occupation?

On policy matters, where do you see yourself on the liberal/conservative spectrum?

- ○ Very liberal
- ○ Liberal
- ○ Moderate
- ○ Conservative
- ○ Very conservative

In politics, as of today, do you consider yourself a Republican, a Democrat or an independent?

- ○ Republican
- ○ Democrat
- ○ Independent

Attention check

How many states are there in the U.S.?

- ○ 5
- ○ 100
- ○ 50
- ○ 10

County

What is the FIPS code of your current county of residence?

If you are unsure, here is one way to look up your FIPS code:

Use your zip code or town/ city to look up your FIPS code on this page: https://www.zipinfo.com/search/zipcode.htm (check the box "county name and FIPS code" on the top left).

Your FIPS code will be a 5-digit number, possibly starting with 0. **Please note that your FIPS code is not your ZIP code! Please ensure that your FIPS code is correct. If it does not match your device location, we may be forced to terminate your survey.**

For how many years have you lived in this county?

- ○ Just moved in the last year
- ○ 1-5 years

- ○ 5-10 years
- ○ 10-20 years
- ○ 20-30 years
- ○ 30+ years

Big 5 Quiz

Next, we would like to ask you some questions about your personality.

Below you will see a number of statements, each of which starts with "I see myself as someone who." For each statement, please indicate how much you agree with this.

I see myself as someone who:

	Disagree strongly	Disagree a little	Neutral; no opinion	Agree a little	Agree strongly
... Tends to be quiet.	○	○	○	○	○
... Is compassionate, has a soft heart.	○	○	○	○	○
... Tends to be disorganized.	○	○	○	○	○
... Worries a lot.	○	○	○	○	○

	Disagree strongly	Disagree a little	Neutral; no opinion	Agree a little	Agree strongly
... Is fascinated by art, music, or literature.	○	○	○	○	○

I see myself as someone who:

	Disagree strongly	Disagree a little	Neutral; no opinion	Agree a little	Agree strongly
... Is dominant, acts as a leader.	○	○	○	○	○
... Is sometimes rude to others.	○	○	○	○	○
... Has difficulty getting started on tasks.	○	○	○	○	○
... Tends to feel depressed, blue.	○	○	○	○	○
... Has little interest in abstract ideas.	○	○	○	○	○

I see myself as someone who:

	Disagree strongly	Disagree a little	Neutral; no opinion	Agree a little	Agree strongly
... Is full of energy.	○	○	○	○	○
... Assumes the best about people.	○	○	○	○	○

	Disagree strongly	Disagree a little	Neutral; no opinion	Agree a little	Agree strongly
... Is reliable, can always be counted on.	○	○	○	○	○
... Is emotionally stable, not easily upset.	○	○	○	○	○
... Is original, comes up with new ideas.	○	○	○	○	○

Perceived_Similarity

We asked **immigrants from 3 different countries** to fill out the same personality quiz and computed their standardized scores on five major personality traits.

Next, we will ask you how you think your personality traits compare to theirs.

If your guess is correct, you will be entered into a lottery for a **$100 Amazon gift card**.

How do you think your personality traits compare to the traits of people **from Japan**?

- You have **0 out of 5** traits in common.
- You have **1 out of 5** traits in common.
- You have **2 out of 5** traits in common.
- You have **3 out of 5** traits in common.
- You have **4 out of 5** traits in common.
- You have **5 out of 5** traits in common.

How do you think your personality traits compare to the traits of people **from the Philippines**?

- You have **0 out of 5** traits in common.
- You have **1 out of 5** traits in common.
- You have **2 out of 5** traits in common.
- You have **3 out of 5** traits in common.
- You have **4 out of 5** traits in common.
- You have **5 out of 5** traits in common.

How do you think your personality traits compare to the traits of people **from Haiti**?

- ○ You have **0 out of 5** traits in common.
- ○ You have **1 out of 5** traits in common.
- ○ You have **2 out of 5** traits in common.
- ○ You have **3 out of 5** traits in common.
- ○ You have **4 out of 5** traits in common.
- ○ You have **5 out of 5** traits in common.

Contact

We would now like to ask about your close friends and family members, neighbors, workplace acquaintances, and others with whom you regularly interact (i.e. speak with at least once a month).

For each of the groups below, please check the box if a member of that group is in the respective category of people you interact with.

	Close friends and family members	Neighbors	Workplace acquaintances	Others with whom I regularly interact	Service or hospitality workers	No interactions
Japanese Americans	☐	☐	☐	☐	☐	☐

	Close friends and family members	Neighbors	Workplace acquaintances	Others with whom I regularly interact	Service or hospitality workers	No interactions
Filipino Americans	☐	☐	☐	☐	☐	☐

	Close friends and family members	Neighbors	Workplace acquaintances	Others with whom I regularly interact	Service or hospitality workers	No interactions
Haitian Americans	☐	☐	☐	☐	☐	☐

End

You have completed the survey. Thank you for your participation!

Powered by Qualtrics

F Spatial Representation of Perceived Similarity

To showcase the relevance and versatility of our measure of perceived similarity, and its potential as a powerful tool to study social perceptions, we extend our analysis of perceived similarity between a respondent and a given foreign country, a *bilateral* measure, to a *multilateral* measure. We apply a simple multidimensional scaling method to represent in a two-dimensional space the positions of Haiti, Japan, and the Philippines, relative to the respondents.[33] This approach is similar to the 'spatial' mental representation of memories in neuroscience (see for instance Pantelis et al., 2008).

We apply this method to compare, across political affiliations, the mental representations of those three countries in a two-dimensional space. We partition respondents into five political groups: very conservative, conservative, moderate, liberal, and very liberal. For each group, we represent in two-dimensional space the positions of Haiti, Japan, and the Philippines, relative to the (group average) position of the respondents. The resulting spatial representations are presented in figure A3. A clear picture emerges. Liberal respondents live in a 'smaller world' than conservative respondents: not only do liberals perceive themselves as more similar to all foreign origins, but they also perceive those foreign origins to be more similar to each other than conservatives. Interestingly, the increased perceived similarity among liberals compared to conservatives is strongest for countries that all respondents, liberals and conservatives, perceive as less similar (Haiti and, to a lesser degree, the Philippines). For Japan, which is perceived as the most similar, perceptions differ much less between liberals and conservatives. This may be due to the fact that Japan is a wealthy country, and therefore perceived as more similar to anyone in the US, a wealthy country too.

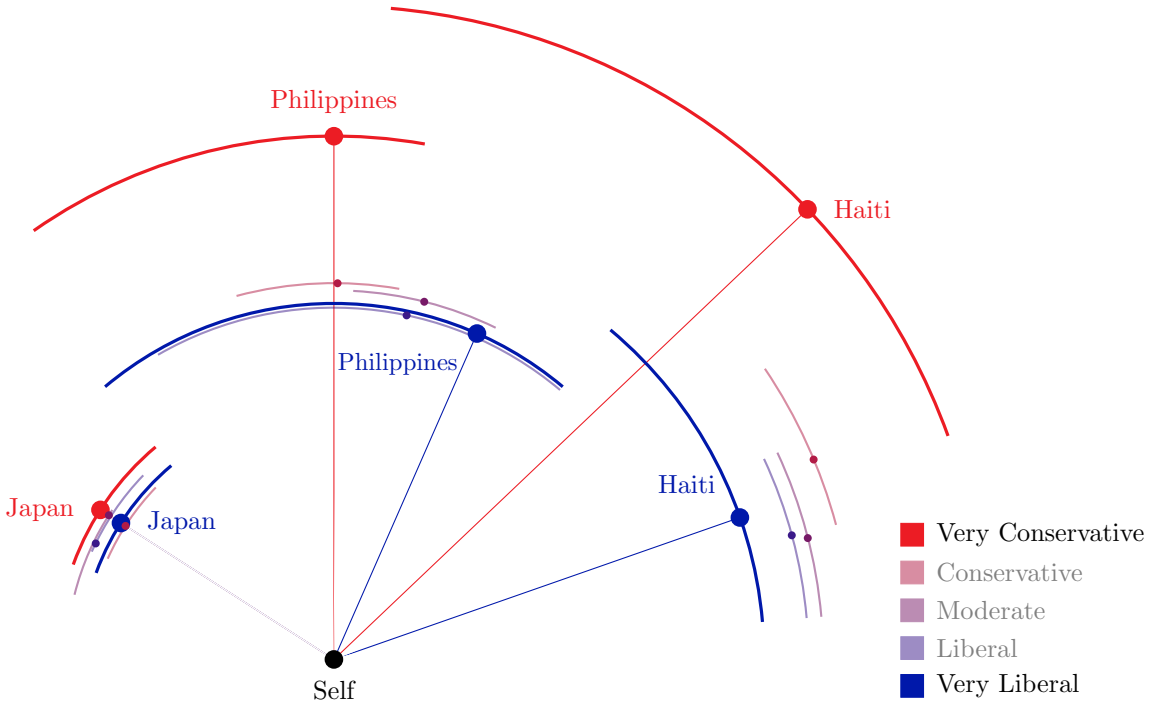
Those results suggest that, in the same way that experiences can interfere with memory retrieval if they are associated with similar mental representations (Bordalo et al., 2024a; Pantelis et al., 2008), contact with one group could interfere with contact with another group if those two groups are perceived as similar to each other.[34] Those results also suggest a complementary explanation for the findings in Enke et al. (2022) who show that universalists allocate their altruism over short and

[33] For each respondent i, we measure their perceived similarity to Japan, Haiti, and the Philippines on a scale from 0 to 5 (section 3.2). We use those similarity measures to define the distance between i and each foreign country f: $Distance_{i,f} \equiv 5 - Similarity_{i,f}$. We then assume that i and f can be represented by their (x, y) coordinates in a 2-dimensional space, s.t.

$$Distance_{i,f} = \sqrt{(x_i - x_f)^2 + (y_i - x_f)^2}.$$

With at least three respondents who live in the same "topography," i.e. for whom Haiti, Japan, and the Philippines have the same coordinates, we can solve for those coordinates, up to a translation and a rotation. Intuitively, if some respondents perceive both Haiti and the Philippines to be similar and Japan to be dissimilar, while others perceive Japan to be similar and both Haiti and the Philippines to be dissimilar, we infer that Haiti and the Philippines are close to each other, while Japan is far. We apply this method separately for respondents partitioned into five political groups.

[34] Our ability to control for county fixed effects, ensures that our results in section 3.2 are not affected by this potential interference: the relative similarities to *other* foreign origins are always absorbed by county fixed effects.



Appendix Figure A3: Multilateral Perceived Similarity

Notes: The figure presents a two-dimensional spatial representation of the relative positions of respondents (self), Haiti, Japan, and the Philippines, according to our perceived similarity measure. We partition the set of respondents into five political groups according to their stated political ideology: 'very conservative,' 'conservative,' 'moderate,' 'liberal,' and 'very liberal.' For each group separately, we perform a two-dimensional scaling exercise, where we define the distance between respondent i and country f as $Distance_{i,f} = 5 - Similarity_{i,f}$. The bilateral distances within each group are presented in appendix table A13. 'Self' is the centroid of all respondents within each group. We arbitrarily normalize the direction towards Japan for all groups (Northwest).

long social distances more uniformly than communitarians: universalists—identified by their liberal political views in our survey—may simply perceive all social distances to be shorter compared to communitarians—identified by their conservative political views. Figure A3 shows this is the case for the different perceptions of foreign origin groups by liberal and conservative respondents.

Overall figure A3 paints a more subtle picture of the role played by perceived similarity than our purely bilateral analysis. We leave a deeper exploration of these more complex interactions across multiple groups and the analysis of the topography of social inter-group connections for future research.

Appendix Table A13: 2-dimensional representation of perceived distances

	Perceived bilateral distances:		
Panel A:	very conservative respondents		
	Japan	Philippines	Haiti
Self	0.367	0.692	0.865
Japan		0.583	1.017
Philippines			0.634
Panel B:	conservative respondents		
	Japan	Philippines	Haiti
Self	0.328	0.498	0.688
Japan		0.426	0.915
Philippines			0.672
Panel C:	moderate respondents		
	Japan	Philippines	Haiti
Self	0.354	0.488	0.647
Japan		0.504	0.925
Philippines			0.596
Panel D:	liberal respondents		
	Japan	Philippines	Haiti
Self	0.351	0.465	0.628
Japan		0.510	0.921
Philippines			0.587
Panel E:	very liberal respondents		
	Japan	Philippines	Haiti
Self	0.335	0.471	0.569
Japan		0.534	0.819
Philippines			0.425

Notes: We partition respondents to our survey on contact and similarity into five political groups ('very conservative,' 'conservative,' 'moderate,' 'liberal,' and 'very liberal') according to their answer to the question "On policy matters, where do you see yourself on the liberal/conservative spectrum?" Using our measure of perceived similarity between respondent i and foreign country f (from 0 to 5), we define $Distance_{i,f} = 5 - Similarity_{i,f}$. For each group separately, we perform a two-dimensional scaling exercise, and recover the positions of each respondent, Haiti, Japan, and the Philippines. For each group, the table presents the matrix of bilateral distances between the centroid of all respondents ('Self'), Haiti, Japan, and the Philippines. We omit the diagonal ($Distance_{k,k} = 0$ by construction), and the lower triangle ($Distance_{k,l} = Distance_{l,k}$). We use those bilateral distances to construct figure A3.