In their Shoes:
Empathy through Information [*]

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January 2026

Abstract

We explore the mechanics of empathy. We show that information about an outgroup can activate and magnify empathy when presented in conjunction with an experience simulating their struggles. This response increases the willingness to help the struggling group. We provide evidence for this effect in an immersive virtual reality experiment where participants ("witnesses") experience a simulation of the struggle of unauthorized migrants ("protagonists"), then replicate these results in a series of controlled lab experiments. We show that information enhances the witnesses' empathetic response and drives them to engage in more prosocial behavior when it increases their perceived interpersonal similarity, or *relatability* to the protagonist—an effect we trace to attention: eye-tracking data reveals that information provision concentrates witnesses' gaze on the struggles of the protagonist instead of searching through peripheral elements of the scene. Conversely, only information packages that strengthen perceived relatability — an effect that can vary across subgroups with heterogeneous attributes — magnify empathy. 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, targeted, information provision.

JEL Classification: C9, D8, D9, F22, Z1.

Keywords: Empathy, Attention, Virtual Reality, Similarity, Contact, Generosity, Immigration.

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Introduction

Humans experience hardship, from natural disasters and 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 may be moved to help through charitable donations, collective mobilization, or 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 activated? Why do different people witnessing the same episodes of struggles by others respond differently? Is there scope for interventions or 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 activate and magnify empathy when presented in conjunction with an experience simulating that group's struggles. This empathetic response increases willingness to help the struggling group, but it is only activated when the information comes *before* the experience, not after. We first show this in a field experiment where participants witness the plight of migrants crossing the U.S. Southern border in an immersive virtual reality experience. This 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] Providing participants with statistical information about unauthorized immigration enhances the empathetic response to the experience — but only if it is provided before rather than after it. This is reflected in more positive attitudes and prosocial behavior towards immigrants. We show the robustness and generalizability of our finding in a pre-registered lab experiment with a setup that 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 choose 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 outgroup activates empathy and increases donation amounts relative to a condition in which the same information is presented after the experience.

We propose a model to shed light on a potential mechanism underlying this magnification of empathy: shifts in attention and in perceptions of interpersonal similarity, or *relatability*. We develop a framework where information received before witnessing the struggles of a protagonist may induce the witness to shift attention to attributes of the protagonist that they can relate to. Attending to the protagonist's shared features then leads the witness to experience the hardship as if in the protagonist's shoes, which activates empathy and leads to prosocial behavior toward the protagonist.

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

We present four lab experiments that provide evidence consistent with the proposed mechanism. Our first study explores the link between information, attention, and the prosocial response. In a novel experimental setup, participants are immersed in a video that simulates the struggles of the urban poor in Pakistan. We use eye-tracking technology to measure attention during the experience. Consistent with our hypothesis, presenting information about the protagonists before the video shifts attention to features of the protagonist and away from peripheral features that are unlikely to be relatable, which has downstream consequences for prosocial behavior. The second study measures and manipulates relatability directly and shows that it mediates the impact of information on prosocial behavior. The third study highlights that not all information has the capacity to activate empathy: presenting participants with information that does not increase relatability has no downstream impact on pro-social behavior. The fourth study provides further support for the relatability channel by showing predictable heterogeneous treatment effects of information; the same information affects prosocial behavior as a function of the witness's attributes—but only to the extent to which they matter for relatability. Finally, we present additional, suggestive evidence that the same mechanism may operate in observational data.

Before turning to a detailed description of our findings, we note that our analysis concerns instances where information *enhances* empathy through *increased relatability*. We acknowledge that a symmetric mechanism may allow information — e.g., anti-migrant propaganda — to reduce empathy through decreased perceptions of relatability to those suffering hardship. We do not explore such cases in this paper.

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, or learn about, attributes of the protagonist that they share and can relate to. This suggests a new channel through which information can shape empathy, in addition to any direct impact on pro-social behavior. If information cues the witness to pay attention to, or learn about, attributes of the protagonist that overlap with their own — forming a representation that is more *relatable* — it will change their experience of witnessing the struggles of others; they will experience the struggle as if 'in their shoes', which magnifies their empathetic response. 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 others' struggles: information acquired before can shift how relatable the struggling protagonist feels to the witness and alter the nature of the experience; information acquired after, which is not top of mind at the time of the experience,

cannot alter how the experience is perceived. Second, this framework suggests a way to measure the role of information in shaping the witnessing experience: revealing or shifting attention towards (away from) attributes the witness shares with the protagonist will be accompanied by increases (decreases) in the witness's perceived *relatability* towards the protagonist. Importantly, the framework also predicts that not all information interventions will be effective in activating empathy — only those that cue relatable categories with overlapping attributes, which implies heterogeneous treatment effects as a function of the witnesses' attributes.

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 (sections 3, 4 and 5), we show evidence that this empathy-enhancing role of information operates by shifting the witness's attention to the painful experience of the protagonist and by increasing how *relatable* the witness perceives the protagonist to be — the main assumption of our conceptual framework. We describe each step in turn.

In our primary demonstration of the effect, we use a controlled field experiment to recruit participants (the witnesses) who are randomized into two treatments that vary the order of the following: (*i*) the immersive virtual reality *experience* Carne y Arena, created by director Alejandro González Iñárritu, which simulates the struggles of unauthorized migrants (the protagonists),[2] and (*ii*) statistical information on unauthorized immigration in the U.S. We then measure participants' empathetic response through a targeted charitable donation decision and questions on immigration 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 34% difference between the two treatment effects is large and significant (*p*-value < 0.01).

Our conceptual framework suggests that the novel effect of information arises because it shifts the witness's attention toward attributes of the protagonist; focusing on these attributes during the experience enhances their ability to connect with the protagonist's circumstances while observing their struggles. To study this proposed mechanism, we design a novel experimental paradigm that emulates the Carne y Arena setting but allows us to directly measure attention through eye tracking. The experience involves an immersive video about the struggles of Pakistan's urban poor. Using four separate measures of attention derived from the eye-tracking data, we show that participants who receive information about the protagonists before the experience focus their attention more on the

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

children and their family members instead of other peripheral features in depiction. They are also less distracted, and end up donating more money to the protagonists' cause over other charitable options. These results provide evidence for the shift-in-attention mechanism in our conceptual framework.

We then design a pre-registered conceptual replication of the Carne y Arena study to reproduce the main findings in a more controlled setting. We recruit India-based participants (the protagonists), and U.S. and U.K.-based participants (the witnesses) who have a chance to receive a bonus payment. The Indian participants are assigned a task both tedious and arduous: counting ones and zeros in large matrices. The U.S./U.K. participants are told about the work Indian participants were asked to perform 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 U.S./U.K. participants, 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: U.S./U.K. participants give 28% more of their bonus payment if presented with information before the experience compared to after (p-value < 0.01).

Having established the validity of this experimental protocol for replicating the effects observed in our field study, we use it to further examine the mechanism. We first look at the hypothesized role of relatability in mediating the impact of information on prosocial behavior. In a similar setting as above, we ask the U.S./U.K. participants, 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* — to measure shifts in this construct depending on when information is received (Byrne, 1961; Echterhoff et al., 2009; Schomerus et al., 2024). 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 indeed primarily mediated through relatability: information received before the witness's 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 simulating the witness's experience operates primarily through an increase in relatability to the protagonist, consistent with our conceptual framework.

Two follow-up experiments using the same paradigm show that not all information about the protagonist's group is sufficient to activate empathy: receiving information that does not increase

relatability will also fail to activate empathy and have little downstream consequences for pro-social behavior. We use a data-driven approach to leverage variation in the relatability of information. In the first study, we start by presenting U.S./U.K. participants with a series of 24 information exhibits and ask them whether they can 'relate' to each. We then select the 12 least relatable information exhibits. These are presented as the information exhibit in the same experimental design described above. Despite keeping the design otherwise unchanged, receiving *unrelatable* information has no impact on donations compared to receiving no information. In the second study, we investigate the role of heterogeneous attributes in U.S./U.K. participants, following a similar approach. We start by asking U.S./U.K. participants to rate the relatibility of 24 information exhibits, randomly selected from a pool of 100 exhibits. This allows us to identify four information pieces that women find highly relatable, that men do not find relatable, and for which female and male participants show the greatest divergence in relatability. We provide these four exhibits to a separate set of participants before they witness the arduous task of the Indian workers. Consistent with our model, women perceive the Indian worker as more relatable after receiving this information, but men do not; and women's donations are significantly higher compared to no information, while men's donations remain unchanged.

Finally, we show suggestive evidence that a mechanism similar to the one outlined in our conceptual framework also operates in observational data. We study a setting that is similar to our experimental framework where we analyze charitable donations from donors across U.S. 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 U.S. counties. We measure the empathy response to witnessing the suffering in 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 U.S. 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 hypothesized 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.

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) (for meta-analyses see Pettigrew and Tropp, 2006; Paluck et al., 2019; Lowe, 2024). A key focus of this literature has been the evaluation of interventions — experimental or quasi-experimental — that facilitate 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, 2023a; Rodríguez Chatruc and Rozo, 2024; Arman et al., 2025; Adida et al., 2025). Siddique et al. (2026) shows that information dissemination, through a documentary about education, increases prosociality from a dominant ethnic group in Bangladesh towards ethnic minorities, and analyses facial expressions revealing empathy. We advance this literature by proposing and providing evidence for a mechanism through which contact and perspective-taking may shift attitudes — via attention and 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

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[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.

[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).

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, our findings contribute to the work on how people form mental representations of their environment and how these representations differ from objective features of that environment due to memory and attention constraints. These constraints limit the number of objects a person can attend to and keep in their working memory at any given time (Oberauer et al., 2016; Luck and Vogel, 1997). As a result, people form simplified representations of the environment that focus on a limited set of features that are either salient at the time of judgment due to 'bottom up' cues (e.g., visual salience), or are top of mind due to the category that is activated at the time of judgment (Markman, 2013; Nosofsky et al., 1992). A stream of research has highlighted the implications of such constraints for representing economically relevant information environments (Loewenstein and Wojtowicz, 2023). For example, Ba et al. (2022) and Bordalo et al. (2024) demonstrate the implications of simplified mental representations for belief updating; Bohren et al. (2024) and Bordalo et al. (2023) highlight the implications for choice and risky decisions. Recent work by Bordalo et al. (2024) incorporates these factors into a formal model of choice, where the decision context cues a mental category that channels attention 'top down' to features of the environment. We build and contribute to this work by showing how a similar mechanism impacts people's *interpersonal* mental representations, and how the overlap between these representations can activate empathy and prompt prosocial behavior.

Fifth, 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 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 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 offers evidence that information alters how the witness experiences observing the struggles of the protagonist, by inducing greater focused attention. Section 4 shows evidence suggesting that information amplifies empathy by increasing perceptions of *relatability* to the outgroup which, in turn, transforms the experience of witnessing their struggles — the main assumption of our conceptual framework. Section 5 provides supportive evidence in observational data. Section 6 concludes.

1 Conceptual framework: the mechanics of empathy

We propose a simple model to formalize 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 empathetic 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. Let $G(w)$ correspond to the group that w belongs to, e.g., politically liberal Americans, the majority group among visitors to the Carne y Arena exhibit; and $G(p)$ correspond to the group that p belongs to, e.g., unauthorized immigrants from Latin America. We propose a framework to characterize the strength of the empathetic response of the witness while observing the protagonist. Following the psychology literature (Wei and Liu, 2020; McPherson et al., 2001), we conjecture that the empathetic response is more likely to be activated when w views p as similar, or *relatable*, to themselves. Information before the experience — but not after — can magnify this response if it reveals or shifts attention to attributes of the protagonist's group $G(p)$ that have a greater overlap with those of the witness's group $G(w)$.

The witness's group 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 group $G(w)$ possesses attribute n, and $a_n(w) = 0$ that it does not.[6] Similarly, the witness perceives the protagonist's group as characterized by a vector of attributes, $\mathbf{a}(p) = (a_1(p), \cdots, a_N(p))$. We follow the literature in cognitive psychology (e.g, Luck and Vogel, 1997)

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[6]We present our conceptual framework with binary values for attributes, $a_n(w) \in \{0, 1\}$, for simplicity. All results 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 the bounded interval $[0, 1]$ is also without loss of generality, allowing for any relative prominence.

and let bounds on attention and working memory prevent the witness from considering the entire set of objective attributes at a given time. Instead, they form a simplified *mental representation* of groups $G(w)$ and $G(p)$ based on the attributes they attend to. Following Nosofsky et al. (1992), we introduce bounded attention across attributes in the form of attribute-specific weights. These attention weights can be driven 'bottom-up' by environmental factors such as salience (Bordalo et al., 2013), or 'top-down' by the category $\mathcal{C}$ of attributes that are cued by the decision context (Bordalo et al., 2024). Specifically, let the vector $\boldsymbol{\alpha}(\mathcal{C}) = (\alpha_1(\mathcal{C}), \ldots, \alpha_N(\mathcal{C}))$ correspond to the attention weights that the witness allocates across the attributes given category $\mathcal{C}$, with $\alpha_n(\mathcal{C}) \in [0, 1]$. A greater $\alpha_n(\mathcal{C})$ indicates that more attention is given to attribute n. We define the attention-weighted set of attributes of the witness's group, $\mathbf{a}_{\boldsymbol{\alpha}(\mathcal{C})}(w)$, as the element-wise product between the attention vector, $\boldsymbol{\alpha}(\mathcal{C})$, and the attributes vector, $\mathbf{a}(w)$,

$$\mathbf{a}_{\boldsymbol{\alpha}(\mathcal{C})}(w) \equiv \boldsymbol{\alpha}(\mathcal{C}) \circ \mathbf{a}(w) = (\alpha_1(\mathcal{C})a_1(w), \cdots, \alpha_N(\mathcal{C})a_N(w)). \tag{1}$$

We refer to $\mathbf{a}_{\boldsymbol{\alpha}(\mathcal{C})}(w)$ as the witness's mental representation of their own group. Similarly the witness's mental representation of the protagonist's group is $\mathbf{a}_{\boldsymbol{\alpha}(\mathcal{C})}(p) \equiv \boldsymbol{\alpha}(\mathcal{C}) \circ \mathbf{a}(p)$.

The mental representation, $\mathbf{a}_{\boldsymbol{\alpha}(\mathcal{C})}(w)$, corresponds to the set of attributes that 'come to mind' (Gennaioli and Shleifer, 2010) when the witness thinks about their own group, while $\mathbf{a}_{\boldsymbol{\alpha}(\mathcal{C})}(p)$ corresponds to the attributes that 'come to mind' when they think of the protagonist's group.

We assume that the witness' empathetic response to witnessing the struggles of the protagonist depends on perceived interpersonal similarity — termed *relatability* — which is captured by the overlap between the witness's mental representation of their own and the protagonist's groups. This overlap increases the ease with which one can put themselves 'in the shoes' of another. 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 induced by observing the protagonist going through an unpleasant experience increases with the dot product of the witness's mental representations of her own group and the protagonist's,

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

With binary attributes, the dot product $\mathbf{a}_{\boldsymbol{\alpha}(\mathcal{C})}(w) \cdot \mathbf{a}_{\boldsymbol{\alpha}(\mathcal{C})}(p)$ is simply the number of attributes shared between w's representations of the groups, weighted by the attention they pay 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 $\theta_{w,p,\mathcal{C}} \in [0, \pi/2]$ as the angle, in absolute value, between the two vectors $\mathbf{a}_{\boldsymbol{\alpha}(\mathcal{C})}(w)$ and $\mathbf{a}_{\boldsymbol{\alpha}(\mathcal{C})}(p)$, we can decompose the strength of the empathetic response into three easily interpretable components,

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

First, empathy is stronger the larger $||\mathbf{a}_{\boldsymbol{\alpha}(\mathcal{C})}(w)||$, which corresponds to a witness who is intrinsically more 'universalist' (Enke et al., 2022), attending to more of their positive attributes, and more likely to feel empathy towards any protagonist. Second, it is stronger the larger $||\mathbf{a}_{\boldsymbol{\alpha}(\mathcal{C})}(p)||$, which corresponds to a protagonist who is, given the category $\mathcal{C}$ of attributes cued by environmental factors and the decision context, intrinsically more 'likable,' more likely to receive empathy from any witness. Third, it is stronger the lower the angle $\theta_{w,p,\mathcal{C}}$, which corresponds to a tighter alignment between the witness's mental representations of groups $G(w)$ and $G(p)$.[7]

This conceptual framework allows us to characterize how information that reveals or shifts attention to shared attributes, can change the perceived relatability of the protagonist and thus alter the witness's empathy when received *before* witnessing the struggles of the protagonist. Let $\mathcal{I}$ be the information set available to the witness. With information $\mathcal{I}$, the vector of attributes of the witness's group becomes $\mathbf{a}(w|\mathcal{I})$, that of the protagonist's group becomes $\mathbf{a}(p|\mathcal{I})$, the category of attributes the witness attends to becomes $\mathcal{C}|\mathcal{I}$ and the attention weights become $\boldsymbol{\alpha}(\mathcal{C}|\mathcal{I})$, such that the strength of the empathetic response to observing the protagonist struggle becomes

$$\mathbf{a}_{\boldsymbol{\alpha}(\mathcal{C}|\mathcal{I})}(w|\mathcal{I}) \cdot \mathbf{a}_{\boldsymbol{\alpha}(\mathcal{C}|\mathcal{I})}(p|\mathcal{I}) = (\boldsymbol{\alpha}(\mathcal{C}|\mathcal{I}) \circ \mathbf{a}(w|\mathcal{I})) \cdot (\boldsymbol{\alpha}(\mathcal{C}|\mathcal{I}) \circ \mathbf{a}(p|\mathcal{I})). \tag{4}$$

By construction, information received after the experience, not available to the witness when entering this experience, has no impact on the relatability of the protagonist during the experience and thus does not affect the intensity of the witness' empathetic response. The asymmetric impact of information received *before* versus *after* the experience is the main prediction of our conceptual framework, and our main empirical result (section 2).

Our framework posits a mechanism through which information can amplify empathy, *relatability*, and suggests a simple way to measure relatability. If information alters how the witness perceives their own group or the protagonist's group — a shift in the attributes vectors $\boldsymbol{a}(w|\mathcal{I})$ and $\boldsymbol{a}(p|\mathcal{I})$ — or if it cues a category that places weight on shared attributes — a shift in the attention vector $\boldsymbol{\alpha}(\mathcal{C}|\mathcal{I})$ — then

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

it will tighten the alignment between w's representations of groups $G(w)$ and $G(p)$. This results in a lower angle $\theta_{w,p,\mathcal{C}|\mathcal{I}}$, and increases perceptions of relatability.

As an example, consider the case examined in our first study where (mostly) politically liberal American visitors (w) witness the struggles of unauthorized migrants (p) at the Carne y Arena exhibit. We follow Bordalo et al. (2024) and Evers et al. (2022) in positing that what 'comes to their mind' in their mental representations is at least partly a function of the category $\mathcal{C}$ that is cued by the environment and the decision at hand. For instance, providing information about wildfires in California or about the pope's health can cue the more narrow category of caring about climate change in w's representation of their own group $G(w)$, or of the protagonist being Catholic in w's representation of the outgroup $G(p)$. Such information would shift attention to a category $\mathcal{C}$ of attributes that tends to decrease perceptions of relatability. Alternatively, information can cue a more universal category and channel attention to attributes that are more likely to be shared. E.g., information about families in Hispanic communities increases attention to the common attribute of being a parent, which would induce many witnesses to perceive the protagonist as more relatable, or more similar to them. In this case, the witness 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 measure of relatability in the lab experiments of section 4; they should also be more likely to say that they share many personality traits with the protagonist, our second measure of interpersonal similarity in the observational data of section 5.

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. Additionally, our framework provides necessary conditions for information to enhance empathy: if information cues categories with little overlap in attributes, then it should not be effective at inducing prosocial behavior.

To conclude, despite having few restrictive features, our simple conceptual framework entails several key testable predictions. First, 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*. Second, the main assumption behind this prediction is that the empathy response — measured as an increase in altruistic actions in favor of the protagonist — is due to a shift in attention towards attributes of the protagonist they can relate to — measured as *relatability*. This process alters the witness' experience when observing the struggles of the protagonist as if 'in their shoes.' This implies that we should be able to see both the shift in attention and relatability as

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upstream measures of prosocial behavior.

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). Information increases prosocial behavior because it alters the witness's experience when observing the struggles of the protagonist, measured through shifts in attention (section 3). We also show that this increase in prosocial behavior is primarily mediated through an increase in relatability (section 4.3). Importantly, when information about the outgroup *does not* cue categories with overlapping attributes (section 4.4), which varies with the heterogeneous attributes of witnesses (section 4.5), this effect disappears.

Before presenting our empirical findings, we discuss some limits of our conceptual framework. First, we recognize that experience and information may also affect empathy directly, for instance 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 the 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 emotional intensity of the witness's experience or in the quality of the story telling, we do not explicitly model them. Finally, while we focus on the mechanism where information purely shifts attention across attributes, it may also be possible that the witness *learns* about the shared attributes and focuses on them during the experience. We cannot distinguish between these two mechanisms in our study, but view them as complementary.

2 Information magnifies empathy: the Carne y Arena experience

We first present our main finding: statistical information about an outgroup magnifies the empathetic response of a person witnessing the struggles experienced by this outgroup if it is presented *before* the experience, compared to *after*. We show evidence for this asymmetric impact of information in a controlled in-the-field experiment.[8]

2.1 Methods

Our in-the-field experiment features two main treatments, a virtual reality immersive experience treatment — Carne y Arena — where participants witness the struggles of unauthorized migrants crossing the Southern border and being apprehended by border patrol; and an information treatment where participants learn about unauthorized immigration to the U.S. 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.[9] The visitor to the museum is immersed in the experience of unauthorized migrants crossing the U.S. 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 U.S. 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 U.S. 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 visitor can move around the protagonists as if they were there. If they walk 'through' a protagonist, they can feel 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

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[8]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). Our finding on the asymmetric impact of information was not pre-registered. We replicate our results in a controlled laboratory experiment which was pre-registered: Wharton Credibility Lab registry, AsPredicted #204323, 12/12/2024, https://aspredicted.org/md7z-trrj.pdf, which we present below in section 4.2.

[9]See a short description and a trailer at https://phi.ca/en/carne-y-arena/.

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 U.S. It consists of a series of 12 exhibits containing information about border crossings to the U.S. (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 U.S. (e.g. "In Texas, unauthorized immigrants are 55% less likely than U.S. born citizens to be arrested for a violent crime").[10] While our information treatment is not designed to be persuasive or to make all attributes of migrants be viewed more favorably, we conjecture that, as in the mechanism formalized in the model of section 1, it will have a positive impact on relatability because it induces participants to focus their attention on attributes of immigrants they share or perceive as important: caring for education, seeking better economic conditions, fleeing violence, etc. We confirm in a separate online experiment that the information package we use at Carne y Arena induces participants to perceive migrants as more relatable.[11] It is possible, naturally, that our information treatment may not be perceived as neutral, and may also induce participants 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 towards 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 participants to choose a charitable donation to be made on their behalf to a charity supporting

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[10]See appendix B for the full list of information exhibits and the full questionnaire.

[11]We follow a procedure similar to the paradigm outlined in section 4.3 below. We recruit 101 participants on Prolific. 51 receive the Carne y Arena information treatment, 50 do not. We then ask them "To what extent do you feel like you understand and relate to the circumstances of the undocumented immigrants in the U.S.?" on a 1 ('not at all') to 10 ('very much so') scale. The information treatment increases this relatability index by 1.37 (p-value = 0.012), one half of a std. dev. (2.75).

immigrants, 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.[12] 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 conditions.[13] For the 'Control' condition we measure attitudes before any treatment. For the 'CyA *only*' condition we measure attitudes just after participants go through Carne y Arena. For the 'Info *before* CyA' condition 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' condition, we measure attitudes after participants 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 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]. 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).

We aim 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"[14] 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 visitors not to communicate with friends or partners about their questionnaire; and respondents answer questions on an individual

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[12]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).

[13]Our experimental design features additional treatment arms which we do not use in this study. See appendix table A1.

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

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.[15]

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 information can act as a treatment that alters the experience and its effect on empathy. As we discuss below, we reproduce this result in a pre-registered laboratory experiment (see section 4.2).

2.2 Main results

We estimate treatment effects on attitudes towards immigration,

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

where $Treatment_i$ takes values zero or one according to which condition 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 $i \in$ 'Control' and $Treatment_i = 1$ if $i \in$ 'CyA *only*,' 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. We measure attitudes for the control group 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 *only*'), 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 figure 1. We first show that the Carne y Arena experience alone improves attitudes towards immigration by 32% of a std. dev. (top estimate, *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.[16] It also confirms that our in-the-field experimental

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[15]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.

[16]The effect of Carne y Arena is also persistent. Appendix table A5 shows that attitudes are 41% higher two months after visiting the exhibit compared to before seeing the exhibit. The size and persistence of the impact of the immersive experience of Carne y Arena on attitudes is worth noting. For instance, Kalla and Broockman (2023b), who use a similar measure of attitudes towards immigration, find that the largest and most effective treatment (through discourse rather than virtual reality) moves attitudes by 10-15% of a std. dev. after 1.5-4.5 months, substantially below the 41% long-run impact of Carne y Arena. Unfortunately, we have too few follow-up respondents to statistically distinguish the long-term
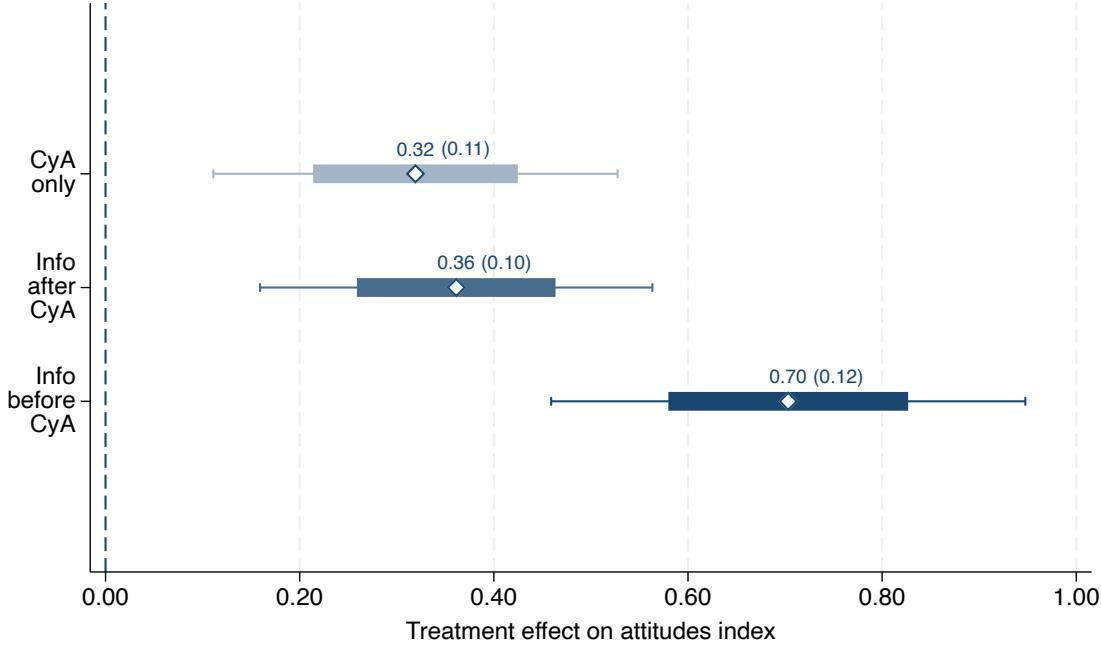
FIGURE 1: INFORMATION, CARNE Y ARENA, AND ATTITUDES

Notes: This figure shows the effect of various treatments on attitudes, expressed as a percentage of a std. dev. of attitudes for the control group, β in equation (5). The thick lines represent $\pm$ one standard error from the point estimates, and the whiskers 95% confidence intervals. Each estimate corresponds to a different regression. The control group is always 'Control'. The treatment groups are, respectively: for the top estimate, 'CyA *only*'; for the middle, 'Info *after* CyA'; for the bottom, 'Info *before* CyA'. Interpretation ('Info *before* CyA,' bottom estimate): the attitudes of respondents exposed to the information *then* Carne y Arena treatments, in that order, are 70% (s.e. 12 p.p.) of a std. dev. higher than the attitudes of respondents not exposed to any treatment (control group). See appendix table A4 for additional statistics.

setting is well-suited to study the interaction between a striking experience and information.

Our main finding is that the impact of Carne y Arena is magnified if a subject receives our information treatment before Carne y Arena, but not after: attitudes improve by 70% of a std. dev. relative to the control group if participants received information before witnessing Carne y Arena (figure 1 bottom estimate, *p*-value < 0.01), substantially more than the 36% increase if participants receive information after witnessing Carne y Arena (figure 1 middle estimate, *p*-value < 0.01). Figure 2 confirms the asymmetric impact of information and presents our main finding: attitudes improve by 34% of a std. dev. for participants who receive information before Carne y Arena compared to those who receive it after (figure 2, top estimate, *p*-value < 0.01). This result is robust to including demographic controls and self reported perceptions of emotional reaction to Carne y Arena (figure 2, middle and bottom estimates). Our interpretation is that information shifts people's attention to traits they share with migrants (e.g., the fact that they are parents) and away from peripheral elements of the scene (e.g., the contours of the terrain). This shift in attention induces them to perceive migrants as

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effect of alternative orderings of information and Carne y Arena.
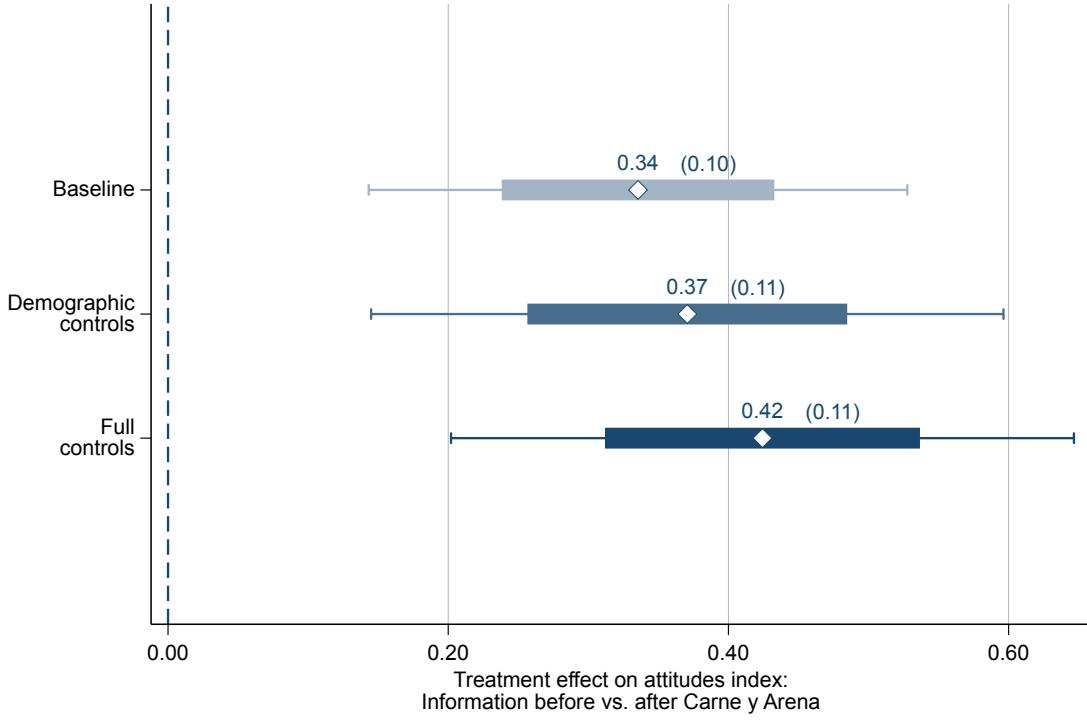
FIGURE 2: ORDER EFFECT ON ATTITUDES, CARNE Y ARENA

Notes: This figure shows the treatment effect of receiving information *before* Carne y Arena, compared to a control group which receives information *after* Carne y Arena. The thick lines represent $\pm$ one standard error from the point estimates, and the whiskers 95% confidence intervals. The middle and bottom estimates include controls for age, gender, and being born outside the U.S. The bottom estimate additionally controls for self-reported strength of emotional response to Carne y Arena. See appendix table A6 for additional statistics.

more relatable and changes the way they experience Carne y Arena, as if they were 'in the shoes' of the protagonists. If instead information comes after, participants 'missed out' on critical aspects of living through the more transformative experience. We provide more direct evidence for this mechanism in sections 3, 4, and 5.

2.3 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 driven by a separate impact that information updating may have on attitudes, orthogonal to the asymmetric mechanism in the model of section 1. To rule out that participants may pay unequal attention to information depending on when they receive it, which could affect our results, we verify and confirm in appendix table A7 that participants who receive information before versus after Carne y Arena are equally successful at answering a quiz on the information they received.

Appendix table A8 presents results 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 A9 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 overlapping attributes are already salient, which blunts the impact of Carne y Arena as they may already know personally of the experience of unauthorized migrants, diluting the treatment effects, notably the impact of information on *relatability*.

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. We confirm in a separate online experiment that the information treatment induces only a small and statistically insignificant shift in the perception of relatability to unauthorized migrants among liberal respondents, while it induces a large and significant shift for conservative respondents.[17]

3   Mechanism: attention

The previous section presented behavioral evidence for the key prediction of the model of section 1: information activates empathy when it is provided *before* witnessing the struggles of an outgroup. The mechanism underlying this finding relies on the assumption that information alters how the witness 'lives through' the experience of observing the struggles of a protagonist by shifting their attention.

In this section, we analyze the role information plays in shaping the experience of the witness by measuring attention directly. Specifically, we incorporate eye-tracking technology to follow the

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[17]Among 39 liberal respondents, the information treatment increases relatability by 0.93 (p-value = 0.31). Among 50 conservative participants, it increases by 1.89 (p-value = 0.018).

witness's gaze while they are observing the struggles of the protagonist. This allows us to provide evidence for the conjecture that information affects the witness's experience by changing what they attend to. A difference in perception, where one group of witnesses is more focused on features of the protagonist than the other, implies that there was a greater capacity for the former to put themselves in the protagonist's shoes—activating empathy.

3.1   Procedure

We develop a novel experimental design which incorporated the Webgazer eye-tracking protocol into an immersive video. Participants ($n = 412$) were recruited using the Prolific crowd-sourcing platform with the survey being hosted on the Gorilla platform (Anwyl-Irvine et al., 2020). All participants view a video titled "Saving Lives in Karachi" produced by Pakistani journalist Sharmeen Obaid-Chinoy. The video is a panoramic experience about a Pakistani pediatrician's efforts to reduce child mortality in the city of Karachi, Pakistan.[18] This video explores the hardships of Pakistan's urban poor. Most of the scenes feature children and their families describing the struggles they face in their lives. About half of the scenes take place in a hospital and discuss the poor health outcomes faced by Pakistan's urban poor.

Importantly, for our purposes, each scene was comprised of features that are central to the protagonist, e.g., the family and the child being cared for, as well as non-central features such as hospital equipment, non-protagonist characters, etc. Our aim with this study is to examine whether providing information alters the witness's experience by shifting their attention to those features that are central to the protagonist. For this purpose, the majority of the movie's scenes have a static setup, in the sense that objects in a scene do not move around too much. For example, one scene in a hospital room features a family with their baby. The baby is located in the center of the scene, as are the subjects of most scenes. While our design cannot identify *which* feature of the protagonist that attention is directed to—we will test for the downstream consequences of this effect in the studies that follow—observing more concentrated gaze data on features central to the protagonist is necessary for relatability to increase.

The static setup and central placement of the protagonists allows us to study this question. Specifically, we can look at whether a participant's eye movements are (*i*) focused on the region which encompasses the protagonist's central features and (*ii*) whether their attention is sustained on that region while engaging in the experience. Our framework predicts that information about the hardships of Pakistan's urban poor will lead to gaze data that is more concentrated on the protagonist. This will induce the witness to experience the struggles of the protagonist as if 'in their shoes,' with downstream

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[18]https://www.youtube.com/watch?v=GG7HtmahJzc.

behavioral consequences for prosocial behavior.

We now describe the outline of the experiment. First, participants' eye movements are calibrated so that their attention can be tracked through their webcam; see Krajbich et al. (2010) and Smith and Krajbich (2019) for details on how this is done. Participants are then divided into two groups: 'Info *before* Experience' and 'Experience *only.*' Demographic information is collected from all of the participants at the beginning of the experiment. For participants in the 'Info *before*' group, 9 pieces of information are provided about economic hardship, especially related to children and infant mortality in Pakistan.[19] All participants then proceed to view the video "Saving Lives in Karachi" with their eye movements being tracked through their webcams. Following the video, similar to the Carne y Arena design, participants choose between three charities to donate $2: The Humane Society of the U.S. (HSUS), the Global Rahmah Foundation (GRF), and the Natural Resources Defense Council (NRDC). Only one of the charities is committed to helping improve the livelihoods of Pakistan's urban poor (GRF), and we use the choice of that charity as our main behavioral dependent variable indicating prosocial behavior toward the protagonist.

3.2   Attention measures

To quantify the participants' attentional responses during the video, we extract a range of gaze metrics derived from the raw eye-tracking data. Webgazer produces estimates of participants' gaze locations at a rate determined by the participants' webcams, ranging between 12 and 15 Hz if there are no interruptions. This allows us to analyze dynamics of visual attention in response to the video. From the estimated coordinates, we compute four core measures that together capture stability, dispersion, and volatility of attention. Note that to the best of our knowledge, this is the first time that visual attention is directly quantified to study the type of hypothesis that we propose; this required the development of a new paradigm and empirical design. We hope that future research builds and extends this paradigm to answer a broader set of economic questions.

Area of focus.   The first set of measures aims to capture where participants directed their gaze. We calculate each participant's *radius of gyration*, defined as the root-mean-square distance of gaze points from their centroid, which is where the central features of the protagonists are located. This measure reflects the spatial breadth of attention: a smaller radius indicates that gaze remain concentrated around the protagonist; a larger radius indicates that the participant explores a wide portion of the screen, attending to many different elements of the video.

In addition, we compute the *mean distance from the centroid*, i.e. the average distance of gaze

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[19]See appendix table A10 for the full list of information exhibits.

points from the participant's typical gaze location. Lower values reflect a strong gravitational pull toward a central visual anchor, suggesting that the participant consistently returns to — or maintains — attention on a specific region of the screen. Higher values reflect a more distributed pattern of attention without a single dominant point of focus, i.e., a focus on many features within the visual field.

Dispersion of attention. The second set of measures focuses on moment-to-moment changes in gaze position. For each participant, we calculate the *mean step distance*, defined as the average Euclidean distance between consecutive gaze points. This quantity represents the typical magnitude of frame-to-frame gaze movement. Lower values indicate more focused behavior, reflecting concentrated attention on specific regions of the screen. Higher values indicate greater scanning behavior, reflecting rapid shifts in attention across different regions of the screen.

We also compute the *standard deviation of step distance*, which measures the variability in gaze movement across the viewing period. This metric captures the degree to which participants' attentional shifts are consistent or erratic. A lower value suggests more stable and focused attention. A high standard deviation reflects irregular, unpredictable movement patterns, potentially indicating fluctuating engagement or moment-to-moment uncertainty about where to look.

Interpretation as attention metrics. Taken together, these four measures provide a comprehensive description of how participants allocate their attention during the experience. Area of focus measures (radius of gyration and mean distance from centroid) capture where participants direct their gaze and whether they maintain attention on the protagonist or explore many features within the visual field. Dispersion of attention measures (mean step distance and its standard deviation) capture moment-to-moment changes in gaze position, quantifying the volatility and stability of attentional shifts.

These metrics allow us to assess whether the information treatment alters participants' attentional patterns. Lower values across all four measures indicate that participants engage in more focused attention: a smaller radius of gyration and lower mean distance from centroid suggest that gaze remains concentrated around the protagonist rather than peripheral elements; lower mean step distance and standard deviation suggest stable, concentrated attention rather than rapid scanning across different regions of the screen. By examining treatment effects across these measures, we are able to evaluate the extent to which information provision reshapes attention and alters how the witness perceives the experience.

3.3 Results

We first examine whether the information treatment affects overall patterns of visual attention over the full duration of the video. To do so, we focus on the aggregated eye-tracking data across all of the scenes and compare participants in the 'Info *before* Experience' ($n = 205$) and the 'Experience *only*' ($n = 207$) conditions along the four gaze-based attention metrics described above.

The attention metrics across both conditions are presented in table 1. We observe significant shifts

TABLE 1: EFFECTS OF INFORMATION ON GAZE-BASED ATTENTION METRICS

Metric	'Info *before* Experience'	'Experience *only*'	Difference	p-value	Cohen's d
Mean Step Distance	0.040	0.044	-0.004	0.006	-0.26
Std. of Step Distance	0.032	0.034	-0.003	0.006	-0.27
Radius of Gyration	0.216	0.223	-0.007	0.055	-0.19
Mean Distance from Centroid	0.189	0.197	-0.007	0.048	-0.19
Observations	205	207			

Notes: Metrics are computed from Webgazer eye-tracking data aggregated over the full video. Values are in normalized screen-distance units. "Difference" is 'Info *before* Experience' minus 'Experience *only*.' "Cohen's d" expresses this difference as a share of the pooled standard deviation of the attention metrics in each group.

in attention as a function of information across all four metrics. The attention of participants in the 'Info *before* Experience' condition is consistently and significantly more focused and concentrated on the specific regions of the scene that encompass the protagonist-relevant features compared to those in the 'Experience *only*' condition. The effect of information on attention is quantitatively large: across the four complementary measures of attention, the treatment effect varies from 19% to 27% of a standard deviation (Cohen's d), similar in magnitude to the treatment effect of information on attitudes in the Carne y Arena study (34% of a standard deviation). Given the structure of the video, this suggests that participants spend more time paying attention to the features of the protagonists if they have received information before the experience than if they have not received this information.

To link the treatment to prosocial behavior, we next relate the information treatment to the donation decision. We regress an indicator for choosing the target charity on the information treatment dummy in table 2. Receiving information prior to the video increases the probability of donating to the target charity by around 10 percentage points. The magnitude of this effect, 33% of a standard deviation, is again similar to the information treatment effect on attitudes in the Carne y Arena study.

These findings provide direct evidence for the mechanism posited in the model of section 1 to explain the main result observed in the field — the impact of information in the immersive Carne y Arena experience. Specifically, information that induces the witness to focus their attention on protagonist-relevant features — caring for children and families in the case of this study — alters the

TABLE 2: EFFECT OF INFORMATION ON DONATIONS

	Donation choice
Information treatment (=1)	0.098**
	(0.049)
Observations	412

Notes: The dependent variable is an indicator equal to 1 if the participant chose the target charity. Estimated using OLS with robust standard errors in parentheses.
$^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

witness's experience of observing the protagonist's struggles and fosters greater pro-social behaviors.

4 Mechanism: *relatability*

In the previous section, we provided initial evidence for the model in section 1: information prior to the experience shifts attention and changes how a witness 'lives through' the experience of observing the struggles of a protagonist. In this section, we test the downstream consequences of such attentional shifts on *relatability.*

To do so, we introduce an experimental paradigm which conceptually reproduces the Carne y Arena field experiment (section 4.1). This controlled laboratory setting allows us to experimentally test the cognitive mechanism of our conceptual framework, something that was not feasible in the field. We first replicate the main result of the Carne y Arena study (section 4.2) — the asymmetric impact of information when received *before* versus *after* witnessing the struggles of the outgroup — in a pre-registered experiment.[20] Using the same paradigm, we then introduce an empirical measure of perceived overlapping attributes between the witness and the protagonist, which we label *relatability*, and show that the observed increase in empathy is mediated through changes in relatability (section 4.3). Finally, we explore a richer set of information treatments. Specifically, we show that unrelatable information *does not* magnify empathy (section 4.4), and that information has heterogeneous treatment effects as a function of the witness's attributes (section 4.5).

4.1 Methods

Participants. We recruit participants from two different online subject pools: one from India on CloudResearch and the other from the U.S./U.K. on Prolific. The first group is asked to complete

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[20]Pre-registrations for the lab studies can be found at AsPredicted #204323 (https://aspredicted.org/md7z-trrj.pdf), #204985 (https://aspredicted.org/wmdg-6bwj.pdf), and #212694 (https://aspredicted.org/3my9-j8b9.pdf).

a tedious and arduous task for over an hour and be paid a flat fee.[21] Specifically, 100 workers are recruited to each complete 60 effort tasks. One effort task involves 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 see one table at a time and could not proceed to the next one before entering the correct answer.

Our primary studies concern the behavior of the group from the U.S./U.K. recruited from Prolific. Participants earn a base fee above the minimum wage of the respective countries (study payment is set at approximately $20/hr); importantly this wage is substantially greater than the wage paid to the Indian workers ($7/hr). 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 are given a brief description of the task given to the Indian workers and the amount they stand to earn — which is substantially less than their own.

Randomization across conditions. U.S/U.K. participants are then randomized into one of four potential conditions:[23] 'Control,' 'Info *before* Experience,' 'Info *after* Experience,' or 'Experience *only*.' Those conditions are designed to mimic the same conditions as in the Carne y Arena study: 'Control,' 'Info *before* CyA,' 'Info *after* CyA,' or 'CyA *only*.'

For the experience component, participants go through a simulation of the Indian workers' experience: each is presented with 10 of the tasks on separate pages. They are also asked to imagine the experience of having to complete the tasks themselves but, importantly, are not required to do so. The experience component is analogous to the immersive virtual reality experience in the Carne y Arena study: participants witness the hardship that the protagonist goes through, they partially experience the arduous task, but they are not fully exposed to the same hardship themselves.

For the information component, participants are presented with a set of information exhibits about social and economic conditions in India. We vary the information set across studies. In sections 4.2 and 4.3, it consists of 12 statements about conditions in India and Indian residents, similar to the information package provided in the field at Carne y Arena.[24] Our aim is to conceptually replicate the

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[21]The flat fee is substantially above the prevailing average wage in the country. Study payment is approximately $7/hr compared to a minimum wage of between $2-$6 per day, depending on the region.

[22]Each Prolific participant is entered into a lottery for the prospect of winning one of two or three $100 gift cards.

[23]The exact number of conditions varies across studies. We describe in detail the conditions used for each study below.

[24]The information treatment is designed to mimic the same treatment as in the Carne y Arena study and contains 12 statistical information statements about the social and economic conditions in India, sourced from the World Bank and Gallup (see appendix D for the full list of information exhibits). Statements include "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

main results in the Carne y Arena study, and to test within this conceptual replication whether the magnification of empathy by information is mediated through relatability. In section 4.4, we pre-select the 12 *least unrelatable* information exhibits from a list of 24 statements. In section 4.5, we explore heterogeneous treatment effects by pre-selecting 4 statements which are perceived as relatable as a function of the witness's own features. We explain in detail how we select information and describe the information selected for each study below. In all four studies, participants who receive the information treatment complete a multiple choice quiz based on this information (note the timing of the quiz was the same across conditions).

Prosocial behavior. Participants then report their willingness to donate part of their potential earnings to a randomly-selected Indian worker. They answer the following question by moving a slider 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 measures prosocial behavior towards the Indian worker, analogous to our measure of attitudes in favor of immigration in the Carne y Arena study.

Relatability. To test our conjecture of empathy through shared attributes, each participant is then asked to answer a question on the relatability of the Indian workers. They are 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 serves as our measure of the participant's perceptions of shared attributes with the Indian worker — *relatability*.[25]

Finally, participants answer questions about their demographics and perceptions of the task (how onerous it is).[26] Summary statistics are in appendix table A2.

4.2 Conceptual replication of the Carne y Arena results

We first use our paradigm to replicate the main behavioral finding in Carne y Arena.

Participants are randomly assigned one of two conditions, 'Info *before* Experience' where they are presented with the 12 information exhibits *before* going through a simulation of the Indian workers' experience, and 'Info *after* experience' where information comes *after* the simulation of the experience.

Arena study, these statements are meant to induce participants to focus their attention on attributes of Indian workers they can relate to — caring about health, education, gender equality, etc — without overtly attempting to be persuasive.

[25]We use the concept of *relatability* (Wei and Liu, 2020; McPherson et al., 2001) rather than the related concept of perspective-taking (Adida et al., 2018; Alan et al., 2021) because it offers a more familiar wording for our question.

[26]See appendix C for the full questionnaire.

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 are no significant differences between the 'Info *before* Experience' and 'Info *after* Experience' conditions (average correct of 8.60 versus 8.76 questions, respectively; p-value for the difference $= 0.69$).

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:

$$Donation_i = \alpha + \beta \cdot Treatment_i + \epsilon_i, \tag{6}$$

where $Treatment_i = 1$ corresponds to 'Info *before* Experience' and $Treatment_i = 0$ to 'Info *after* Experience', i.e., donation amounts are regressed on whether information came before or after the simulation of the Indian workers' experience. Results are presented in figure 3. Replicating the
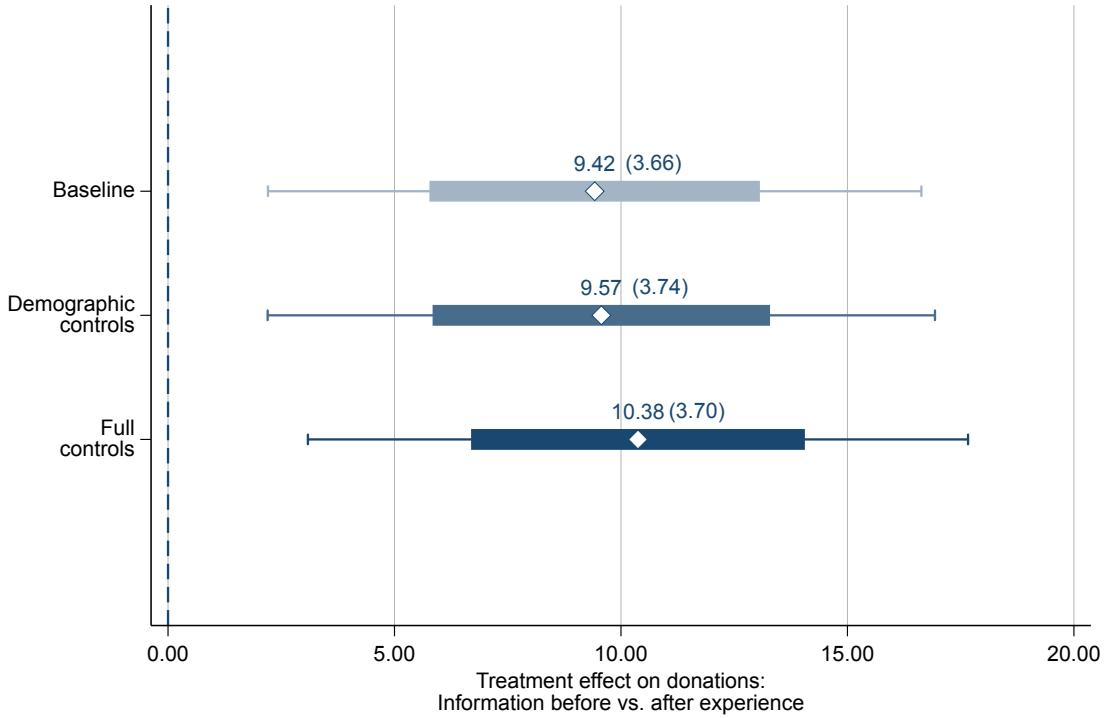
FIGURE 3: ORDER EFFECT ON DONATIONS, CONCEPTUAL REPLICATION

Notes: This figure shows the treatment effect of receiving information *before* the experience, compared to a control group which receives information *after* the experience, corresponding to various specifications of equation (6). The dependent variable is the amount allocated to the Indian worker. The top estimate has the treatment variable only; the middle estimate includes demographic controls of age, gender, foreign born; the bottom estimate also controls for task perception. The thick lines represent $\pm$ one standard error from the point estimates, and the whiskers 95% confidence intervals. See appendix table A11 for additional statistics.

main Carne y Arena results (figure 2), participants are substantially and significantly more prosocial toward the disadvantaged group if the information comes before the experience than after; participants who receive the information before are willing to donate significantly more than those who receive

information after ($9.4 more than the baseline of $33.8, p-value < 0.01). The effect is robust to including demographic controls and to controlling for perceptions of the penibility of the task. This replicates the Carne y Arena result and provides further evidence that information activates the capacity for empathy.[27]

4.3 The activation of empathy is mediated through *relatability*

Building on the paradigm of section 4.2, we then proceed to test the hypothesis from our conceptual framework (section 1) that the activation of empathy is mediated through an increase in the perception of overlapping attributes between the witness and the protagonist—relatability.

We use the same 12 exhibits for the information treatment as in the study above. Participants are randomized into one of three conditions: 'Control,' 'Experience *only*,' and 'Info *before* Experience.' Importantly, after making their donation decisions but before answering demographic questions, we measure each participant's perception of shared attributes with the Indian worker—our *relatability* measure from the answer to the question "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.
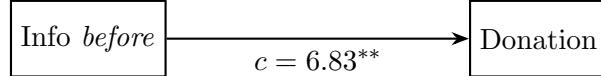
Results. This experiment allows us to test whether changes in perceptions of relatability drive the shift in donation behavior. We do this by estimating a mediation model (Baron and Kenny, 1986), which decomposes the unconditional effect of introducing information before the simulated experience into 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 4. 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 'Info *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.
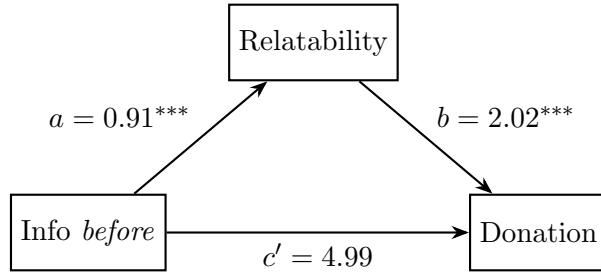
In panel A, we see that, in line with the study in section 4.2, providing information about the disadvantaged group before the simulated experience has a substantial and significant effect on donation behavior (arrow c). This total effect is decomposed in panel B. Consistent with our hypothesis, and

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[27]We also replicate the Carne y Arena findings of figure 1 in appendix figure A1 —the increase in prosocial behavior relative to the 'Control' group is similar for the 'Experience *only*' and the 'Info *after* Experience' groups, and both are significantly smaller than for the 'Info *before* Experience' group.

(A) Total Effect Model (c)

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

Figure 4: 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 A13 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 A14). *** p<0.01, ** p<0.05, * p<0.1.

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 donations. 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').

These results provide supporting evidence for the mechanism postulated in our model: introducing information before the experience changes the perception of overlapping versus non-overlapping attributes with the disadvantaged group, measured as increased relatability, which activates the empathetic response to witnessing their struggles and increases the willingness to help.

4.4 *Unrelatable* information does not magnify empathy

Our conceptual framework in section 1 proposes a mechanism where information about an outgroup shifts the perception of shared attributes with that outgroup and enhances empathetic responses. For this to occur, however, the information the witness receives has to highlight features—characteristics or values—they share with the outgroup. Information *per se* is not sufficient to activate the capacity for empathy: only information that makes the outgroup more relatable can do so.

We take a data-driven approach to test this conjecture in a separate study. A group of U.S. and

U.K. participants ($n = 49$) is recruited to rate the relatability of 24 statements about conditions in India and about Indian residents. After being presented with each statement, the participants answer "To what extent do you find this statement relatable?" on a 10-point scale. We take the statements with below-median scores ($Median = 5$) and create a set of 12 *unrelatable* information statements.[28] Some of the *unrelatable* statements present India as a competitor to the U.S. and the U.K., e.g. "India's focus on infrastructure and economic expansion is reflected in its 2023 investment levels accounting for 33.32% of GDP, outpacing the U.S. (22.3%) and the U.K. (17.0%)" or "In 2024, India has emerged as the world's fifth-largest economy, surpassing the United Kingdom" while others emphasize specific cultural differences, e.g. "Indians have a more circular concept of time than U.S. and U.K. citizens. They are less focused on deadlines and efficiency, and more focused on maintaining relationships" or "Indians view change and progress with suspicion. Progress is viewed as illusory and there is a tight link to the past."

A separate group ($n = 147$) is randomly assigned to three conditions: 'Control' and 'Experience *only*' as in the previous study (section 4.3), and '*unrelatable* Info *before* Experience' where we replace the relatability-enhancing information with the *unrelatable* set.

We first verify that the '*unrelatable* Info *before* Experience' treatment condition does not affect relatability in the same way as the baseline 'Info *before* Experience' treatment condition does in our previous experiment. This is indeed the case: relatability scores in response to the same "To what extent do you feel like you understand and relate to the circumstances of the Indian workers?" question are significantly lower in the '*unrelatable* Info *before* Experience' treatment than in the baseline 'Info *before* Experience' ($Mean = 4.82$ versus 5.92, $p < 0.01$). Importantly, donation rates are also significantly lower ($Mean = \$34.69$ versus \$42.81, $p = 0.01$). Donation rates in the '*unrelatable* Info *before* Experience' condition are similar in magnitude and not statistically different from the 'Control' and 'Experience *only*' conditions ($Mean = \$33.11$ and \$35.27, respectively). These results provide further support for the proposed relatability-based information channel mechanism described in section 1.

4.5 Heterogeneous treatment effects of information by group attributes

Our conceptual framework in section 1 implies that information will have heterogeneous treatment effects on empathy depending on whether groups of witnesses share the salient attributes of the protagonist or not. The activation of empathy through information is not universal. Rather, it depends on the congruence between a specific information set and a specific group: only information that makes the outgroup more relatable for a specific group will activate empathy for that group.

We again take a data-driven approach to test this conjecture. We focus on gender to separate

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[28]All 24 statements are listed in appendix table A15, with the 12 *unrelatable* statements we select at the bottom.

participants into two similar-sized groups, women and men. Our aim is to identify gender-specific information exhibits, i.e. information about the protagonist that is perceived as relatable by women but not by men. We first conduct a survey with 251 Prolific participants based in the U.S. and U.K. Each participant sees 24 statements about Indian citizens randomly selected from a pool of 100 statements, and is asked to rate how relatable they found each statement. As in the preceding study, participants are asked "To what extent do you find this statement relatable?" and respond using a 10-point scale. We then perform an analysis of ratings by gender, and select the subset of statements such that: (i) the mean relatability rating for women is above 5.2, (ii) the mean rating for men is below 4.8, (iii) the difference in mean relatability is at least 1.6 points higher for women than for men, and (iv) the gender difference in relatability is statistically significant (p-value < 0.05). Four statements meet our criteria, and a two-tailed t-test reports significant differences in relatability between women and men when filtering for these statements (5.69 and 3.78, respectively, p-value $= 0.000$).[29] All four selected female-relatable statements are about the condition of women in India, and they emphasize hardships that women in the U.S. and the U.K. may also face, e.g. "30% of women have faced physical violence since age 15" or "Only 0.6% of women report having had a breast-cancer screening."

We recruit 399 new Prolific participants (202 women, 197 men), randomly assigned to two conditions: 'Experience *only*' and '*female-relatable* Info *before* Experience.' We substitute the information package of sections 4.2 and 4.3 with the four '*female-relatable*' statements.

In line with the predicted heterogeneous treatment effect of information, women in the '*female-relatable* Info *before* Experience' treatment are willing to donate significantly more than women in the 'Experience *only*' condition ($41.16 vs $33.07, $p < 0.01$), whereas the same statements does not significantly impact male donations in the two treatments ($30.01 vs $33.08, $p = 0.279$). The interaction between gender and condition is also significant ($p < 0.01$). These results show that the proposed relatability-based information mechanism described in section 1 will have heterogeneous treatment effects that are group-specific.

5   Observational evidence

In this last section, we present suggestive evidence that the mechanism we propose and verify experimentally — namely, that feeling similar to and able to relate to an outgroup strengthens empathetic response to witnessing their struggles — also operates 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 Philip-

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[29]All 100 statements are listed in appendix tables A16-A19, with the four selected statements at the top. The statements are sorted in decreasing relatability for women, with the mean relatability for women and men in columns 1 and 2.

pines), analogous to witnessing the struggles of unauthorized migrants crossing the Southern border (section 2), the hardships of Pakistan's urban poor (section 3), or the tedious task performed by Indian workers (section 4); (*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, 3, and 4); (*iii*) perceived similarity towards Haiti, Japan, and the Philippines, analogous to the notion of relatability to Indian workers (section 4); and (*iv*) charitable donations sent to disaster stricken countries, analogous to our measure of attitudes in favor of immigration (section 2), donations to a charity helping people living below the poverty line in Pakistan (section 3), or the sharing of a bonus with Indian workers (section 4).

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.

5.1   Data

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 U.S. population using Prolific.[30] We introduce an incentivized measure of the perceived similarity between a subject and a person from Haiti, Japan, or

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[30]See appendix E for the complete survey. We drop respondents we cannot match to a U.S. 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 U.S. population (see appendix table A20).

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.[31] 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.[32] 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.[33] $Donations_{d,f}$ is the inverse hyperbolic sine of the number of charitable donations from U.S. domestic county d to foreign country f.[34] $Contact_{i,d,f}$ 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.

5.2   Identification

Since there are almost no donations in the absence of a natural disaster and donations flow only after a disaster strikes (see appendix figure A3), 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

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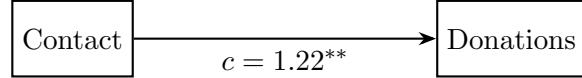
[31]We use the answers from a randomly selected respondent from Haiti, Japan, or the Philippines.
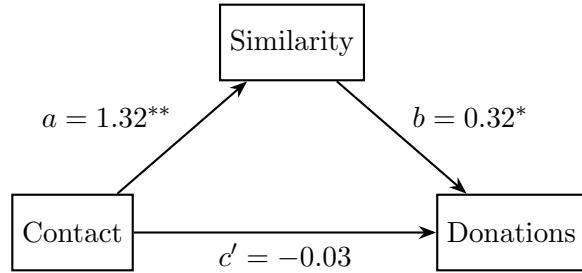
[32]We show in appendix F that this measure captures plausible variations. For instance, conservative respondents perceive all foreign origins as less similar to them compared to liberal respondents, with a more pronounced difference for Haiti and the Philippines which all respondents perceive as less similar than Japan.

[33]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 survey on similarity about their direct family connections to country f.

[34]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 5: Contact, Perceived Similarity, and Donations

Notes: This figure quantifies the impact of contact between residents in U.S. 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 A21 for additional details, and appendix table A22 for results with a single instrument. *** p<0.01, ** p<0.05, * p<0.1.

country fixed effects, and use variation in the ethnic composition of U.S. 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 4.

5.3 Results

The results are presented in figure 5. 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').[35] This suggests that the impact of contact on donations is mediated by similarity, a result

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[35]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 A22 shows specifications

which mirrors our experimental evidence showing the impact of information on donations is mediated by relatability (figure 4).

6 Conclusion

Using a series of field and lab 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, and only when, it increases *relatability* to the outgroup. Being able to relate to the circumstances of others enables a vicarious experience of their struggles — as if one were 'in their shoes.'

In a controlled field experiment, individuals exposed to statistical information about unauthorized immigrants to the U.S. *before* an immersive virtual-reality experience depicting the hardships faced by unauthorized migrants crossing the Southern border 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 then conduct an experiment that explicitly measures attention in a similar immersive experience, finding that information prior to the experience shifts attention to features relevant to the protagonist in a manner consistent with our framework. We then use a series of controlled lab experiments to identify the proposed mechanism. First, we reproduce our main finding from the field: participants previously exposed to statistical information about India have a stronger empathetic response to witnessing Indian workers performing an arduous task than participants 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 contrast, information which does not induce greater relatability fails to enhance empathetic responses; and information has heterogeneous treatment effects on empathy as a function of the witness's group identify and attributes. 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 can change: information provision and inter-group contact can improve a person's ability to put

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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 5. Unfortunately, neither instrument is strong on its own.

themselves in the shoes of others. In particular, we show that, beyond a possible direct informational effect, receiving information about an outgroup can shift attention to shared attributes, increasing perceived relatability, and, in turn, enhance empathy — even among individuals who are initially more hostile toward the outgroup.

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Online Appendix

"In their Shoes: Empathy through Information

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

A   Additional Tables and Figures

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APPENDIX TABLE A1: CARNE Y ARENA PROTOCOL

</div>

Dallas, Texas

	On site (short run)				Follow-up (long run)	
'Control'	Attit	*Info*	*CyA*	$(n = 83)$	Attit	$(n = 8)$
'CyA *only*'	*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)	
'Control'	Attit	*Info*	*CyA*	$(n = 82)$	Attit	$(n = 29)$
'CyA *only*'	*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 conditions, 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)						
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: Eye tracking and attention (section 3)						
Mean step dist.	412	0.043	0.017	0.039	0.010	0.131
Std. dev. of step dist.	412	0.034	0.014	0.031	0.010	0.123
Radius of gyration	412	0.220	0.045	0.215	0.105	0.408
Mean dist. from centroid	412	0.193	0.042	0.190	0.085	0.373
Donation to GRF	412	0.546	0.498	1.000	0.000	1.000
Panel C: Conceptual replication (section 4.2)						
Donations	244	37.730	27.910	39.500	0.000	100.000
Panel D: Relatability (section 4.3)						
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 E: Unrelatable information (section 4.4)						
Relatability	147	4.816	2.737	5.000	0.000	10.000
Donations	147	34.694	26.172	30.000	0.000	100.000
Panel F: Gender-specific relatability (section 4.5)						
Relatability:						
Women	200	5.560	2.920	6.000	0.000	10.000
Men	194	5.443	3.151	6.000	0.000	10.000
Donations:						
Women	200	36.080	25.323	40.000	0.000	100.000
Men	194	34.954	28.690	40.000	0.000	100.000

Panel G: Charitable donations and migrations, county d-country f level (section 5)

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 H: Contact and similarity to Haiti, Japan, and the Philippines (section 5)

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

	Control	CyA *only*	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 experiment participants, and the p-values from a Pearson test of equality of those demographic shares between treatment arms.

APPENDIX TABLE A4: INFORMATION, CARNE Y ARENA, AND ATTITUDES

	(1) Attitudes	(2) Attitudes	(3) Attitudes
CyA *only*	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 complements figure 1. It shows estimates of various specifications of equation (5). 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 'Control.' The treatment groups are: 'CyA *only*' 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.

	(1)	(2)
	only CyA	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 'Control,' 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 (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.

	(1) Attitudes	(2) Attitudes	(3) Attitudes
Info *before*	0.335***	0.371**	0.424***
	(0.098)	(0.115)	(0.113)
p-value Robust S.E.	0.001	0.001	0.000
p-value Wild Bootstrap	0.001	0.001	0.001
p-value Permutation test	0.000	0.000	0.000
Observations	286	224	224
Demographics	N	Y	Y
Emotional response	N	N	Y

Notes: This table complements Figure 2. The dependent variable is an index of attitudes in favor of migrants, normalized to mean zero and std. dev. one for the 'Control' group. 'Info *before*' is a dummy variable equal to one for the 'Info *before* CyA' group, and zero for the 'Info *after* CyA' group. Robust standard errors are in parentheses. Demographic controls in Columns 2-3 include age, gender, and being born outside the U.S. Column 3 additionally controls for the self-reported strength of emotional response to CyA. *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.

APPENDIX TABLE A7: 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 (5), where we estimate the treatment effect of Carne y Arena on the ability of participants to retain information, controlling for differences between Dallas and Omaha participants. 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 A8: INFORMATION, CARNE Y ARENA, AND ATTITUDES, DALLAS VS OMAHA

	(1) CyA *only*	(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 (5) for Dallas and Omaha participants combined (panel A), for Dallas participants only (panel B), and for Omaha participants only. For comparison, panel A is an exact reproduction of table A4 (columns 1-3). The dependent variable is an index of attitudes in favor of migrants. The control group is always 'Control.' The treatment groups are: 'CyA *only*' 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 A9: Information, Carne y Arena, and Attitudes, Heterogeneity

	(1) CyA *only*		(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 (5), exploring the heterogeneity of the various treatment effects on attitudes in favor of migrants across types. Each row corresponds to a separate regression. The control group is always 'Control.' The treatment groups are: 'CyA *only*' in column 1; 'Info *after* CyA' in column 2; 'Info *before* CyA' in column 3. The top panel (Baseline) reproduces the results from table A4 for comparison. The other panels present separate regressions for each type: Hispanic versus non-Hispanic respondents, foreign versus U.S.-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 - Page 11
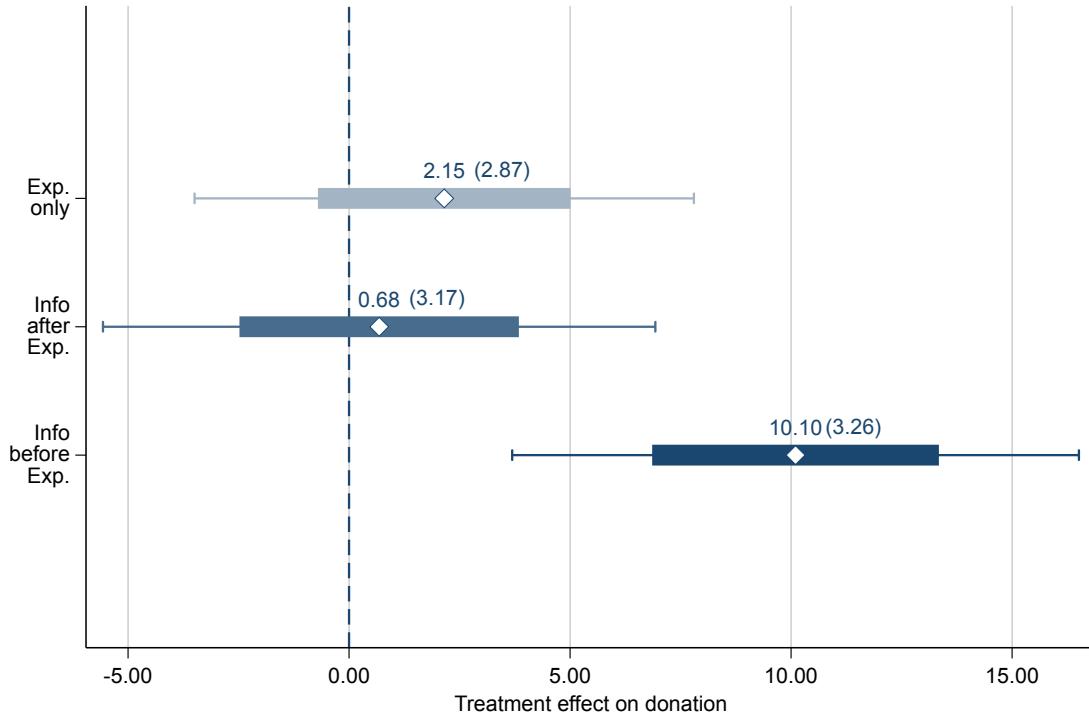
Statement
Pakistan is the fifth most populous country in the world, with about 240 million people. Its largest city, Karachi, is home to over 15 million people.
Pakistan is a developing country where about 2 in 5 people live below the poverty line, with sharp inequalities between cities and rural areas.
About 44% of school-age children in Pakistan are out of school — the second-highest number in the world in absolute terms — with girls more likely than boys to miss out on education.
A national survey found that about 3.3 million Pakistani children are trapped in child labor.
Pakistan has a low Social Mobility Index of 36.7, showing limited chances for children to improve their life circumstances.
Nearly 38% of Pakistani children under 5 are stunted due to malnutrition.
Pakistan's infant mortality rate is about 50 deaths per 1,000 live births.
Only 42% of children under five are registered at birth—meaning nearly 6 in 10 lack an official identity. Without registration, kids struggle to access services like school and healthcare.
Around 1.5 million children in Pakistan live on the streets, compared to about 770,000 homeless children in the United States. Many of these kids spend their time in unsanitary conditions such as garbage dumps.

Notes: The table shows the 9 statements we use in section 3 to test the impact of information on attention.

APPENDIX TABLE A11: ORDER EFFECT ON DONATIONS

	(1) Donations	(2) Donations	(3) Donations
Info *before*	9.420**	9.566**	10.375***
	(3.660)	(3.737)	(3.697)
Constant	33.794***	24.820***	26.848***
	(2.535)	(6.199)	(6.423)
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	0.02	< 0.01	< 0.01
Observations	219	219	219
Demographics	N	Y	Y
Task Perception	N	N	Y

Notes: This table complements figure 3. It shows estimates of various specifications of equation (6). 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.

APPENDIX FIGURE A1: INFORMATION, EXPERIENCE, AND DONATIONS

Notes: This figure shows the effect of various treatments on donations, β in equation (6). The thick lines represent $\pm$ one standard error from the point estimates, and the whiskers 95% confidence intervals. Each estimate corresponds to a different regression. The control group is always 'Control.' The treatment groups are, respectively: for the top estimate, 'Experience *only*'; for the middle, 'Info *after* Experience'; for the bottom, 'Info *before* Experience.' See appendix table A12 for additional statistics.

	(1) Donation	(2) Donation	(3) Donation
Experience *only*	2.153 (2.869)		
Info *after* Experience		0.681 (3.172)	
Info *before* Experience			10.101*** (3.255)
Constant	33.113*** (1.907)	33.113*** (1.908)	33.113*** (1.908)
p-value Robust S.E.	0.45	0.83	< 0.01
p-value Wild Bootstrap	0.41	0.82	< 0.01
p-value Permutation test	0.40	0.88	< 0.01
Observations	270	244	259

Notes: This table complements figure A1. It shows estimates of various specifications of equation (6) on data from the Conceptual Replication. The dependent variable is the amount allocated to the Indian worker. The control group is always 'Control.' The treatment groups are: 'Experience *only*' in column 1; 'Info *after* Experience' in column 2; 'Info *before* Experience' 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.
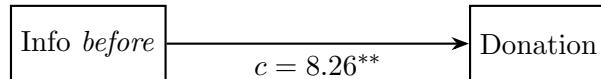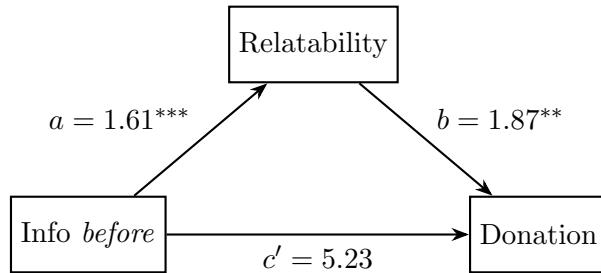
	Donations	Relatability	Donations
	(1)	(2)	(3)
Info *before*	6.834**	0.908***	4.994
	(3.232)	(0.333)	(3.208)
Relatability			2.026***
			(0.571)
Constant	35.605***	5.008***	25.458***
	(2.409)	(0.248)	(3.706)
Observations	279	279	279

Notes: This table shows the regression coefficients underlying figure 4. Column 1 gives the total effect of the 'Info *before*' treatment on donations (compared to the 'Experience *only*' treatment), arrow *c* in figure 4; column 2 gives the impact of the 'Info *before* Experience' treatment on relatability, arrow *a* in figure 4; the second row of column 3 gives the impact of relatability on donations, arrow *b* in figure 4, and the first row gives the direct effect of the 'Info *before* Experience' treatment on donations, arrow c' in figure 4.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$.

(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 4. It shows results for the same mediation model, except that we compare the 'Info *before* Experience' and 'Control' conditions, instead of the 'Info *before* Experience' and 'Experience *only*' conditions in figure 4. See appendix table A14 for additional details.
*** p<0.01, ** p<0.05, * p<0.1.

Appendix Table A14: 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 A13, except that we compare the 'Info *before* Experience' and 'Control' conditions, instead of the 'Info *before* Experience' and 'Experience *only*' conditions in appendix table A13.
*** p<0.01, ** p<0.05, * p<0.1.

APPENDIX TABLE A15: INFORMATION ABOUT INDIA, RANKED BY RELATABILITY

Relatability	Statement
6.11	In 2022, **85%** of Indian population felt that children in the country have the chance to learn and grow every day.
6.10	Over the past few decades, India has been seeing a **consistent upward trend** in its literacy rate.
6.03	According to the latest World Happiness Report, the United States has a significantly better ranking on the happiness index than India, with the **US at 23rd place and India at 126th place**.
5.85	Out-of-pocket costs make up 62.6% of health spending in India, pushing up to **39 million people into poverty annually**.
5.79	People born poor in India are likely to stay poor throughout their lives. Ranking **76th** in social mobility, India offers **little** opportunity for hundreds of millions to climb out of poverty or reach a higher income bracket.
5.72	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%).
5.71	An Indian citizen is almost **65 times more likely** than a U.S. citizens to live below the poverty line, according to the 2021 statistics.
5.50	**70% to 92%** of people with mental disorders in India do not receive proper treatment due to lack of awareness, stigma, and shortage of professionals.
5.48	In 2022, **90%** of the Indian population expressed confidence in their financial institutions or banks.
5.41	In traditional Indian society, the majority view is **"all men are NOT created equal,"** let alone women and children. Indian society is based on hierarchy, patriarchy, and endogamy. Status distinctions are important and guarded.
5.40	India's economy has rebounded strongly from the pandemic, with GDP growth averaging **7–8%** in recent years, and projections indicating sustained expansion through 2030.
5.35	Indians display **lower risk taking** than US and UK residents. This is driven by an attitude that possessions need to be held on to and protected.
5.15	In 2024, India has emerged as the **world's fifth-largest economy**, surpassing the United Kingdom.
5.13	In 2022, over **4 in 10** Indians reported struggling to afford food in the past 12 months.
5.09	Saying **"no"** is often considered rude in India, so Indians are more likely to use indirect communication than US and UK residents.
5.06	India's cost of living index is significantly **lower** than that of the UK and the US, making it **more affordable** for residents and expatriates.
5.00	Indians are less **direct** than citizens of Western countries. They are more likely to rely on environmental cues and contexts rather than expressing their opinion **directly**.
4.96	India's focus on infrastructure and economic expansion is reflected in its 2023 investment levels accounting for **33.32%** of GDP, outpacing the U.S. (**22.3%**) and the UK (**17.0%**).
4.93	People in India save and invest more of their income than U.S. and UK citizens. In 2023, India's gross savings rate was >**30%** of GDP, significantly higher than the U.S. (**17.8%**) and the UK (<**16%**), reflecting a stronger culture of financial prudence.
4.73	In 2023, **nearly half** of all Indian women remained outside the workforce, limiting their financial independence despite educational gains.
4.72	Indians have a more **circular** concept of time than US and UK citizens. They are less focused on **deadlines** and efficiency, and more focused on maintaining relationships.
4.55	Indians view **change** and **progress** with suspicion. Progress is viewed as illusory and there is a tight link to the past.
4.54	The **Caste system**, while formally illegal, continues to impact Indian society. Jobs and marriages are often determined by one's caste, which is determined by **birth**.
4.21	India ranked as the **lowest** country in the G20 for women.

Notes: The table shows the 24 statements we piloted in order to test their relatability to U.S. and U.K. participants. Relatability was rated on a 10-point scale. Statements are presented in descending order of mean relatability score. The horizontal line divides the list of statements into 12 relatable (above-median relatability) and 12 unrelatable (below-median relatability) statements. Section 4.4 uses the bottom 12 *unrelatable* statements.

Female	Male	Statement
6.46	3.96	**24% of women are overweight or obese.**
6.27	4.03	**30% of women have faced physical violence since age 15.**
5.50	3.67	**23% of Indian households are headed by a woman.**
5.45	3.30	**Only 0.6% of women report having had a breast-cancer screening.**
7.83	8.00	**91%** of men have a mobile phone they can use.
7.70	7.81	**Three-quarters** of respondents agree that free speech is essential to democracy.
7.63	6.91	More than **80%** want stronger government action against global warming.
7.54	7.47	**78%** want large corporations to pay higher tax rates.
7.45	6.97	**89%** want social-media companies to remove hateful or abusive content proactively.
7.43	6.97	**59%** want the government to expand public higher-education scholarships.
7.34	6.22	**78.6%** of women have a bank account they themselves use.
7.33	5.59	Women's life expectancy has reached **74.1** years.
7.22	6.89	**65%** favor raising the minimum wage to keep pace with inflation.
7.19	5.13	**54%** of Indian women aged **15-49** operate a mobile phone that is theirs to use.
7.15	6.87	**71%** support higher taxes on large businesses to fund major economic transitions.
7.10	6.62	**74%** of Indians support imposing a wealth tax on high-net-worth individuals.
7.08	7.11	Most Indians say that both women and men should be responsible for earning money, caring for children and making family financial decisions.
7.05	5.96	**80%** support the government guaranteeing free or affordable healthcare for every citizen.
6.94	7.75	**72%** say people should be free to criticize government policies publicly—an expansive view of political speech.
6.90	6.32	**71%** of currently-married women take part in key household decisions.
6.82	6.96	**74%** of streaming-service users want a legally enforceable code compelling platforms to block explicit content from minors.
6.80	6.15	**80%** support taxing companies and individuals that pollute, with the revenue redistributed to cleaner actors.
6.80	5.74	Female literacy has risen to **74.6%**.
6.78	6.91	**8 in 10** respondents say India should invest more in clean-energy R&D.

Notes: The table shows the first 25 out of 100 statements we piloted in order to test their relatability to U.S. and U.K. participants. Relatability was rated on a 10-point scale. The remaining statements are presented in descending order of mean relatability score among female respondents. Section 4.5 uses the four statements selected for their specificity (relatable to women, unrelatable to men) shown in bold at the top.

Female	Male	Statement
6.76	5.96	Women spend a daily average of **5** hours on unpaid domestic work.
6.62	6.56	**69%** believe that the way the world's economy works now is unfair to poorer countries.
6.61	7.05	**78%** want the government to prioritize climate resilience funding.
6.56	5.76	**89%** want social-media firms held responsible for removing abusive or hateful posts.
6.42	5.77	Contraceptive prevalence among women has climbed to **67%**.
6.36	5.92	The Arms Act in India makes self-defense the only civilian reason that routinely qualifies for a license; applicants must prove a specific danger to life. Most Indians support the strict gun control policies.
6.36	6.08	**70%** favor introducing a Universal Basic Income paid by the government each month to every adult.
6.35	4.76	**58%** favor tighter controls on foreign funding of NGOs.
6.24	6.30	Nearly **two-thirds** endorse subsidies for solar home-rooftop systems.
6.06	5.25	**72%** of **13,000** respondents in an Ipas survey support the legal right to abortion.
6.00	6.34	Male literacy has reached **87.2%**.
5.97	5.55	**60%** support a national register to identify undocumented immigrants.
5.96	6.67	Men's labor-force participation rate is **77.1%**.
5.96	4.22	India's maternal-mortality ratio has fallen to **97** per **100 000** live births.
5.91	5.81	**56%** of Indians surveyed ahead of Budget 2024 wanted the Finance Ministry to prioritize personal-income-tax cuts.
5.87	5.62	Male life expectancy now stands at **70.5** years.
5.87	6.14	**60%** of men own a house or land, alone or jointly.
5.84	6.21	**80%** of Indians say discrimination against transgender people should end—a higher share than in most of the **27** countries Ipsos surveyed.
5.75	4.85	**69%** favor the death penalty for convicted rapists.
5.73	5.34	**68%** favor gender quotas in state assemblies.
5.71	5.45	**91%** of surveyed Indians approved the government's ban on Chinese-origin mobile apps.
5.68	5.45	**63%** back decriminalizing consensual same-sex relations in all states.
5.67	5.31	**7 in 10** voters endorse a national women-reservation law for Parliament.
5.61	4.34	About **43%** of women report owning a house and/or land, alone or jointly.
5.56	3.83	The female labor-force participation rate stands at **32.8%**.

Notes: This table is a continuation of Table A16, showing statements 26-50 (out of 100) in descending order of mean relatability among female respondents.

Female	Male	Statement
5.54	4.75	**Two-thirds** of Indians polled by Pew believed that having more women politicians would improve policymaking in the country.
5.52	5.74	**56%** of nearly 9600 Economic Times readers picked a personal-income-tax cut as the single thing they wanted from the 2024 Union Budget.
5.52	4.56	**22%** of men consume alcohol.
5.51	5.30	**61%** support the Citizenship Amendment Act provisions. These provide an accelerated pathway to Indian citizenship for persecuted refugees of religious minorities from Islamic countries Afghanistan, Bangladesh and Pakistan who arrived in India by 2014. The eligible minorities are Hindus, Sikhs, Buddhists, Jains, Parsis or Christians.
5.45	4.05	High blood-glucose is reported by **12%** of women.
5.44	4.85	About **62%** of regular male wage-earners have no written job contract, and **53%** receive no social-security benefit.
5.42	4.39	Women own **22 %** of all officially registered Micro, Small & Medium Enterprises in India.
5.41	5.53	About **22.9%** of men are overweight or obese.
5.39	5.26	**55%** Indians rank law-and-order issues above welfare in local election priorities.
5.39	5.12	**51%** prefer national service requirements for all **18**-year-olds.
5.39	4.82	**55%** of men have ever used the internet.
5.36	4.33	Spousal sexual violence has been experienced by **14%** of ever-married women.
5.33	5.06	**63%** favor higher defense spending to strengthen national security.
5.31	3.89	**63%** want stricter dress codes in public schools.
5.27	3.97	**57%** of women have a waist-to-hip ratio signaling metabolic risk.
5.24	5.65	On Indian social media, men generate **80%** of all political tweets.
5.20	4.25	**48%** of men record a waist-to-hip ratio in the high-risk range.
5.19	5.06	**91%** think banning Chinese apps and denying contracts to Chinese firms was the right way to counter Beijing.
5.17	5.09	Among male drinkers, **15%** drink almost every day.
5.12	5.38	**55%** of Indian adults say abortion should be illegal in all or most cases.
5.10	4.30	In the 2023–24 PLFS cycle, the male unemployment rate stood at just **3.2%**.
5.06	2.71	Half of Indian adults favor legal bans on religious conversion.
5.00	4.97	**2 in 3** Indian men agree that "a wife must obey her husband."
5.00	4.84	Fathers in the private sector still have no statutory paid paternity leave.
4.97	4.38	Anemia affects **57%** of women aged **15-49**.

Notes: This table is a continuation of Table A16 and Table A17, showing statements 51-75 (out of 100) in descending order of mean relatability among female respondents.

APPENDIX TABLE A19: INFORMATION ABOUT INDIA AND GROUP-SPECIFIC RELATABILITY (76-100)

Female	Male	Statement
4.96	6.56	**64%** believe climate-change action will create economic growth.
4.96	5.44	National male unemployment measured **5.6%** in May 2025.
4.94	5.54	World-Values Survey data show **62%** of Indians 'would not like' a homosexual neighbor; attitudinal work finds similar discomfort toward transgender neighbors.
4.91	6.00	Substantial minorities have traditional views when it comes to family responsibilities, saying men should be the primary money earners in a family and women should be the primary caregivers for children.
4.88	5.17	**66%** support the right of same-sex couples to adopt children.
4.88	5.07	Suicide claims **14.2** men per **100 000** annually.
4.78	4.69	Paid maternity leave in India is **26** weeks by law.
4.76	4.08	Exactly **one-third** of women have ever used the internet.
4.73	3.94	Only **1.2%** of women have ever undergone a cervical-cancer screening.
4.68	4.76	More than a **quarter** of men in government service opt for voluntary retirement before the age of **55**.
4.59	5.24	Hypertension is present in **21%** of women aged **15-49**.
4.57	4.10	Among mothers in the past **two** years, **36%** received an HIV test.
4.56	4.84	**42.4%** of men use some form of tobacco.
4.55	4.61	**Two-thirds** want social-media posts that "hurt religious sentiments" removed by law.
4.50	5.36	Hypertension affects **24%** of men aged **15-49**.
4.39	4.27	Overall, **63%** of Indians rate preventing interfaith marriage for women as very important. Similarly, for men, **67%** hold the same opinion.
4.24	3.76	**64%** say dissent that "hurts the nation's image" should face legal penalties.
4.11	4.68	**53%** of Indians favor legal recognition of same-sex marriage.
3.92	2.28	**35%** of men believe wife-beating is justified under some situations.
3.87	4.65	**16.8%** of men have diabetes.
3.84	3.77	**15%** of men aged **21-29** were married before reaching the legal age of **21**.
3.67	3.97	Sexually-transmitted-infection symptoms were reported by **9%** of men.
3.64	4.52	Internet use among the poorest men is only **26%**.
3.62	4.77	**36%** believe abortion should be illegal in every case, without exception.
3.00	3.42	**56%** say police should have greater powers to detain without warrant in "security cases."
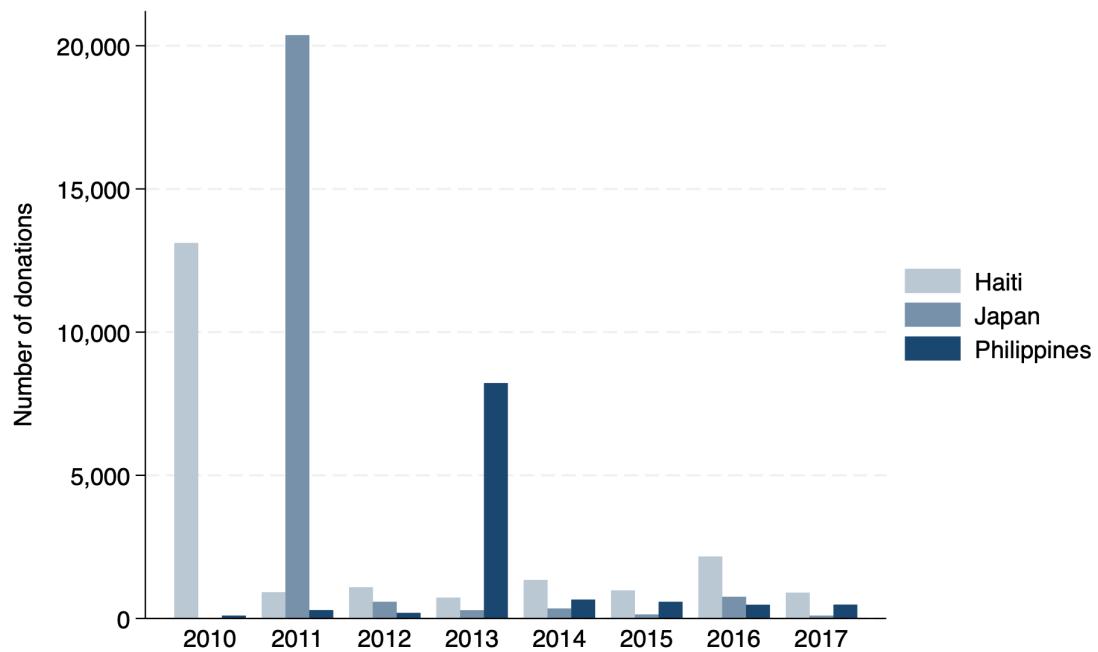
*Notes:* This table is a continuation of Table A16-Table A18, showing statements 76-100 (out of 100) in descending order of mean relatability among female respondents.

Appendix Table A20: 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 U.S. 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 A3: Total number of donations to each country per year

Notes: This figure shows the total number of charitable donations, from all U.S. 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.

APPENDIX TABLE A21: 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: $Contact_{i,d,f} = \sum_{t=1880}^{2010} \gamma_t^{Cont.} I_{-r(d),f,t} \frac{I_{d,-c(f),t}}{I_{.,-c(f),t}} + \delta_d^{Cont.} + \delta_f^{Cont.} + \eta_{i,d,f}^{Cont.}$

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

Notes: This table shows the regression coefficients underlying figure 5. It quantifies the impact of contact between residents in U.S. 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 $I_{-r(d),f,t} \times I_{d,-c(f),t}/I_{.,-c(f),t}$'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 5; column 2 gives the impact of contact on similarity, arrow a in figure 5; column 3 gives the impact of similarity on donations, arrow b in figure 5, and the direct effect of contact on donations, arrow c' in figure 5.

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.

	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: $Contact_{i,d,f} = \gamma^{Cont.} I_{-r(d),f,2000} \frac{I_{d,-c(f),2000}}{I_{.,-c(f),2000}} + \delta_d^{Cont.} + \delta_f^{Cont.} + \eta_{i,d,f}^{Cont.}$

Model II: $Similarity_{i,d,f} = \gamma^{Sim.} I_{-r(d),f,2000} \frac{I_{d,-c(f),2000}}{I_{.,-c(f),2000}} + \gamma^{Sim.} Contact_{i,d,f} + \delta_d^{Sim.} + \delta_f^{Sim.} + \eta_{i,d,f}^{Sim.}$

	Donations	Similarity	Donations
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: $Contact_{i,d,f} = \gamma^{Cont.} I_{-r(d),f,2010} \frac{I_{d,-c(f),2010}}{I_{.,-c(f),2010}} + \delta_d^{Cont.} + \delta_f^{Cont.} + \eta_{i,d,f}^{Cont.}$

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

Notes: This table replicates the results in table A21 with a single instrumental variable. Our excluded instrument in panel A is $I_{-r(d),f,2000} \times I_{d,-c(f),2000}/I_{.,-c(f),2000}$'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	○ $50,000-$69,999
○ $10,000-$14,999	○ $70,000-$89,999
○ $15,000-$19,999	○ $90,000-$109,999
○ $20,000-$29,999	○ $110,000-$149,999
○ $30,000-$39,999	○ $150,000-$199,999
○ $40,000-$49,999	○ $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).
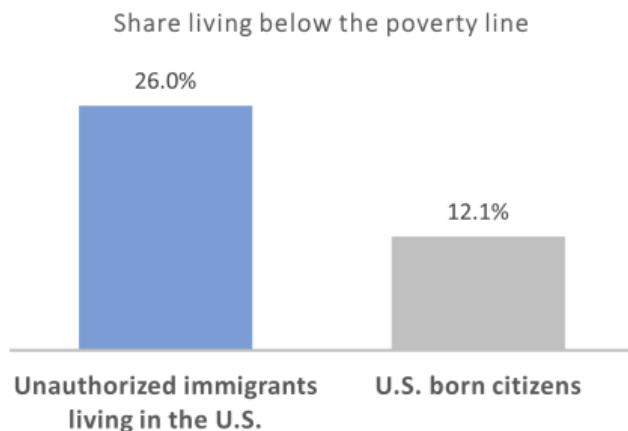
In the fiscal year 2020, U.S. Customs and Border Protection apprehended a total of **400,651 people** on the Southwest border.

In the fiscal year 2020, U.S. Customs and Border Protection seized **287,000 pounds** of drugs on the Southwest border.
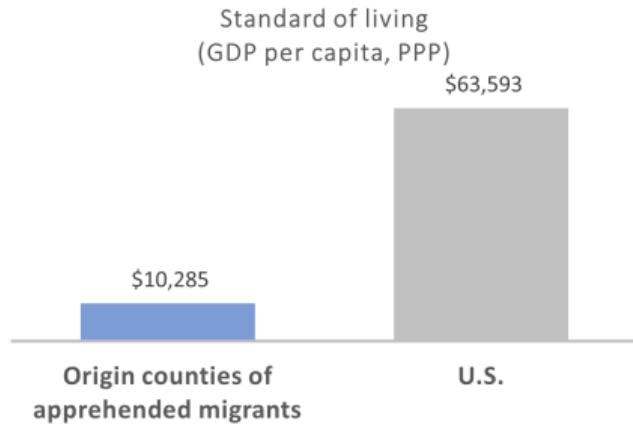
The number of unauthorized immigrants living in the U.S. is about **11 million**.

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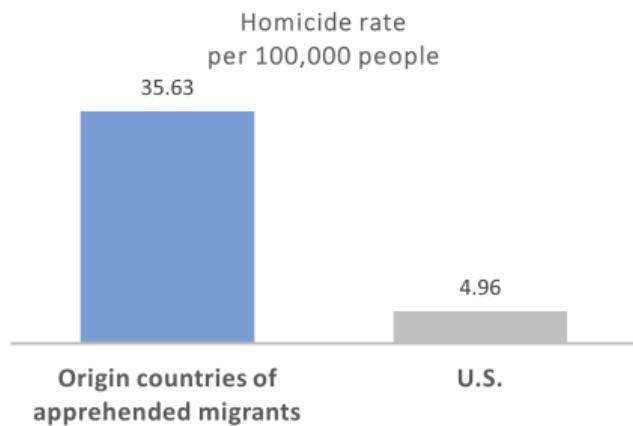
line.

Share living 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.

Standard of living
(GDP per capita, PPP)

$63,593

$10,285

Origin counties of
apprehended migrants

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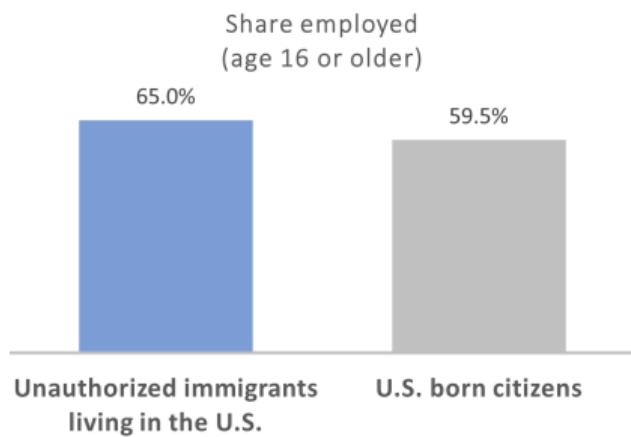
The average homicide rate in the top four origin countries of migrants apprehended on the Southwest border is **7 times higher** than that in the U.S.

Homicide rate
per 100,000 people

35.63

4.96

Origin countries of
apprehended migrants

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.

Share employed
(age 16 or older)

65.0%

59.5%

Unauthorized immigrants
living in the U.S.

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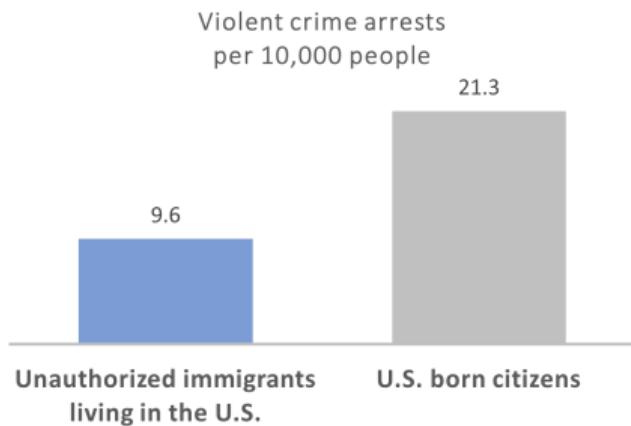
Unauthorized immigrants living in the U.S. have the following rights and obligations:

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.

Violent crime arrests
per 10,000 people

21.3

9.6

Unauthorized immigrants living in the U.S.

U.S. born citizens

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 4.3). The questionnaire for first conceptual replication study (section 4.2) 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

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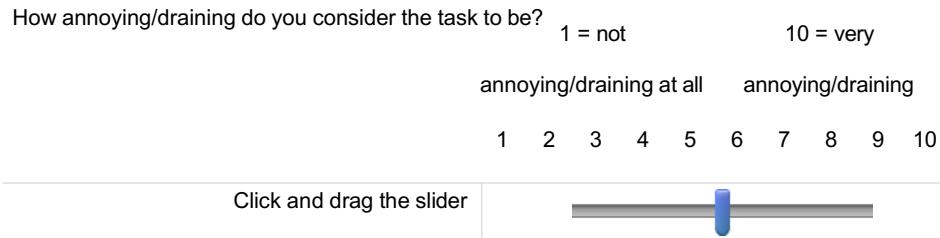
Keep in mind that the workers will actually have to complete 60 of these tasks by counting the number of zeros in each.

You will be 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?

	0 10 20 30 40 50 60 70 80 90 100
Give bonus	

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

	Not at all Very much so
	0 1 2 3 4 5 6 7 8 9 10
Know the circumstances	

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

| | 1 = not | 10 = very |
| | annoying/draining at all | 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 4.2 and 4.3). In the first replication study (section 4.2) it is presented to participants in both conditions, 'Information *before*' and 'Information *after*.' In the second replication study (section 4.3) 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
World Risk Poll
Gallup
Published Academic Papers

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 2024, India has emerged as the **world's fifth-largest economy**, surpassing the United Kingdom.

India's cost of living index is significantly **lower** than that of the UK and the US, making it **more affordable** for some residents and expatriates.

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

Indians display **lower risk taking** than US and UK residents.

The **Caste system**, while formally illegal, continues to impact Indian society. Jobs and marriages are often determined by one's caste, which is determined by **birth**.

India's focus on infrastructure and economic expansion is reflected in its 2023 investment levels accounting for **33.32%** of GDP, outpacing the U.S. (22.3%) and the UK (17.0%).

People in India save and invest more of their income than U.S. and UK citizens. In 2023, India's gross savings rate was **30%** of GDP, significantly higher than the U.S. (17.8%) and the UK (16%), reflecting a stronger culture of financial prudence

India ranked as the **lowest** country in the G20 to be a woman.

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   ○ $50,000-$69,999

○ $10,000-$14,999   ○ $70,000-$89,999

○ $15,000-$19,999   ○ $90,000-$109,999

○ $20,000-$29,999   ○ $110,000-$149,999

○ $30,000-$39,999   ○ $150,000-$199,999

○ $40,000-$49,999   ○ $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!

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F   Spatial Representation of Perceived Similarity

To showcase the relevance and versatility of our measure of perceived similarity, and its potential as a 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.[36] This approach is similar to the 'spatial' mental representation of memories in neuroscience (see for instance Pantelis et al., 2008).

We then 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 A4. 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 U.S., a wealthy country too.
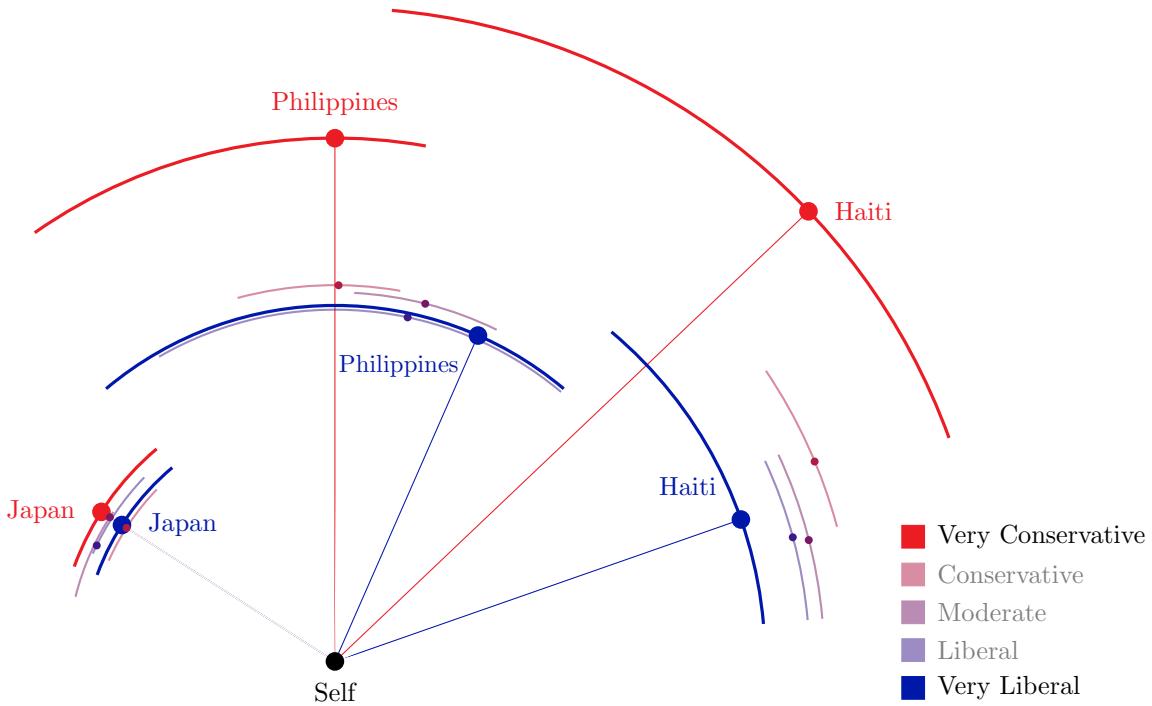
Those results suggest a complementary explanation for the findings in Enke et al. (2022) who show that universalists allocate their altruism over short and long social distances more uniformly than communitarians: universalists — identified by their liberal political views in our survey — may simply perceive all social distances to be shorter compared to communitarians — identified by their conservative political views. In our conceptual framework of section 1, universalists correspond to witnesses with a larger $||\mathbf{a}_{\boldsymbol{\alpha}(\mathcal{C})}(w)||$, who are more likely to feel empathy towards any protagonist.

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[36]For each respondent i, we use their perceived similarity to Japan, Haiti, and the Philippines on a scale from 0 to 5 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.

APPENDIX FIGURE A4: 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 A23. 'Self' is the centroid of all respondents within each group. We arbitrarily normalize the direction towards Japan for all groups (Northwest).

Overall figure A4 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 A23: 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 A4.