



# Symptoms and Stereotypes: Perceptions and Responses to Covid–19 in Malawi and Zambia

Karen E. Ferree<sup>\*</sup>, Boniface Dulani<sup>†</sup>, Adam S. Harris<sup>‡</sup>, Kristen Kao<sup>§</sup>,  
Ellen Lust<sup>¶</sup>, Cecilia Ahsan Jansson<sup>||</sup> and Erica Ann Metheney<sup>\*\*</sup>

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<sup>\*</sup>Associate Professor, University of California, San Diego.

<sup>†</sup>Associate Professor, University of Malawi.

<sup>‡</sup>Lecturer (Assistant Professor), University College London.

<sup>§</sup>Senior Research Fellow, University of Gothenburg.

<sup>¶</sup>Professor, University of Gothenburg.

<sup>||</sup>PhD Student, University of Gothenburg.

<sup>\*\*</sup>Statistician, University of Gothenburg.

## Abstract

A growing literature documents Covid-19's health and economic effects. Can Covid-19 also exacerbate identity divisions? Psychologists argue that contagious disease increases threat perceptions and provokes policing of group boundaries and discrimination against perceived outsiders. We focus on the emergence of disease-based stereotypes as a mechanism underlying this work. We explore how insider/outsider status and symptoms of illness shape perceptions of infection, reported willingness to help, and desire to restrict free movement of an ailing neighbor using a phone-based survey experiment administered three times in two neighboring African countries during different stages of the pandemic: Malawi, from May 5 to June 2, 2020 ( $n=4,641$ ); Zambia, from July 2 to August 13, 2020 ( $n=2,198$ ); and Malawi again, from March 9 to May 1, 2021 ( $n=4,356$ ). We find that symptoms more strongly shape perceptions and projected behavior than insider/outsider status in both countries and across time, suggesting that objective risk matters more than identities in shaping responses to the illness.

Key Words: Health politics; social policy; health policy; Covid-19; disease threat; prejudice; stereotypes.

# 1 Introduction

A large and growing literature documents Covid-19’s catastrophic health and economic effects. In this paper, we focus on its political effects, in particular the potential for Covid-19 to exacerbate identity group divisions. Research on epidemics by psychologists (Schaller, 2011) and political scientists (Aarøe, Petersen, & Arceneaux, 2017; Adida, Dionne, & Platas, 2018; Albertson & Gadarian, 2015; Arriola & Grossman, 2021; Casey, 2015; Dionne & Turkmen, 2020; Kam, 2019; Lieberman, 2007; Onoma, 2020) suggests that Covid-19 could intensify group conflict and lead to greater discrimination against already marginalized groups. We consider a mechanism underlying this work: the emergence of disease-based stereotypes around insider-outsider identities. Stereotypes precede and enable discriminatory behaviors and the stigmatizing of groups as bearers of disease. We pay particular attention to how insider/outside identities interact with symptoms to shape perceptions about who carries disease and behavioral responses to perceived disease threat. Earlier research suggests that disease threat may not reflect epidemiological data and actual risk of infection, with individuals dismissing or ignoring symptoms of insiders while associating disease with outsiders even when symptoms are absent (Dionne & Turkmen, 2020; Harell & Lieberman, 2021; Lieberman, 2009; Onoma, 2020). The relationship between identity and symptoms seems particularly important in the case of Covid-19, a disease often transmitted through asymptomatic individuals. A core contribution of our work is therefore to explore identity, symptoms, and the interaction between them in perceptions about and reaction to disease.

We examine the emergence of stereotypes through a phone-based survey experiment administered in two neighboring African countries, Malawi and Zambia. These are countries which represent a large number of cases that have clearly recognized outgroups and yet lack a history of identity-based violence. We focus on two types of outgroups: a racially distinct but economically privileged group (Amwenye) and foreign nationals

(Zambians) in Malawi, and on two different foreign national groups (Zambians and Tanzanians) in Zambia. As such we seek to understand how outsider identity shapes perceptions about and responses to disease in what are arguably the vast majority of contexts – those in which out-groups are recognized but not heavily discriminated. We also implemented our surveys at different stages of the pandemic, ranging from a very early period when cases were low (Malawi from May-June 2020,  $n=4,641$  and then Zambia from July-August 2020,  $n=2,198$ ), to a later one when the disease had spread extensively (Malawi again, from March-May 2021,  $n=4,356$ ). This allows us to examine how time shaped responses, and to interrogate the extent to which identity effects change over time, in cases in which outgroup discrimination is not initially strong.

The experimental vignette about an ailing neighbor seeking help getting to the hospital permits us to manipulate three aspects of identity: insider/outsider status, gender and age. We consider outsider identities based on newer (versus more established) residency in the neighborhood; and those associated with foreign or racial minorities. We also manipulate the nature of the neighbor’s ailment, with symptoms ranging from highly suggestive of infectious disease and Covid-19 (cough and high fever) to symptoms not suggestive of infectious disease and Covid-19 (a badly injured and infected leg). We evaluate the main effects of identity and symptoms as well as their interaction and explore three outcomes: 1) whether the respondent believed the neighbor had Covid-19; 2) whether the respondent would be willing to accompany the neighbor to the hospital; and 3) whether the respondent believed the neighbor should be restricted from moving freely around the community. The first captures associations of identity characteristics with disease and the early emergence of stereotypes; the last two consider how identity characteristics shape hypothetical behaviors.

As anticipated by disease threat theories, we find that identities shape perceptions about and behavioral responses to Covid-19, particularly in Malawi. These effects were

surprisingly small in size, however, and remained so even as the pandemic grew in magnitude. Symptoms, on the other hand, strongly and consistently shaped reactions to disease in the hypothetical vignettes in both countries and across time periods. We find only limited evidence that stereotypes and symptoms interact: in the first Malawian survey, identity may have a slightly smaller effect on perceptions of disease when symptoms point unambiguously to Covid-19, but this interaction effect does not persist in the second Malawi survey, nor does it show up in Zambia or for any of our behavioral indicators. We therefore conclude that identity has a small but persistent main effect on disease-related perceptions and behaviors in the cases we examine here, and that this effect is dwarfed by the effect of symptoms. Our results thus provide a counterpoint to previous work arguing that actual disease risk has less influence over perceptions and behavior than identity.

## **2 Theorizing Disease Stereotypes: Identity and Symptoms**

Humans have long associated “others” with disease, blaming contagions on community outsiders, justifying exclusionary policies and even violence on the basis of real or imagined disease threats (Schaller, 2011). Communities attributed outbreaks of plague in Medieval Europe to ethnic or religious outsiders (Nohl, 2006). Ideas about disease, contagion, and purity accompanied the Holocaust (Suedfeld & Schaller, 2002) and informed longstanding practices of excluding immigrant groups in the United States (Adida et al., 2018). During the 2014 West African Ebola outbreak, Senegalese targeted the migrant Peul population because of their roots in neighboring Guinea (Onoma, 2020), while people in Western countries associated the disease with Africa itself (Benton & Dionne, 2015). Likewise, Asian-Americans suffered acts of discrimination and racism

because of their purported association with Covid-19's origins, a connection encouraged by politicians like President Donald Trump (Dionne & Turkmen, 2020; Reny & Barreto, 2020).

Psychological theories explain the association of outsiders with contagion as a function of the “behavioral immune system,” a set of “psychological processes that infer infection risk from perceptual cues, and that respond to these perceptual cues through the activation of aversive emotions, cognitions and behavioural impulses,” (Schaller, 2011: 3418). Such cues include obesity, advanced age, physical disabilities, and, most relevant here, being perceived as an outsider. Schaller (2011) offers an evolutionary mechanism for the association of foreignness with disease: when humans lived in small, isolated communities, “exotic” visitors may have been a source of new and virulent pathogens. Such visitors may also have violated local cultural norms around hygiene and food preparation believed to reduce disease transmission, enhancing perceptions of threat. Schaller (2011) argues that this association between outsiders and disease became hardwired into human psychology as an unconscious instinct that continues to shape behaviors today, even as the original context has disappeared.

Empirical tests of behavioral immune system theories explore the effects of disease threats on outcomes like prejudice and xenophobia (Faulkner, Schaller, Park, & Duncan, 2004; Navarrete & Fessler, 2006; Navarrete, Fessler, & Eng, 2007; Schaller, 2011). Political scientists have built upon these foundations to explore the effect of disease threat on political outcomes like support for immigration restrictions, limits on civil liberties, and foreign policy spending, finding mixed support (Aarøe et al., 2017; Adida et al., 2018; Albertson & Gadarian, 2015; Casey, 2015; Kam, 2019).

A growing strand of this work points to the potential *conditionality* of the link between disease threat and attitudes towards outsiders. Onoma (2020), in his work on the Peul in Senegal, emphasizes the role of proximity in conditioning beliefs about who has

the disease: while ethnic Peul in general were believed to be disease carriers, specific Peul who were well known neighbors and community members escaped this association. Dionne and Turkmen (2020) point instead to prior patterns of discrimination, suggesting that othering based on disease threat should focus on groups who are already marginalized, particularly racial and religious minorities.

We consider another potential conditioning effect: disease symptoms. Health threats do not always reflect objective risks (Faulkner et al., 2004). The behavioral immune system may “not only lead to the social stigmatization of people who truly are infectious but also equally pernicious prejudices directed against people who are not” (Schaller, 2011: 3420). Dutta and Rao (2015) find that disease threat can provoke xenophobic responses against outsider groups, *even when these groups pose no increased risk of contagion*. In his study of Senegal, Onoma (2020: 369) notes “the rather marginal influence (if any) that the epidemiology of EVD [Ebola Virus Disease] had on which people were targeted by xenophobic acts,” a conclusion echoed by Dionne and Turkmen (2020) about other pandemics. These effects may reflect the ambiguity of symptoms for some diseases and the use of identity characteristics as an informational shortcut to resolve it, or a form of motivated reasoning wherein individuals discount disease risk for members of their own group and overstate disease risk for outsiders (Cohen, 1999; Lieberman, 2009).

Previous work on symptoms and identity has largely been historical or ethnographic. In the research that follows, we employ a survey experimental approach in Malawi and Zambia during different stages of the Covid-19 pandemic. Survey experiments allow us to independently manipulate symptoms and identity to gain greater insight into the independent and interactive effects of each, holding constant additional considerations like age and gender.

We explore four pre-registered hypotheses about identities, symptoms, and their



interaction on perceptions about and responses to an ailing neighbor.<sup>1</sup>

**Hypothesis 1.** *Identity shapes perceptions and responses: Malawians and Zambians will be (a) more likely to believe a neighbor has Covid-19 when they are members of outsider rather than insider groups; (b) less likely to help a neighbor get to the hospital if that neighbor is described as an outsider rather than an insider; (c) less likely to support free movement for an ailing neighbor described as an outsider rather than an insider.*

We also consider a second identity hypothesis consonant with Dionne and Turkmen (2020)'s argument that identity effects are strongest for marginalized or racialized groups:

**Hypothesis 2.** *Identity effects will be stronger for previously marginalized and/or racially different groups versus less marginalized and/or racially similar groups. This will be true across outcomes (a) perceptions of disease; (b) willingness to help an ailing neighbor; (c) support free movement of an ailing neighbor.*

**Hypothesis 3.** *Symptoms shape perceptions and responses: Malawians and Zambians will be (a) more likely to believe a neighbor has Covid-19 when they are described as having symptoms of fever and/or cough; (b) less likely to help a neighbor get to the hospital if they are described as having a fever and/or cough; (c) less likely to support free movement for a neighbor described as having a fever and/or cough.*

**Hypothesis 4.** *Identity and symptoms interactively shape perceptions and responses. When symptoms are clear, insider/outsider distinctions will cease to have an effect on (a) perceptions of disease; (b) willingness to help an ailing neighbor; (c) support for free movement of an ailing neighbor.*

In the next section we provide background on our two cases, thus situating our experiment before turning to the experimental design.

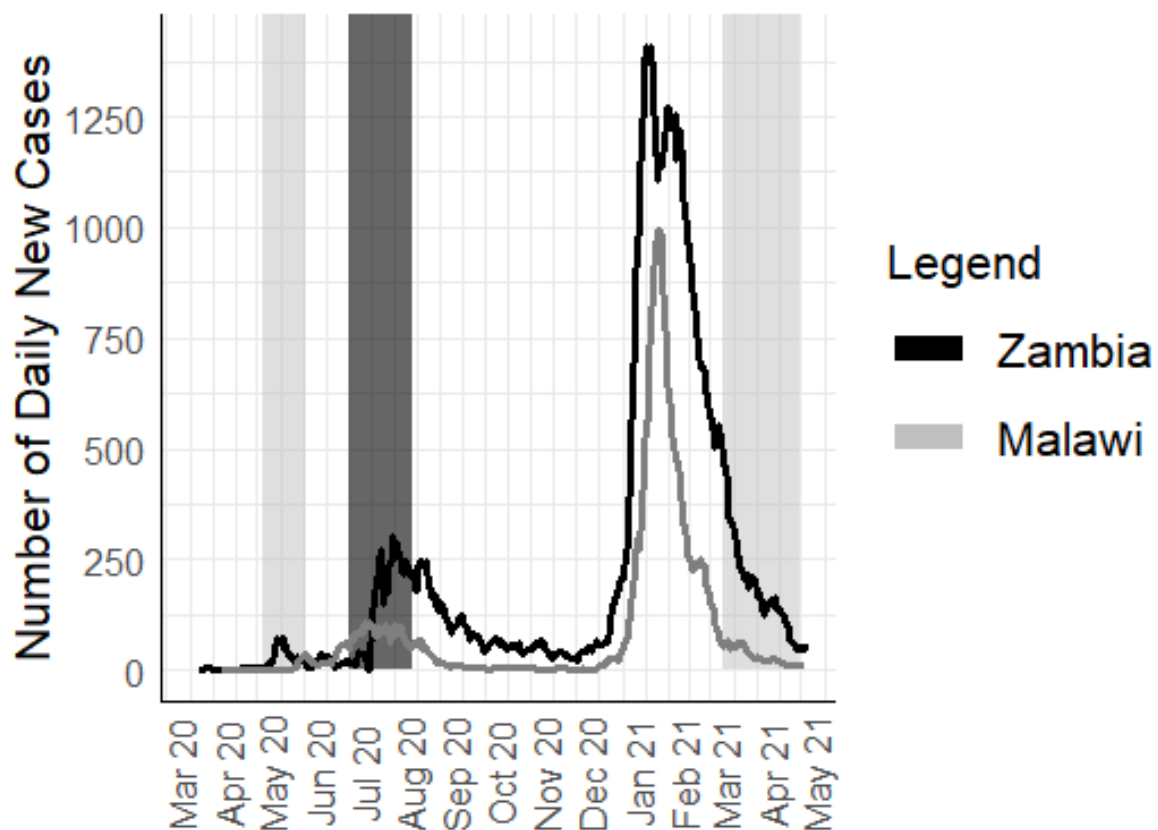
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<sup>1</sup>For the Zambian pre-analysis plan, see: <https://osf.io/azpvk/> and for the Malawian pre-analysis plan, see <https://osf.io/wxytd/>.

### 3 Covid-19 in Malawi and Zambia

Zambia reported its first cases of Covid-19 in March 2020, followed by Malawi a month later. Zambia experienced an early spike in May, reaching over 1000 cases by the end of that month, and a second, larger wave in late July and August. Malawi's first wave hit in July and early August. Both countries then experienced substantial waves in January and February of 2021 (see Figure 1).

Figure 1: Reported New Cases of Covid-19 in Malawi and Zambia Over Time



Note: The figure shows the 7-day rolling average of new cases. The shaded regions indicate when our surveys were in the field. Malawi and Zambia each have between 17-18 million inhabitants. Original data obtained from *Our World in Data*, Hasell (2020).

Even before the first confirmed cases, the Zambian government responded to the growing global pandemic by implementing nationwide restrictions in an attempt to curb the spread. They activated the National Public Health Emergency Operations Centre, implemented active surveillance of all international passengers, procured supplies of personal protective equipment, launched a series of community engagement campaigns to increase awareness about the disease, and closed all educational institutions. Following the confirmation of the first cases, they added new measures to regulate public interactions, implementing a partial lockdown of the country on March 13, 2020. As more information became available, the government restricted non-essential travel, instructed the use of facemasks in public, and issued a general stay-at-home advisory with police officers deployed to ensure compliance.

The Malawian government responded to the pandemic in late March by declaring a State of National Disaster, which banned public gatherings, closed schools, and introduced a hand-washing and social distancing campaign. The government further established a Ministerial Committee to spearhead efforts to contain the pandemic at the national level. Following confirmation of the first cases, the government added new measures to regulate public interactions. These included the closure of all national borders and airports, reduction in the number of passengers on public transportation, and further limiting the size of public and social gatherings.

As the number of cases continued to increase in Malawi, the government announced plans to impose a 21-day nationwide lockdown from April 18, 2020. However, this announcement was met with sporadic demonstrations and protests across the country, mostly by small businesses operating in the country's many markets. The protestors complained that a lockdown without government support for small businesses and poor households would create economic hardships for millions of Malawians and could result in mass starvation. A coalition of human rights civil society organizations, operating

under the banner of the Human Rights Defenders Coalition (HRDC), obtained a court injunction against the proposed lockdown by arguing that the proposal was unconstitutional. The lockdown was accordingly suspended.

The first wave of COVID-19 in Malawi peaked by mid August 2020, with the total number of cases reaching 2,273. A new government that came to power in July 2020 introduced a raft of fresh COVID-19 preventative measures that were similar to those that came into force at the beginning of the pandemic. In the ensuing months, the number of active cases gradually declined, reaching a lowest point of 31 active cases by mid December 2020. Towards the second half of December 2020, however, Malawi began to experience a second wave of COVID-19 infections and fatalities with the more contagious Beta variant as the main strain. The number of active cases reached 14,631 by early February 2021. In March 2021, Malawi received a first batch of Covishield vaccines under the COVAX scheme and immediately launched a vaccination campaign that initially targeted health personnel and other essential service providers.<sup>2</sup>

Our surveys, which were fielded from May 5 to June 2 2020 in Malawi, July 2 to August 13 2020 in Zambia, and March 9 to May 1 2021 in Malawi, thus coincided with very different periods in the outbreak of the pandemic in each country. The first survey – indicated by the first vertical gray bar in Figure 1 – was implemented during the early period of the pandemic. At this time, the region witnessed cases of Covid-19, but the incidence of the disease was low. The second survey – the blue vertical bar in Figure 1 – took place at a later stage of the pandemic. Cases were spiking, and information about the disease was more widespread. The third survey – indicated by the second gray vertical bar – occurred just after the large January-February wave in both countries. Covid-19 was truly “novel” during our first surveys in Malawi in March 2020. A year later this was no longer the case. Staggering surveys across twelve months

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<sup>2</sup>For more on the early Malawian response, see Dionne, Dulani, and Fischer (2021) and Tengtenga, Tengtenga Duley, and Tengtenga (2021).

and different pandemic stages allows us to explore the role of time and learning, two relatively under-studied factors in current research on Covid-19.

## 4 Empirical Strategy

We employ single profile conjoint experiments (Hainmueller, Hopkins, & Yamamoto, 2013) embedded in phone surveys on perceptions of and reported behavioral responses to Covid-19.

### 4.1 Experimental Design

The experiments presented each respondent with a hypothetical profile about a neighbor, which randomly assigned the neighbor's age, gender, length of residency in the community, racial and/or national identity, and symptoms of illness. All attributes were concrete, easy to understand, and conveyed in a single sentence. Table 1 presents the attributes and their levels. After listening to the scenario read over the phone, we asked each respondent how likely he or she would be to help the neighbor to the hospital and whether the neighbor's movement should be restricted. We then asked respondents whether they thought the neighbor had Covid-19. Answers to these questions, which report on projected behavioral responses to and perceptions about a hypothetical scenario, constitute our dependent variables of interest. Below Table 1 is the full text of the experimental script; the post-treatment questions can be found in Table 2.

The Malawian experimental script read as follows, with the randomized components

Table 1: Conjoint Experiment Attributes and Levels

Attributes	Levels (Malawi)	Levels (Zambia)
<b>Age</b>	25	25
	60	60
<b>Gender</b>	Man	Man
	Woman	Woman
<b>Time in Community</b>	Many years	Many Years
	A few months	A few months
<b>Identity</b>	Malawian	Zambian
	Mmwenye	Tanzanian
	Zambian	Malawian
<b>Symptoms of Illness</b>	Badly injured and infected leg	Badly injured and infected leg
	Bad cough and high fever	Bad cough and high fever
	High fever	High fever

in bold and in brackets:

Now I would like you to imagine the following situation. Your neighbor, a [25 year old/60 year old] [Malawian/Mmwenye/Zambian] [man/woman] who has lived in your community for [many years/a few months], has [a badly injured and infected leg; a bad cough and high fever; a high fever].

A nearly identical script was read in Zambia, the only difference being the three randomized identity groups. This script was followed by three questions presented in the order given in Table 2 <sup>3</sup>.

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<sup>3</sup>RTA = Refuse to Answer

**Table 2: Post-Treatment Questions**

Question	Responses	
	Malawi	Zambia
If this person needed you to accompany him/her to the hospital, would you help him/her?	Yes No Don't Know/RTA	Yes No Don't Know/RTA
Do you think this person should be allowed to move freely about the community or should be made to stay inside at home?	Move freely Stay at home Don't know/RTA	Move freely Stay at home Don't Know/RTA
Do you think this person has Covid-19/ Novel Corona virus?	Yes No Not sure what Covid-19/ corona virus is RTA	Yes No Don't Know RTA

#### 4.1.1 Choosing the Levels for the Identity Attribute

To choose appropriate levels of the Identity attribute in our experiment, we needed to know how Malawians and Zambians think about insiders and outsiders. Previous research emphasized ethnic (Dionne, 2015; Ejdemyr, Kramon, & Robinson, 2018; Posner, 2004), village (Dionne, 2015), and regional (Ferree & Horowitz, 2010; Posner, 2005) divisions as critical drivers of Malawian and Zambian politics. Cross-border migration and flows of refugees may also create divisions within African communities (Adida, 2014).

For insight into how these divisions map to perceptions of insiders and outsiders in both countries, we draw on a 2019 survey administered to over 20,000 Malawians and Zambians in the regions along the Zambian/Malawi border and the Lilongwe and Lusaka metropolitan areas. The survey asked respondents: “Sometimes certain people are considered to be ‘outsiders’ from a community. When you hear the term ‘outsider,’ who do you think of?” Read out loud response options included “one from a different ethnic group,” “one from a different country,” “one from a different neighborhood in this region,” and “one from a different region.” Multiple responses were possible, as was

an “other” option. See Table 3.

**Table 3: ‘Outsiders’ in Malawi and Zambia (from 2019)**

	Malawi	Zambia
Who do you think of as an outsider?	Proportion	Proportion
One from another ethnic group	30%	14%
One from another country	57%	72%
One from another neighborhood in this region	35%	20%
One from another region	38%	15%
Other	3%	3%
Do not understand the question	5%	5%
Observations	10,302	9,864

“One from a different country” was the most common answer in both countries, with more than half of respondents in both samples providing this response, and somewhat higher prevalence in Zambia. Given the salience of the “different country” category and early narratives characterizing Covid-19 as “imported,”<sup>4</sup> we sought groups with clear connections to other countries that would nonetheless be familiar to survey respondents and plausible as residents within their communities.

For Malawians, we chose Zambians and Malawians of South Asian descent, or *Amwenye*. Populations frequently cross borders in Southern Africa, and the border between Zambia and Malawi is particularly porous (Posner, 2004). Zambians therefore seemed a logical candidate for local “outsiders” in the Malawian context. They have an immediate connection to a different country, yet would not be unusual residents in Malawian neighborhoods. Amwenye represent a racialized “other” with a distinct foreign connection. They are primarily descendants of Indian migrants to Malawi who arrived in the late 19th and early 20th centuries as small traders. There is a long history of othering Amwenye (Power, 1993) that persists today. Resentment focuses on their elite economic

<sup>4</sup>Capital FM Malawi, a radio station, characterized most Covid-19 cases as “imported,” (Tengatenga et al., 2021). The index case in Malawi was a woman who had travelled to India to see family and an early center of disease outbreak was at the border in Mwanza, the exit and entry point for the migration route to South Africa (Dionne et al., 2021).



status and stereotypes about business practices.<sup>5</sup> The first cases of Covid-19 in Malawi coincidentally involved an Amwenye couple and their domestic worker. Amwenye thus represent a racialized other, if not a truly marginalized one,<sup>6</sup> and as such offer a way to test (at least partially) Hypothesis 2 that identity effects are strongest for marginalized and/or racially different groups.

For Zambia, we operationalized outsiders as Malawians and Tanzanians. Both groups share a porous border with Zambia. It would not be unusual in Lusaka or a border town to have migrants from either country living in communities. Additionally, Tanzania was believed to have a very high rate of Covid-19 infection at the time of the Zambian survey (Mwai & Giles, 2020). Malawi, on the other hand, likely had equal or lower levels of Covid-19 infection than Zambia, suggesting little reason to associate Malawians with the virus. We therefore have four different outsider groups, where we might expect stronger effects in Malawi for Amwenye versus Zambians, and stronger effects in Zambia for Tanzanians versus Malawians.

We also manipulated the neighbor's time in the community (a few months, many years). This allows us to explore another dimension of "outsiderness." It also anchors the individual as a neighbor and resident in the community instead of a visitor. This aims to ensure that respondents view the neighbor's objective risk of introducing contagion to the community is the same as any other resident (Dutta & Rao, 2015), and neutralizes "proximity" (Onoma, 2020) as a potential confound.

To evaluate prejudicial attitudes toward these identities, in each of the three Covid surveys we asked about willingness to have as neighbors individuals from the relevant outgroups. This is a common technique for measuring prejudice in surveys (Schuman & Bobo, 1988; Strabac & Listhaug, 2008).<sup>7</sup> As a comparison, we also asked about

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<sup>5</sup>For example, see *Malawi Nyasa Times* editorial by Mike Fiko (2020) from October 24, 2020 "Don't Blame it on 'Amwenye': It's Malawi Public Servants and Politicians, stupid!"

<sup>6</sup>Cohen (1999) and Dionne et al. (2021) see marginalized groups as those systematically excluded from access to resources and power. Amwenye, as an economic elite, do not fit this characterization

<sup>7</sup>These questions came at the end of each survey. They are therefore measured post-treatment; a

willingness to have “people with Covid-19” as neighbors.

The results in Tables 4 and 5 suggest that the outsider groups we chose for the experiment tap into prejudicial attitudes for many respondents, particularly in Malawi, where only 24 percent of respondents in the first survey expressed willingness to live next to people of Indian origin, 27 percent expressed willingness to live next to people of Zambian origin, and 21 percent next to people with Covid-19. These numbers increased somewhat in the second round. Zambians, in contrast, were relatively more willing to live next to Malawians (60 percent) and Tanzanians (56 percent) versus those with Covid-19 (23 percent). These differences across countries could reflect variations in sampling, indicate less xenophobia toward the particular groups chosen for the experiment in Zambia versus Malawi, or be evidence of lower latent prejudice in Zambia.

**Table 4: Attitudes in Malawi (from Covid phone surveys)**

	Malawi Round 1	Malawi Round 2
Would you be willing to have them as neighbors?	Proportion Yes	Proportion Yes
Amwenye	24%	40%
People of Zambian origin	27%	43%
People with Covid-19	21%	35%
Observations	4,641	4,372

**Table 5: Attitudes in Zambia (from Covid phone survey)**

	Zambia
Would you be willing to have them as neighbors?	Proportion Yes
People of Malawian origin	60%
People of Tanzanian origin	56%
People with Covid-19	23%
Observations	2,198

large amount of unrelated content nonetheless separated the experiment and these questions, hopefully mitigating any treatment effects.

## 4.2 Sampling Method

The first Malawian survey, administered from May 5, 2020 to June 2, 2020, reached 4641 respondents in all regions of the country. The second Malawian survey, administered from March 9, 2021 to May 1, 2021, surveyed 4356 respondents, of which 1974 also took the first wave survey. The sampling frame for the Malawi surveys consisted of phone numbers obtained in 2019 and 2016 Malawi surveys.<sup>8</sup> The Zambian survey, in the field from July 2, 2020 to August 13, 2020, drew from the Lusaka region and the areas bordering Malawi and Tanzania and reached 2198 respondents. The sampling frame for the Zambia Covid-19 telephone survey consisted of telephone numbers obtained from the 2019 Zambia survey. The Zambian sampling frame did not contain individuals in the Copper-Belt, North-Western, Western, or Southern regions of the country. (See Appendix B for more details on sampling.)

## 5 Data

### 5.1 Contextual Data

Nearly all (99 percent) of the respondents in both countries had heard of Covid-19. Anxiety about falling ill was substantially higher in the Zambian sample (82 percent of the Zambian sample were somewhat or very worried, compared with 54 percent in Malawi Wave 1 and 55 percent in Wave 2). Covid-19 was thus very much on the minds of our respondents, even when the disease itself had not yet penetrated deeply into the population, see Figure 1.

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<sup>8</sup>The original sampling frame for the Malawian surveys did not contain ten of the country's 28 districts. Due to movement of respondents and the allowance of replacement respondents, we were able to survey some individuals in districts not in the original sampling frame such that we collected data from 27 out of 28 districts. (Eight of these had very small sample sizes).

## 5.2 Demographic Data

Summaries of respondent demographics can be found in Table 6. Comparing the Malawian waves, we see a slight change in the gender distribution and similar age and education distributions. The Zambian sample is more educated and a bit younger than the Malawian samples.

**Table 6: Survey Sample Demographics**

<b>Demographic</b>	<b>Malawi Wave 1</b>	<b>Malawi Wave 2</b>	<b>Zambia</b>
<b>Male</b>	56	49	51
<b>Female</b>	44	51	49
<b>18-34 Years</b>	48	43	52
<b>35-54 Years</b>	40	40	33
<b>55 Years +</b>	12	17	16
<b>Little Formal Education</b>	7	6	4
<b>Primary Education</b>	56	53	27
<b>Secondary Education</b>	35	36	53
<b>University Education</b>	1	4	17
<b>Observations</b>	4641	4356	2198

## 5.3 Experimental Data

Turning to our outcome variables, when averaged across experimental conditions, we find that 78 percent in Malawi Wave 1, 76 percent in Malawi Wave 2 and 71 percent in Zambia stated that they were willing to help those in need get to the hospital. We also find relatively low levels of support for free movement of ailing individuals (15 percent Malawi Wave 1; 18 percent Malawi Wave 2; 10 percent Zambia). A third of the Malawian Wave 1 sample thought the neighbor had Covid-19 and another 20 percent were unsure. These percentages held steady in Wave 2, in which a third thought that the neighbor had Covid-19 and 17 percent were unsure. A third of the Zambian sample suspected Covid-19 and another 30 percent were not sure. The results we present for the outcome

(Has Covid–19) excludes respondents who stated that they were unsure.<sup>9</sup>

Reflecting the discussion in Section 4.1.1, we define a new variable `Outsider`, based on the experimental attribute `Identity`. `Outsider` is equal to 0 if `Identity` is equal to the national identity of the sample (Malawian or Zambian depending) and 1 otherwise. We estimate group specific effects to evaluate Hypothesis 2 but otherwise discuss results using the `Outsider` variable.

## 6 Results

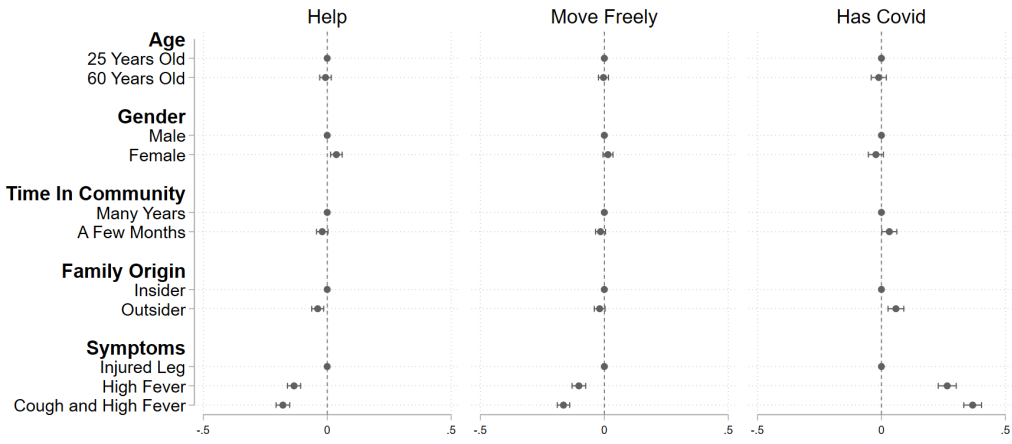
### 6.1 Main Effects

Following Hainmueller et al. (2013), we use ordinary least squares (OLS) regression to estimate average marginal component effects (AMCE). Subfigures 2a, 2b, and 2c display the results for our Malawi Wave 1, Zambia, and Malawi Wave 2 samples, respectively. They indicate point estimates with a dot and 95% confidence intervals with horizontal lines for the AMCE of each of the randomized profile attributes on the respondent’s willingness to help the neighbor to the hospital, belief that the neighbor should be allowed to move about freely in the community, and belief that the neighbor has Covid–19. Baseline categories for each attribute are indicated with a dot at the vertical dashed line at 0. (See Appendix section A for full results and additional analyses).

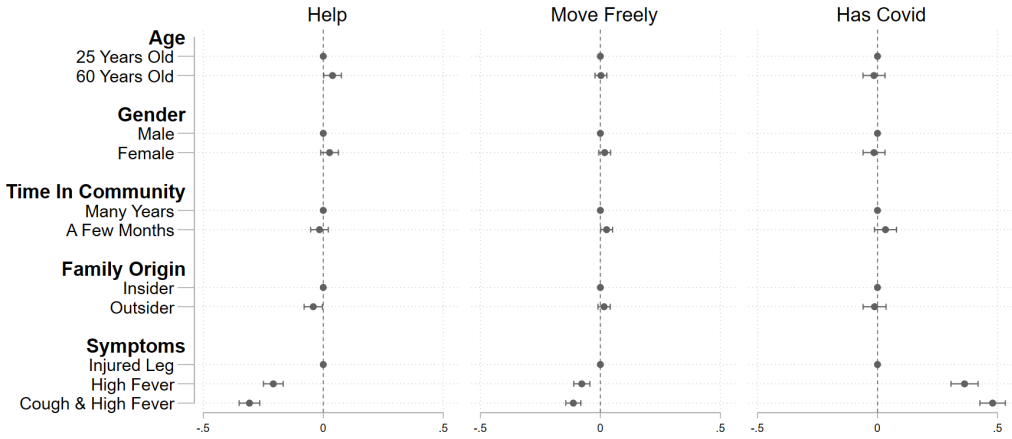
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<sup>9</sup>A multinomial logistic regression analysis shows similar results to dropping these observations (See Appendix section A.4 for details).

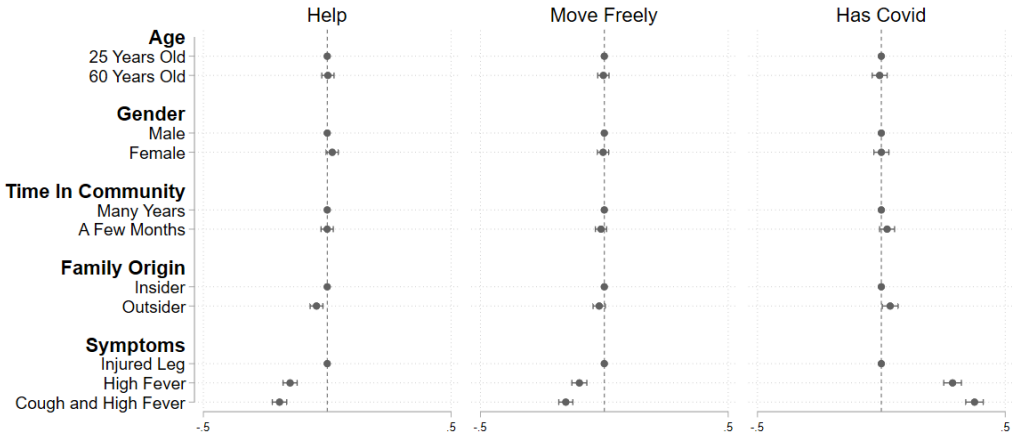
Figure 2: AMCEs of Profile Attributes on Outcomes in Malawi and Zambia



(a) Malawi First Wave



(b) Zambia



(c) Malawi Second Wave

We find mixed support for Hypothesis 1 that identity shapes perceptions and responses. Consistent with the hypothesis, Malawians are 6 (Wave 1) and 4 (Wave 2) percentage points ( $SE=0.02$ ) more likely to perceive that an Amwenye or Zambian neighbor has Covid-19 versus a Malawian neighbor. We find weak evidence that Malawians also associate community newcomers with disease more than long-term residents, but this effect is small (3 percentage points,  $SE=0.015$ ) and disappears in the second wave. Zambians, on the other hand, do not associate disease with any of our measures of outsider status: they are not more likely to perceive that Malawians or Tanzanians have Covid-19 than Zambians, nor are they more likely to perceive the disease in community newcomers vs. long-term residents. We also find that Malawians and Zambians are marginally more likely (4 percentage points with  $SE=0.01$  and  $0.02$ , respectively) to say they would help insiders versus outsiders get to the hospital. In our second wave in Malawi, this effect increased to 6 percentage points ( $SE=0.01$ ). However, neither Malawians nor Zambians differentiate between insiders and outsiders when it comes to moving around the community, although Zambians do (unexpectedly) report slightly *more* willingness to allow newcomers to move freely than longer term residents. Altogether, we find limited evidence of identity effects, and these are strongest in Malawi.

Hypothesis 2 suggests that effects would be strongest for previously marginalized and/or racially similar groups. Amwenye in Malawi are the only racially distinct group of the four we analyze. We therefore consider whether effects are stronger in Malawi for Amwenye versus Zambians. For Wave 1, with Malawians as the base category, the estimated effect of the Amwenye treatment is 7 percentage points ( $SE=0.02$ ), whereas that for Zambians was 5 percentage points ( $SE=.02$ ), but this difference is not statistically significant. (See Appendix section A2). For Wave 2, we find that Zambians, not Amwenye, are seen as significantly more likely to have contracted the disease (by 5 percentage points,  $SE = 0.02$ ). (See Table A2 in the Appendix). We do not find significant

differences in willingness to help or allow free movement across subgroups in any sample. Evidence for H2 is therefore weak. The only significant difference we find is for Zambians in Malawi in Wave 2. As the Wave 2 Malawi survey fielded just after a regional wave that hit Zambia harder (at least in terms of sheer numbers) than Malawi, these findings suggest that beliefs about who has disease reflect local and temporal patterns rather than static and unchanging stereotypes.<sup>10</sup>

While our findings on identity are surprisingly small (especially in light of prior literature), we do find strong support for Hypothesis 3 on symptoms. Malawians and Zambians clearly associate Covid-19 with high fever and cough. Malawians are 37 (Wave 1) and 38 (Wave 2) percentage points (SE = 0.02) more likely to judge neighbors with a high fever and bad cough than those with an injured leg to have the disease. They are 27 and 29 percentage points (SE=0.02) more likely to do so for those with just a high fever. Zambians display a similar, even starker pattern. They are 48 percentage points (SE=0.03) more likely to consider those with a high fever and bad cough to have Covid-19 than those with an injured leg. Similarly, they are 36 percentage points (SE=0.03) more likely to consider those with just a high fever to have Covid-19 than those with an injured leg.

Malawians and Zambians also report less willingness to help neighbors described with clear symptoms. In Malawi, respondents were 18 percentage points (SE=0.01) less likely to indicate that they would help someone with the strongest Covid-19 symptoms (a high fever and a bad cough) to the hospital, as compared to someone with an injured leg. This finding persists in our second wave, with the negative effect of strong symptoms at 19 percentage points (SE=0.02). Zambians respond even more forcefully to symptoms: they are 31 percentage points (SE=0.02) less likely to say they would help a neighbor with strong Covid-19 symptoms. These results are particularly noteworthy given norms in both countries favoring helping others in the community. The effect of symptoms carry

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<sup>10</sup>It remains possible that findings would be different for truly marginalized groups.



through to restrictions on movement. Malawians are 15 percentage points (SE=0.01) (Wave 1 and Wave 2) less likely to endorse free movement for those with high fever and a cough, while Zambians are 11 percentage points (SE=0.02) less likely to endorse free movement.

Our results thus show that outward symptoms of disease drive perceptions and responses more than identities. Malawians and Zambians respond strongly to disease symptoms, associating high fever (alone or accompanied by a cough) with Covid-19 and indicating that they would sharply curtail interactions with neighbors who display these symptoms. On the other hand, with symptoms experimentally specified, we only find partial support for the role of insider/outsider stereotypes, with results strongest in Malawi.

## 6.2 Symptoms and Outsider Identity Interactions

Next we consider Hypothesis 4 and whether ambiguity about Covid-19 symptoms enhances the effects of insider/outsider status in Malawi.<sup>11</sup> If it does, this suggests that insider/outsider stereotypes are a heuristic used to overcome uncertainty about contagion risk, not a hardwired psychological response rooted in prejudice.

To evaluate, we estimate Average Component Interaction Effects (ACIEs) using the procedure described by Hainmueller et al. (2013). If individuals use insider/outsider status as a heuristic for disease, as expected by behavioral immune system theories (Schaller, 2011), then we would expect more ambiguous symptoms to induce stronger insider/outsider effects across our three dependent variables. Across our three sets of symptoms, “fever and cough” is the least ambiguous as it clearly indicates Covid-19 (indeed effects are strongest for it). In contrast, “fever” alone is more ambiguous as fevers can be caused by many diseases. “Injured and infected leg” could be seen as

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<sup>11</sup>We do not do a similar analysis for Zambia given null insider/outsider results.

unambiguously indicating a lack of Covid-19 (and indeed, this was our assumption in our Pre-Analysis Plan), but given asymptomatic transmission, it might plausibly be seen as ambiguous as well.

**Table 7: Malawi: Average Component Interaction Effects**

	Help	Move Freely	Has Covid
<b><i>Base: Insider</i></b>			
Outsider	-0.0382* (0.0162)	-0.0420* (0.0191)	0.0861** (0.0279)
<b><i>Base: Injured Leg</i></b>			
Cough and High Fever	-0.183*** (0.0231)	-0.194*** (0.0219)	0.420*** (0.0328)
High Fever	-0.130*** (0.0221)	-0.120*** (0.0220)	0.270*** (0.0329)
<b><i>Interactions of Origin and Symptoms</i></b>			
Outsider × Cough and High Fever	0.00560 (0.0290)	0.0433 (0.0268)	-0.0776+ (0.0400)
Outsider × High Fever	-0.00636 (0.0280)	0.0259 (0.0269)	-0.00650 (0.0403)
Constant	0.910*** (0.0157)	0.266*** (0.0179)	0.158*** (0.0260)
Observations	4627	4548	3652

Standard errors in parentheses

+  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Not Shown: Age, Gender, Time in Community

Table 7 shows the estimation of the interaction effects. We find weak evidence of an interaction between symptoms and insider/outsider status on the ‘Has Covid-19’ outcome with an estimated interaction effect of Outsider and Cough and High Fever of -0.0776 (SE = 0.04) which almost entirely negates the Outsider effect of 0.0861 (SE = 0.03). We find no evidence of an interaction between Outsider and High Fever. This suggests that Malawians may only rely on insider/outsider identities to determine infection status when clear Covid-19 symptoms are not available.

Confronted with clear disease symptoms, they judge insiders and outsiders the same way. As Kam (2019) argues for Americans, there may be a point at which disease risk becomes high enough that insider/outsider distinctions fall to the wayside, however we emphasize that these results are estimated with some uncertainty and should be viewed as suggestive. We did not find evidence of any interaction effects (symptoms X identity) for our other outcomes and the interaction effect on disease perceptions disappears in the second wave of the Malawian survey. (See Table ??).

## 7 Scope Conditions and Other Limitations

Malawians and Zambians in our samples responded more strongly and consistently to overt indications of disease than the information conveyed about identity. We draw cautious optimism from these findings about the ability of the pandemic to exacerbate identity divisions, at least through the mechanism of disease threat. We nonetheless acknowledge some important aspects to our study design that might have lead to smaller identity effects than would have been observed had we studied different countries, groups, or samples. We also explore whether social desirability bias might have dampened identity effects.

Our findings pertain to two countries, Malawi and Zambia, that are arguably hard tests of the theory. Neither have histories of extensive identity-based conflict, although

there racial and ethnic groups have been associated with disease in Malawi; Malawians linked the Yao with HIV and the Amwenye with Covid early in the pandemic. Moreover, while Amwenye are a racialized minority that has been subjected to some degree of discrimination, they are not a truly marginalized group. It may be the case that identity results would be stronger for more marginalized groups, or groups that are both racially distinct and economically disadvantaged, or in countries with histories of more identity-based violence. Results might also be stronger had we not limited our experiment to “neighbors,” as less proximate individuals from outsider groups may provoke stronger boundary policing (Onoma, 2020).

We also consider the sample itself. Given our use of cell-phones, which are not universal in Malawi or Zambia, we may have slightly over-sampled more educated and resourced respondents. Indeed, our Malawian sample is somewhat more educated on average than the more representative sample of the 2016 Malawian survey (14% of our sample had completed secondary education, versus only 5% of the 2016 sample). We do not have a comparable benchmark for Zambia, but we expect the same dynamic there to also lead to over-representation of educated respondents. If more educated respondents in turn respond more to symptoms and less to identity, then identity effects could be stronger in a more fully representative sample. To evaluate this possibility, we interacted respondent education level with the insider/outsider treatment, using a combined sample of Malawi and Zambia. (See Appendix section A). The results suggest that respondents with at least a secondary education are more willing to let outsiders move about freely than respondents with a primary education or less when all other attributes are at their baseline levels. However, with regards to disease perceptions and willingness to help outsiders, we do not find any significant differences across education groups. We therefore do not believe that the mild skewing of our sample toward more educated Malawians and Zambians has significantly attenuated identity effects.

Finally, it is possible that social desirability bias has masked the true effects of identity in our results. We cannot rule out attenuation from this source but are nonetheless skeptical that it plays a large role. Our respondents revealed fairly high levels of prejudice in direct questions about willingness to live next to people from the outsider groups in the study. (See Table 5). It therefore seems unlikely that they would conceal prejudice in a more subtle experiment that manipulated several dimensions at once. Moreover, given the strong culture of mutual reciprocity in Malawian and Zambian communities, we would expect people to be the least willing to reveal bias in helping neighbors get medical help, yet we find the most consistent identity effects for this outcome.

## 8 Reflections and Conclusions

Will the Covid-19 pandemic, which has sickened and killed millions of people and deeply damaged economies around the world, also have long-term social and political effects? In this paper, we explored one possible fallout of the disease: the exacerbation of group conflict. Prior work in a variety of fields—most notably psychology—suggests that threats posed by disease provoke anti-outsider sentiments and lead to the hardening of boundaries between groups.

We have shown small but persistent identity effects on perceptions of disease in Malawi (but not Zambia) and willingness to help neighbors in both countries. We do not find identity effects for the free movement outcome. These effects do not seem particularly acute for the racially distinct group we analyze, and they do not shift significantly in response to the waxing and waning of the pandemic. In contrast, symptoms, which have been ignored or downplayed in prominent previous research, exert large, persistent, and robust effects on perceptions of disease, willingness to help, and support for free movement.

We cannot rule out the possibility of stronger identity effects in other contexts or

samples, but we can say that disease threat effects do not appear to be universal or automatic. Moreover, we believe this is significant because while the cases we study are potentially a hard test of the theory, they are also realistic. Racial and ethnic divisions are often not associated with histories of violence, and the most important engagements - particularly in the context of contagious disease - are with neighbors. These factors attenuate the possibility of finding large, significant effects, but they also allow us to consider identity effects in the vast majority of cases.

Our results thus offer something of an assurance about the potential identity effects of the pandemic, albeit one conditioned by the limitation of our method, which studies hypothetical responses to a vignette, not actual behavior in the real-world, and does so in two countries without histories of significant identity-based violence between the groups analyzed. At a minimum, we can say that disease threat effects are not universal. In the two countries we study, for the groups we study, we do not find evidence of major exacerbation of identity boundaries.

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