**Supporting Online Material**

This document provides additional information for the current paper. Table S1 lists the demographic composition of the sample, Table S2 displays the regression results of mixed-effect models testing the primary hypothesis on the relationship between pandemic severity, (within/between-participant) pathogen disgust sensitivity, and explicit disease concerns with attitudes towards immigrants, and Table S3 presents the results of regression models with further interactions to test the moderation effect from immigrant attributes and cultural distance to the focused prediction in the primary hypothesis. We also provided details of the sensitivity analysis, as well as the Bayesian regression results testing our main model shown with Table S4.

This document also includes information on the manipulations and measurements used in the project, including the immigration attitudes measurement task (Table S5 provides data on cultural distance) and the items for pathogen disgust sensitivity and explicit disease concerns measurements.

**Demographical description of the current sample**

*Table* S1. Demographical description of the current sample

|  |  |
| --- | --- |
| Variables | *N* = 1011 |
| Sex |  |
| -       Male | 499 |
| -       Female | 512 |
| Age |  |
| -       15-19 | 21 |
| -       20-24 | 77 |
| -       25-29 | 93 |
| -       30-34 | 76 |
| -       35-39 | 78 |
| -       40-44 | 73 |
| -       45-49 | 99 |
| -       50-54 | 86 |
| -       55-59 | 88 |
| -       60-64 | 77 |
| -       >=65 | 243 |
| Education |  |
| -       Elementary school | 279 |
| -       Middle school | 452 |
| -       College or University | 280 |
| Residing province |  |
| -       Drenthe | 31 |
| -       Flevoland | 27 |
| -       Friesland | 30 |
| -       Gelderland | 112 |
| -       Groningen | 39 |
| -       Limburg | 74 |
| -       Noord-Brabant | 156 |
| -       Noor-Holland | 153 |
| -       Overijssel | 67 |
| -       Utrecht | 82 |
| -       Zeeland | 32 |
| -       Zuid-Holland | 208 |

**Regression Results of Main Analyses**

*Table* S2. Regression results including main effects

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Predictors | Immigration Attitudes | | | | | |
| *β* | 95% CI | *p* | *β* | 95% CI | *p* |
| (Intercept) | .56 | .48, .65 | **<.001** | .56 | .48, .65 | **<.001** |
| Wealth manipulation | .06 | .00, .11 | **.05** | .06 | .00, .11 | **.05** |
| Prosociality manipulation | –.39 | –.44, –.33 | **<.001** | –.39 | –.44, –.33 | **<.001** |
| Norm assimilation manipulation | –.87 | –.92, –.81 | **<.001** | –.87 | –.92, –.81 | **<.001** |
| EDC | .01 | –.03, .04 | .69 |  |  |  |
| PDS | –.05 | –.09, –.01 | **.01** |  |  |  |
| Cultural distance | –.03 | –.06, –.00 | **.04** | –.03 | –.06, –.00 | **.05** |
| Survey wave [2] | .05 | –.02, .12 | .14 | .05 | –.02, .12 | .14 |
| Survey wave [3] | .00 | –.07, .08 | .94 | .00 | –.07, .08 | .95 |
| Survey wave [4] | –.02 | –.10, .06 | .58 | –.03 | –.11, .06 | .55 |
| Participant sex | .07 | –.02, .15 | .15 | .07 | –.02, .16 | .14 |
| Participant age | –.07 | –.11, –.03 | **<.01** | –.07 | –.11, –.02 | **<.01** |
| EDC: between-participant |  |  |  | .02 | –.03, .06 | .51 |
| PDS: between-participant |  |  |  | –.07 | –.11, –.02 | **<.01** |
| EDC: within-participant |  |  |  | .00 | –.03, .03 | .91 |
| PDS: within-participant |  |  |  | –.01 | –.03, .02 | .53 |
|  | | | | | | |
| **Random Effects** | | | | | | |
| σ2 | 1.12 | | | 1.12 | | |
| τ00 ID | 0.77 | | | 0.76 | | |
| τ00 Origin Nation |  | | | 0.00 | | |
| ICC | 0.41 | | | 0.41 | | |
| N Origin Nation |  | | | 25 | | |
| N ID | 1011 | | | 1011 | | |
| Observations | 2827 | | | 2827 | | |
| Marginal / Conditional R2 | 0.236 / 0.547 | | | 0.238 / 0.548 | | |

*Note*: EDC = explicit disease concerns, PDS = pathogen disgust sensitivity.

*Table* S3. Regression results of secondary model including interactions of EDC, PVD and survey wave with immigrant target attribute manipulations and cultural distance

|  |  |  |  |
| --- | --- | --- | --- |
| Predictors | Immigration Attitudes | | |
| *β* | 95% CI | *p* |
| (Intercept) | .58 | .47, .69 | <.001 |
| Wealth manipulation | .08 | –.02, .17 | .12 |
| Prosociality manipulation | –.37 | –.47, –.27 | <.001 |
| Norm assimilation manipulation | –.95 | –1.04, –.85 | <.001 |
| Cultural distance | .00 | –.04, .05 | .87 |
| EDC | .03 | –.03, .10 | .34 |
| PDS | –.02 | –.08, .04 | .52 |
| Survey wave [2] | .03 | –.12, .17 | .74 |
| Survey wave [3] | –.03 | –.19, .13 | .74 |
| Survey wave [4] | –.05 | –.22, .12 | .57 |
| Participant sex | .07 | –.02, .16 | .14 |
| Participant age | –.07 | –.12, –.03 | .002 |
| Wealth manipulation \* EDC | .00 | –.06, .06 | .94 |
| Wealth manipulation \* PDS | –.03 | –.09, .02 | .26 |
| Wealth manipulation \* Survey wave [2] | –.02 | –.17, .13 | .81 |
| Wealth manipulation \* Survey wave [3] | –.01 | –.17, .15 | .88 |
| Wealth manipulation \* Survey wave [4] | –.06 | –.23, .11 | .50 |
| Prosociality manipulation \* EDC | .02 | –.04, .08 | .56 |
| Prosociality manipulation \* PDS | –.04 | –.09, .02 | .21 |
| Prosociality manipulation \* Survey wave [2] | –.02 | –.17, .12 | .77 |
| Prosociality manipulation \* Survey wave [3] | –.07 | –.23, .09 | .42 |
| Prosociality manipulation \* Survey wave [4] | .03 | –.13, .20 | .69 |
| Norm assimilation manipulation \* EDC | –.07 | –.13, –.01 | .03 |
| Norm assimilation manipulation \* PDS | .01 | –.05, .06 | .84 |
| Norm assimilation manipulation \* Survey wave [2] | .09 | –.05, .24 | .21 |
| Norm assimilation manipulation \* Survey wave [3] | .16 | –.00, .32 | .06 |
| Norm assimilation manipulation \* Survey wave [4] | .09 | –.08, .26 | .29 |
| Cultural distance \* EDC | –.01 | –.05, .02 | .36 |
| Cultural distance \* PDS | –.02 | –.05, .01 | .14 |
| Cultural distance \* Survey wave [2] | –.05 | –.13, .02 | .17 |
| Cultural distance \* Survey wave [3] | –.08 | –.16, –.00 | .05 |
| Cultural distance \* Survey wave [4] | –.02 | –.10, .06 | .64 |
|  |  | | |
| **Random Effects** |  | | |
| σ2 | 1.12 | | |
| τ00 ID | 0.77 | | |
| ICC | 0.41 | | |
| N ID | 1011 | | |
| Observations | 2827 | | |
| Marginal / Conditional R2 | 0.240 / 0.551 | | |

*Note*: EDC = explicit disease concerns, PDS = pathogen disgust sensitivity.

**Sensitivity Analysis**

To estimate statistical power, we executed a sensitivity analysis using the 'simr' package. We initiated this process by retrieving data collected from Waves 1 and 4. Using these data, we regressed the variables of interest - pathogen disgust sensitivity and immigration attitudes - on the fixed effect of Wave, and we used the random intercept of participant ID. We ran 1000 simulations for each test, with a significance level of 0.05, and we iteratively changed the effect size until we arrived at a power of 80%. Results indicated that we had 80% power to detect a small effect size for the cross-wave variations of pathogen disgust sensitivity (*r*partial = 0.04, Cohen's *d* = 0.08) and immigration attitudes (*r*partial = 0.05, Cohen’s *d* = 0.10) between Wave 1 and Wave 4.

**Bayesian Modeling**

We fitted a Bayesian linear mixed model (estimated using MCMC sampling with 4 chains of 2000 iterations and a warmup of 1000) to predict immigration attitudes with three immigrant manipulations, explicit disease concerns, pathogen disgust sensitivity, cultural distance, wave, and participant sex and age. The model included participant ID as a random intercept. Parameter priors were set as normal distributions. The model’s explanatory power was substantial (*R*2 = 0.55, 95% CI [0.53, 0.58], adjusted *R*2 = 0.42) and the part related to the fixed effects alone (marginal *R*2) is of 0.24 (95% CI [0.21, 0.26]).

The effect of wealth manipulation has a 97.65% probability of being positive (> 0), 59.62% of being significant (> 0.08), and 0.00% of being large (> 0.47). The estimation successfully converged (Rhat = 1.000) and the indices are reliable (ESS = 3280); the effect of prosociality manipulation has a 100.00% probability of being negative (< 0), 100.00% of being significant (< -0.08), and 99.80% of being large (< -0.47). The estimation successfully converged (Rhat = 1.000) and the indices are reliable (ESS = 3106); the effect of norm assimilation manipulation has a 100.00% probability of being negative (< 0), 100.00% of being significant (< -0.08), and 100.00% of being large (< -0.47). The estimation successfully converged (Rhat = 0.999) and the indices are reliable (ESS = 3137)

The effect of explicit disease concerns has a 65.18% probability of being positive (> 0), 0.10% of being significant (> 0.08), and 0.00% of being large (> 0.47). The estimation successfully converged (Rhat = 1.005) and the indices are reliable (ESS = 1526). The effect of pathogen disgust sensitivity has a 99.65% probability of being negative (< 0), 62.42% of being significant (< -0.08), and 0.00% of being large (< -0.47). The estimation successfully converged (Rhat = 1.002) and the indices are reliable (ESS = 1039)

The effect of cultural distance has a 97.75% probability of being negative (< 0), 91.95% of being significant (< -0.08), and 5.67% of being large (< -0.47). The estimation successfully converged (Rhat = 1.000) and the indices are reliable (ESS = 1139)

Compare with Wave 1, the effect of Wave 2 has a 92.27% probability of being positive (> 0), 50.52% of being significant (> 0.08), and 0.00% of being large (> 0.47). The estimation successfully converged (Rhat = 1.000) and the indices are reliable (ESS = 3762); Wave 3 has a 53.73% probability of being positive (> 0), 11.55% of being significant (> 0.08), and 0.00% of being large (> 0.47). The estimation successfully converged (Rhat = 1.004) and the indices are reliable (ESS = 1446); Wave 4 has a 69.08% probability of being negative (< 0), 25.37% of being significant (< -0.08), and 0.00% of being large (< -0.47). The estimation successfully converged (Rhat = 1.000) and the indices are reliable (ESS = 2959)

The effect of participant sex has a 91.92% probability of being positive (> 0), 61.55% of being significant (> 0.08), and 0.00% of being large (> 0.47). The estimation successfully converged (Rhat = 1.001) and the indices are reliable (ESS = 2249); participant age has a 99.88% probability of being negative (< 0), 0.00% of being significant (< -0.08), and 0.00% of being large (< -0.47). The estimation successfully converged (Rhat = 1.002) and the indices are reliable (ESS = 1988)

*Table* S4. Bayesian regression results of the main model

|  |  |  |  |
| --- | --- | --- | --- |
| Predictors | Immigration Attitudes | | |
| *B* | 95% CI |
| (Intercept) | 6.25 | 5.84, 6.66 |
| Wealth manipulation | 0.09 | 0.00, 0.18 |
| Prosociality manipulation | –0.61 | –0.70, –0.52 |
| Norm assimilation manipulation | –1.37 | –1.46, –1.28 |
| Cultural distance | –0.27 | –0.53, –0.00 |
| Explicit disease concern | 0.01 | –0.03, 0.05 |
| Pathogen disgust sensitivity | –0.09 | –0.16, –0.02 |
| Survey wave [2] | 0.08 | –0.03, 0.18 |
| Survey wave [3] | 0.00 | –0.11, 0.12 |
| Survey wave [4] | –0.04 | –0.17, 0.09 |
| Participant sex | 0.10 | –0.04, 0.24 |
| Participant age | –0.04 | –0.06, –0.01 |
|  |  | | |
| **Random Effects** |  | | |
| σ2 | 1.12 | | |
| τ00 ID | 0.77 | | |
| ICC | 0.41 | | |
| N ID | 1011 | | |
| Observations | 2827 | | |
| Marginal / Conditional R2 | 0.237 / 0.551 | | |

**Immigration attitudes measurement task**

***Immigrant instructions***

Great! You are done with the first part of the survey. For the next part, you will read a description of a person who has immigrated to the Netherlands, and you will answer some questions about your opinions about immigrants like this person. XXX is a man from ZZZ who has recently immigrated to the Netherlands. XXX (comes from a wealthy family and has moved to the Netherlands with more than enough money to get by)/(comes from a poor family and has moved to the Netherlands with almost no money). Now that he is in the Netherlands, he is strongly motivated to (help others and make his neighborhood a better place)/(accumulate as much money and possessions as possible for himself). XXX does everything he can to live by the norms, values, and traditions (of the Dutch/that he was raised with in ZZZ), even if doing so means rejecting the norms, values, and traditions that are common in (the Netherlands/ZZZ).

***Wealth manipulation***

– comes from a wealthy family and has moved to the Netherlands with more than enough money to get by

– comes from a poor family and has moved to the Netherlands with almost no money

***Prosociality manipulation***

– comes from a wealthy family and has moved to the Netherlands with more than enough money to get by

– comes from a poor family and has moved to the Netherlands with almost no money

***Norm assimilation manipulation***

– does everything he can to live by the norms, values, and traditions of the Dutch, even if doing so means rejecting the norms, values, and traditions that are common in (IMNATION).

– does everything he can to live by the norms, values, and traditions of (IMNATION), even if doing so means rejecting the norms, values, and traditions that are common in the Netherlands.

***Origin Nation manipulation***

*Table* S4. Immigrant origin nation manipulation and cultural distance

|  |  |  |
| --- | --- | --- |
| Nation | Name | Cultural Distance from the Netherlands |
| New Zealand | Oliver | 0.012 |
| Uruguay | Augastin | 0.03 |
| United States | James | 0.074 |
| South Korea | Seo-jun | 0.083 |
| Argentina | Pedro | 0.087 |
| Russia | Artyom | 0.106 |
| Mexico | Mateo | 0.142 |
| Brazil | Marcos | 0.15 |
| Vietnam | Tuan | 0.18 |
| Romania | Alexandru | 0.202 |
| China | Yong | 0.227 |
| Trinidad and Tobago | Ceejay | 0.239 |
| Zambia | Mulubwa | 0.259 |
| Kyrgyzstan | Vladislav | 0.279 |
| Turkey | Hasan | 0.301 |
| Georgia | Nikoloz | 0.326 |
| Rwanda | Dido | 0.353 |
| Nigeria | Osita | 0.378 |
| Libya | Mahmoud | 0.403 |
| Ghana | Emmanuel | 0.427 |
| Tunisia | Mehdi | 0.468 |
| Iraq | Mahdi | 0.504 |
| Jordan | Ahmad | 0.519 |
| Pakistan | Zahid | 0.549 |
| Yemen | Fahd | 0.606 |

***Immigration Attitudes Items***

1. How wealthy is XXX compared to the average person who grew up in the Netherlands?

2. How interested in helping others is XXX compared to the average person who grew up in the Netherlands?

3. To what degree has XXX adopted Dutch norms, values, and traditions?

4. I feel positively toward people like XXX immigrating to the Netherlands.

5. XXX is the type of immigrant I would welcome in the Netherlands.

6. I would support policies that allow people like XXX to immigrate to the Netherlands.

7. I oppose people like XXX immigrating to the Netherlands.

8. People like XXX make our country worse.

9. XXX is from ZZZ. In general, how similar are ZZZ and the Netherlands in terms of culture?

10. XXX is from ZZZ. In general, how similar are ZZZ and the Netherlands in terms of religious practices?

11. XXX is from ZZZ. In general, how similar are ZZZ and the Netherlands in terms of cuisine?

12. XXX is from ZZZ. In general, how similar are ZZZ and the Netherlands in terms of attitudes toward sex and romance?

13. XXX is from ZZZ. How similar are ZZZ and the Netherlands in terms of health and hygiene?

*Items 1-3 are manipulation checks for immigrant’s attribute manipulation; Items 4-8 are the core measurement items of immigration attitudes which was used in the main analysis; Items 9-13 are manipulation checks for the cultural distance manipulation. All items were on Likert-like scales of 1-7.*

*Item 1: 1 - Much less wealthy to 7 – Much wealthier*

*Item 2: 1 - Not at all interest to 7 – Very interested*

*Item 3: 1 - Not at all – to 7 - Very much*

*Items 4-8: 1 - Strongly disagree to 7 – Strongly agree*

*Items 9-13: 1 – Very dissimilar to 7 – Very similar*

**Explicit concern measurement items**

Great! You are done with the second part of the survey. The rest of the survey includes questions about your views toward society and relationships between groups, emotional reactions to situations, and issues related to infectious disease and the economy. In total, there are XX questions remaining, and they should take you about another six or seven minutes to complete.

Some of these questions ask you specifically about your current thoughts (rather than your thoughts in general). For these questions, please make sure to think about your current thoughts.

1. I currently avoid places and people that might carry diseases

2. I currently avoid people who might have a contagious illness

3. I am currently worried about catching a disease from too much contact with other people

4. I am not very worried about getting germs from others right now

5. If someone near me were sick right now, I wouldn’t be very bothered

6. Right now, I wouldn’t mind being around someone who is sick

*All items were on Likert-like scales of* *1 - Strongly disagree to 7 – Strongly agree.*

**Pathogen disgust sensitivity items**

The following items describe a variety of concepts. Please rate how disgusting you find the concepts described in the items, where 1 means that you do not find the concept disgusting at all and 7 means that you find the concept extremely disgusting.

1. Stepping on dog poop

2. Sitting next to someone who has red sores on their arm

3. Shaking hands with a stranger who has sweaty palms

4. Seeing some mold on old leftovers in your refrigerator

5. Standing close to a person who has body odor

6. Seeing a cockroach run across the floor

7. Accidentally touching a person’s bloody cut

*All items were on Likert-like scales 1 – not at all disgusting to 7 – extremely disgusting*