Online Appendix to

**“The Behavioral Immune System Shapes Political Intuitions: Why and How Individual Differences in Disgust Sensitivity Underlie Opposition to Immigration”**

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[A1. Supplemental Information about the Meta-Analysis 3](#_Toc468909400)

[A1.1. Research design: Eligibility criteria, data abstraction, and coding procedures 3](#_Toc468909401)

[A.1.1.1. Eligibility criteria and literature search 3](#_Toc468909402)

[A.1.1.2 Full list of included research articles 6](#_Toc468909403)

[A1.1.3. Data abstraction and coding procedures 7](#_Toc468909404)

[A2. Supplemental Analyses and Results from the Meta-Analysis 9](#_Toc468909405)

[A3. Sampling Procedures and Sample Characteristics for Samples 1-4 19](#_Toc468909406)

[A3.1. Samples 1-2 19](#_Toc468909407)

[A3.2. Sample 3 19](#_Toc468909408)

[A3.3. Sample 4 19](#_Toc468909409)

[A4. Measurement Details for Test 1 21](#_Toc468909410)

[A4.1. Measures of behavioral immune sensitivity 21](#_Toc468909411)

[A4.1.1. Supplemental discussion and definition of measures of behavioral immune sensitivity 21](#_Toc468909412)

[A4.1.2. Item wording for the contamination disgust scale, pathogen disgust scale, and the germ aversion factor 23](#_Toc468909413)

[A4.1.3. Measurement details for the physiological SCR measure 25](#_Toc468909414)

[A4.1.4. Demographic correlates of behavioral immune sensitivity in Samples 1-4 26](#_Toc468909415)

[A4.2. Measurement details for opposition to immigration and control variables 27](#_Toc468909416)

[A4.3. Supplemental details on survey flow in Samples 1-4 29](#_Toc468909417)

[A4.3.1. Experimental test of effects of the placement of measures of behavioral immune sensitivity 29](#_Toc468909418)

[A5. Supplemental Analyses for Test 1 32](#_Toc468909419)

[A5.1. Analysis of robustness of the effect of behavioral immune sensitivity in Samples 1-4 32](#_Toc468909420)

[A5.2. Supplemental analysis of robustness of the effect of contamination disgust excluding the item referencing sexual behavior 37](#_Toc468909421)

[A5.3. Supplemental analysis of robustness of the effect of the physiological measure of behavioral immune sensitivity 37](#_Toc468909422)

[A5.4. Analysis of the moderating effect of ideology 38](#_Toc468909423)

[A6. Measurement Details for Test 2 44](#_Toc468909424)

[A7. Manipulation Checks for the Disease Protection Experiment in Test 2 47](#_Toc468909425)

[A8. Supplemental Analyses for Test 2 49](#_Toc468909426)

[A8.1 Replication analyses for Table 3 utilizing the contamination disgust, pathogen disgust, and germ aversion factor 49](#_Toc468909427)

[A8.2. Supplemental analysis of the effect of protection cues among individuals with relatively low behavioral immune sensitivity 50](#_Toc468909428)

[A8.3. Supplemental analysis of the moderating effect of protection cues on the influence of income and education 52](#_Toc468909429)

[A8.4 Supplemental analysis including anxiety 54](#_Toc468909430)

[A9. Measurement Details for Test 3 57](#_Toc468909431)

[A10. Supplemental Analyses for Test 3 58](#_Toc468909432)

[A10.1 Main effects of the experimental treatments in Test 3 58](#_Toc468909433)

[A10.2. Supplemental analyses of the uniqueness of the effects of behavioral immune sensitivity 60](#_Toc468909434)

[A11. Measurement details for Test 4 62](#_Toc468909435)

[A12. Supplemental Discussion of the Linkage Between Substantial Contact with Outside Groups and Behavioral Immune Sensitivity 64](#_Toc468909436)

[A.13. Supplemental Sample and Measurement Details for Sample 5 66](#_Toc468909437)

[A13.1. Sampling procedures and sample characteristics 66](#_Toc468909438)

[A13.2. Measurement details 66](#_Toc468909439)

[A14. Analysis of the Moderating Effect of Ideological Self-Identification on the Influence of Behavioral Immune Sensitivity on Social and Economic Policy Preferences in Sample 5 70](#_Toc468909440)

[A15. References 72](#_Toc468909441)

# A1. Supplemental Information about the Meta-Analysis

As explained in the section “Behavioral immune sensitivity and political attitudes” in the main text, the novelty to political science of the theoretical framework on the linkage between the behavioral immune system and opposition to immigration led us to conduct a systematic meta-analysis of published articles between 2004 and 2014 that investigate this relationship. Although the basic prediction on the linkage between the behavioral immune system and immigration attitudes has attracted much attention in psychology, there has not been a comprehensive review of the empirical evidence. In the main text and below, we present the first systematic meta-analytical review of the published record of empirical findings.

## A1.1. Research design: Eligibility criteria, data abstraction, and coding procedures

In this section we provide supplemental information about the research design for the meta-analysis, including information about eligibility criteria, the literature search and data abstraction.

### A.1.1.1. Eligibility criteria and literature search

The criteria for inclusion were that (a) the research presented new (previously unpublished) quantitative data on the link between the behavioral immune system and opposition to immigration, and (b) that the research was published. We focus on published research because the aim of the meta-analysis is to provide a systematic overview of the extant publicly available scientific evidence of the link between the behavioral immune system and opposition to immigration.

To determine whether a publication presented new research on the relationship between behavioral immune sensitivity and opposition to immigration, clear operationalizations of both concepts were necessary. In the main text we define the behavioral immune system as a psychological structure of behavioral mechanisms that are designed to promote pathogen avoidance (Schaller and Neuberg 2012; Schaller and Park 2011; Schaller and Duncan 2007; Tybur et al. 2013). Following Terrizzi et al. (2013, 101), we apply a relatively broad operationalization as the field is relatively new. Included measures of behavioral immune sensitivity comprised both affective measures of sensitivity to disgust and behavioral/cognitive measures of disease avoidance motivations and thoughts of contamination. These measures also comprised both self-reported scales and experimental manipulations of behavioral immune sensitivity. Table A1 presents an overview of included measures.

Opposition to immigration was also operationalized broadly. We accepted affectively-oriented measures, cognitively-oriented stereotype measures and general and group specific anti-immigration attitudes. The operational definition of immigrants included people who were referred to as immigrants, people from other countries or people from unfamiliar places.

**Table A1. Indicators of behavioral immune sensitivity and opposition to immigration**

|  |  |
| --- | --- |
| **Measure** |  |
| **Measures of behavioral immune sensitivity** | * Measures of disgust sensitivity, including:   + The disgust sensitivity scale – DS   + Disgust scale 2   + The reduced disgust sensitivity scale – the DS-R   + Contamination disgust   + Interpersonal disgust   + Intergroup disgust – ITG-DS   + Pathogen disgust from the Three Domain Model of Disgust   + Scales of emotional states measuring disgust * Perceived vulnerability to disease – PVD * Germ aversion * Perceived infectability * Any kind of experimental priming of disease/disgust, including:   + Experimental exposure to questions measuring disgust sensitivity   + Making the Avian flu salient   + Experimental contamination threat prime   + Experimental disgust induction technique |
| **Measures of opposition to**  **immigration** | * Foreign/immigrant group stereotypes * General immigration attitudes * Thermometer ratings * Group-specific immigrant attitudes (ex. Africans, Middle Easterners) * Illegal immigration * Outgroup negativity * Other (for example Islamophobia, ethnocentrism, implicit measures, modern racism) |

*Literature Search***[[1]](#footnote-1)**

To retrieve the population of published studies we followed state-of-the-art practices (e.g. Baliunas et al. 2009, 2124; Danesh and Appleby 1999, 852). Specifically, the identification of research to be included in the meta-analysis was based on a two-step procedure combining manual searches and computer-assisted automatic searches to ensure that “eligible studies are included as much as possible” (Yan et al. 2014, 2401; see also for example Baliunas et al. 2009, 2124; Danesh and Appleby 1999, 852). First, based on our own reading of the literature, a start list of relevant published articles and books was compiled using snowball sampling. However, a classic limitation of snowball sampling is that it “poses a distinct risk of capturing a biased set of the total population” (Morgan 2008, 816). Hence, the second step in the selection procedure was to conduct computer-assisted automatic searches using the search engine Google Scholar. First a search was conducted using the search terms “behavioral immune system” + “immigration” + “disgust sensitivity.” This resulted in 44 hits. Additionally, an enlarged search was conducted using the search terms “immigration” + “disgust sensitivity.” This search generated 128 hits.[[2]](#footnote-2) All hits that were identified in the automatic searches on Google Scholar were then screened according to the same selection criteria as the snowball sample. Published work presenting original, new quantitative data on the relationship between behavioral immune sensitivity and opposition to immigration was selected. All articles and books not fulfilling these criteria were unselected.

The two-step selection procedure resulted in a final list of 16 articles published from 2004 to 2014 presenting original quantitative data on the link between the behavioral immune system and opposition to immigration. The full list of included research articles is presented in Online Appendix A1.1.2, Table A2.

### A.1.1.2 Full list of included research articles

Table A2 below shows the full list of research articles that were selected for the meta-analysis based on the eligibility criteria.

**Table A2. Full list of included research articles**

|  |
| --- |
| 1. Adams, Thomas G., Patrick A. Stewart, and John C. Blanchar. 2014. “Disgust and the Politics of Sex: Exposure to a Disgusting Odorant Increases Politically Conservative Views on Sex and Decreases Support for Gay Marriage.” *PloS One* 9(5): e95572.  2. Brenner, Corinne J., and Yoel Inbar. 2014. “Disgust Sensitivity Predicts Political Ideology and Policy Attitudes in the Netherlands.” *European Journal of Social Psychology,* doi: 10.1002/ejsp.2072  3. Choma, Becky L., Gordon Hodson, and Kimberly Costello. 2012. “Intergroup Disgust Sensitivity as a Predictor of Islamophobia: The Modulating Effect of Fear.” *Journal of Experimental Social Psychology* 48(2): 499-506.  4. Duncan, Lesley A., Mark Schaller, and Justin H. Park. 2009. “Perceived Vulnerability to Disease: Development and Validation of a 15-Item Self-Report Instrument.” *Personality and Individual Differences* 47: 541-46.  5. Faulkner, Jason, Mark Schaller, Justin H. Park, and Lesley A. Duncan. 2004. “Evolved Disease Avoidance Mechanisms and Contemporary Xenophobic Attitudes.” *Group Processes and Intergroup Relations* 7(4): 333-53.  6. Green, Eva G. T., Franciska Krings, Christian Staerklé, Adrian Bangerter, Alain Clémence, Pascal Wagner‐Egger, and Thierry Bornand, Thierry. 2010. “Keeping the Vermin Out: Perceived Disease Threat and Ideological Orientations as Predictors of Exclusionary Immigration Attitudes.” *Journal of Community & Applied Social Psychology* 20(4): 299-316.  7. Hodson, Gordon, and Kimberly Costello. 2007. “Interpersonal Disgust, Ideological Orientations, and Dehumanization as Predictors of Intergroup Attitudes.” *Psychological Science* 18: 691–98.  8. Hodson, Gordon, Becky L. Choma, Jacqueline Boisvert, Carolyn L. Hafer, Cara C. MacInnis, and Kimberley Costello. 2013. “The Role of Intergroup Disgust in Predicting Negative Outgroup Evaluations.” *Journal of Experimental Social Psychology* 49(2): 195-205.  9. Huang, Julie Y., Alexandra Sedlovskaya, Joshua M. Ackerman, and John A. Bargh. 2011. “Immunizing Against Prejudice Effects of Disease Protection on Attitudes Toward Out-Groups.” *Psychological Science* 22(12): 1550-56.  10. Klavina, Liga, Abraham P. Buunk, and Thomas V. Pollet. 2011. “Out-Group Mating Threat and Disease Threat Increase Implicit Negative Attitudes toward the Out-Group Among Men.” *Frontiers in Psychology* 2 (76): 2-8. doi: 10.3389/fpsyg.2011.00076  11. Krings, Franciska. Eva T. Green, Adrian Bangerter, Christian Staerklé, Alain Clemence, Pascal Wagner-Egger, and Thierry Bornand. 2012. “Preventing Contagion With Avian Influenza: Disease Salience, Attitudes Toward Foreigners, and Avoidance Beliefs.” *Journal of Applied Social Psychology* 42(6),:1451-1466.  12. Navarrete, Carlos D., and Daniel M. T. Fessler. 2006. “Disease Avoidance and Ethnocentrism: The Dffects of Disease Vulnerability and Disgust Sensitivity on Intergroup Attitudes.” *Evolution and Human Behavior* 27(4): 270-282.  13. Navarrete, Carlos. D., Daniel M. T. Fessler, and Serena J. Eng. 2007. “Elevated Ethnocentrism in the First Trimester of Pregnancy.” *Evolution and Human Behavior* 28(1): 60-65.  14. Reid, Scott A., Jinguang Zhang, Grace L. Anderson, Jessica Gasiorek, Douglas Bonilla, and Susana Peinado. 2012. “Parasite Primes Make Foreign-Accented English Sound More Distant to People who are Disgusted by Pathogens (but not by Sex or Morality).” *Evolution and Human Behavior* 33(5): 471-478.  15. Smith, Kevin B., Douglas Oxley, Matthew V. Hibbing, John R. Alford, and John R. Hibbing. 2011. “Disgust Sensitivity and The Neurophysiology of Left-Right Political Orientations.” *PloS One* 6 (10): e25552.  16. Terrizzi, John A., Natalie J. Shook, and Larry W. Ventis. 2010. “Disgust: A Predictor of Social Conservatism and Prejudicial Attitudes toward Homosexuals.” *Personality and Individual Differences* 49(6): 587-592. |

### A1.1.3. Data abstraction and coding procedures

From each research article that matched the eligibility criteria we coded results for direct and interactive effects of the behavioral immune system on opposition to immigration. As the aim of the meta-analysis is to provide a systematic overview of extant evidence of the direct effect of behavioral immune sensitivity on opposition to immigration, we did not code results concerning the mediators of a linkage between behavioral immune sensitivity and opposition to immigration.

Importantly, if the same basic association between a measure of behavioral immune sensitivity and opposition to immigration was investigated more than one time in an article (for example with different control variables or in a setup in which an increasing number of control variables was added), we coded the result for the model with the highest number of control variables to guard against spuriosity. In situations in which there were two investigations of the same basic association that included an equal number of control variables, we coded the result for the model that was designated as the strongest in the article.

Importantly, theories on the link between behavioral immune sensitivity and perceptions of immigrants suggest that the link does not apply to immigrants from familiar places (e.g. Faulkner et al. 2004; Hodson and Costello 2007). Consequently, some studies investigate attitudes towards various specific immigrant groups (e.g. people from Africa or Peru) and only predict an effect of behavioral immune sensitivity on attitudes towards immigrants from unfamiliar places. To ensure that the meta-analysis faithfully reflects the theoretical arguments of the literature, the analysis does not include tests of effects of behavioral immune sensitivity on opposition to a specific familiar immigrant group if the research article specifically predicts that there should be no effect (for example, if a research article classifies people from Asia as a familiar outgroup and predicts that there will be no significant correlation between behavioral immune sensitivity and negative attitudes towards people from Asia). Across the 16 articles in the meta-analysis, eight such results were identified.

For each published result in the articles we coded for the following information (a full codebook is available from the authors upon request):

*Bibliographical information* (authors, year).

*Information on the sample* (sample size, sample country, type of sample).

*Interaction hypothesis* (whether an interaction hypothesis was tested, the specific content of the interaction hypothesis).

*Information about the type of research design and statistical analyses* (whether the results were generated based on an experimental or non-experimental research design and whether the type of statistical analyses were bivariate, multivariate or interactive).

*Information on the statistical results* (type of statistic, the p-value and whether the reported p-value was one-sided, whether the exact effect size was reported, effect size [information about the type of statistic and effect sizes was only coded for linear additive results]).

*Measurement information* (type of behavioral immune sensitivity measure). Importantly, a large part of the selected research articles apply several different measures of behavioral immune sensitivity in their analyses. All results based on measures that are consistent with the definition of behavioral immune sensitivity described under the eligibility criteria were coded. Importantly, we also coded for whether the measure was identified by the authors of the research article as the primary indicator of behavioral immune sensitivity in the study or had the status of a control variable/secondary measure. This coding strategy ensured that we were able to run analyses on the most inclusive population of available results as well as a more restricted population that included only those measures of behavioral immune sensitivity that each specific article designates as the most valid key measure.

# A2. Supplemental Analyses and Results from the Meta-Analysis

We first review the empirical evidence for the basic prediction of the direct relationship between the behavioral immune system and opposition to immigration. As we explain in Footnote 3 in the main text, some studies include multiple empirical measures of behavioral immune sensitivity in the same analysis as control variables in order to promote a particular measure of behavioral immune sensitivity that is designated by the article as the better/most valid predictor. As also explained in Footnote 3 in the main text, to ensure that the meta-analysis faithfully represents the underlying theoretical and methodological arguments of each article, in the main analysis for the meta-analysis we only include results that are based on the article’s favored measure of behavioral immune sensitivity (N = 68) and exclude results based on alternative operationalizations that serve control functions in the articles.[[3]](#footnote-3)

**A2.1. Main results from the meta-analysis**

Overall, 80% of published additive tests find a significant association between their chosen measures of behavioral immune sensitivity and their chosen measure of anti-immigration attitudes (n = 65). The distribution of obtained effect sizes (see Figure A1A on the next page) has a mean of .23 and a standard deviation of .13 and hence suggests the existence of a moderate association. Although these findings point to the potential theoretical importance of the pathogen avoidance perspective, there are nonetheless major limitations with respect to internal and external validity. In terms of external validity, the results, like those of many psychological studies (c.f. Sears 1986), are based on small samples (Figure A1B), such that 73% of the samples are unpowered relative to the average effect size (with a statistical power rate of .80). They are also based almost entirely (85%) on samples drawn from one Anglo-Saxon country (Figure A1C). Finally, no study employs representative samples (Figure A1D). Almost all (91%) were conducted on student samples. Hence, while the purpose of social science research is “to establish causal relationships that are generalizable” (Barabas and Jerit 2010, 227), the results of the meta-analysis highlight a deficiency of studies on the effect of individual differences in behavioral immune sensitivity on anti-immigration attitudes in the general mass public.

Even though studies in psychology often prioritize internal validity over external validity, as Figure A1E shows, only two studies in our population use experimentation as a basis for testing the direct effect of behavioral immune sensitivity on anti-immigration attitudes in a non-interactive model that includes the entire sample. The majority of tests (53%) employ only bivariate correlations of observational data (Figure A1E). Of the remaining tests, 43% use a multivariate design but do so primarily to control for alternative operationalizations of behavioral immune sensitivity. If behavioral immune sensitivity is spuriously correlated with immigration attitudes (e.g., education or income explains both), such a research design will not be able to rule out alternative explanations.

**Figure A1. Results from the meta-analysis**

|  |  |
| --- | --- |
| **A1A. Effect size (N = 56)** | **A1B. Sample size (N = 68)** |
|  |  |
| **A1C. Site of study (N = 68)** | **A1D. Type of sample (N = 68)** |
|  |  |
| **A1E: Research design (N = 68)** | **A1F. Control for education and income (N =68)** |
|  |  |
| **1G. P-curve (N = 56)** | **1H. Deviation from mean effect size (N = 56)** |
|  |  |

*Note.* Because some studies do not report the exact effect size, N is lower in Figures A1A, G and H. In Figure A1D, the “other” sample is a combination of a student and an adult convenience sample.

As Figure A1F shows, the lack of attention to alternative explanations means that no study pits the effects of the behavioral immune system against the individual-level factors that are key to political scientists’ understanding of anti-immigration attitudes: education and income (e.g. Citrin et al. 1997; Coenders and Scheepers 2003; Espenshade and Calhoun 1993; Hainmueller and Hiscox 2007; McLaren 2001). Only one result controls for education and no results control for income. Consequently, the extent to which behavioral immune sensitivity explains variance beyond well-established causal factors from political science is unclear.

So far we have assessed the internal validity of the published record under the assumption of an unbiased data generation process. There is increasing awareness in both psychology and political science that research practices such as *p-hacking* (e.g. Simmons, Nelson, and Simonsohn 2011, 1359), *publication bias* and *the file drawer problem* (e.g. Franco, Malhotra, and Simonovits 2014) can create “a distorted impression of effect sizes” (Gerber, Green, and Nickerson 2001, 385). To assess the existence of these concerns within the literature on behavioral immune sensitivity and opposition to immigration, we performed two additional tests.

*P-hacking* refers to a process of selective reporting in which researchers intentionally push *p*-values below .05 (Simmons, Nelson, and Simonsohn 2011, 1359). To test for selective reporting we follow the procedure recommended by Simonsohn, Nelson, and Simmons (2014) and calculate the p-curve for the distribution of statistically significant p-values. When the null hypothesis is false, a right-skewed distribution of p-values should be expected; that is, more p-values below .025 than between .025 and 0.05 in independent tests. In contrast, a left-skewed curve indicates p-hacking (Simonsohn, Nelson and Simmons 2014, 535-6). Figure A1G shows the p-curve, including all results for which we can extract exact information about effect sizes as Pearson’s correlations or partial Pearson’s correlations. We observe a clearly right-skewed p-curve, which supports that p-hacking is not a problem in this literature.

The final test focuses on *publication bias* and *the file drawer problem,* where statistically insignificant results remain unpublished. An observable consequence of publication bias is that published effect sizes “will decrease as sample size increases” (Gerber, Green, and Nickerson 2001, 389). Following the advice of Begg and Berlin (1988, 433), we use a funnel graph to plot estimated effect size against sample size in Figure A1H. This analysis shows a clear overrepresentation of large effect sizes above the average estimate in small samples. Further analyses show that the correlation between the deviation from the mean effect size and sample size is -.32, p = 0.017, two-sided, N = 56. These results raise the concern that published results may reflect “false positive” errors (see also Franco, Malhotra, and Simonovits 2014) and emphasize the need for further tests with higher statistical power.

In our total population of 16 articles, we were able to identify 14 distinct hypothesized interactions focusing on the conditionality of the effect of behavioral immune sensitivity on opposition to immigration. Figure A2 below shows the full list of the 14 hypothesized interactions between behavioral immune sensitivity and various factors.

One of the most common hypothesized conditional effect is that making disease salient in people’s minds moderates the effect of behavioral immune sensitivity on opposition to immigration (Hypotheses 9, 10, and 12). This has been tested in three samples with Ns of 146, 58 and 132. Specifically, in a study based on 132 participants recruited from an online survey website, Huang et al. (2011) found that the effect of a disease threat (reading a newspaper article describing swine flu) on modern racism was moderated by whether the participants were protected against the disease (through a swine flu vaccination). Likewise, in a sample collected in America and consisting of 58 undergraduates, Reid et al. (2012) found that the effect of individual differences in disgust sensitivity on perceived dissimilarity to a (foreign) Scottish-accented speaker was moderated by exposure to a disease prime (the disease prime was a slide show with images of disease symptoms; the control group watched images of guns). Yet in the same study, the authors found no effect of exposure to the disease prime on the effect of individual differences in disgust sensitivity on perceived dissimilarity to a foreign-accented speaker from Sierra Leone. Finally, in a second sample consisting of 146 undergraduates, Reid et al. (2012) found that the moderating effect of a disease prime on the impact of pathogen disgust was stronger on perceived dissimilarity to unfamiliar foreign-accented people (Romanian, Jiangsu and Sierra Leonean speakers) than on the perceived dissimilarity to familiar foreign-accented people (speakers from New Zealand, Ireland and Scotland). Importantly, the more detailed pattern of findings underlying this result was that the effect of pathogen disgust on the perceived dissimilarity to unfamiliar foreign-accented people (Romanian, Jiangsu and Sierra Leonean speakers) was stronger in the disease than the gun prime (F (1,135)=5.83, p = 0.017), consistent with Reid et al.’s expectations. No moderating effect was found of the disease prime on the impact of disgust sensitivity on the perceived dissimilarity to familiar foreign-accented people (speakers from New Zealand, Ireland and Scotland) (F (1,135)=0.62, *ns*). It is not clear from the article whether this non-significant result was expected.

**Figure A2. List of interactive hypotheses**

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| --- |
| 1. Compared to participants in the control condition, participants in the disease condition are expected to respond more negatively toward foreign unfamiliar – but not familiar – immigrant groups. 2. Participants in the disease-salient condition, compared to participants in the control condition, are expected to allocate relatively less of the budget to subjectively foreign areas compared to familiar areas. 3. Fear (a negative dispositional emotion) strengthens the positive association between ITG-DS and Islamophobia. 4. Sadness (a negative dispositional emotion) strengthens the positive association between ITG-DS and Islamophobia. 5. Anger (a negative dispositional emotion) strengthens the positive association between ITG-DS and Islamophobia. 6. Happiness (a positive dispositional emotion) interferes with the negative impact of ITG-DS on Islamophobia. 7. When Avian influenza is salient, people holding unfavorable attitudes toward foreigners will be more likely to believe that avoiding foreigners efficiently protects against infection from Avian influenza than will people holding favorable attitudes toward foreigners. 8. Attitudes toward foreigners do not moderate the effects of AI salience on outgroup avoidance beliefs. 9. The more individuals are disgusted by pathogenic stimuli, the more they will perceive themselves as dissimilar from outgroup members. This relationship will be most evident after exposure to stimuli that increases the salience of disease risk. 10. Increases in pathogen disgust will be associated with greater perceived dissimilarity between ingroup and outgroup accents and this effect will be stronger under the disease prime than under the guns prime. 11. Overall, people will react more negatively to a disgusting (vs. neutral) outgroup. 12. When disease threat is salient, people who are protected from that disease (by vaccination) will be less prejudiced toward immigrants compared to people who are not protected from that disease. 13. Compared to men who have a low perceived vulnerability to disease (and all women), men who have a high perceived vulnerability to disease are more likely to express negative attitudes toward an outgroup when they are led to believe that outgroup members pose a threat to their mating opportunities. 14. Men who were induced to perceived vulnerability to disease (compared to those who were not) are more likely to express negative attitudes toward an outgroup when they are led to believe that outgroup members pose a threat to their mating opportunities. |

The question of whether the degree of disease threat moderates the effect of behavioral immune sensitivity on anti-immigration attitudes is of key importance, as reflected in the current attention in the literature. Specifically, if the activation of the behavioral immune system is not just another indicator of a predisposition to be prejudiced, but a highly flexible defense system evolved to respond to individual and contextual circumstances, the effect of behavioral immune sensitivity on anti-immigration attitudes should be moderated by the perceived level of pathogen threat in the environment. Hence, to further demonstrate the causal role of behavioral immune sensitivity, we return to this hypothesis in the analyses in Test 2 in the main text.

**A2.2. Meta-analysis: Analysis of robustness**

As described in Online Appendix A2, to make sure that the meta-analysis faithfully represents the underlying theoretical and methodological arguments of each article, we only include results that are based on the article’s favored measure of behavioral immune sensitivity in the analysis reported in Online Appendix A2.1 of the direct relationship between the behavioral immune system and opposition to immigration (N = 68) and exclude results based on alternative operationalizations that serve control functions in the articles.

To document that our conclusions are robust to the inclusion of these additional results, we report a robustness analysis below of the direct effect of behavioral immune sensitivity on opposition to immigration. Overall, 62.5% (61 out 96 results[[4]](#footnote-4)) of published additive tests find a significant association between their primary measure of behavioral immune sensitivity and anti-immigration attitudes. Figure A3 shows the results from the analysis of robustness in the extended population of the findings reported in Figure A1 in Online Appendix A2.1.

As can be seen in Figure A3, all substantial conclusions replicate in the extended population. In the extended population, the distribution of obtained effect sizes (Figure A3A) has a mean of .15 and a standard deviation of .17. While this average effect size is lower than the effect size found when only investigating the results based on the primary measures of behavioral immune sensitivity designated in the research articles, these findings also point to the potential theoretical importance of the pathogen avoidance perspective for understanding anti-immigration attitudes.

In terms of external validity, the analysis in the extended population also shows that these results are bedeviled by many of the methodological pitfalls that often characterize psychological research: the use of small samples (Figure A3B), single-country studies from Anglo-Saxon countries (Figure A3C), and that no studies have been conducted with representative samples (Figure A3D).

In terms of the internal validity of extant results, the analysis of robustness also replicates the findings reported in Online Appendix A2.1. As can be seen in Figure A3E, also in the extended population are only two results based on the use of an experiment to test the linear additive effect of behavioral immune sensitivity on opposition to immigration in a test including the entire sample. In the extended population, the majority of tests are based on either bivariate correlations in observational data or a multivariate design in which the control variables are primarily constituted by alternative operationalizations of behavioral immune sensitivity. Importantly, the analysis of robustness in the extended population also replicates the conclusion that almost no study has pitted the effects of the behavioral immune system against the individual-level factors that are key to political scientists’ understanding of anti-immigration attitudes: education and income (e.g. Citrin et al. 1997; Coenders and Scheepers 2003; Espenshade and Calhoun 1993; Hainmueller and Hiscox 2007; McLaren 2001). 97 out of 99 results are not controlled for either education or income. Two results are controlled for education and are significant, but report no effect size nor exact *p*-value. No study in the extended population controls for income. Hence, the analysis of robustness further emphasizes that it remains unclear to what extent pathogen avoidance motivations explain variance beyond well-established causal factors in the political science literature.

Finally, in terms of the tests for research practices such as p-hacking, publication bias, and the file drawer problem, the findings in Figures A3G-F also replicate the conclusions reported in Online Appendix A2.1. Hence, in Figure A3G we observe a clearly right-skewed p-curve, which shows that p-hacking is not a problem. However, consistent with the findings reported in Online Appendix A2.1., the analysis of robustness in Figure A3H shows indications of publication bias and the file drawer problem. Hence, in Figure A3H, in small samples, we observe some overrepresentation of large effect sizes above the average effect size. Further analysis shows a correlation between the deviation from the mean effect size and sample size of -.20, p = 0.06, N = 85. These results further increase the concern that published results may reflect “false positive” errors (see also Franco, Malhotra, and Simonovits 2014) and accentuate the need for further tests with better statistical power.

**Figure A3. Results from the meta-analysis in the extended population**

|  |  |
| --- | --- |
| **A3A. Effect size (N = 85)** | **A3B. Sample size (N = 99)** |
|  |  |
| **A3C. Site of study (N = 99)** | **A3D. Type of sample (N = 99)** |
|  |  |
| **A3E: Research design (N = 99)** | **A3F. Control for education and income (N =99)** |
|  |  |
| **A3G. P-curve (N = 85)** | **A3H. Deviation from mean effect size (N = 85)** |
|  |  |
| *Note.* Because some studies do not report the exact effect size, N is lower in Figures A3A, A3G and A3H. In Figure A3D, the “other” sample is a combination of a student and an adult convenience sample. | |

# A3. Sampling Procedures and Sample Characteristics for Samples 1-4

## A3.1. Samples 1-2

Samples 1-2 were collected as online web surveys in the United States and Denmark by the YouGov survey agency. Based on quota sampling, nationally representative samples were drawn to match population on gender, age (18-74), education and region. The U.S. nationally representative sample was collected 19-21 October 2012, and the Danish nationally representative sample 4-22 January 2013 (nUS = 1,321, nDK = 2,005).

In terms of demographics, 51.9 percent of the U.S. sample was female and the average age was 47.6. In terms of ideology, the average ideological self-placement was .53 on a scale ranging from 0 to 1, with higher values indicating a more conservative position. The most frequently reported family income was $20,000 - $29,999. In the Danish sample, 51.1 percent of the respondents were female and the average age was 44.9. In terms of ideology, the average ideological self-placement was .51 on a scale ranging from 0 to 1, with higher values indicating a more right-wing position. The most frequently reported household income was 300,000 DKK - 300,999 DKK (about $53,000 - $71,000).

## A3.2. Sample 3

Sample 3 was collected as a laboratory study from 12-20 December 2012, and consists of 42 students recruited from a large Danish research university. In this sample, 64 percent of the respondents were female and the average age was 20.8 years. The average ideological self-placement was .44 on a scale ranging from 0 to 1, with higher values indicating a more right-wing position. We do not have income data available in this sample.

## **A3.3. Sample 4**

Sample 4 was collected in the United States through Amazon’s Mechanical Turk (MTurk) on-line labor market in May 2013. In order to ensure that respondents were evaluating outgroups only, we restricted the sample to White respondents (n = 1,076). In this sample, 54.4 percent of the respondents were female and the average age was 33.98. In terms of ideology, the average ideological self-placement was .41 on a scale ranging from 0 to 1, with higher values indicating a more conservative position. The most frequently reported family income was $15,000 - $24,999.

# A4. Measurement Details for Test 1

## A4.1. Measures of behavioral immune sensitivity

### A4.1.1. Supplemental discussion and definition of measures of behavioral immune sensitivity

As presented in the main text, our research strategy across the four samples was to include several measures of individual differences in behavioral immune sensitivity, including three of the most established scales in the literature as well as both self-reported and physiological measures. This research strategy increases the validity of the findings and allows for assessment of replicability and robustness across different measures and different samples.

Specifically, for our self-reported measures, we include the original 5-item contamination disgust subscale (Haidt, McCauley, and Rozin 1994; modified by Olatunji et al. 2007), the 7-item pathogen disgust scale (Tybur, Lieberman, and Griskevicius 2009) and the 8-item germ aversion factor of the Perceived Vulnerability to Disease scale (Duncan, Schaller, and Park 2009).

As explained in the main text for Test 1 in the section “Materials and Methods,” as our point of departure we utilize the original 5-item contamination disgust subscale from the 25-item Revised Disgust Sensitivity Survey or DS-R (Haidt, McCauley, and Rozin 1994; modified by Olatunji et al. 2007). The contamination disgust subscale was offered by Olatunji et al. (2007) as a measure of “disgust reactions based on the perceived threat of transmission of contagion” (Olatunji et al. 2007, 285), and is based on items from “the most widely used instrument for assessing disgust propensity” (van Overveld et al. 2011, 325; see also see also Tybur, Lieberman, and Griskevicius 2009, 104). The items from the contamination disgust subscale have also used in prior work on disgust sensitivity and politics (e.g. Kam and Estes 2016; Smith et al. 2011; Inbar et al. 2012; Inbar, Pizarro, and Bloom 2009). Contamination disgust sensitivity was measured in Samples 1-4.

Though the contamination disgust subscale, as noted, is a central part of one of the most common measures of disgust sensitivity, later research notes that the conceptual distinctness of the domains of the DS-R are unclear; that the measurement is based on a set of disgust elicitors with limited variation (Tybur, Lieberman, and Griskevicius 2009, 104-5, 116); and that its internal consistency can be low (e.g. Inbar et al. 2012, 542; Tybur, Lieberman, and Griskevicius 2009, 116; van Overveld 2011, 329), possibly in part due to the relatively low number of items in the scale or diversity in the item content (Inbar et al. 2012, 542).

We sought to establish the robustness of the effects of behavioral immune sensitivity on opposition to immigration by also collecting and using the more recent and well-validated 7-item pathogen disgust scale from the Three Domain Model of Disgust (Tybur, Lieberman, and Griskevicius 2009) and the 8-item germ aversion factor from the Perceived Vulnerability to Disease (PVD) scale (Duncan, Schaller, and Park 2009). As described in the main text in Test 1, in the pathogen domain, the pathogen disgust scale taps individual differences in sensitivity to disgust “that functions to motivate avoidance of infectious micro-organisms” (Tybur, Lieberman, and Griskevicius 2009, 119). The germ aversion factor taps “aversive affective responses to situations that connote a relatively high likelihood of pathogen transmission” (Duncan, Schaller, and Park 2009, 542). As emphasized by Duncan, Schaller, and Park (2009, 545), in their psychometric evaluation of the PVD scale, germ aversion specifically assesses reactions “to situations connoting the potential transmission of infectious diseases.”

Importantly, prior research shows that both the pathogen disgust scale and the germ aversion factor have good internal consistency (e.g. Tybur, Lieberman, and Griskevicius, 2009, 116; Duncan, Schaller, and Park 2009, 542). The pathogen disgust scale is characterized by a strong conceptual and empirical distinctness from other types of disgust in the Three Domain Model of Disgust (sexual and moral disgust) (Tybur, Lieberman, and Griskevicius 2009, 117). Pathogen disgust sensitivity and germ aversion were measured in Sample 4.

Finally, we also measured individual differences in behavioral immune sensitivity using skin conductance response (SCR). This is important because it gives a behavioral measure of individual differences in physiological arousal in response to disgusting images of infection risk and disease (Oxley et al. 2008; Smith et al. 2011). As emphasized in Test 1 in the main text, the physiological measure of individual differences in behavioral immune sensitivity based on skin conductance response has the central advantage over self-reports that it can measure even “nonconscious and nonreportable” responses (Cacioppo, Tassimary, and Bernston 2007, 2; see also Balzer and Jacobs 2011, 1302). Additionally, traditionally self-reported measures can be influenced by social desirability and individuals can have difficulty (self-)identifying their response to hypothetical scenarios, which further adds to the value of including a non-self-reported physiological measure (Balzer and Jacobs 2011, 1302; Smith et al. 2011, 2). The physiological measure of individual differences in behavioral immune sensitivity based on skin conductance response (SCR) was collected in Sample 3.

### A4.1.2. Item wording for the contamination disgust scale, pathogen disgust scale, and the germ aversion factor

*Contamination disgust sensitivity*. To measure individual differences in contamination disgust sensitivity, we used the full 5-item contamination disgust subscale in the DS-R (Haidt, McCauley, and Rozin, 1994; modified by Olatunji et al. 2007). Specifically, the respondents were asked to “indicate how much you agree with each of the following statements, or how true it is about you”: “I never let any part of my body touch the toilet seat in public restrooms,” and “I probably would not go to my favorite restaurant if I found out that the cook had a cold.” Answers to these two items were measured on 5-point scales ranging from “Strongly disagree (very untrue about me)” to “Strongly agree (very true about me).” The respondents were also asked “How disgusting would you find each of the following experiences?”: “You take a sip of soda, and then realize that you drank from the glass that an acquaintance of yours had been drinking from,” “A friend offers you a piece of chocolate shaped like dog doo,” “As part of a sex education class, you are required to inflate a new unlubricated condom, using your mouth” (Olatunji et al. 2007; modified by Olatunji et al. 2007). Answers to these three items were measured on 5-point scales ranging from “Not disgusting at all” to “Extremely disgusting.” Answers to all of the five items above were summed into a scale measuring individual differences in contamination disgust sensitivity (αUS Sample 1 = .67, αDK Sample 2 = .61, αDK Sample 3 = .29, αUS Sample 4 = .67). The scale ranges from 0 to 1, with higher values indicating higher contamination disgust sensitivity (MeanUS sample 1 = .41, SDUS sample 1 = .22, MeanDK sample 2 = .31, SDDK sample 2 = .18, MeanDK sample 3 = .19, SDDK sample 3 = .10, MeanUS sample 4 = .38, SDUS sample 4 = .20).

Importantly, as described in the main text, in the small Danish student sample (Sample 3), the items from the contamination disgust scale do not sum to a reliable scale, as can be seen from the very low Chronbach’s alpha (αDK Sample 3 = .29). The intercorrelations of these scale items in Sample 3 are also very low. The self-reported measure of individual differences in contamination disgust sensitivity in Sample 3 should therefore be interpreted with this lack of reliability and problems of measurement validity in mind, and interpretations of the measure in this sample should be made with much caution. For this reason, we only report this measure in Footnote 5 in the main text and in Online Appendix A5.3.

*Pathogen disgust sensitivity*. To measure individual differences in pathogen disgust sensitivity, we included the full well-validated 7-item pathogen disgust scale (Tybur, Lieberman, and Griskevicius 2009). Specifically, the respondents rated on 7-point scales how disgusting they would find each of the following concepts: “Stepping on dog poop,” “Sitting next to someone who has red sores on their arm,” “Shaking hands with a stranger who has sweaty palms,” “Seeing some mold on old leftovers in your refrigerator,” “Standing close to a person who has body odor,” “Seeing a cockroach run across the floor,” and “Accidentally touching a person’s bloody cut” (Tybur, Lieberman, and Griskevicius 2009). Answers were summed into a satisfactorily reliable scale (α =.83) ranging from 0 to 1, with higher values indicating stronger pathogen disgust sensitivity (mean = .62, SD = .19)

*Germ aversion.* To measure individual differences in germ aversion, we included the full 8-item germ aversion factor of the Perceived Vulnerability to Disease scale (Duncan, Schaller, and Park 2009). Specifically, the respondents indicated on 7-point scales how much they agreed or disagreed with the following statements: “I prefer to wash my hands pretty soon after shaking someone’s hand,” “I avoid using public telephones because of the risk that I may catch something from the previous user,” “I do not like to write with a pencil someone else has obviously chewed on,” “I dislike wearing used clothes because you do not know what the last person who wore it was like,” “I am comfortable sharing a water bottle with a friend” (reverse coded), “It really bothers me when people sneeze without covering their mouths,” “It does not make me anxious to be around sick people” (reverse coded) and “My hands do not feel dirty after touching money” (reverse coded) (Duncan, Schaller, and Park 2009). Answers were summed into a satisfactorily reliable scale (α = .71) ranging from 0 to 1, with higher values indicating stronger germ aversion (mean = .49, SD = .18).

### A4.1.3. Measurement details for the physiological SCR measure

In the Danish laboratory study (Sample 3), individual differences in behavioral immune sensitivity were measured using skin conductance response (SCR). Specifically, six disgusting images of infection risk and disease were taken from the International Affective Picture System (IAPS) collection (Lang, Bradley, and Cuthbert 2008), which is a widely used source of visual stimuli in psychological studies (see also Smith et al. 2011, 3). In a separate pretest conducted as a self-completion survey among 25 university students, we validated that all six pictures related to infection risk and disease triggered disgust.

Following Smith et al. (2011, 3), the respondents in the Danish laboratory (Sample 3) watched the six images as part of a larger series of positive, disgusting and neutral images. Each image was displayed for 15 seconds. Between each image a white screen with a focus point (an “X”) was displayed for 10 seconds (i.e., the Interstimulus Interval). Skin Conductance Levels were measured during image exposure. Specifically, skin conductance response to each image was measured as the area bounded by the curve measured between one second after stimulus onset to 15 seconds after stimulus onset (cf. Figner and Murphy 2011). Skin conductance responses were summed into a single scale ranging from 0 to 1, with higher values indicating stronger physiological response to the images of infection risk and disease (mean = .16, SD = .19).

### A4.1.4. Demographic correlates of behavioral immune sensitivity in Samples 1-4

For each sample, Table A3 shows the demographic correlates of the available measures of behavioral immune sensitivity included in Test 1. Entries are bivariate correlations.

Consistent with past research (e.g. Brenner and Inbar 2015, 32; Duncan, Schaller, and Park 2009, 543; Haidt, McCauley, and Rozin 1994, 709; Inbar, Pizarro, and Bloom 2009, 717; Kam and Estes 2016, 484; Tybur, Lieberman, and Griskevicius 2009, 112), the pattern across our samples indicates that women display higher behavioral immune sensitivity than men, though the difference is statistically insignificant in the small Sample 3. Also consistent with past research (e.g. Haidt, McCauley and Rozin 1994, 709; Kam and Estes 2016, 484), our findings further indicate that Caucasians report lower disgust sensitivity than non-white racial and ethnic minority groups.

Furthermore, the pattern in the data across our samples indicates a positive correlation between age and behavioral immune sensitivity, though the correlations do not reach statistical significance in the small student laboratory Sample 3. Likewise, the pattern across our samples provides some evidence of negative correlations between behavioral immune sensitivity and education and income. Yet the strength of these correlations varies greatly, and they do not always reach statistical significance, even in large, well-powered samples.

**Table A3. Bivariate correlations between measures of behavioral immune sensitivity and demographics.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Contamination**  **disgust** | | | **Pathogen disgust** | **Germ aversion** | **Disgust SCR** |
|  | **U.S. Nat. Rep. Sample 1** | **DK Nat. Rep. Sample 2** | **DK Lab. Sample 3** | **U.S. Mturk Sample 4** | **U.S. Mturk Sample 4** | **DK Sample 3** |
| **Female** | 0.22\*\*\* | 0.17\*\*\* | 0.14 | 0.21\*\*\* | 0.13\*\*\* | 0.16 |
| **Age** | 0.07\*\* | 0.13\*\*\* | 0.15 | 0.10\*\* | 0.10\*\*\* | 0.02 |
| **Education** | -0.21\*\*\* | -0.03 |  | -0.09\*\* | -0.06 |  |
| **Income** | -.17\*\*\* | -0.08\*\* |  | -0.04 | 0.00 |  |
| **Non-white** | 0.25\*\*\* |  |  | - | - |  |
| **n** | 1321-1329 | 1709-2005 | 42 | 1065-1076 | 1065-1076 | 42 |

*Note*. Entries are Pearson’s correlations. \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001, two-sided tests.

## A4.2. Measurement details for opposition to immigration and control variables

*Opposition to immigration.* In all samples in Test 1, opposition to immigration was measured using a scale including the following six items: “Immigrants improve American [Danish] society by bringing in new ideas and cultures” (reverse scored), “The government spends too much money assisting immigrants,” “Legal immigrants to America who are not citizens should have the same rights as American citizens (reverse scored in the U.S. Sample) [Immigrants should not have the same rights as Danish citizens]”, “Immigrants take jobs away from people who were born in the U.S. [Denmark],” “Immigrants spur higher economic growth” (reverse scored), “Immigrants contribute to higher crime rates.” Answers were measured on 7-point scales ranging from “Strongly disagree” to “Strongly agree” (α US Sample 1 = .84, α DK Sample 2 = .84, α DK Sample 3 = .76, α US Sample 4 = .84). [[5]](#footnote-5) The final scale measuring opposition to immigration was recoded to range from 0 to 1, with higher values indicating higher opposition to immigration (mean US sample 1 = .50, SD US sample 1 = .23; mean DK sample 2 = .51, SD DK sample 2 = .21; mean DK sample 3 = .31, SD DK sample 3 = .16; mean US sample 4 = .49, SD US sample 4 = .21).

*Big Five.* To measure individual differences in personality as indexed by the Big Five inventory, we rely on the 10-item scale in the version introduced in recent political science research on personality traits by Mondak et al. (2010; see also Gosling, Rentfrow, and Swann 2003). Specifically, the respondents in the U.S. Mturk Sample 4 were instructed that “[t]he following section contains pairs of words. On the scale, please tell us which word best describes you.  If a word is particularly good at describing you, click the circle next to that word.  If neither word describes you, click the circle in between both words.  You can click any circle on the scale.” The respondents then placed themselves on 11-point scales with the following pairs of words at the endpoints: “An intellectual: Not an intellectual,” “Philosophical: Unreﬂective,” “Neat: Sloppy,” ”Hard working: Lazy,” “Outgoing: Shy,” “Extroverted: Introverted,” “Sympathetic: Unsympathetic,” “Kind: Unkind,” “Relaxed: Tense,” “Calm: Nervous.” Answers were summed into satisfactorily reliable scales (Mondak et al. 2010) ranging from 0 to 1 and measuring openness (r = .39), conscientiousness (r = .47), extroversion (r = .79), agreeableness (r = .65) and emotional stability (i.e., neuroticism) (r = .76).

Openness: mean = .75, SD = .17; conscientiousness: mean = .69, SD = .22; extroversion: mean = .49, SD .29; agreeableness: mean = .80, SD = .18; emotional stability: mean = .64, SD = .25.

*Ideology*. To measure individual differences in ideological self-placement, participants in the American Samples 1 and 4 were asked to place themselves on a 5-point scale with endpoints labeled “Very liberal” and “Very conservative.” A “Haven't thought much about this” option was also presented in the U.S. Sample 1 (those answers were subsequently excluded from the analyses).

Participants in the Danish Samples 2-3 placed themselves on a 7-point scale with end points labeled “Extremely left-wing” and “Extremely right-wing.” Answers were recoded to range on a scale from 0 to 1, with higher values indicating a more conservative/right wing ideology (mean US Sample 1 = .53, SD US Sample 1 = .34; mean DK Sample 2 = .49, SD DK Sample 2 = .22; mean DK Sample 3 = .44, SD DK Sample 3 = .26; mean US Sample 4 = .41, SD US Sample 4 = .28).

*Education*. Education is coded on a 6-point scale with end points “No HS” and “Postgraduate” in the U.S. Sample 1, on an 8-point scale with end points “Primary and lower secondary school” and “PhD” in the Danish Sample 2; and on a 5-point scale with end points “Less than high school graduate” and “Post college degree” in the American MTurk Sample 4. In all three samples, the education measure was recoded to vary between 0 and 1, with higher values indicating higher education. Education was not measured in the Danish laboratory Sample 2 as all participants were university students. Hence, education was a constant.

*Income*. In the U.S. Samples 1 and 4 and in the Danish Sample 2, income was measured using family income, consistent with prior work in the literature on income and attitudes towards immigration (cf. Hainmueller and Hiscox 2010, 72; Quillan 1995, 595; Espenshade and Hempstead 1996, 547; Jackson et al. 2001, 445). Specifically, in the U.S. Sample 1 family income was obtained on a 16-point scale (with end points “Less than $10,000” and “$500,000 or more”), in the Danish Sample 2 on an 11-point scale (with end points “Less than 100,000 Danish kroner” [about $14,875] and “1,000,000 Danish kroner or more” [about $148,750]), and in the U.S. Sample 4 on a 10-point scale (with end categories “Under $15,000” and “Over $200,000”). The income scales were coded to range from 0 to 1, with higher values indicating higher income.

*Race*. In the nationally representative U.S. Sample 1, race is coded as a dichotomous variable with 0 = white respondents, and 1 = non-white respondents from racial and ethnic minorities. In the MTurk Sample 4, all respondents are white/Caucasian and hence race is a constant.

## A4.3. Supplemental details on survey flow in Samples 1-4

In Samples 1, 2 and 4, immigration attitudes and individual differences in behavioral immune sensitivity were measured in the same survey. The measures of individual differences in behavioral immune sensitivity appeared before the measure of opposition to immigration.

In Sample 3, self-reported behavioral immune sensitivity and opposition to immigration were measured in the same survey. The self-reported measure of individual differences in behavioral immune sensitivity appeared before the measure of opposition to immigration. In Sample 3, the physiological measure of behavioral immune sensitivity was obtained after the survey in which self-reported behavioral immune sensitivity and opposition to immigration were measured.

### A4.3.1. Experimental test of effects of the placement of measures of behavioral immune sensitivity

Using an experiment implemented in a nationally representative online survey collected by the survey agency YouGov, we tested whether asking the questions measuring behavioral immune sensitivity *prior* to the questions measuring opposition to immigration increased the association between disgust and opposition to immigration. Below we describe the sample, the research design and measures, and the results from the experiment.

*The sample.* Using quota sampling, a nationally representative sample was drawn to match the population of citizens in the United States on gender, age (18-74), education, and geographic location. The survey was collected for another larger experiment involving a different set of treatments (party cues treatments) for a different research question. Here, we therefore restrict the sample to respondents from the other experiment’s control group to avoid any confounding from that experiment's treatments (n = 785).

*Research design and measures:* In the survey, all respondents were asked to answer the items in the 5-item contamination disgust scale (Haidt, McCauley, and Rozin 1994; modified by Olatunji et al. 2007), the 7-item pathogen disgust scale (Tybur, Lieberman, and Griskevicius 2009), and the 8-item germ aversion factor (Duncan, Schaller, and Park 2007) (see Online Appendix A4.1.2 for wording of the scale items). Experimentally, the respondents were randomly assigned to answer the three measures of behavioral immune sensitivity either *before* the question measuring opposition to immigration (“placed first” condition) or *after* the question measuring opposition to immigration (“placed after” condition). Therefore, in terms of survey flow, the three scales measuring behavioral immune sensitivity appeared either as the very first set of questions in the entire survey, or as the second set of questions measured immediately after the question battery with an item measuring opposition to immigration.

The question measuring *opposition to immigration* was asked as part of a 17-item question battery measuring preferences on a variety of political issues. The order of the 17 items was randomized. Specifically, to measure opposition to immigration, half of the respondents were randomly assigned the following question wording: “Some people support stopping immigration. How about you? Do you support or oppose that immigration should be stopped?” The other half of the respondents were assigned to the following question wording: “Some people oppose stopping immigration. How about you? Do you support or oppose that immigration should be stopped?” Answers were measured on a 7-point scale with endpoints labeled “Strongly oppose” and “Strongly support,” and re-scaled to range from 0 to 1, with higher values indicating higher opposition to immigration.

*Results:* Table A4 below shows the effect of the placement of the three scales measuring individual differences in behavioral immune sensitivity on opposition to immigration. The placement of the questions measuring behavioral immune sensitivity is coded as a dummy variable where 1 = “placed first” condition and 0 = “placed last” condition. All other variables range from 0 to 1, except for age, which is measured in years. Entries are unstandardized OLS regression coefficients. In Model 2 we have included the same set of control variables as in Test 1 in the main text as a robustness check.

The findings in Table A4 show no effect on opposition to immigration of whether the measures of behavioral immune sensitivity appeared *before* or *after* the question measuring immigration attitudes in the survey. These results suggest that simply asking questions related to disgust do not create a priming effect that influences opposition to immigration. These results are consistent with the experimental findings of Navarrete and Fessler (2006) who, using a convenience sample of U.S. citizens, found that asking 21 questionnaire items “with potential disgust eliciting content extracted from the Disgust Scale (Haidt et al., 1994)” (Navarrete and Fessler 2006, 277) did not have a statistically significant effect on outgroup negativity toward a foreigner (*t* = 1.27, n =253) (Navarrete and Fessler 2006, 278). Navarrete and Fessler (2006, 278) did find a statistically significant positive effect on in-group attraction (*t* = 2.55, n =253), but conclude that “the increase in negativity toward the foreigner did not reach statistical significance.” Using a larger nationally representative sample and asking a total of 20 questionnaire items related to disgust sensitivity, we replicate this null-finding.[[6]](#footnote-6)

**Table A4. Effect of Placement of Behavioral Immune Sensitivity Measures on Opposition to Immigration**

|  |  |  |
| --- | --- | --- |
|  | **Opposition to immigration** | |
|  | **Model 1** | **Model 2** |
| **Placement of behave immune sensitivity measures (placed first =1)** | -0.01 (0.02) | -0.01 (0.03) |
| **Female** |  | -0.01 (0.03) |
| **Age** |  | 0.00 (0.00) |
| **Education** |  | -0.13\* (0.05) |
| **Income** |  | -0.03 (0.05) |
| **Ideology** |  | 0.39\*\*\* (0.04) |
| **Non-white** |  | -0.00 (0.03) |
| **Constant** | 0.53\*\*\* (0.02) | 0.36\*\*\* (0.05) |
| **adj. *R*2** | -0.001 | 0.135 |
| ***n*** | 785 | 628 |

*Note*. Entries are unstandardized OLS regression coefficients with standard errors in parentheses. \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001, one-sided tests.

# A5. Supplemental Analyses for Test 1

## A5.1. Analysis of robustness of the effect of behavioral immune sensitivity in Samples 1-4

The findings in Test 1 in the main text demonstrate that across highly different national contexts, contamination disgust sensitivity correlates with opposition to immigration and that this relationship exists beyond the effects of classic demographic correlates of prejudice, including education and income. The results also show that the relationship between behavioral immune sensitivity and anti-immigration attitudes is robust across different operationalizations of behavioral immune sensitivity and when controlling for personality traits.

To further test the robustness of this relationship between behavioral immune sensitivity and anti-immigration attitudes, we investigate the correlation between contamination disgust and opposition to immigration when controlling for the effect of the full DS-R scale (Haidt, McCauley, and Rozin 1994; modified by Olatunji et al. 2007) and for the two other disgust factors in the DS-R, animal-reminder and core disgust.

To measure the *animal-reminder factor*, respondents in all four samples indicated how much they agreed or disagreed with the following statements: “It would bother me to be in a science class and to see a human hand preserved in a jar,” “I would go out of my way to avoid walking through a graveyard,” “It would not upset me at all to watch a person with a glass eye take the eye out of the socket” (reverse coded), “It would bother me to sleep in a nice hotel room if I knew that a man had died of a heart attack in that room the night before.” Answers were measured on 5-point scales ranging from “Strongly disagree (very untrue about me)” to “Strongly agree (very true about me)”. The respondents were also asked “How disgusting would you find each of the following experiences?”: “Your friend's pet cat dies, and you have to pick up the dead body with your bare hands,” “You see a man with his intestines exposed after an accident,” “You accidentally touch the ashes of a person who has been cremated” (Olatunji et al. 2007). Answers were measured on 5-point scales ranging from “Not disgusting at all” to “Extremely disgusting.” Answers to the five items were summed into a scale (αUS Sample 1 = .78, αDK Sample 2 = .77; αDK Sample 3 = .75; αUS Sample 4 = .80). The scale ranges from 0 to 1, with higher values indicating higher animal-reminder disgust sensitivity.

To measure the *core disgust factor*, respondents in all four samples indicated how much they agreed or disagreed with the following statements: “I might be willing to try eating monkey meat, under some circumstances” (reverse coded), “It bothers me to hear someone clear a throat full of mucous,” “Seeing a cockroach in someone else's house doesn't bother me” (reverse coded), “If I see someone vomit, it makes me sick to my stomach,” “It would bother me to see a rat run across my path in a park,” “Even if I was hungry, I would not drink a bowl of my favorite soup if it had been stirred by a used but thoroughly washed flyswatter.” Answers were measured on 5-point scales ranging from “Strongly disagree (very untrue about me)” to “Strongly agree (very true about me).” The respondents were also asked “How disgusting would you find each of the following experiences?”: “You see maggots on a piece of meat in an outdoor garbage pail,” “While you are walking through a tunnel under a railroad track, you smell urine,” “You see someone put ketchup on vanilla ice cream, and eat it,” “You discover that a friend of yours changes underwear only once a week,” “A friend offers you a piece of chocolate shaped like dog doo,” “You are about to drink a glass of milk when you smell that it is spoiled,” “You are walking barefoot on concrete, and you step on an earthworm” (Olatunji et al. 2007). Answers were measured on 5-point scales ranging from “Not disgusting at all” to “Extremely disgusting.” Answers to the five items were summed into a scale (αUS Sample 1 = .81, αDK Sample 2 = .77, αDK Sample 3 = .69, αUS Sample 4 = .78). The scale ranges from 0 to 1, with higher values indicating higher core disgust sensitivity.

To obtain the full DS-R scale answers to all items measuring contamination disgust, core disgust and animal-reminder were summed into a single scale (αUS Sample 1 = .89, αDK Sample 2 = .87, αDK Sample 3 = .82, αUS Sample 4 = .88). The scale ranges from 0 to 1, with higher values indicating higher disgust.

Across the four samples, Table A4 shows the association between contamination disgust sensitivity and opposition to immigration when controlling for the effect of the full DS-R scale (M1, M3, M5, M7) and for the two other disgust factors in the DS-R, animal-reminder and core disgust (M2, M4, M6, M8). Entries are standardized beta-coefficients.

Concerning the association between contamination disgust sensitivity and opposition to immigration when controlling for the full DS-R scale, the central pattern in Table A4 is that the relationship remains robust across the four models, although the association with contamination disgust only reaches marginal statistical significance in M5 where the measure of disgust sensitivity is based on SCR. Yet the sample size in Model 5 is also very limited, with only 42 respondents. Furthermore, the findings in the models also show that while the association between contamination disgust and opposition to immigration is stable and robust across the four samples, the association between the DS-R and opposition to immigration is highly unstable – the coefficient size varies greatly and the relationship changes between significant and insignificant across the four samples.

Concerning the association between contamination disgust and opposition to immigration when controlling for the animal-reminder factor and core disgust, the central pattern in Table A4 (M2, M4, M6, M8) is that the relationship remains robust across the four models, although, again, the association only reaches marginal statistical significance with the SCR measure from the small Danish laboratory Sample 3 (M6). Furthermore, the findings in the models also demonstrate that there are no robust associations between either animal-reminder or core disgust and opposition to immigration across the four models estimated in the four samples. In sum, across the eight models in Table A4, the pattern of the findings supports the robustness of the association between contamination disgust and opposition to immigration when controlling for other types of disgust. The findings also show that these correlations cannot be replicated using other types of disgust. This is consistent with the theoretical focus on pathogen avoidance.

**Table A4. The Correlation Between Contamination Disgust and Opposition To Immigration, Controlling for Other Types of Disgust.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **U.S. Nat. Rep. Sample 1** | | **DK Nat. Rep. Sample 2** | | **DK Lab sample 3** | | **U.S. MTurk Sample 4** | |
| DS-R scale  (M1) | All DS-R subscales  (M2) | DS-R scale    (M3) | All DS-R subscales  (M4) | DS-R scale    (M5) | All DS-R subscales  (M6) | DS-R scale    (M7) | DS-R subscales  (M8) |
| Contamination | .17\*\*\* | .16\*\*\* | .09\*\* | .12\*\*\* |  |  | .18\*\*\* | .20\*\*\* |
| Disgust SCR |  |  |  |  | .24ƚ | .24ƚ |  |  |
| DS-R scale | .02 |  | .16\*\*\* |  | -.15 |  | .10\* |  |
| Core |  | .06ƚ |  | .15\*\*\* |  | -.22 |  | .10\*\* |
| Animal-reminder |  | -.04 |  | .00 |  | .00 |  | -.01 |
| Adjusted R2 | .03 | .03 | .05 | .06 | .02 | .03 | .07 | .07 |
| n | 1321 | 1321 | 2005 | 2005 | 42 | 42 | 1073 | 1073 |

Note. Entries are standardized beta coefficients. ƚ p < 0.1 \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001, one-sided tests.

## A5.2. Supplemental analysis of robustness of the effect of contamination disgust excluding the item referencing sexual behavior

A possible concern regarding the effects of contamination disgust sensitivity is that one of the items explicitly references sexual behavior (“As part of a sex education class, you are required to inflate a new unlubricated condom, using only your mouth”). Prior research has found that this specific item predicts political conservatism better than any other item in the contamination disgust scale (Inbar et al. 2012, 542; see also Tybur et al. 2010, 602). This suggests that the effects of the contamination disgust measure in Table 2 in the main text could reflect effects of sexual disgust rather than pathogen disgust. At the same time, a primary source of infection is sex, and “semen” is, for example, included as an elicitor of pathogen disgust in the conceptualization outlined by Tybur, Lieberman, and Griskevicius (2009, 105). Consistent with the notion that this single item does not bias the results, analyses of robustness support that all analyses reported with contamination disgust in Table 2 in the main text replicate when the item referring to sexual behavior is excluded.

## A5.3. Supplemental analysis of robustness of the effect of the physiological measure of behavioral immune sensitivity

As noted in the results section in Test 1 in the main text, we have conducted analyses to check the robustness of the effect of the physiological measure of behavioral immune sensitivity on opposition to immigration by replicating the analysis reported in Table 2, Model 3 (a) without controlling for ideology, and (b) including the self-reported contamination disgust measure and the physiological SCR measure simultaneously in the models. These results are reported in Table A5 below.

Setting aside for the moment our reservations about the reliability and validity of the self-reported contamination disgust measure in Sample 3 (see discussion in Online Appendix A4.1.2 and in Footnote 5 in the main text), the results in Table A5 support the robustness of the findings reported in Table 2, Model 3 in the main text. In Table A5, the effect of the physiological SCR measure of disgust sensitivity also remains robust without controlling for ideology and when self-reported contamination disgust sensitivity is included in the model.

As described in Footnote 5 in the main text, no statistically significant zero-order correlation was observed between the physiological and the self-reported measure of behavioral immune sensitivity in the laboratory student Sample 3 (r = -0.16, p =0.315, two-sided, n = 42). This could suggest that physiological and self-reported disgust sensitivity may operate independently (see also Smith et al. 2011, 5). Nonetheless, as Smith et al. explain, one should consider neither self-reports nor physiological indicators to be the “right” indicator. Both approaches offer a valid way to capture a trait as complex as disgust sensitivity. In our study, the findings in Table A5, Model 2, support that that the two measures have effects in the same direction when it comes to immigration attitudes, despite the reliability problems and low inter-item correlations of the self-reported measure in Sample 3.

**Table A5. Supplemental Analyses of the Effect of the Physiological SCR Disgust Sensitivity Measure**

|  |  |  |
| --- | --- | --- |
|  | **Opposition to immigration** | |
|  | **M1** | **M2** |
| **Disgust SCR** | 0.24\* (0.13) | 0.26\*\* (0.10) |
| **Contamination Disgust** |  | 0.28ƚ (0.18) |
| **Female** | -0.11\* (0.05) | -0.06 (0.04) |
| **Age** | 0.01 (0.02) | -0.00 (0.01) |
| **Ideology** |  | 0.36\*\*\* (0.07) |
| **Constant** | 0.15 (0.40) | 0.17 (0.38) |
| **Adjusted *R*2** | 0.10 | 0.49 |
| **n** | 42 | 42 |

*Note*. Entries are unstandardized OLS regression coefficients with standard errors in parentheses. All variables range from 0 to 1 except for age, which is measured in years. ƚ = *p* = 0.065, \* *p* < 0.05, \*\* *p* < 0.01, \*\*\* *p* < 0.001, one-sided tests.

## A5.4. Analysis of the moderating effect of ideology

As summarized in Test 1 in the main text, we have analyzed whether ideology moderates the effect of behavioral immune sensitivity on opposition to immigration. As discussed in the theory section, a growing line of research focuses on how behavioral immune sensitivity underlies the motivation to adopt conservative ideologies (e.g., Hibbing, Smith, and Alford, 2014; Smith et al., 2011; Terrizzi, Shook, and McDaniel, 2013). Consistent with these findings, as can be seen in Table A6, a preliminary inspection of the correlation between behavioral immune sensitivity and ideology shows positive zero-order correlations between the measures of behavioral immune sensitivity and conservative ideological self-identification, except in the small Danish laboratory student Sample 3. In Sample 3, the correlation between the physiological measure of behavioral immune sensitivity and ideology is statistically non-significant (r = -0.05, p = 0,384, one-sided)[[7]](#footnote-7),[[8]](#footnote-8) (see Online Appendix A4.2 for descriptions of the measures of ideological self-identification in each sample).

**Table A6. Zero-order correlations between behavioral immune sensitivity and ideology**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **U.S.**  **Nat. Rep.**  **Sample 1** | **DK**  **Nat. Rep. Sample 2** | **DK**  **Lab.**  **Sample 3** | **U.S. MTurk**  **Sample 4** | **U.S. MTurk**  **Sample 4** | **U.S. MTurk**  **Sample 4** |
| **Contamination disgust** | r=.10\*\*\* | r=.09\*\*\* |  | r=.20\*\*\* |  |  |
| **Disgust SCR** |  |  | r=-0.05 |  |  |  |
| **Pathogen disgust** |  |  |  |  | r=.13\*\*\* |  |
| **Germ aversion** |  |  |  |  |  | r=.16\*\*\* |
| **n** | 1207 | 2005 | 42 | 1075 | 1075 | 1075 |

*Note.* Entries are zero-order correlations. \**p* <.05, \*\* p < .01, \*\*\* *p* < .001, one-sided tests.

Importantly, as described in Test 1 in the main text, we have analyzed whether ideology moderates the effect of behavioral immune sensitivity on opposition to immigration. Table A7 reports the OLS regression results that are summarized in the main text. Entries in Table A7 are unstandardized OLS regression coefficients and all variables range between 0 and 1 except for age, which is measured in years.

As can be seen in Table A7, across Samples 1, 2 and 4, we observe a significant or marginally significant interaction such that the effect of contamination disgust, pathogen disgust, and germ aversion on opposition to immigration is intensified the more liberal the respondents are. Only in the small Danish lab study do we find no moderating effect of ideology on the influence of the physiological measure of behavioral immune sensitivity on opposition to immigration (*p* = 0.40, one-sided). A likely explanation for this latter non-significant interaction is that Sample 3 is a smaller student sample with lower variation in conservative self-identification and no respondents identifying as “extremely right-wing” (see Footnote 8 in the Online Appendix).

Though the moderating effect of ideology on the influence of behavioral immune sensitivity on opposition to immigration in the Danish nationally representative Sample 2 (Model 2) and in one of the three models from the MTurk sample (Model 6) does not quite reach conventional levels of statistical significance (*p* = 0.066 in Model 2 and *p* = 0.056 in Model 6), the fundamental pattern of the moderating effect of ideology on the impact of the self-reported measures of behavioral immune sensitivity on opposition to immigration is interesting. The findings suggest that the effect of individual difference in behavioral immune sensitivity on anti-immigration attitudes is strongest among liberals, so that high behavioral immune sensitivity leads liberals to be more opposed to immigration – a position that is otherwise contrary to their ideological orientations (see the Conclusion in the main text for further interpretation and discussion).

**Table A7. The moderating effect of ideology on the impact of behavioral immune sensitivity on opposition to immigration**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Opposition to immigration** | | | | | |
|  | **U.S.**  **Nat. Rep.**  **Sample 1**  **M1** | **DK**  **Nat. Rep. Sample 2**  **M2** | **DK**  **Lab.**  **Sample 3**  **M3** | **U.S. MTurk**  **Sample 4**  **M4** | **U.S. MTurk**  **Sample 4**  **M5** | **U.S. MTurk**  **Sample 4**  **M6** |
| Contamination disgust | 0.27\*\*\*  (0.06) | 0.27\*\*\*  (0.07) |  | 0.26\*\*\*  (0.05) |  |  |
| Disgust SCR |  |  | 0.26\*  (0.11) |  |  |  |
| Pathogen disgust |  |  |  |  | 0.26\*\*\*  (0.06) |  |
| Germ aversion |  |  |  |  |  | 0.23\*\*\*  (0.06) |
| Ideology | 0.42\*\*\*  (0.04) | 0.39\*\*\*  (0.04) | 0.40\*\*\*  (0.08) | 0.42\*\*\*  (0.04) | 0.42\*\*\*  (0.07) | 0.40\*\*\*  (0.06) |
| Ideology × Contamination | -0.33\*\*\*  (0.10) | -0.17*†*   (0.11) |  | -0.30\*\*  (0.10) |  |  |
| Ideology × Disgust SCR |  |  | -0.07  (0.27) |  |  |  |
| Ideology × Pathogen |  |  |  |  | -0.19\*  (0.11) |  |
| Ideology × Germ aversion |  |  |  |  |  | -0.19ƚ  (0.12) |
| Female | 0.02\*  (0.01) | -0.02\*  (0.01) | -0.04   (0.05) | -0.00  (0.01) | -0.01  (0.01) | -0.00  (0.01) |
| Age | 0.00\*\*  (0.00) | 0.00\*\*\*  (0.00) | -0.00   (0.01) | 0.00  (0.00) | 0.00  (0.00) | 0.00  (0.00) |
| Education | -0.13\*\*\*  (0.02) | -0.15\*\*\*  (0.02)) |  | -0.11\*\*\*  (0.03) | -0.11\*\*\*  (0.03) | -0.11\*\*\*  (0.03) |
| Income | -0.09\*\*  (0.03) | -0.01 (0.02) |  | -0.02  (0.02) | -0.02  (0.02) | -0.02  (0.02) |
| Stability |  |  |  | -0.04  (0.03) | -0.03  (0.03) | -0.03  (0.03) |
| Openness |  |  |  | -0.13\*\*\*  (0.04) | -0.14\*\*\*  (0.04) | -0.13\*\*\*  (0.04) |
| Conscientious |  |  |  | 0.09\*\*  (0.03) | 0.10\*\*\*  (0.03) | 0.09\*\*\*  (0.03) |
| Extroversion |  |  |  | 0.04\*  (0.02) | 0.04\*  (0.02) | 0.04\*  (0.02) |
| Agreeableness |  |  |  | -0.04  (0.04) | -0.05  (0.04) | -0.04  (0.04) |
| Non-white | -0.06\*\*\*  (0.02) |  |  |  |  |  |
| Constant | 0.27\*\*\*  (0.03) | 0.24\*\*\* (0.03) | 0.17  (0.25) | 0.40\*\*\*  (0.05) | 0.34\*\*\*  (0.05) | 0.38\*\*\*  (0.05) |
| Adjusted R2 | 0.30 | 0.23 | .46 | 0.27 | 0.28 | 0.27 |
| n | 1034 | 1709 | 42 | 1046 | 1046 | 1046 |

*Note*. Entries are unstandardized OLS regression coefficients with robust standard errors in parentheses. All variables range from 0 to 1 except for age, which is measured in years. *†* *p* =0.066, ƚ p = 0.056, \**p* <.05, \*\* p < .01, \*\*\* *p* < .001, one-sided tests.

To elaborate the results in Table A7, and to investigate whether the significant moderating effect of ideology on the influence of behavioral immune sensitivity is simply caused by conservatives having no or little variation in behavioral immune sensitivity (leading to the greater effect among liberals), we investigate the mean level of behavioral immune sensitivity and the variance among respondents who identify as liberals, conservatives and middle of the road in our four samples.

Table A8 shows the mean and standard deviation for each of our four measures of behavioral immune sensitivity by respondents’ ideological self-identification. For ease of interpretation we have used respondents’ ideological self-placement to categorize them into three ideological groups: liberals, conservatives and middle of the road. As described in Online Appendix A4.2, to measure ideological self-placement, respondents in the U.S. Samples 1 and 4 placed themselves on a 5-point scale with endpoints labeled “Very liberal” and “Very conservative” (A “Haven’t thought much about this” option was also presented in Sample 1; those answers were subsequently excluded). Respondents in the Danish Samples 2-3 placed themselves on a 7-point scale with endpoints labeled “Extremely left-wing” and “Extremely right-wing.” In each sample, respondents who placed themselves in the middle category were coded as “Middle of the road.” Respondents who placed themselves in a category on the liberal (left) side of the scale were coded as “Liberals,” and respondents who placed themselves on the conservative (right) side of the scale were coded as “Conservatives.”

Consistent with the positive zero-order correlations between self-reported measures of behavioral immune sensitivity and ideological conservatism reported in Table A6, the general pattern in Table A8 indicates that conservatives report higher behavioral immune sensitivity than individuals who identify as liberals. Supplemental analyses show that these differences are statistically significant (*p* = 0.003, or lower, one-sided tests). Yet the tendency on the physiological measure of behavioral immune sensitivity seems to be in the opposite direction, with liberal respondents displaying stronger physiological reactions to disgusting images than conservatives, although the difference is not statically significant (p =.299, one-sided test). As discussed above and in Footnote 8 in the Online Appendix, the use of a student sample with lower variation in conservative self-identification and no respondents identifying as “Extremely right-wing” (the Danish equivalent to “Extremely conservative”) could be an explanation for the non-significant difference in behavioral immune sensitivity among liberals and conservatives on the physiological SCR measure.

Importantly, with respect to the variance in behavioral immune sensitivity among people who identify as liberals and conservatives respectively, the findings in Table A8 indicate that the standard deviation on the self-reported measures is highly similar among liberals and conservatives in the U.S. and Danish nationally representative Samples 1 and 2 and in the U.S. MTurk Sample 4. These results support that the significant moderating effect of ideology on the influence of behavioral immune sensitivity on opposition to immigration is not simply caused by conservatives having no or little variation in behavioral immune sensitivity, leading to the greater effect among liberals (see the Conclusion in the main text for further interpretation and discussion of the theoretical implications).

**Table A8: Mean and standard deviation in behavioral immune sensitivity by ideological self-identification**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Liberals** | | | **Middle of the road** | | | **Conservatives** | | |
|  | **Mean** | **SD** | **n** | **Mean** | **SD** | **n** | **Mean** | **SD** | **n** |
| U.S. Nat. Rep. Sample 1 |  |  |  |  |  |  |  |  |  |
| **Contamination disgust** | .38 | .21 | 430 | .41 | .23 | 284 | .42 | .21 | 493 |
| DK Nat. Rep. Sample 2 |  |  |  |  |  |  |  |  |  |
| **Contamination disgust** | .29 | .16 | 709 | .34 | .19 | 597 | .31 | .18 | 699 |
| DK Lab. Sample 3 |  |  |  |  |  |  |  |  |  |
| **Disgust SCR** | .19 | .23 | 19 | .09 | .11 | 7 | .15 | .16 | 16 |
| U.S. MTurk Sample 4 |  |  |  |  |  |  |  |  |  |
| **Contamination disgust** | .35 | .20 | 537 | .40 | .20 | 276 | .43 | .20 | 262 |
| **Pathogen disgust** | .60 | .19 | 537 | .63 | .20 | 276 | .65 | .18 | 262 |
| **Germ aversion** | .46 | .18 | 537 | .50 | .18 | 276 | .53 | .17 | 262 |

# A6. Measurement Details for Test 2

*Individual differences in behavioral immune sensitivity*:As presented in the main text in Test 1 in the section “Materials and Methods,” our research strategy across the empirical tests in the article was to include several measures of individual differences in behavioral immune sensitivity. This research strategy increases the validity of the findings and allows for assessment of replicability and robustness across different measures and different samples.

As a consequence of this strategy, in Test 2 we also include the 5-item *contamination disgust* subscale (Haidt, McCauley, and Rozin 1994; modified by Olatunji et al. 2007) and two of the most established alternative measures of behavioral immune sensitivity, i.e. the 7-item *pathogen disgust scale* from the Three Domain Model of Disgust (Tybur, Lieberman, and Griskevicius, 2009) and the 8-item *germ aversion factor* from the Perceived Vulnerability to Disease scale (Duncan, Schaller, and Park 2009). We used the same three scales measured in the same way as described in Test 1 (see therefore the Online Appendix A4.1.2 for specific measurement details and item wordings for each scale).

Finally, we created a *combined measure of individual differences in behavioral immune sensitivity* by combining the three scales in a reliable index (α = .77). Supporting the validity of the combined index and the interpretation that contamination disgust, pathogen disgust and germ aversion all track the same underlying individual difference in pathogen avoidance motivations, the correlations between the three scales in the index are also strong (for contamination disgust and pathogen disgust r = .53, for contamination disgust and germ aversion r = .58, and for pathogen disgust and germ aversion r = .46). The use of four different empirical indicators of behavioral immune sensitivity in Test 2, including three of the most established measures in the literature on the behavioral immune system, increases the validity of the findings and allows for assessment of the robustness of the effects.

*Disease protection experiment:* The full wording of the story in the disease protection experiment is reported below. All respondents read the instruction text. In both the control and the treatment condition, respondents read a detailed disgusting story in which an orderly at a hospital cleans up vomit. Subjects in the control group stopped here [Disease threat, no infection protection cues], while subjects in the treatment condition read on to learn how the orderly carefully washed his hands in the freshly cleaned wash area afterwards [Disease threat, infection protection cues provided].

**[Instruction text]**

“In the following task, we want you to read a story about a person’s typical day at work.  While you are reading this story, please try to imagine yourself as the narrator doing the described activities as concretely and vividly as possible.  In order to give you adequate time to read the selection, the advance button will appear after a few moments.”

**[Control condition: Disease threat, no infection protection cues]**

“I work as an orderly in an Emergency Room for a large hospital. Every day is an adventure, that’s for sure. My job is to assist the doctors and nurses. I pretty much do anything they need. Today was one of those days I dread. It was a busy one. We saw a lot of patients with the flu. About mid-day, I’m helping someone who could barely stand to walk from the waiting area to an observation room. About halfway down the hall, the patient stops and proceeds to vomit a green and red mass of chunky fluid on the floor.

On most days I love what I do, but this is one of those things I’d skip if I could. It is essential to make sure that everything is cleaned up. So I had to get on my knees and clean it up with my hands. I do not think I will ever get used to feeling bile, half-digested food, and, in this case, a bit of blood cover my fingers as I remove everything from the floor. It is absolutely revolting.”

**[Treatment condition: Disease threat, infection protection cues provided]**

[Participants read the same text as participants in the control condition. They also read the continuation of the story below. The story was accompanied by a photo of hand washing (i.e. two hands soaped up in white lather to be rinsed under a tap)].

“Click the arrow below to read the continuation of the story. While reading the story, please remember to try to imagine yourself as the narrator doing the described activities as concretely and vividly as possible.

It was quite a relief, though, when I could go wash my hands. I made a beeline to the wash area. The area was freshly cleaned. I carefully started to wash my hands. I used the heavy duty soap to ensure that my hands were completely clean. I felt the rinsing effect of the water on my hands. The liquid soap bubbled up in a thick white lather as I rubbed my hands together. I breathed in the fresh smell from the soap, and carefully rinsed my hands under the running water. I finished by putting on a refreshing disinfecting lotion.”

# A7. Manipulation Checks for the Disease Protection Experiment in Test 2

A manipulation check was conducted to validate that the experimental manipulation had been successful in ensuring that respondents in the treatment condition had a significantly stronger feeling of cleanliness than respondents in the control condition, and a significantly weaker feeling of disease threat than respondents in the control condition.

Feelings of cleanliness were measured using a 3-item scale (α=.93). Specifically, respondents indicated on 7-point scales how much they agreed or disagreed with the following statement when thinking back to the story they just read: “At the end of the story I felt clean,” “At the end of the story I had a feeling of cleanliness and relief,” and “At the end of the story I had pictures of clean and fresh hands on my mind.” To measure feelings of disease threat, respondents indicated how much they agreed or disagreed with the following two statements when thinking back to the story they just read: “At the end of the story I had pictures of vomit on my mind,” and “At the end of the story I felt disgusted” (r = .64).

Table A9 shows the average feeling of disease threat and cleanliness in the control group that received no infection protection cues and the treatment group that read the detailed description of how the orderly carefully washed his hands in the freshly cleaned wash area after cleaning up the vomit. Feelings of cleanliness and disease threat range from 0 to 1, with higher values indicating stronger feelings of cleanliness/disease threat. Mean differences are estimated using independent sample t-test (two-sided tests are reported).

The results of the manipulation check validate that respondents in the treatment condition had a significantly stronger feeling of cleanliness than respondents in the control condition (mean difference = .43, p < .001) and a significantly weakened feeling of disease threat than respondents in the control condition (mean difference = -.26, p < .001).

**Table A9. Manipulation check of the effect of the infection protection cues**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Infection protection cues**  **(Mean – M1)** | **No infection protection cues**  **(Mean – M2)** | **No infection protection cues - infection protection cues**  **(Mean difference – M3)** |
| Feelings of cleanliness | .65 | .22 | .43 (.01)\*\*\* |
| Feelings of disease threat | .51 | .76 | -.26 (.02)\*\*\* |
| N | 537 | 536 | 1073 |

Entries are estimated using independent sample t-test. Entries in M1-2 represent the mean scores in each experimental condition on the feelings of disease threat and cleanliness, respectively. Entries in M3 represent the mean difference (No infection protection cues - infection protection cues). \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001, two-sided test.

# A8. Supplemental Analyses for Test 2

## A8.1 Replication analyses for Table 3 utilizing the contamination disgust, pathogen disgust, and germ aversion factor

In Test 2 in the main text we analyze the mitigating effect of disease protection cues on the link between anti-immigration attitudes and behavioral immune sensitivity using a combined measure that adds the contamination disgust subscale (Olatunji et al., 2007), the pathogen disgust scale (Tybur, Lieberman, and Griskevicius 2009) and the germ aversion factor (Duncan, Schaller, and Park 2009) into a single highly reliable index of behavioral immune sensitivity. The findings are reported in Table 3 in the main text.

In this section we offer replication analyses of the analysis reported in Table 3 in the main text using the three individual scales as operationalizations of behavioral immune sensitivity. All three scales range from 0 to 1, with higher values indicating higher behavioral immune sensitivity. As in the main text, the experimental treatment is coded as a dummy variable (1 = disease protection and 0 = disease threat).

The pattern in the findings in Table A10 replicate the key findings reported in Table 3 in the main text. Though the moderating effect of disease protection cues on the influence of contamination disgust sensitivity on opposition to immigration in Model 1 only reaches marginal statistical significance (b = -0.09, *p* = 0.084, one-sided), the central pattern across the three measures in Models 1-3 is that disease protection cues reduce the influence of behavioral immune sensitivity on opposition to immigration substantially when compared to cues stimulating pathogen threat (bprotection cues × pathogen disgust  = -.13, *p* = 0.033, bprotection cues × germ aversion  = -.13, *p* = 0.031 one-sided).

**Table A10. The Mitigating Effect of Infection Protection Cues on the Impact of Three Different Measures of Behavioral Immune Sensitivity on Opposition to Immigration**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Opposition to Immigration** | | |
|  | **Contamination disgust**  **Model 1** | **Pathogen disgust**  **Model 2** | **Germ aversion**  **Model 3** |
| Constant | 0.34\*\*\* (0.03) | 0.25\*\*\* (0.04) | 0.30\*\*\* (0.03) |
| Protection Cues | 0.02 (0.03) | 0.07 (0.04) | 0.05 (0.04) |
| Protection cues × contamination disgust |  |  |  |
| Contamination disgust | 0.19\*\*\* (0.04) |  |  |
| Protection cues × contamination disgust | -0.09ƚ  (0.07) |  |  |
| Pathogen disgust |  | 0.26\*\*\* (0.05) |  |
| Protection cues × pathogen disgust |  | -0.13\* (0.07) |  |
| Germ aversion |  |  | 0.24\*\*\* (0.05) |
| Protection cues × germ aversion |  |  | -0.13\* (0.07) |
| Female | 0.00 (0.01) | -0.01 (0.01) | -0.00 (0.01) |
| Age | 0.00 (0.00) | 0.00 (0.00) | 0.00 (0.00) |
| Ideology | 0.32\*\*\* (0.02) | 0.33\*\*\* (0.02) | 0.33\*\*\* (0.02) |
| Education | -0.11\*\*\* (0.02) | -0.11\*\*\* (0.02) | -0.11\*\*\* (0.03) |
| Income | -0.00 (0.03) | -0.01 (0.03) | -0.01 (0.03) |
| Adjusted R2 | 0.236 | 0.248 | 0.240 |
| n | 1021 | 1021 | 1021 |

*Note*:Entries are unstandardized coefficients from a fixed effects model with state as group variable. Robust standard errors in parentheses. ƚ p = 0.084 \* p < .05, \*\* p < .01, \*\*\* p < .001, one-sided tests.

## A8.2. Supplemental analysis of the effect of protection cues among individuals with relatively low behavioral immune sensitivity

As noted in Footnote 6 in the main text, the entries in Table 3 in the main text might suggest a positive effect of protection cues among individuals with no behavioral immune sensitivity (i.e. when behavioral immune sensitivity is 0). Yet, as described in Footnote 7 in the main text, the lowest observed value on the combined measure of behavioral immune sensitivity is 0.087. Therefore, the significant term at the value 0 represents an extrapolation of the data.

We have estimated the effect of disease protection cues on opposition to immigration when the combined measure of behavioral immune sensitivity assumes the value at the first interquartile median and the 10th percentile. This provides us with estimates of the effect of disease protection cues among individuals with relatively low behavioral immune sensitivity at a place in the distribution where there is more data and the estimates are thus reliable. The results are reported in Table A11, Model 1, below. By measure of behavioral immune sensitivity, Table A11 shows the effect of disease protection cues on immigration attitudes when the measure of behavioral immune sensitivity is held at the first interquartile median and the 10th percentile (one-sided tests). The effects in Table A11 have been calculated based on the findings reported in Table 3 in the main text (Model 1 in Table A11) and Table A10 in the online appendix (Models 2-4 in Table A11).

When the combined measure of behavioral immune sensitivity is held at the first interquartile median, the predicted effect of disease protection cues on opposition to immigration is non-substantial (0.01) and clearly statistically non-significant (*p* = 0.287, one-sided). This finding is replicated when the combined measure of behavioral immune sensitivity is held at the 10th percentile. Here, the predicted effect of disease protection cues is still non-substantial (0.02) and still statistically non-significant (*p* = 0.0.127). Importantly, this pattern is also replicated when we observe the effect of disease protection cues on opposition to immigration when contamination disgust sensitivity (Model 2), pathogen disgust sensitivity (Model 3), and germ aversion (Model 4), respectively, are held at the first interquartile median and the 10th percentile. These findings consistently indicate that we observe no significant effects of disease protection cues among individuals with relatively low behavioral immune sensitivity.

**Table A11. Predicted effect of disease protection cues when behavioral immune sensitivity is held constant at the first interquartile median and the 10th percentile**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Combined measure of behav. immune sensitivity**  **M1** | **Contamination**  **Disgust**  **M2** | **Pathogen**  **Disgust**  **M3** | **Germ**  **Aversion**  **M4** |
| **Effect of protection cues at the 1st interquartile median** | 0.01, *p* = 0.287 | 0.01, *p* =0,368 | 0.01, *p* = 0.323 | 0.01, *p* = 0.356 |
| **Effect of protection cues at the 10th percentile** | 0.02, *p* = 0.127 | 0.01, *p* = 0.298 | 0.02, *p* = 0.127 | 0.02, *p* = 0.200 |
| **n** | 1021 | 1021 | 1021 | 1021 |

*Note*. *p*-values are reported for one-sided tests.

## A8.3. Supplemental analysis of the moderating effect of protection cues on the influence of income and education

The results in Test 2 in the main text showed that the effect of behavioral immune sensitivity on anti-immigration attitudes is substantially reduced by disease protection cues. The central pattern in the replication analysis in Online Appendix A8.2 supported this key finding using the three individual scales (i.e. the contamination disgust scale, the pathogen disgust scale and the germ aversion factor) as operationalizations of behavioral immune sensitivity.

To investigate whether this moderating effect of disease protection cues is unique to behavioral immune sensitivity, Table A12 reports the moderating effect of disease protection cues on the impact of education and income on immigration attitudes. Entries are unstandardized OLS regression coefficients. All variables range between 0 and 1 except for age, which is measured in years.

Consistent with the results in Test 1, the results in Table A12 show clear negative constitutive effects of education on opposition to the entering immigrant. Equally in line with the main pattern, in four of the five models, including income in Test 1, the results in Table A12 show no statistically significant constitutive effect of income. Importantly, the findings in Table A12 also demonstrate that the effects of neither education nor income on immigration attitudes are changed by disease protection cues. This pattern is consistent across the four different measures of behavioral immune sensitivity. That the effects of neither education nor income on immigration attitudes are changed by disease protection cues supports the distinctness of the effects and psychological motivations of the behavioral immune system observed in Test 2 in the main text.

**Table A12. The moderating effect of disease protection cues on the influence of education and income**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Opposition to immigration**  **(MTurk Sample 4)** | | | | | | | |
|  | **Moderating effect on the influence of**  **education** | | | | **Moderating effect on the influence of income** | | | |
|  | **M1** | **M2** | **M3** | **M4** | **M5** | **M6** | **M7** | **M8** |
| **Protection cues** | -0.01  (0.03) | -0.01  (0.03) | -0.02  (0.03) | -0.01  (0.03) | -0.02\*   (0.01) | -0.02   (0.01) | -0.02   (0.01) | -0.03\*   (0.01) |
| **Combined behav. immune sensitivity** | 0.26\*\*\*   (0.04) |  |  |  | 0.26\*\*\*  (0.04) |  |  |  |
| **Contamination disgust** |  | 0.15\*\*\*   (0.03) |  |  |  | 0.15\*\*\*   (0.03) |  |  |
| **Pathogen disgust** |  |  | 0.20\*\*  (0.03) |  |  |  | 0.20\*\*\*   (0.03) |  |
| **Germ aversion** |  |  |  | 0.17\*\*\*   (0.03) |  |  |  | 0.18\*\*\*  (0.03) |
| **Female** | -0.01  (0.01) | -0.00  (0.01) | -0.01  (0.01) | -0.00  (0.01) | -0.01   (0.01) | -0.00  (0.01) | -0.01   (0.01) | -0.00  (0.01) |
| **Age** | 0.00  (0.00) | 0.00  (0.00) | 0.00   (0.00) | 0.00  (0.00) | 0.00  (0.00) | 0.00  (0.00) | 0.00  (0.00) | 0.00   (0.00) |
| **Ideology** | 0.32\*\*\*   (0.02) | 0.32\*\*\*   (0.02) | 0.33\*\*\*   (0.02) | 0.32\*\*\*  (0.02) | 0.32\*\*\*   (0.02) | 0.32\*\*\*   (0.02) | 0.33\*\*\*  (0.02) | 0.32\*\*\*   (0.02) |
| **Education** | -0.11\*\*   (0.04) | -0.11\*\*   (0.04) | -0.12\*\*   (0.04) | -0.12\*\*  (0.04) | -0.11\*\*\*  (0.02) | -0.11\*\*\*   (0.02) | -0.11\*\*\*  (0.02) | -0.11\*\*\*  (0.02) |
| **Protection cues × education** | 0.00  (0.05) | -0.00   (0.05) | 0.01  (0.05) | 0.00  (0.05) |  |  |  |  |
| **Income** | -0.00   (0.03) | -0.00   (0.03) | -0.00   (0.03) | -0.01  (0.03) | -0.02   (0.03) | -0.02  (0.03) | -0.02  (0.03) | -0.03  (0.03) |
| **Protection cues × income** |  |  |  |  | 0.04  (0.03) | 0.04  (0.04) | 0.03  (0.04) | 0.04  (0.04) |
| **Constant** | 0.29\*\*\*  (0.04) | 0.36\*\*\*   (0.03) | 0.30\*\*\*   (0.04) | 0.33\*\*\*  (0.03) | 0.30\*\*\*   (0.03) | 0.36\*\*\*  (0.03) | 0.30\*\*\*  (0.03) | 0.34\*\*\*  (0.03) |
| **adj. *R*2** | 0.250 | 0.234 | 0.245 | 0.237 | 0.250 | 0.235 | 0.245 | 0.237 |
| **n** | 1021 | 1021 | 1021 | 1021 | 1021 | 1021 | 1021 | 1021 |

*Note*:Entries are unstandardized coefficients from a fixed effects model with state as group variable. Robust standard errors in parentheses. \* p < .05, \*\* p < .01, \*\*\* p < .001, one-sided tests.

## A8.4 Supplemental analysis including anxiety

Prior political science research demonstrates that anxiety plays a central role in explaining anti-immigration attitudes (Brader, Valentino, and Suhay 2008). To provide further causal leverage and demonstrate that the dynamic reported in Table 3 in the main text is specific to the operations of the behavioral immune system and not confounded by anxiety, we replicate the analysis in Table 3 in the main text including a measure of anxiety. Specifically, we utilize a scale of self-reported measures of emotion that represent the kind of anxiety response described in the affective intelligence model by Marcus, Neuman, and MacKuen (2000; see also Brader, Valentino, and Suhay 2008, 967-8)

Self-reported anxiety was measured immediately after the experimental stories and, in contrast to our measures of behavioral immune sensitivity, constitutes a measure of emotional states rather than emotional traits (see e.g. Brader, Valentino, and Suhay 2008 for a similar approach). Specifically, immediately after reading the story, participants received the following instruction: ”Below is a list of common feelings. Please tell us how much or how little you feel these emotions right now using the slider.” The list included the following emotions: “Nervous,” “Afraid,” “Happy,” “Cheerful,” “Clean,” “Refreshed,” “Disgusted,” “Nauseous,” “Calm,” and “Relaxed.” To increase reliability and avoid unnecessary truncation of the data, respondents used a slider to report their emotional reactions (Marcus, Neuman, and MacKuen 2015).

The affective intelligence model conceptualizes the structure of emotional reactions in two orthogonal unipolar dimensions (Marcus, Neuman, and MacKuen 2000, 153), with a cluster of negative emotions forming an anxiety response – also sometimes labeled negative affect – and a cluster of positive emotions forming an enthusiasm response – also sometimes labeled positive affect (Marcus, Neuman, and MacKuen 2000, 153; see also Brader, Valentino, and Suhay 2008, 967-8). Consistent with the affective intelligence model (Marcus, Neuman, and MacKuen 2000, 153-4), a factor analysis supports a two-dimensional structure with “Nervous,” “Afraid,” “Disgust” and “Nauseous” forming the anxiety scale (α = .78), and “Happy,” “Cheerful,” “Clean,” “Refreshed,” “Calm” and “Relaxed” forming the enthusiasm scale (α = .90). The items for the anxiety scale were summed and coded to range from 0 to 1, with higher values indicating higher anxiety. In line with past research (Brader, Valentino, and Suhay, 2008), we observe a significant bivariate correlation between anxiety and opposition to the entering immigrant in Test 2 (r = 0.11, *p* < 0.001), such that higher anxiety is associated with higher opposition to the entering immigrant.

Importantly, the results in Table A13, Model 1, including the anxiety scale and the interaction between disease protection cues and anxiety, replicate the analysis reported in Table 3 in the main text. The results in Models 2-4 replicate the analysis reported in Table 3 in the main text and in Online Appendix A8.1 using the contamination disgust scale (Model 2), the pathogen disgust scale (Model 3) and the germ aversion factor (Model 4) as operationalizations of behavioral immune sensitivity. Across all four models in Table A13, the mitigating effect of disease protection cues on the impact of behavioral immune sensitivity remains robust when anxiety and the cross-product between anxiety and disease protection cues are included in the statistical model. Even though self-reported measures of *state* disgust are included in the Affective Intelligence measure of anxiety (see also Marcus, Neuman, and MacKuen 2000, 156-8), we observe an independent and distinct effect of *trait-level* behavioral immune sensitivity moderated by disease protection cues.

Consistent with past research, the findings in Table A13 show that anxiety increases opposition to immigration (Brader, Valentino, and Suhay 2008). Importantly, however, this is only the case in the disease protection condition. In three of the four models in Table A13, we observe an interaction between the disease protection treatment and anxiety just beyond the borderline of statistical significance. Specifically, the disease protection treatment increases the correlation between anxiety and immigration attitudes. Importantly, supplemental analyses show that in the disease protection condition, the effect of anxiety on opposition to immigration is statistically significant in all four models reported in Table A13 (b = 0.08 or higher, *p* = 0.020 or lower, one-sided). When only pathogen threat cues are present, no statistically significant effect of anxiety is observed. We replicate this substantial pattern across all four measures of behavioral immune sensitivity reported in Table A13. In sum, across four different measures of behavioral immune sensitivity, we observe that simply eliminating the psychological experience of disease threat substantially attenuates the effect of the behavioral immune system on opposition to immigration. Importantly, the findings support that this moderation dynamic with disease protection cues is unique to behavioral immune sensitivity.

**Table A13.** **The mitigating effect of infection protection cues on the impact of behavioral immune sensitivity and anxiety on opposition to immigration**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Opposition to Immigration**  **(MTurk Sample 4)** | | | |
|  | **Combined behavioral immune sensitivity Model 1** | **Contamination disgust**  **Model 2** | **Pathogen disgust**  **Model 3** | **Germ aversion**  **Model 4** |
| Constant | 0.26\*\*\* (0.04) | 0.34\*\*\* (0.03) | 0.26\*\*\* (0.04) | 0.30\*\*\* (0.03) |
| Protection Cues | 0.06ƚ (0.04) | 0.01 (0.03) | 0.06ƚ  (0.05) | 0.04 (0.04) |
| Combined behav. immune sensitivity | 0.34\*\*\* (0.06) |  |  |  |
| Protection cues × combined behav. immune sensitivity | -0.21\*\* (0.08) |  |  |  |
| Contamination disgust |  | 0.19\*\*\* (0.04) |  |  |
| Protection cues × contamination disgust |  | -0.11\* (0.06) |  |  |
| Pathogen disgust |  |  | 0.26\*\*\* (0.05) |  |
| Protection cues × pathogen disgust |  |  | -0.17\* (0.08) |  |
| Germ aversion |  |  |  | 0.24\*\*\* (0.05) |
| Protection cues × germ aversion |  |  |  | -0.16\* (0.07) |
| Anxiety | -0.03 (0.04) | 0.01 (0.04) | -0.02 (0.05) | 0.00 (0.05) |
| Protection cues × anxiety | 0.11ƚ (0.07) | 0.08 (0.07) | 0.10ƚ (0.07) | 0.09ƚ (0.07) |
| Female | -0.01 (0.01) | -0.00 (0.01) | -0.01 (0.01) | -0.00 (0.01) |
| Age | 0.00 (0.00) | 0.00ƚ (0.00) | 0.00ƚ (0.00) | 0.00ƚ  (0.00) |
| Ideology | 0.32\*\*\* (0.02) | 0.32\*\*\* (0.02) | 0.32\*\*\* (0.02) | 0.32\*\*\* (0.02) |
| Education | -0.10\*\*\* (0.02) | -0.11\*\*\* (0.02) | -0.11\*\*\* (0.02) | -0.11\*\*\* (0.03) |
| Income | -0.01 (0.03) | -0.01 (0.03) | -0.01 (0.03) | -0.01 (0.03) |
| Adjusted *R*2 | 0.253 | 0.237 | 0.248 | 0.241 |
| *n* | 1019 | 1019 | 1019 | 1019 |

*Note*:Entries are unstandardized coefficients from a fixed effects model with state as group variable. Robust standard errors in parentheses. ƚ p <.10 \* p < .05, \*\* p < .01, \*\*\* p < .001, one-sided tests.

# A9. Measurement Details for Test 3

*Experimental conditions.* Figure A4 below reports thefull wording of the stimuli in the six experimental conditions in our 2 (familiarity) × 3 (intention cues) full factorial design:

**Figure A4. Study design and full wording of experimental conditions**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | **Familiarity** | | | |
|  |  | **Unfamiliar Middle-Eastern immigrant** | | **Familiar European immigrant** | |
| **Intentions** | **Bad intentions cues** |  | **1** |  | **4** |
| “Let me tell you about an immigrant – Muhammad Mahmoud. He comes from the Middle East. He is not motivated to learn English and is skeptical of American ideals such as democracy and equal rights.” | | “Let me tell you about an immigrant – Nikolai Vandinsky. He comes from Eastern Europe. He is not motivated to learn English and is skeptical of American ideals such as democracy and equal rights.” | |
| **Good intentions cues** |  | **2** |  | **5** |
| “Let me tell you about an immigrant – Muhammad Mahmoud. He comes from the Middle East. He is very motivated to learn English and is committed to American ideals such as democracy and equal rights” | | “Let me tell you about an immigrant – Nikolai Vandinsky. He comes from Eastern Europe. He is very motivated to learn English and is committed to American ideals such as democracy and equal rights.” | |
| **No intention cues** |  | **3** |  | **6** |
| “Let me tell you about an immigrant – Muhammad Mahmoud. He comes from the Middle East.“ | | “Let me tell you about an immigrant – Nikolai Vandinsky. He comes from Eastern Europe.” | |

*Opposition to “having immigrants like him” enter the country*. To measure the dependent variable in the experiment, opposition to having immigrants like him enter the country, we rely on a 3-item scale (α = .89). Specifically, the respondents indicated on 7-point scales the extent to which they disagreed or agreed that “The US should allow more immigrants like him to come and live here” (reverse scored), “Immigrants like [Muhammad Mahmoud/ Nikolai Vandinsky] will have a negative impact on the way of life in the US,” and “Immigrants like [Muhammad Mahmoud/ Nikolai Vandinsky] will have a negative financial impact on many Americans” (cf. Brader, Valentino, and Suhay 2008; Hainmueller and Hiscox 2010). The scale was recoded to range from 0 to 1, with higher values indicating higher opposition (mean = .51, SD = .21).

Behavioral immune sensitivity was measured using the contamination disgust scale described under Test 1 (see Online Appendix A.4.1.2 for item wordings).

*Control variables.* We included the same individual-level control variables as in the previous analyses of Sample 1 in Tests 1-2. See Online Appendix A4.2 for measurement details.

# A10. Supplemental Analyses for Test 3

## A10.1 Main effects of the experimental treatments in Test 3

As described in the main text in the results section for Test 3, we have tested that our manipulations are effective and can replicate prior key findings in the political science literature. Specifically, Table A14 shows the main effects of contamination disgust sensitivity and of the experimentally provided cues about the intentions and the ethnic origin of the immigrant on opposition to having immigrants like him enter the country.

Consistent with prior research (e.g. Sniderman, Hagendoorn, and Prior 2004; Hainmueller and Hiscox 2010), we observe that clear cues about the intentions of immigrants to make an effort and fit in have direct effects on anti-immigration attitudes. When the immigrant is described as having good intentions, anti-immigration attitudes decrease significantly (b = -0.13, *p* < 0.001). In contrast, when he is described as having bad intentions, anti-immigration attitudes increase substantially (b = 0.24, *p* < 0.001). Similarly, when the immigrant is described as being of familiar Eastern European origin rather than Middle Eastern origin, anti-immigration attitudes decrease (b = -0.05, *p* *<* 0.001). These observations support that our manipulations are effective and replicate prior key findings in the political science literature. This supports the measurement validity of the experimental conditions.

These results also support that the absence of a moderating effect of cues about the good or bad intentions of the immigrant is not caused by the use of experimental treatments lacking the basic strength to shape immigration attitudes.

Finally, and consistent with the range of previous findings in the main text, the results in Table A14 also show that there is a significant effect of contamination disgust sensitivity on anti-immigration attitudes (b = 0.15, *p* < 0.001).

**Table A14. Main effects of experimental conditions and contamination disgust on opposition to entering immigrant**

|  |  |
| --- | --- |
|  | **Opposition to Entering Immigrant**  **(U.S. Sample 1)** |
| Cues of Familiar (European) Origin | -0.05\*\*\* (0.01) |
| Cues of Bad Intentions | 0.24\*\*\* (0.02) |
| Cues of Good Intention | -0.13\*\*\* (0.02) |
| Contamination Disgust | 0.15\*\*\* (0.04) |
| Female | 0.00 (0.02) |
| Age | 0.00\*\* (0.00) |
| Education | -0.08\*\* (0.03) |
| Ideology | 0.21\*\*\* (0.02) |
| Income | -0.05 (0.04) |
| Non-white | -0.01 (0.02) |
| Constant | 0.32\*\*\* (0.04) |
| adj. *R*2 | 0.362 |
| *n* | 1034 |

Entries are unstandardized OLS regression coefficients with standard errors in parentheses. All variables range between 0 and 1 except for age, which is measured in years. \* p < .05, \*\* p < .01, \*\* p < .001, one-sided tests.

## A10.2. Supplemental analyses of the uniqueness of the effects of behavioral immune sensitivity

The analyses in Test 3 in the main text demonstrate that the effect of behavioral immune sensitivity on anti-immigration attitudes is not moderated by clear cues about the immigrant’s willingness to make an effort and fit in, but only by the information about the ethnic origin of the immigrant.

To investigate whether these effects are unique to behavioral immune sensitivity, Table A15 shows the moderating effect of cues about the ethnic origin and the intentions of the immigrant on the impact of income and education on opposition to the entering immigrant. For ease of comparison, the moderating effect of the cues about the ethnic origin and the intentions of the immigrant on the impact of contamination disgust is also reported (identical to Models 1-2 in Table 4 in the main text). Entries are unstandardized OLS regression coefficients. All variables range between 0 and 1 except for age, which is measured in years.

Consistent with the results in Test 1, we observe negative constitutive effects of education on opposition to the entering immigrant in Table A15. Consistent with the main pattern in four of the five models including income in Test 1, no statistically significant constitutive effect of income is observed in Table A15. Importantly, the findings in Table A15 also demonstrate that the effects of neither education nor income on immigration attitudes are changed as a function of information about the ethnic origin of the immigrant (Model 3: bEducation **×** familiar ethnic origin = -0.00, *p* = 0.467, one-sided; Model 5: bIncome **×** familiar ethnic origin = -0.06, *p* = 0.246, one-sided). Education, it seems, regulates principled opposition to immigration. As demonstrated in Test 3 in the main text, contamination disgust sensitivity, in contrast, triggers opposition to immigrants of unfamiliar origin perceived as a pathogen threat. Thus, the results in Table A15 support the uniqueness of the effects of disgust sensitivity disgust.

**Table A15. The unique effect of contamination disgust on opposition to entering immigrant**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Opposition to Entering Immigrant**  **(U.S. Sample 1)** | | | | | |
|  | **Contamination**  **disgust** | | **Education** | | **Income** | |
|  | **M1** | **M2** | **M3** | **M4** | **M5** | **M6** |
| **Cues of Familiar (European) Origin** | 0.02  (0.04) |  | -0.04  (0.03) |  | -0.02  (0.03) |  |
| **Cues of Bad Intentions** |  | 0.27\*\*\*   (0.04) |  | 0.21\*\*\*  (0.03) |  | 0.21\*\*\*  (0.03) |
| **Cues of Good Intentions** |  | -0.15\*\*\*   (0.04) |  | -0.14\*\*\*  (0.03) |  | -0.11\*\*\*   (0.03) |
| **Contamination** | 0.22\*\*\*   (0.06) | 0.16\*\*  (0.06) | 0.13\*\*   (0.05) | 0.15\*\*\*  (0.04) | 0.13\*\*   (0.05) | 0.15\*\*\*   (0.04) |
| **Education** | -0.10\*\*  (0.03) | -0.09\*\*  (0.03) | -0.09\*  (0.04) | -0.12\*\*  (0.04) | -0.09\*\*  (0.03) | -0.09\*\*   (0.03) |
| **Income** | -0.06  (0.04) | -0.04  (0.04) | -0.07  (0.04) | -0.04  (0.04) | -0.04  (0.06) | -0.05  (0.06) |
| **Contamination Disgust × Familiar Origin** | -0.16\*  (0.08) |  |  |  |  |  |
| **Contamination Disgust × Familiar Origin** |  | -0.09  (0.09) |  |  |  |  |
| **Contamination Disgust × Bad Intentions** |  | 0.06  (0.09) |  |  |  |  |
| **Education × Familiar Origin** |  |  | -0.00  (0.06) |  |  |  |
| **Education × Bad Intentions** |  |  |  | 0.05  (0.06) |  |  |
| **Education × Good Intentions** |  |  |  | 0.04  (0.06) |  |  |
| **Income × Familiar origin** |  |  |  |  | -0.06  (0.08) |  |
| **Income × Bad Intentions** |  |  |  |  |  | 0.08   (0.08) |
| **Income × Good Intentions** |  |  |  |  |  | -0.05   (0.08) |
| **Female** | 0.00   (0.02) | 0.01  (0.02) | 0.00  (0.02) | 0.01  (0.02) | 0.00   (0.02) | 0.01  (0.02) |
| **Age** | 0.00\*\*  (0.00) | 0.00\*\*  (0.00) | 0.00\*\*  (0.00) | 0.00\*\*  (0.00) | 0.00\*\*   (0.00) | 0.00\*\*  (0.00) |
| **Ideology** | 0.19\*\*\*  (0.03) | 0.21\*\*\*  (0.02) | 0.19\*\*\*  (0.03) | 0.21\*\*\*  (0.02) | 0.19\*\*\*  (0.03) | 0.21\*\*\*  (0.02) |
| **Non-white** | -0.01  (0.02) | -0.01  (0.02) | -0.01  (0.02) | -0.01  (0.02) | -0.01  (0.02) | -0.01  (0.02) |
| **Constant** | 0.33\*\*\*  (0.04) | 0.29\*\*\*  (0.04) | 0.36\*\*\*   (0.04) | 0.30\*\*\*  (0.04) | 0.36\*\*\*  (0.04) | 0.29\*\*\*  (0.04) |
| **Adjusted *R*2** | 0.102 | 0.356 | 0.099 | 0.355 | 0.099 | 0.356 |
| ***N*** | 1034 | 1034 | 1034 | 1034 | 1034 | 1034 |

*Note.* Entries are unstandardized OLS regression coefficients with robust standard errors in parentheses. All variables range between 0 and 1 except for age, which is measured in years. \* p < .05, \*\* p < .01, \*\* p < .001, one-sided tests.

# A11. Measurement details for Test 4

To measure approval of situations related to contact with immigrants (cf. Bogardus 1933), the respondents were asked to indicate how much they would be bothered by the following eight situations: “That someone in your immediate family married an immigrant,” “To have an immigrant family as neighbors,” “To have more immigrants move to your neighborhood,” “To eat a meal prepared by an immigrant,” “To shop in a butcher shop owned by an immigrant,” “To swim in a public swimming pool with many immigrants,” “That immigrants stopped shopping in your local grocery store and instead only shopped in shops owned by other immigrants,” and “That immigrants moved away from the city's other neighborhoods and gathered themselves in their own community.” Answers were measured on an 11-point scale with endpoints labeled “Completely bothered” and “Completely unbothered.” A “Don’t know/not relevant” option was also presented (those answers were subsequently excluded from the analyses). All items were recoded to range on a scale from 0 to 1, with higher values indicating higher approval of the situation.

Table A16 shows the summary statistics for each of these dependent variables, and their correlation with the scale measuring opposition to immigration that was applied in Tests 1-2. As expected based on the theory of the behavioral immune system and pathogen avoidance psychology, we observe some correlations between opposition to immigration and the more sociological matter of how to treat and live in contact with immigrants who have been granted residence in the country. However, consistent with the argument that the question of how to treat and live with immigrants once they are in the country is a related but distinct issue, the strength of the correlations in Table A16 varies greatly (from .61 to .07 numerically). Thus about half of the items measuring approval of situations related to contact with immigrants display a moderate to low correlation with opposition to immigration.

**Table A16. Summary statistics for measures of approval of contact situations with immigrants**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Mean | SD | n | Correlation with opposition to immigration scale |
| That someone in your family married an immigrant | .67 | .33 | 1962 | -.54 |
| To have an immigrant family as neighbors | .73 | .31 | 1976 | -.56 |
| To have more immigrants move to your neighborhood | .62 | .34 | 1969 | -.61 |
| To eat a meal prepared by an immigrant | .88 | .22 | 1971 | -.39 |
| To shop in a butcher shop owned by an immigrant | .78 | .31 | 1950 | -.45 |
| To swim in a public swimming pool with many immigrants | .73 | .30 | 1925 | -.52 |
| That immigrants moved away from the city's other neighborhoods and gathered themselves in their own community | .22 | .26 | 1967 | .16 |
| That immigrants stopped shopping in your local grocery store and instead only shopped in shops owned by other immigrants | .33 | .30 | 1925 | .07 |

Note. All items were recoded to range on a scale from 0 to 1, with higher values indicating higher approval of the situation.

# A12. Supplemental Discussion of the Linkage Between Substantial Contact with Outside Groups and Behavioral Immune Sensitivity

As described in the theory section, we argue that the behavioral immune system is “functionally flexible,” calibrating its response to the perceived degree of pathogen threat posed by the environment and the costs of foregoing of contact (Tybur and Lieberman 2016).

While our findings show that people high in behavioral immune sensitivity are motivated to avoid such contact, we do expect that if they were unable to avoid engaging in substantial and continuous personal contact with immigrants, this could decrease the degree to which foreigners are tagged as cues of potential pathogen threat. Substantial and continuous personal contact with immigrants living in the society may be a contextual factor that conditions individuals to stop mistakenly categorizing them as pathogen threats (and hence decrease the expected costs of contact) and increase their awareness of the potential benefits of exchange (i.e., up-regulate the expected benefits of contact).

As we argued and demonstrated in Test 3 in the main text, familiarity is a crucial moderator of the link between behavioral immune sensitivity and reactions to immigrants (see also e.g. Faulkner et al 2004, Hodson and Costello 2007, Reid et al 2012). In a similar way, contextual factors that make people more generally familiar with ethnic and racial differences might decrease disgust reactions to ethnically and racially different others living in society. Direct, face-to-face contact and interaction with people from other ethnic and racial groups could constitute such a factor. For an analogy, consider food preferences. People can come to like food that they initially found disgusting through repeated exposure (i.e., eating), dissociating the food from feelings of disgust and creating an “acquired taste.”

We would expect that the interactions with ethnically and racially different individuals need to be continuous and positive in order to temper one’s behavioral immune system response (see also Steinkopf 2016). Such interactions are most likely to occur in societies that are both ethnically diverse and, importantly, non-segregated. It is also plausible that these interactions need to take place within particular developmental windows such as early childhood for this effect to obtain.

The general notion that contextual factors can reduce the attention the physical, racial differences has already received some evidence in psychological research. Research on social categorization, for example, show that while people often automatically categorize individuals along racial lines, they cease to do this when offered alternative cues to the social affiliations of these individuals whether in the form of sports teams (Kurzban, Tooby and Cosmides 2001) or political parties (Pietraszewski et al 2015).

In this way, we urge future research to clarify to what extend there are downstream effects of continued contact with outside immigrant groups. Consistent with this argument, Al-Shawaf and Lewis (2013, 702) urge, “future work should investigate the manifest behavioral output of the disgust system in response to cues from distinct domains.”

# A.13. Supplemental Sample and Measurement Details for Sample 5

In the conclusion in the main text, we present analyses of a nationally representative sample of Americans (Sample 5). This section provides information about 1) the sampling procedures and sample characteristics, and 2) measurement details for the analyses presented in the main text. Online Appendix A14 reports the full statistical models and regression tables, with the findings illustrated in Figure 3 in the main text.

## A13.1. Sampling procedures and sample characteristics

Sample 5 was collected as an online web survey in the United States by the YouGov survey agency between 18-24 March, 2015. Based on quota sampling, a nationally representative sample was drawn to match the population of U.S. residents on gender, age (18-74), geographical location and education. 2,510 interviews were completed.

In terms of demographics, 54.3 percent of the sample was female and the average age was 44.9 years. In terms of ideology, the average ideological self-placement on the liberal-conservative continuum was .47 on a scale ranging from 0 to 1, with higher values indicating a more conservative position. The most frequently reported family income was $20,000-$29,000.

## A13.2. Measurement details

As presented in the main text, we measured overall ideological self-placement on the liberal-conservative continuum and two key attitudinal dimensions in the American electorate: social and economic conservatism. Additionally, we measured self-reported behavioral immune sensitivity and included the same rich set of demographic variables and personality traits as in the U.S. MTurk Sample 4, i.e. gender, age, education, income, race and personality traits as indexed by the Big Five.

*Overall ideological self-placement* was measured on a 7-point scale with endpoints labeled “Very liberal” and “Very conservative” and coded to range from 0 to 1, with higher values indicating a more conservative ideological self-placement (mean = 0.47, SD =0.28). For the purpose of the analysis, we subsequently categorized the respondents into three general ideological categories: liberals, conservatives, and middle of the road. Respondents who placed themselves in the middle category of the 7-point scale were coded as “Middle of the road.” Respondents who placed themselves in a category on the liberal side of the scale (i.e. “Very liberal,” “Liberal” or “Somewhat liberal”) were coded as “Liberals.” Respondents who placed themselves in a category on the conservative side of the scale (i.e. “Very conservative,” “Conservative” or “Somewhat conservative”) were coded as “Conservatives.”

*Social and economic conservatism* was measured with 18 questions developed in a Likert format to mirror the items selected from the ANES by Treier and Hillygus (2009). The 18 items are listed below (items measuring social conservatism are marked with “s,” and items measuring economic conservatism are marked with “e”; reverse coded questions are marked with “rc”). Specifically, all respondents were asked to indicate: “Please indicate how much you agree or disagree with the following statements?”

1. Gay or lesbian couples, in other words homosexual couples, should be legally permitted to adopt children (s, rc)
2. It is important for the government to provide many more services even if it means an increase in spending (e, rc)
3. All medical expenses should be paid by individuals through private health care insurance plans like Blue Cross or other company plans (e)
4. The government should see to that every person has a job and a good standard of living (e, rc)
5. If a company has a history of discriminating against blacks when making hiring decisions, then they should be required to have an affirmative action program that gives blacks preference in hiring (s, rc)
6. Federal spending on welfare programs should be decreased (e)
7. Federal spending on aid to poor people should be decreased (e)
8. Federal spending on social security should be increased (e)
9. Federal spending on public schools should be increased (e)
10. Taxes should be increased to reduce the budget deficit (e)
11. By law, a woman should always be able to obtain an abortion as a matter of personal choice (s, rc)
12. Permission from the parents should be required before a teenage girl under the age of 18 can obtain an abortion (s)
13. Late-term abortions, sometimes called partial birth abortions, should be illegal (s)
14. Homosexuals should be allowed to serve in the United States Armed Forces (s, rc)
15. The federal government should make it a lot easier for people to buy a gun than it is now (s)
16. Persons convicted of murder should receive the death penalty (s)
17. A woman’s place is in the home (s)
18. Current regulations to protect the environment are already way too much of a burden on business (e)

Answers to each of the 18 items were obtained on a 7-point scale with endpoints labeled “Disagree strongly” and “Agree strongly.” Answers were summed into highly reliable scales measuring economic conservatism (α = 0.86) and social conservatism (α = 0.81), and ranging from 0 to 1, with higher values in indicating higher support for conservative policies.

*Behavioral immune sensitivity* was measured using the well-validated 7-item pathogen disgust scale from the Three Domain Model of Disgust (Tybur, Lieberman, and Griskevicius 2009) as in Sample 4 (see online Appendix A4.1.1 for further description and discussion of the pathogen disgust scale). Specifically, the respondents read the following instruction: “The following items describe a variety of concepts. Please rate how *disgusting* you find the concepts described in the items, where 0 means that you do not find the concept disgusting at all and 6 means that you find the concept extremely disgusting.” The respondents rated the following seven items: “Stepping on dog poop,” “Sitting next to someone who has red sores on their arm,” “Shaking hands with a stranger who has sweaty palms,” “Seeing some mold on old leftovers in your refrigerator,” “Standing close to a person who has body odor,” “Seeing a cockroach run across the floor,” and “Accidentally touching a person’s bloody cut” (Tybur, Lieberman, and Griskevicius 2009). Answers were summed into a highly reliable scale (α =.86) ranging from 0 to 1, with higher values indicating higher pathogen disgust sensitivity (mean = .64, SD = .22).

*Control variables.*

*Age* is measured in years and ranges from 18 to 74.

*Education* was measured on a 5-point scale with the categories “No HS,” “High school graduate,” “Some college,” “Two-year degree,” “Four-year degree” and “Post-graduate,” and coded to range from 0 to 1, with higher values indicating higher education.

*Income* was measured using family income, consistent with the measurement strategy in Samples 1, 2 and 4. Specifically, family income was measured on a 16-point scale with endpoints “Less than $10,000” and “$500,000 or more.” A “Prefer not to say” category was also offered and those answers were subsequently excluded.[[9]](#footnote-9) Answers were recoded to range from 0 to 1, with higher values indicating higher income.

*Race* was coded as a dichotomous variable with 0 = white/Caucasian respondents and 1 = non-white respondents from racial and ethnic minority groups, consistent with the coding in the U.S. Sample 1.

*Personality traits as indexed by the Big Five.* To tap individual differences in the Big Five personality traits, we included the 10-item scale in the version introduced in recent political science research on personality traits by Mondak et al. (2010; see also Gosling, Rentfrow, and Swann 2003). This scale was also used in the U.S. MTurk Sample 4. Specifically, the respondents in Sample 5 read the following instruction: “The following section contains pairs of words. On the scale, please tell us which word best describes you.  If a word is particularly good at describing you, click on the scale next to that word.  If neither word describes you, click on the scale in between both words.  You can click anywhere on the scale.” Answers were obtained on 11-point scales with the following pairs of words at the endpoints: “An intellectual: Not an intellectual,” “Philosophical: Unreﬂective,” “Neat: Sloppy,” ”Hard working: Lazy,” “Outgoing: Shy,” “Extroverted: Introverted,” “Sympathetic: Unsympathetic,” “Kind: Unkind,” “Relaxed: Tense,” “Calm: Nervous.” Answers were summed into satisfactorily reliable scales ranging from 0 to 1 and measuring openness (r = 0.49), conscientiousness, (r = 0.47), extroversion (r = 0.69), agreeableness (r = 0.64), and emotional stability (r = 0.75).

# A14. Analysis of the Moderating Effect of Ideological Self-Identification on the Influence of Behavioral Immune Sensitivity on Social and Economic Policy Preferences in Sample 5

To analyze whether overall liberal-conservative ideology moderates the effect of behavioral immune sensitivity on social and economic policy preferences in general and not just immigration attitudes, we first regress social policy preferences (Model 1) and economic policy preferences (Model 2) on pathogen disgust sensitivity, overall ideological self-identification and the cross-product between the two variables. “Liberals” are coded as reference category on our measure of overall ideological self-identification. We included control for age, gender, education, income, race and personality traits to ensure that we were not detecting a spurious relationship that can be explained by demographics or general-domain predispositions as indexed by the Big Five traits. We use robust standard errors in Models 1-2 in Table A17 because we estimate interactive models.

The findings in Table A17, Models 1-2, support that overall liberal-conservative ideology moderates the effect of behavioral immune sensitivity on social policy preferences (b Middle of the road × pathogen disgust = -0.08, *p* = 0.037; b Conservatives × pathogen disgust = -0.15, *p* < 0.001, one-sided tests) and economic policy preferences (b Middle of the road × pathogen disgust = -0.15, *p* < 0.001; b Conservatives × pathogen disgust = -0.21, *p* < 0.001 one-sided tests).[[10]](#footnote-10) For ease of interpretation we therefore proceed and regress for “Liberals,” “Middle of the road” and “Conservatives” separately, social and economic policy preferences on pathogen disgust sensitivity and the same set of control variables as in Models 1-2. The findings are reported in Models 3-5 (social policy preferences) and Models 6-8 (economic policy preferences). The findings in Table A17, Models 3-5 are illustrated in Figure 3, Panel A in the main text, and the findings in Models 6-8 are illustrated in Panel B. See the conclusion in the main text for interpretation, discussion and implications of the findings.

**Table A17. The moderating effect of overall ideological self-identification on the effect of pathogen disgust on social and economic conservatism**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Social conservatism** | **Economic conservatism** | **Social**  **conservatism** | | | **Economic**  **conservatism** | | |
|  | **All** | **All** | **Liberals** | **Middle of the road** | **Conservatives** | **Liberals** | **Middle of the road** | **Conservatives** |
|  | **M1** | **M2** | **M3** | **M4** | **M5** | **M6** | **M7** | **M8** |
| Pathogen disgust | 0.12\*\*\* (0.03) | 0.09\*\*\* (0.03) | 0.09\*\*\* (0.03) | 0.04 (0.03) | 0.01 (0.03) | 0.03 (0.03) | -0.06\* (0.03) | -0.07\* (0.03) |
| Middle of the road | 0.19\*\*\* (0.02) | 0.24\*\*\* (0.03) |  |  |  |  |  |  |
| Conservatives | 0.41\*\*\* (0.03) | 0.44\*\*\* (0.03) |  |  |  |  |  |  |
| Middle of the road × pathogen disgust | -0.08\* (0.04) | -0.15\*\*\* (0.04) |  |  |  |  |  |  |
| Conservatives × pathogen disgust | -0.15\*\*\* (0.04) | -0.21\*\*\* (0.04) |  |  |  |  |  |  |
| Female | -0.02\* (0.01) | -0.01 (0.01) | -0.00 (0.01) | -0.03\*\* (0.01) | -0.02 (0.01) | 0.03\*\* (0.01) | -0.01 (0.01) | -0.05\*\*\* (0.01) |
| Age | -0.00 (0.00) | -0.00\* (0.00) | 0.00 (0.00) | -0.00 (0.00) | 0.00 (0.00) | -0.00\*\*\* (0.00) | -0.00\* (0.00) | 0.00 (0.00) |
| Education | -0.07\*\*\* (0.01) | -0.01 (0.01) | -0.09\*\*\* (0.02) | -0.08\*\*\* (0.02) | -0.02 (0.02) | -0.07\*\*\* (0.02) | -0.01 (0.02) | 0.04 (0.03) |
| Income | -0.05\*\* (0.02) | 0.14\*\*\* (0.02) | -0.12\*\*\* (0.02) | -0.06\* (0.03) | 0.08\*\* (0.03) | 0.04 (0.03) | 0.14\*\*\* (0.03) | 0.30\*\*\* (0.03) |
| Nonwhite | 0.01 (0.01) | -0.01 (0.01) | 0.06\*\*\* (0.01) | 0.01 (0.01) | -0.05\*\*\* (0.02) | 0.04\*\*\* (0.01) | -0.03\*\* (0.01) | -0.06\*\*\* (0.02) |
| Openness | -0.11\*\*\* (0.02) | -0.11\*\*\* (0.02) | -0.25\*\*\* (0.03) | -0.05 (0.04) | 0.04 (0.04) | -0.22\*\*\* (0.03) | -0.09\* (0.04) | 0.05 (0.05) |
| Conscientiousness | 0.03 (0.02) | 0.05\* (0.02) | 0.03 (0.03) | 0.07\* (0.04) | -0.03 (0.04) | 0.09\*\* (0.03) | 0.10\*\* (0.04) | -0.07 (0.04) |
| Extraversion | 0.07\*\*\* (0.02) | 0.06\*\*\* (0.02) | 0.09\*\*\* (0.02) | 0.10\*\*\* (0.03) | -0.00 (0.03) | 0.06\*\* (0.02) | 0.04 (0.03) | 0.03 (0.03) |
| Agreeableness | -0.06\*\* (0.02) | -0.14\*\*\* (0.02) | -0.11\*\*\* (0.03) | 0.01 (0.04) | -0.01 (0.04) | -0.13\*\*\* (0.03) | -0.12\*\*\* (0.04) | -0.09\* (0.04) |
| Neuroticism | -0.02 (0.02) | -0.04\* (0.02) | -0.06\*\* (0.03) | 0.07\*\* (0.03) | -0.03 (0.03) | -0.08\*\* (0.03) | -0.03 (0.03) | 0.00 (0.03) |
| Constant | 0.33\*\*\* (0.03) | 0.37\*\*\* (0.03) | 0.51\*\*\* (0.04) | 0.39\*\*\* (0.05) | 0.60\*\*\* (0.05) | 0.53\*\*\* (0.04) | 0.57\*\*\* (0.05) | 0.61\*\*\* (0.06) |
| adj. *R*2 | 2111 | 2111 | 792 | 688 | 631 | 792 | 688 | 631 |
| *n* | 0.456 | 0.432 | 0.281 | 0.071 | 0.020 | 0.170 | 0.067 | 0.227 |

*Note.* Entries are unstandardized OLS regression coefficients with robust standard errors (Models 1-2) and standard errors (Models 3-8) in parentheses. All variables range between 0 and 1 except for age, which is measured in years. “Liberals” are coded as reference category on ideological self-identification. \* p < .05, \*\* p < .01, \*\* p < .001, one-sided tests.

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1. The full codebook describing the literature search and coding of results is available from the authors. [↑](#footnote-ref-1)
2. The search on Google Scholar using the key words “behavioral immune system” + “immigration” + “disgust sensitivity” was concluded 19 November 2014. The search using the key words “immigration” + “disgust sensitivity” as key words was concluded 21 November 2014. [↑](#footnote-ref-2)
3. In Online Appendix A2.2 we provide analyses of robustness that also include the additional results in the investigation of the direct effect of behavioral immune sensitivity on opposition to immigration. In this extended population, N = 99. The findings support that our conclusions are robust. [↑](#footnote-ref-3)
4. N = 96 for this analysis because we do not have information about whether the effect was significant for 3 out of 99 results. [↑](#footnote-ref-4)
5. In Sample 4, this scale was embedded in two experimental conditions (see Test 2). We simply average across conditions for the purpose of Test 1. [↑](#footnote-ref-5)
6. Using the 2014 YouGov sample and each of the three scales measuring behavioral immune sensitivity, we can replicate the effect of individual differences in trait-level disgust sensitivity on opposition to immigration reported in Table 2 in the main text in Test 1. In this replication analysis we have controlled for gender, age, education, income, ideology and race, consistent with the analysis of the American representative Sample 1 in Test 1. [↑](#footnote-ref-6)
7. Using the self-reported contamination disgust measure from Sample 3, we observe a zero-order correlation with ideology of r =.15, *p* =0.173 (one-sided test), n = 42. Because of problems with reliability and low inter-item-correlations between the scale items in the self-reported instrument, caution should be made when interpreting the correlation. [↑](#footnote-ref-7)
8. The non-significant relationship between the physiological skin conductance measure of behavioral immune sensitivity and conservative ideological self-identification is consistent with the findings of Knoll, O’Daniel, and Cusato 2015 but contrary to the findings of Smith et al. 2011. Smith et al. (2011, 2) used a non-student sample consisting of “politically interested participants,” whereas Knoll, O’Daniel, and Cusato (2015, 3) used a relatively liberal student sample. In our small, relatively liberal Danish student Sample 3, no respondents identified as “extremely right-wing.” Hence, the use of a student sample with lower variation in conservative self-identification and absence of strong conservatives could explain the non-significant correlation between the physiological measure of behavioral immune sensitivity and conservative self-identification in Sample 3. [↑](#footnote-ref-8)
9. By mistake two respondents appear in a category “$150,000 or more,” which is inconsistent with the other consecutive income intervals on the scale. Because these two answers cannot be situated with sufficient precision in the other income intervals on the response scale, these two answers were therefore excluded. [↑](#footnote-ref-9)
10. These moderating effects replicate when ideological self-identification is coded on the full 7-point scale instead of the 3-point categorization used in Table A17. For ease of interpretation, we use the 3-point categorization of ideological self-placement in Table A17 and in the main text. [↑](#footnote-ref-10)