APPENDIX

Democracy and Depression:
A Cross-National Study of Depressive Symptoms and Non-Participation

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Table of Contents

Appendix A: Question Wording 3
- European Social Survey 3
- German GESIS Panel 5
- British Household Panel Study 6
- United States Qualtrics Study 7

Appendix B: The Physicality of Participation 10

Appendix C: The Measurement of Depressive Symptoms 12
- Self-Report vs. Diagnosed Depression 12
- Diagnosed Depression and the General Social Survey 12

Appendix D: Descriptive Statistics 15
- Table D.1: European Social Survey 15
- Table D.2: German GESIS Panel 15
- Table D.3: British Household Panel Study 16
- Table D.4: United States Qualtrics Survey 16

Appendix E: Full Output of Regression Models 17
- Table E.1: Voter Turnout Models 17
- Table E.2: Political Motivation Models 18
- Table E.3: Political Participation Models 19

Appendix F: Fixed Effects in the British Household Panel Study 20
Appendix G: Post-Treatment Bias and Alternative Model Specifications 21
Table G.1: Results from Reanalysis of ESS Models 21
Table G.2: Result from Reanalysis of GESIS, BHPS, and Qualtrics Models 22
Appendix H: Reanalysis of Political Motivation Index 23
Appendix I: Vote Validation and the 2019 American National Election Pilot Study 24
Appendix J: Predictions from the European Social Survey Models 26
Table J.1: Predicted Probability of Voting 26
Table J.2: Predicted Level of Political Motivation 26
Table J.3: Predicted Probability of Physical Acts 26
Table J.4: Predicted Probability of Non-Physical Acts 26

Appendix A: Question Wording

European Social Survey

Voter Turnout was measured by asking respondents "Some people don't vote nowadays for one reason or another. Did you vote in the last [country] national election in [month/year]?" Responses are coded so vote is 1 and abstention is 0.

Internal Efficacy was measured by asking respondents two questions. First, "How often does politics seem so complicated that you can't really understand what is going on?" Response options included never, seldom, occasionally, regularly, and frequently. Second, "How difficult or easy do you find it to make your mind up about political issues?" Response options included very difficult, difficult, neither difficult nor easy, easy, and very easy. Responses are coded so that higher values correspond to more efficacy.

Political Interest was measured by asking respondents "How interested would you say you are in politics—are you…?" Response options included very interested, quite interested, hardly interested, and not at all interested. Responses are coded so that higher values correspond to more interest.

Non-Voting Political Participation was measured by asking respondents "There are different ways of trying to improve things in [country] or help prevent things from going wrong. During the last 12 months, have you done any of the following? Have you…?" Responses are coded so participation is 1 and abstention is 0. The forms of participation asked about include

- Contacted a politician, government or local government official
- Worked in a political party or action group
- Worked in another organization or association
- Worn or displayed a campaign badge/sticker
- Signed a petition
- Taken part in a lawful public demonstration

Gender was measured by asking respondents about their sex with responses of male or female. Responses are coded so female is 1 and male is 0.

Age was measured by asking respondents to report their year and date of birth and then calculating their age at the time of the interview.

Education was measured by asking respondents "About how many years of education have you completed, whether full-time or part-time? Please report these in full-time equivalents and include compulsory years of schooling?" Responses that exceeded 25 years of schooling are coded as missing.

Income was measured by asking respondents "Using this card, if you add up the income from all sources, which letter describes your household's total net income? If you don't know the exact figure, please give an estimate. Use the part of the care that you know best: weekly, monthly, or

annual income." Responses were then recoded into 12 categories that are comparable across countries. Responses are further recoded for this analysis into 10 categories with the top three categories collapsed into one due to small sample sizes. Responses are coded so that higher values correspond to more income.

Health was measured by asking respondents "How is your health in general? Would you say it is very good, good, fair, bad, or very bad?" Response options include very good, good, fair, bad, or very bad. Responses are coded so higher values correspond to better health.

Religious Attendance was measured by asking respondents "Have you ever considered yourself as belonging to a particular religion or denomination?" Response options include yes or no. Responses are recoded so yes is 1 and no is 0.

Marital Status was measured by asking respondents "Could I ask about your current legal marital status? Which of the descriptions on this card applies to you?" Response options include married, in a civil partnership, separated (still legally married), separated (still in a civil partnership), divorced, widowed, formerly in a civil partnership (now dissolved), formerly in a civil partnership (partner died), and never married and never in civil partnership. Reponses are recoded so married and civil partnership are coded as 1 and all other responses are coded as 0.

Union Membership was measured by asking respondents "Are you or have you ever been a member of a trade union or similar organization?" Response options include yes (currently), yes (previously), and no. Responses are coded to capture whether a respondent has *ever* been in a union, with yes (currently) and yes (previously) coded as 1 and no coded as 0.

Underemployment was measured by asking respondents "Using this card, which of these descriptions applies to what you have been doing for the last 7 days?" Response options include paid work, education, unemployed (looking for job), unemployed (not looking for job), permanently sick or disabled, retired, community or military services, housework (looking after children, others), and other. Responses are coded so that unemployed (looking for job), unemployed (not looking for job), and permanently sick or disabled are coded as 1 and all other responses are coded as 0.

Disproportional Representation was measured as ratio comparing votes received by a party to legislative seats given to a party. As the ESS documentation notes, "a score of 1 means that on the seats level there is, on average, one (effective) party less than on the votes level. 'Absolute' refers to the calculation of the differences between the effective number of parties in elections and parliaments without taking the fractionalization of the party system into account. The more fractionalized a party system, the greater the likelihood – ceteris paribus – of high values of absolute disproportionality. The index is calculated as follows: Absolute disproportionality = Effective number of parties on the votes level / Effective number of parties on the seats level."

Income Inequality was measured using the Gini coefficient for each country as calculated by the OECD. Values range between 0 and 1, with higher values corresponding to greater income inequality.

GDP Per Capita was measured by taking the ratio of a country's GDP to their population size as calculated based on information from the United Nations Statistics Division and EUROSTAT.

Unemployment was measured as the percentage of persons in a country who were without work during the reference period, available for work at the time, and actively seeking work. This statistic is calculated by EUROSTAT.

German GESIS Panel

Voter Turnout was measured by asking respondents "In last parliamentary elections on 22 September 2013 you were able to cast two votes. Your first vote for a candidate from your electoral district, your second vote for a political party. How did you cast your two votes in the last parliamentary elections on September 22?" Responses are coded so vote is 1 and abstain is 0.

Internal Efficacy was measured by asking respondents how much they agreed or disagreed with two statements. First, "Politics is too complicated to understand what it is really about." Second, "I find it easy to form an opinion about political topics." Response options for both questions ranged on a 7-point scale form totally disagree to totally agree. Responses are coded so that higher values correspond to more efficacy.

Political Interest was measured by asking respondents "How interested are you in politics?" Response options included very strong, strong, moderately, little, and not at all. Responses are coded so that higher values correspond to more interest.

Gender was measured by asking respondents about their sex with responses of male or female. Responses are coded so female is 1 and male is 0.

Age was measured by asking respondents to report their year and date of birth and then calculating their age at the time of the interview.

Education was measured by asking respondents "What is your highest general degree of education?" Response options include student, left school without degree, degree after 7 years of school attendance at most (abroad), polytechnic secondary school GDR (degree 8th or 9th grade), polytechnic secondary school GDR (degree 10th grade), lower secondary school, secondary school, advanced technical college certificate, general qualification for university entrance, and other degree. Responses are coded into three categories that corresponding to currently in school or lower-level degree, technical degree, and collegiate degree, with higher values corresponding to more education

Income was measured by asking respondents "And how high is the average net income of your household, meaning the sum of all net incomes and social security/welfare benefits of people living inside your household?" Response options include 10 categories that correspond to numerical values of Euros.

Health was measured by asking respondents "How would you rate your overall health?" Response options include very good, good, bad, and very bad. Responses are coded so higher values correspond to better health.

Religious Attendance was measured by asking respondents "During the last 12 months, how often did you participate in the following federations, associations, clubs, and organizations…church or religious organization?" Response options include never, rarely, sometimes, and often. Responses are coded so that higher values correspond to more attendance.

Marital Status was measured by asking respondents "What is your marital status?" Response options include single, married (living together), married (living apart), divorced, widowed. Reponses are recoded so married (living together or apart) is 1 and all other responses are 0.

Union Membership was measured by asking respondents "During the last 12 months, how often did you participate in the following federations, associations, clubs, and organizations…labor union?" Response options include never, rarely, sometimes, and often. Responses are coded so that higher values correspond to more participation.

Underemployment was measured by asking respondents "Which employment situation fits you?" Response options include full-time employed, part-time employed, partial retirement (no longer at work), slightly employed (450 euro job or mini-job), one-euro-job (with purchase of unemployment benefit II), occasional or irregular activity, in a vocational training or apprenticeship, in retraining, volunteer social year or volunteer ecological year, maternity, parental or other leave of absence, and not employed. Respondents who report slight employment, one-euro-jobs, and irregular activity are coded as 1 and all other responses are coded as 0.

East German status was measured by asking respondents "In which federal state do you live?" Response options include west and east (including west Berlin). Residence in east Germany is coded as 1 and residence in west Germany is coded as 0.

British Household Panel Study

Voter Turnout was measured by asking respondents "Did you vote in the [DATE] UK general election?" Responses are coded so vote is 1 and abstain is 0.

Political Interest was measured by asking respondents "How interested would you say you are in politics? Would you say you are…" Response options include very interested, fairly interested, not very interested, not at all interested. Responses are coded so higher values correspond to more interest.

Gender was measured by asking respondents about their sex with responses of male or female. Responses are coded so female is 1 and male is 0.

Age was measured by asking respondents to report their year and date of birth and then calculating their age at the time of the interview.

Education was measured using a derived variable from a series of questions that ask respondents about their educational background. Responses from these questions are coded by BHPS researchers into a final set of categories that include higher degree, first degree, teaching QF, other higher QF, nursing QF, GCE A levels, GCE O levels or equivalent, commercial QF (no O), CSE grade 2-5 (scot G), apprenticeship, other QF, no QF, and still at school (no QG). Responses are coded so higher values correspond to more education.

Income was measured using a derived variable from a series of questions that ask respondents about their income. The responses are coded in terms of the logged pound value of the household's total income.

Health was measured by asking respondents "Please think back over the last 12 months about how your health has been. Compared to people of your own age, would you say that your health has been on the whole been…" Response options include excellent, good, fair, poor, or very poor. Responses are coded so higher values correspond to better health.

Religious Attendance was measured by asking respondents "How often, if at all, do you attend religious services or meetings?" Response options include once a week or more, at least once a month, at least once a year, and practically never. Responses are coded so higher values correspond to more attendance.

Marital Status was measured by asking respondents "What is your legal marital status?" Response options include married, separated, divorced, widowed, and never married. Reponses are recoded so married is 1 and all other responses are 0.

Union Membership was measured by asking respondents "Are you a member of this trade union/association?" The "this trade union/association" is a reference to an earlier question in which respondents were asked whether there was a trade union/association at their place of employment which they could potentially join. Response options include yes and no. Responses are coded so that yes is 1 and no is 0.

Underemployment was measured by asking respondents "Did you do any paid work last week that is in the seven days ending last Sunday either as an employee or self-employed?" Response options include yes and no. Responses are coded so that yes is 1 and no is 0.

United States Qualtrics Study

Voter Turnout was measured by asking respondents "In talking to people about elections, we often find that a lot of people were not able to vote because they weren't registered, they were sick, or they just didn't have time. Which of the following statements best describes you? I did not vote; I thought about voting this time, but didn't; I usually vote, but didn't this time; or I am sure I voted." Responses are coded so vote is 1 and abstain is 0.

Internal Efficacy was measured by asking respondents how much they agreed or disagreed with two statements. First, "Politics is so complicated that it is often difficult to understand what is

going on." Second, "I often find it difficult to make up my mind on political issues." Response options included strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, and strongly agree. Responses are coded so that higher values correspond to more efficacy.

Political Interest was measured by asking respondents "How interested would you say you are in politics? Would you say you are…" Response options include very interested, fairly interested, not very interested, not at all interested. Responses are coded so higher values correspond to more interest.

Gender was measured by asking respondents "What is your gender?" Response options include male, female, and other (text). Responses are coded so female is 1 and male is 0.

Age was measured by asking respondents to report their age at the time of the interview.

Education was measured by asking respondents "What is the highest level of school you have completed or the highest degree you have received?" Response options include less than high school degree, high school graduate (high school diploma or equivalent including GED), some college but no degree, associate degree in college (2-year), bachelor's degree in college (4-year), Master's degree, Doctoral degree, Professional degree (JD, MD). Responses are coded so higher values correspond to more education.

Income was measured by asking respondents "Information about income is very important to understand. Would you please give your best guess? Please indicate the answer that includes your entire household income in (previous year) before taxes." Response options include 13 categories ranging from less than $10,000 to $200,000 or more.

Religious Attendance was measured by asking respondents "How frequently do you attend religious service?" Response options include never, a couple times a year, once a month, once a week, and a couple times a week. Responses are coded so higher values correspond to more attendance.

Marital Status was measured by asking respondents "Are you now married, widowed, divorced, separated, or never married?" Response options include married, separated, divorced, widowed, and never married. Reponses are recoded so married is 1 and all other responses are 0.

Underemployment was measured by asking respondents "Which statement best describes your current employment status?" Response options include working (paid employee), working (self-employed), not working (disabled), not working (temporary layoff from a job), not working (looking for work), not working (retired), and not working (other). Responses are coded so that not working (disabled, temporary layoff, looking for work, and other) is 1 and the other responses are 0.

Black was measured by asking respondents "Choose one or more races that you consider yourself to be." Response options include White, Asian, Black or African American, Native

Hawaiian or Pacific Islander, American Indian or Alaska Native, and other (text). Responses are coded so Black or African American is 1 and all other responses are 0.

Hispanic was measured by asking respondents "Do you identify as Hispanic or Latino?" Response options include yes and no. Responses are coded so that yes is 1 and no is 0.

Appendix B: The Physicality of Participation

In their landmark book *Voice and Equality*, Verba, Schlozman, and Brady (1995) put forth the Civic Voluntarism Model. One aspect of this model is the idea that some citizens do not participate because they lack the *resources* to do so. A lack of resources compares to other reasons for abstention, such as a lack of motivation, a lack of recruitment/mobilization, and a lack of legal standing. In what is now commonly referred to as the resource model of participation, time, money, and civic skills are seen as resources required for participation. It takes time to vote, money to donate to a candidate, and civic skills to work for a campaign.

We expand the resources model by arguing that physical energy is a fourth resource required for many forms of participation. Henry Brady defines political participation as "*action* by *ordinary citizens* directed toward *influencing* some *political outcomes*" (1993, p. 737). Action is central to the idea that participation requires physicality. Brady goes on to write, "the first element, an *action*, is something that a person does. It is not just thoughts or tendencies…similarly approving of a political activity or being willing to do it are not the same as actually doing it" (p. 737). Actions always requires physical exertion on the part of the person undertaking the act. Voting requires citizens to *go* to a poll, working for any organization requires citizens to *attend* political events or meetings at the group's office, and attending a demonstration requires citizens to *leave their home and take to the streets*. These acts cannot be completed without physical exertion.

A small body of research on physical disabilities supports the idea that participation demands physicality. This work finds that disabled citizens are generally less participatory than their able-bodied counterparts, in part because participation is geared towards able-bodied citizens and thus physical demands increase the cost of action for citizens with disabilities. In their article "Enabling Democracy: Disability and Voter Turnout," Schur, Shields, Kruse, and Schriner write "many disabilities limit people's physical or mental resources, often requiring that extra time, effort, and money be spent to compensate for the limitations. Securing adequate transportation can be difficult, time-consuming, and expensive, and architectural barriers can make it harder for people with disabilities to participate in public life" (2002, p. 169). Psychosomatic problems are common symptoms of citizens who experience feelings of depression: restless sleep, dietary changes, fatigue, heaviness of arms and legs, feeling like everything is an effort, and so forth. These symptoms may, as is the case of citizens with disabilities, make participation more difficult and thus raise the cost of action.

We test this hypothesis by leveraging variation in which forms of participation require high levels of physicality and which forms of participation can be undertaken with low levels of physicality. Just as Verba, Scholzman, and Brady (1995) argued that different forms of participation require different resources in the form of time, money, and civic skills, we argue that there is variation in which acts require physical resources. Our distinguishing metric for physicality is whether an act requires citizens to leave their homes. Working for a political group, demonstrating, and voting typically requires citizens to leave home. Most work for electoral organizations involves canvassing, delivering flyers, or phone banking, which cannot traditionally be done from home (although the rise of the internet and digital technology appears to be change this fact). For other organizations, participation may come in the form of physically attending a meeting or event. Voting likewise requires citizens to go to the polls; although postal

voting is becoming more popular, most countries in Europe and most places in the United States do not have this option available for citizens.

In contrast, contacting a politician, displaying campaign gear, and signing a petition could be done from home. Petitions can be signed online or when a canvasser comes to the door, officials can be contacted using form emails, dropping a letter in the mailbox, or on the phone. Campaign badges can be easily received via mail. Although these activities can involve physicality (e.g., driving to a campaign's headquarters to get campaign gear), it is generally possible for all citizens to undertake these activities from their home. That is, a high level of physicality is not a prerequisite for these acts, at least not to the extent it is for voting, demonstrating, and working for a political group.

Some evidence of this division is reflected in the literature on disability. For instance, Schur and Adya (2013) find that citizens with a disability are just as likely to join an internet group, but substantially less likely to attend a meeting, march in a demonstration, or vote than are citizens without disabilities. They find mixed evidence about contacting an official, with one study showing now difference and another study finding one.

Although a factor analysis does not reveal two "factors" that reflect the physical and non-physical categorization of these political acts, research in political behavior has long divided participation into categories on the basis of theory and content validity rather than statistics and data reduction techniques. Some recent examples include Mattila (2020) dividing behaviors into institutional and non-institutional or Dalton (2008) dividing behaviors into acts of political engagement (e.g., voting) and acts of social order (e.g., serving on a jury). We thus do not see the lack of statistical justification as prohibitive of drawing on this division, especially given the theoretical foundations for doing so based on the resource model and disability literature.

In keeping with the resource model of participation, research on disability, and broader scholarship on political behavior, we believe our distinction of physical and non-physical has content validity and ultimately proves useful in illuminating our understanding of how depression shapes political participation.

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Appendix C: The Measurement of Depressive Symptoms

To measure depression, respondents are asked how often they felt a particular symptom in a particular time period, with options typically ranging from none or almost none of the time to all or almost all of the time. The exact symptoms measured are reported in the main text. There are some variations in measurement across studies—such as the time frame of the symptoms (week, month, recently), the number of questions asked, and the exact question wording—but the scales are similar insofar as each includes at least one question about the four clusters of depressive symptoms—absence of positive feelings, presence of negative feelings, interpersonal problems, and psychosomatic problems—which provides strong construct validity. The scales also exhibit strong reliability, with the average Cronbach alpha scores across waves of study ranging from a low of 0.82 in the ESS to a high of 0.94 in the Qualtrics survey.

Self-Report vs. Diagnosed Depression

One concern with using a self-report measure of depressive symptoms is that respondents will interpret questions differently. This problem—in which survey respondents with the same objective health status interpret the question differently and therefore offer different assessments of their health— is well-document for self-rated health status (Layes et al. 2012), which is the most widely used single-item indicator of health (Jylhä 2009) and is known to reliably predict a multitude of physical, mental, and behavioral health factors (Fylkesnes and Ford 1992; Mavaddat et al. 2011). Adjusting for interpersonal incomparability reveals that optimism about one's own health—rather than health itself—predicts voter turnout (Pacheco 2019). Fortunately, our inventories for measuring depression are not ridden by this problem. Depression can *only* be diagnosed on the basis of self-reported symptoms, unlike physical conditions which are often diagnosed with objective metrics (e.g., blood pressure). Moreover, the depression inventories in our studies are derived from clinical diagnostic criteria and ask about specific *symptoms* (e.g., restless sleep) rather than a global evaluation of health.

The self-reported symptoms approach also offers advantages by capturing subclinical feelings and by minimizing bias in assessments. Diagnoses of depression are known to be substantially underestimated for men (Bertakis et al. 2001), people of color (Stockdale et al. 2008), and more educated citizens (Callahan et al. 1997). Underreporting of symptoms still occurs on surveys when the purpose of measurement is overt in a questionnaire (e.g., by labeling a question battery respectively), although this problem can be minimized by making the purpose covert (e.g., by labeling the battery instead "life stress inventory") (Hunt et al. 2003). The contexts of our surveys are political and sociological rather than clinical, making our purposes covert and likely minimizing underreporting. Moreover, to the extent underreporting still occurs, it is likely to *underestimate* the effect of depressive symptoms in our models.

Diagnosed Depression and the General Social Survey

Although we see few advantages in using a diagnostic measure compared to self-reported symptoms, we nevertheless report a descriptive analysis of the General Social Survey that shows a turnout been those with and without a self-reported lifetime diagnosis. We use the 2014 and

2018 waves to show that there is a statistically significant and negative association between poor mental health and voter turnout when using a measure of diagnosed depression rather than a measure of depressive symptoms.

Voter turnout is measured by asking respondents about whether they voted in the 2008, 2012, and 2016 elections. Respondents are asked about the 2008 and 2012 elections in the 2014 GSS and about the 2012 and 2016 elections in the 2018 GSS. We construct a variable indicating whether a respondent voted in both of the elections or not (i.e., did not vote or only voted in 1 election). About 68% of respondents report voting in both elections. The decision for coding turnout this way will become clearer once we describe the measure of depression.

Diagnosed depression is measured by asking respondents whether they have ever been told they have depression by a healthcare professional. This measure captures "lifetime incidence" of depression because it asks respondents to report on whether they have ever—at any point in their life—had depression, rather than asking respondents to report on whether they have been diagnosed with depression in the past 12 months. About 16% of respondents report a depression diagnosis. Importantly, because we cannot pinpoint the exact moment in time that a respondent received a depression diagnosis, we cannot be sure whether it preceded or followed a particular election. For this reason, we opt to analyze cumulative turnout rather than turnout in any particular election.

The table below shows a cross-tabulation of turnout and depression and affirms the results of the main text: individuals who have received a depression diagnosis are less likely to report having voted in both elections than individuals who have not received such a diagnosis. More precisely, turnout was about 6.8 percentage points greater among those without a depression diagnosis than those with such a diagnosis.

	Voted in 0-1 elections	**Voted in both elections**	*Total*
NO depression diagnosis	35.3%	64.7%	100.0%
Depression diagnosis	42.1%	57.9%	100.0%

A multivariate analysis of the relationship between diagnosed depression and turnout affirms the results seen from the cross-tabulation. A logistic regression produces a coefficient for depression diagnosis of -0.243 (se = 0.144, $p < 0.10$) after controlling for gender, age, race, and education.

The findings suggest that the results we report in the main text are not simply a function of how we use depression. One potential problem with perceived depression symptoms is that individuals may have different standards for reporting them and that those standards may not reflect how healthcare professionals would evaluate such symptoms. However, the results here suggest that this is not in fact a problem as depression diagnoses from healthcare professionals *are* associated with voter turnout.

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Appendix D: Descriptive Statistics

Table D.1: European Social Survey

Variable	Mean	SD	Min	Max
Vote	0.76	0.43	0	1
Depressive Symptoms	1.75	0.46	1	4
Internal Efficacy #1	0.47	0.29	0	1
Internal Efficacy #2	0.48	0.26	0	1
Political Interest	0.45	0.30	0	1
Gender	0.52	0.50	0	1
Age	45.82	18.64	14	103
Education	12.20	3.86	0	25
Income	5.65	2.79	1	10
Health	2.22	0.93	1	5
Religious Attendance	0.62	0.49	0	1
Married	0.54	0.50	0	1
Union Membership	0.41	0.49	0	1
Unemployment	0.06	0.25	0	1
Disproportional Representation	0.94	0.63	0.12	2.89
GDP per capita	30.95	19.87	2.30	100.06
Income inequality	2.90	0.37	2.26	3.77
Unemployment (country)	0.42	0.61	0.00	2.56

Table D.2: German GESIS Panel

Variable	Mean	SD	Min	Max
Vote	0.86	0.34	0	1
Depressive Symptoms	2.70	0.77	1	6
Internal Efficacy #1	0.56	0.30	0	1
Internal Efficacy #2	0.57	0.28	0	1
Political Interest	0.53	0.23	0	1
Gender	0.51	0.50	0	1
Age	46.47	14.70	20	72
Education	1.26	0.77	0	2
Income	5.19	2.07	1	9
Health	3.67	0.85	1	5
Religious Attendance	1.56	0.94	1	4

Marital Status	0.61	0.49	0	1
Union Membership	1.21	0.60	1	4
Unemployment	0.08	0.26	0	1
East German	0.19	0.39	0	1

Table D.3: British Household Panel Study

Variable	Mean	SD	Min	Max
Vote	0.74	0.44	0	1
Depressive Symptoms	1.93	0.45	1	4
Political Interest	0.42	0.30	0	1
Gender	0.54	0.50	0	1
Age	45.21	18.63	15	99
Education	7.01	3.50	1	13
Income (logged)	6.62	1.06	0	11.17
Health	3.82	0.96	1	5
Religious attendance	2.32	1.40	1	5
Marital status	0.54	0.50	0	1
Union membership	0.13	0.34	0	1
Unemployment	0.60	0.49	0	1

Table D.4: United States Qualtrics Survey

Variable	Mean	SD	Min	Max
Vote	0.65	0.48	0	1
Depressive Symptoms	1.83	0.65	1	3.85
Internal Efficacy #1	0.43	0.31	0	1
Internal Efficacy #2	0.58	0.33	0	1
Political Interest	0.61	0.34	0	1
Gender	0.53	0.50	0	1
Age	47.42	17.20	18	88
Education	4.16	1.57	1	7
Income	7.29	3.61	1	13
Religious attendance	2.35	1.38	1	5
Marital Status	0.52	0.50	0	1
Unemployment	0.19	0.39	0	1
Black	0.12	0.32	0	1
Hispanic	0.18	0.38	0	1

Appendix E: Full Output of Regression Models

Table E.1: Voter Turnout Models

	ESS	GESIS	BHPS	Qualtrics
Depressive Symptoms	-0.325* (.031)	-0.275* (.095)	-0.154* (.048)	-0.226 (.127)
Gender	0.012 (.026)	-0.228 (.145)	0.033 (.052)	-0.287 (.151)
Age	0.032* (.001)	0.028* (.006)	0.069* (.002)	0.045* (.005)
Education	0.097* (.004)	0.549* (.107)	0.137* (.008)	0.194* (.054)
Income	0.071* (.006)	0.185* (.043)	0.006 (.027)	0.049 (.026)
Health	-0.072* (.017)	-0.014 (.089)	0.076* (.025)	
Religious Attendance	0.213* (.029)	0.107 (.085)	0.227* (.017)	0.078 (.055)
Married	0.387* (.028)	0.372* (.167)	0.772* (.048)	0.107 (.166)
Union Membership	0.274* (.029)	0.207 (.135)	0.631* (.065)	
Un/Underemployment	-0.231* (.052)	0.139 (.283)	-0.120 (.065)	-0.111 (.195)
East German		-0.273 (.168)		
Black				0.104 (.236)
Hispanic				-0.264 (.195)
Disproportional Representation	-0.054 (.091)			
GDP Per Capita	0.033* (.006)			
Income Inequality	0.582* (.140)			
Unemployment	0.098 (.069)			
Election	-0.199* (.044)		-4.081* (.333)	
Wave			0.729* (.072)	
Constant	-3.311* (.562)	-0.456 (.651)	0.769* (.294)	-2.161* (.511)
Observations	53,314	2,203	37,400	1,014
Groups	-	-	20,388	-

Note: * $p < 0.05$

Table E.2: Political Motivation Models

	ESS	GESIS	BHPS	Qualtrics
Depressive Symptoms	-0.035* (.004)	-0.020* (.005)	-0.041 (.029)	-0.033* (.013)
Gender	-0.084* (.003)	-0.107* (.007)	-1.119 (.043)	-0.055* (.015)
Age	0.002* (.0001)	0.003* (.0003)	0.047* (.001)	0.002* (.0005)
Education	0.016* (.0004)	0.065* (.005)	0.243 (.006)	0.011* (.005)
Income	0.009* (.001)	0.007* (.002)	0.019 (.016)	0.005* (.003)
Health	-0.007* (.002)	0.005 (.005)	0.026 (.015)	
Religious Attendance	-0.0002 (.003)	0.003 (.004)		-0.024* (.005)
Married	-0.001 (.003)	-0.013 (.008)	0.153* (.034)	0.010 (.016)
Union Membership	0.018* (.003)	0.033* (.006)	0.124 (.042)	
Un/Underemployment	-0.007 (.007)	0.012 (.014)	-0.202* (.040)	0.028 (.020)
East German		-0.020* (.009)		
Black				0.032 (.024)
Hispanic				-0.026 (.019)
Disproportional Representation	-0.070* (.007)			
GDP Per Capita	-0.001* (.0003)			
Income Inequality	0.278* (.053)			
Unemployment	-0.481* (.111)			
Election			0.794* (.077)	
Wave			-0.287* (.017)	
Constant	-0.297* (.120)	0.330* (.033)		0.496* (.051)
Observations	25,405	2,514	65,539	1,014
Groups	-	-	23,352	-

Note: * $p < 0.05$

Table E.3: Political Participation Models

	Physical Acts	Non-Physical Acts
Depressive Symptoms	-0.106*	-0.016
	(.012)	(.023)
Gender	-0.067*	0.239
	(.009)	(.017)
Age	0.010*	-0.005*
	(.0003)	(.001)
Education	0.051*	0.082*
	(.001)	(.002)
Income	0.024*	0.039*
	(.002)	(.004)
Health	-0.010	0.014
	(.006)	(.012)
Religious Attendance	0.074*	0.051*
	(.010)	(.018)
Married	0.112*	0.033
	(.010)	(.019)
Union Membership	0.218*	0.346*
	(.010)	(.020)
Un/Underemployment	-0.094*	-0.023
	(.024)	(.042)
Disproportional Representation	0.021	0.041
	(.036)	(.084)
GDP Per Capita	0.012*	0.015*
	(.002)	(.004)
Income Inequality	0.154*	0.026
	(.045)	(.094)
Unemployment	-0.079*	-0.219*
	(.024)	(.048)
Election	-0.076*	-0.172*
	(.016)	(.033)
Constant	-3.044*	-3.507*
	(.188)	(.431)
Observations	56,942	56,891

Note: * $p < 0.05$

Appendix F: Fixed Effects in the British Household Panel Study

Here we estimate individual-level fixed effects models for the British Household Panel Study. The results of the voter turnout model reveal a negative and statistically significant effect of depressive symptoms, which is consistent with the individual-level random effects model in the main text. The results of the political motivation model reveal a negative but not statistically significant effect of depressive symptoms, which is also consistent with the individual-level random effects model reported in the main text. We would note that while the coefficient in the political motivation model does not reach a conventional level of significance ($p < 0.50$), it falls just shy in both the fixed effects ($p = 0.79$) and random effects ($p = 0.155$) models.

	Voter Turnout	**Political Motivation**
Depressive Symptoms	-0.116* (.041)	-0.004 (.003)
Age	-0.066 (.056)	-0.006* (.003)
Education	0.013 (.017)	0.002 (.001)
Income	0.024 (.025)	0.002 (.001)
Health	0.022 (.022)	0.0002 (.001)
Married	0.623* (.059)	0.012* (.004)
Union Membership	0.151* (.065)	0.002 (.004)
Un/Underemployment	-0.097 (.064)	-0.014* (.004)
Election	0.176 (.010)	0.062* (.006)
Wave	-0.067 (.059)	-0.012* (.003)
Constant		0.622* (0.103)
Observations	24,896	65,539
Groups	5,250	23,352

* Note: $p < 0.05$

Notably, the fixed effects models here exclude control variables for gender and religious attendance. Gender is excluded because it lacks any intra-individual variation, while religious attendance is excluded from the voter turnout model because it has only minimal intra-individual variation (thus drastically reducing the sample size of the model) and from the political motivation model because there is insufficient overlap in questions about political interest and religious attendance across waves of data collections.

Appendix G: Post-Treatment Bias and Alternative Model Specifications

One concern with the selection of control variables is that income, health, and unemployment are both a cause and consequence of depressive symptoms. Including them in models of political behavior therefore introduces post-treatment bias, while excluding them introduces omitted variable bias. Unfortunately, there is no good statistical fix for this problem. Since our concern about post-treatment bias is primarily that it may *reduce* the size of the depressive symptoms coefficient because of potential mediating effects (rather than increase the size of the coefficient through suppressor effects), we include them in the models reported in the main text, but with a caveat that our estimates may be conservative. Here, we report models that exclude these variables and find that the estimated effect of depressive symptoms is largely unchanged.

Table G.1 presented the estimated coefficients, standard error, and statistical significance of depressive symptoms on turnout, political motivation, physical participation, and non-physical participation in the ESS models. These models include all the control variables reported in the main text, although we suppress their output below for the purposes of summarizing the key results. A star (*) indicates significance at the level of $p < 0.05$, while a dagger (†) indicates significance at the level of $p < 0.10$.

Table G.1: Results from Reanalysis of ESS Models

	Turnout	**Political Motivation**	**Physical Participation**	**Non-Physical Participation**
No exclusion (i.e., results from text)	-0.325* (.031)	-0.026* (.003)	-0.106* (.012)	-0.016 (.023)
Excludes income, health, and unemployment	-0.408* (.024)	-0.035* (.002)	-0.109* (.010)	-0.006 (.019)
Includes income	-0.380* (.028)	-0.030* (.003)	-0.116* (.011)	-0.006 (.021)
Includes health	-0.352* (.026)	-0.030* (.003)	-0.096* (.011)	-0.008 (.021)
Includes unemployment	-0.393* (.024)	-0.034* (.002)	-0.105* (.010)	-0.002 (.019)

The results from the ESS models suggest that the estimated effect of depressive symptoms on turnout, political motivation, physical participation, or non-physical participation is unaffected by the inclusion or exclusion of control variables for income, health, or unemployment. In the cases of turnout and political motivation, the coefficient for depressive symptoms is smallest in the "no exclusion" model, which indicates that, if anything, including controls for income, health, and unemployment leads to a smaller (not larger) effect. In the case of physical and non-physical participation, the coefficient for depressive symptoms is sometimes larger in the "no exclusion" model than elsewhere, but the substantive results are not changed in any way.

Table G.2: Result from Reanalysis of GESIS, BHPS, and Qualtrics Models

	Turnout			*Political Motivation*		
	GESIS	**BHPS**	**Qualtrics**	**GESIS**	**BHPS**	**Qualtrics**
No exclusion (i.e., results from text)	-0.275* (.095)	-0.154* (.048)	-0.226 † (.127)	-0.020* (.005)	-0.003 (.002)	-0.033* (.013)
Excludes income, health, and unemployment	-0.319* (.076)	-0.200* (.044)	-0.272* (.125)	-0.018* (.004)	-0.004† (.002)	-0.035* (.013)
Includes income	-0.290* (.085)	-0.196* (.045)	-0.233† (.127)	-0.021* (.005)	-0.004† (.002)	-0.031* (.013)
Includes health	-0.297* (.083)	-0.152* (.047)	-	-0.015* (.005)	-0.003 (.002)	-
Includes unemployment	-0.312* (.079)	-0.206* (.044)	-0.255* (.126)	-0.019* (.004)	-0.005* (.002)	-0.036* (.013)

Table G.2 reports the same results as Table G.1 but with the GESIS, BHPS, and Qualtrics data. Like the ESS, the results from this reanalysis suggest that the estimated effects of depressive symptoms on turnout and political motivation are essentially unchanged between the inclusion and exclusion of control variables for income, health, and unemployment. The instances of biggest change can be seen in the Qualtrics turnout model and the BHPS political motivation model. The effect of depressive symptoms in many of these models becomes statistically significant at either the level of $p < 0.05$ or $p < 0.10$ under different specifications than what is reported in the main text (the "no exclusion") model, suggesting that those results are, if anything, weakened (not strengthened) by post-treatment bias.

Appendix H: Reanalysis of Political Motivation Index

The GESIS and BHPS models of political motivation reported in the main text focus on election years or post-election years as opposed to all waves of study. Since our goal in the paper was to examine the possibility that depressive symptoms reduce turnout via a reduction in political interest, focusing on election years seemed most relevant. Here we report the results of models that draw on all waves of data. The results are similar albeit slightly weaker. In the GESIS, the estimated effect is smaller (but still statistically significant) compared to what is reported in the main tex. In the BHPS, the estimated coefficient is smaller and still not statistically significant. These findings suggest that depressive symptoms have a stronger effect on political motivation in election and post-election years than non-election years.

	GESIS	**BHPS**
Depressive Symptoms	-0.011*	-0.001
	(.003)	(.002)
Gender	-0.115*	-0.093*
	(.006)	(.003)
Age	0.003*	0.004*
	(.0002)	(.0001)
Education	0.055*	0.017*
	(.004)	(.0004)
Income	0.006*	0.001
	(.001)	(.001)
Health	0.002	0.002*
	(.004)	(.001)
Religious Attendance	0.007*	
	(.002)	
Married	-0.006	0.015*
	(.006)	(.002)
Union Membership	0.019*	0.005*
	(.004)	(.002)
Un/Underemployment	0.004	-0.013*
	(.008)	(.002)
East German	-0.015*	
	(.007)	
Election		0.012*
		(.002)
Wave	-0.004*	-0.010*
	(.002)	(.0004)
Constant	0.360*	0.246*
	(.024)	(.008)
Observations	7,289	126,114
Groups	3,130	25,540

Appendix I: Vote Validation and the 2019 American National Election Pilot Study

Research has found that the overreporting of turnout on surveys can compromise estimates of the correlates of participation (Ansolabehere and Hersch 2012), with the factors that predict overreporting appearing incorrectly strong in their correlation with turnout (Bernstein et al. 2001). While we do not have strong reasons to suspect that depressive symptoms lead to overreporting of turnout, we nonetheless report analyses of the 2019 American National Election Pilot Study that show *validated* turnout is lower among those with mental health problems. This finding is imperfect due to differences in the measurement of mental health, but offers some evidence that the results we report below are not overstated by the overreporting of turnout, although this remains a distinct possibility.

Validated turnout is based on data provided to the ANES from the company TargetSmart. TargetSmart validated turnout in the 2018 midterm election for 1,578 respondents in the 2019 ANES Pilot. We code the remaining respondents as having abstained, although it is possible that some of these "abstainers" voted and TargetSmart was simply unable to validate their turnout. However, we have no reason to believe that TargetSmart can validate turnout better or worse for people with mental health problems compared to those without mental health problems. So, while the overall levels of turnout may be incorrect because of this problems, we don't believe that differences in turnout based on mental health will be affected by such a problem.

Mental health is measured by asking respondents "Which of the following health conditions do you have…serious difficulty concentrating, remembering, or making decisions due to a physical, mental, or emotional condition." About 11.4% reported having such a condition. Although this question does not focus exclusively on mental health problems nor specifically on depression, it is the best assessment of mental health that we could find in a study that also includes measures of validated turnout. As a result, we see these analyses as suggestive—rather than demonstrative—that the depression-turnout gap is not an artifact of overreported voter turnout.

The table below shows the average level of *validated* turnout across years and election types for those with and without mental health conditions. The results reveal a large difference in turnout among those reporting a mental health condition and those who do not. For instance, whereas nearly 50% of those without a mental health condition voted in the 2018 midterm election, only 39% of those who report a mental health condition did. A remarkably similar difference in turnout—ranging from a low of 8.7 percentage points to a high of 14.4 percentage points—is observed across election and years. A t-test indicates that these differences are statistically significant at the level of $p < 0.05$.

Voter Turnout	**Did NOT Report a Condition**	**Reported a Condition**	**Difference**
2012 General Election	51.5%	38.4%	13.1
2016 General Election	55.6%	42.5%	13.1
2018 General Election	49.7%	38.7%	11.0
2012 Primary Election	23.3%	14.6%	8.7

2016 Primary Election	31.5%	17.1%	14.4
2018 Primary Election	30.6%	20.7%	9.9

If overreporting of voting is accentuated among people with good mental health—thus raising the prospect that the association between mental health and turnout is simply a function of measurement error—then we would not expect to see a difference in *validated* turnout between those with and without mental health problems. However, the results here show large and statistically significant differences. We find that the association between mental health and voting is observed even when using a validated measure of turnout, thus mitigating concerns that the results we report in the main text are an artifact of overreported turnout.

References

Ansolabehere, S., & Hersh, E. (2012). Validation: What Big Data Reveal About Survey Misreporting and the Real Electorate. Political Analysis, 20(4), 437–459.

Bernstein, R., Chadha, A., & Montjoy, R. (2001). Overreporting voting: why it happens and why it matters. Public Opinion Quarterly, 65(1), 22–44.

Appendix J: Predictions from the European Social Survey Models

Table J.1: Predicted Probability of Voting

	Minimum	Predicted Probability	Maximum	Predicted Probability	Absolute Difference
Depressive Symptoms	1	0.856	4	0.692	0.164
Age	18	0.637	100	0.960	0.323
Education	0	0.584	25	0.941	0.357
Income	0	0.756	10	0.863	0.107
Health	1	0.837	5	0.794	0.043
Religious Attendance	0	0.807	10	0.838	0.031
Marital Status	0	0.790	1	0.847	0.057
Union Membership	0	0.805	1	0.845	0.040
Unemployment Status	0	0.827	1	0.791	0.036

Table J.2: Predicted Level of Political Motivation

	Minimum	Predicted Level	Maximum	Predicted Level	Absolute Difference
Depressive Symptoms	1	0.510	4	0.405	0.105
Female	0	0.527	1	0.443	0.084
Age	18	0.430	100	0.586	0.156
Education	0	0.283	25	0.694	0.411
Income	0	0.427	10	0.516	0.089
Health	1	0.493	5	0.465	0.028
Union Membership	0	0.476	1	0.494	0.018

Table J.3: Predicted Probability of Physical Acts

	Minimum	Predicted Level	Maximum	Predicted Level	Absolute Difference
Depressive Symptoms	1	0.259	4	0.203	0.056
Female	0	0.251	1	0.239	0.012
Age	18	0.195	100	0.354	0.159
Education	0	0.147	25	0.382	0.235
Income	0	0.219	10	0.264	0.045
Religious Attendance	1	0.237	5	0.251	0.014
Marital Status	0	0.234	1	0.254	0.020
Union Membership	0	0.227	1	0.267	0.040
Unemployment	0	0.246	1	0.229	0.017

Table J.4: Predicted Probability of Non-Physical Acts

	Minimum	Predicted Level	Maximum	Predicted Level	Absolute Difference
Depressive Symptoms	1	0.136	4	0.130	0.006
Age	18	0.152	100	0.108	0.044

Education	0	0.053	25	0.304	0.251
Income	0	0.110	10	0.154	0.044
Religious Attendance	1	0.131	5	0.137	0.006
Union Membership	0	0.117	1	0.158	0.041