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Bridging the Divide: Does Social Capital Moderate the Impact of Polarization on Health?

Costas Panagopoulos[1], Timothy Fraser[1], Daniel P. Aldrich[1], Daniel Kim[2], and David Hummel[3]

Abstract

Rising partisan polarization in the American public over the last decade has been linked to stress and anxiety, raising questions about how communities and public health experts should respond. As the strength of an individual's social network correlates with better health outcomes, could building a diverse set of connections moderate the effect of political polarization on an individual's health? This study examines the role of social capital as a key intervening variable in the relationship between polarization and health. Drawing on a nationally representative survey of 2,752 U.S. residents conducted in December 2019 compared with county-level data, we use negative binomial, logit, and gamma models to examine the interaction between indicators of political polarization and bonding, bridging, and linking social capital on physical and mental health outcomes. We find consistent evidence that bonding social ties intervene to improve the physical and mental health of individuals in polarized communities, while bridging ties are related to worse health for politically isolated residents. By highlighting the relationship between polarization, social networks, and health, our findings shed light on how public health experts, and policymakers can improve health outcomes in polarized communities.

Keywords

politics, polarization, partisanship, social capital, health impacts, survey

Introduction

Over the last two decades, partisan polarization has intensified in America, sowing division in national politics and local communities (Iyengar et al. 2019; Levendusky 2009; Webster and Abramowitz 2017). Polarized political views increasingly manifest as affective polarization, that is, the tendency for individuals to view members of their own party favorably but see the worst in members of the opposing party (Iyengar et al. 2019; Iyengar and Westwood 2014). Over a similar period, aggregate-level studies have linked county-level presidential election voting preferences to changing health outcomes, where support for Republican candidates correlate with higher mortality rates (Bilal, Knapp, and Cooper 2017; Bor 2017), greater opioid use (Goodwin et al. 2018), lower vaccination rates (Bernstein et al. 2016), and higher obesity rates (Shin and McCarthy 2013). Furthermore, individual-level studies suggest increasing political polarization is linked to worse poor overall health (Nayak et al. 2021). However, changing health outcomes in local communities have also been connected to the changing structure of social capital—the social ties in a community that enable trust, reciprocity, and collective action—with higher levels of trust in neighbors and residents associated with better physical health, lower levels of chronic stress (Fujiwara and Kawachi 2008; Lee and Kim 2013), better quality of life (Kim and Kawachi 2007), and lower mortality rates (Aldrich 2019). These findings raise the compelling possibility that if political polarization and social capital are both associated with health outcomes, building a robust social network could moderate the impact of political polarization on an individual's health.

This study examines physical and mental health outcomes using a survey of 2,752 U.S. adults conducted between December 23, 2019, and January 3, 2020, probing the interaction effects of mass polarization and different

[1]Department of Political Science, Northeastern University, Boston, MA, USA
[2]Bouvé College of Health Sciences & School of Public Policy and Urban Affairs, Northeastern University, Boston, MA USA
[3]Department of Economics, Northeastern University, Boston, MA USA

Corresponding Author:
Timothy Fraser, Department of Political Science, Northeastern University, 960A Renaissance Park, 360 Huntington Ave., Boston, MA 02115, USA.
Email: timothy.fraser.1@gmail.com

forms of social capital on self-reported days of poor physical and mental health per month. By counting the number of days in the last month that a person reports poor physical health, or alternatively, poor mental health, a commonly used health measure in the CDC's Behavioral Risk Factor Surveillance System (BRFSS), we can approximate an individual's overall quality of health. We hypothesize that respondents in polarized communities will have worse health outcomes depending on the types of social ties they have built. If they have strong *bonding social capital*, or close in-group ties built among members of the same race, religion, class, gender, or age group (McPherson, Smith-Lovin, and Cook 2001), we hypothesize they will have worse health outcomes. Similarly, if respondents in polarized communities have strong *bridging social capital*, which refers to intergroup ties between members of different racial, religious, class, gender, or age groups (Aldrich 2012; Putnam 2000), we hypothesize that this will also lead to better health outcomes. This is because while bonding ties connect individuals to echo chambers of similar people who may sit far from the median position they encounter in their daily lives, bridging ties connect them with a diverse pool of opinions and viewpoints and help them feel accepted and valued in their community. We find evidence that respondents living in politically polarized areas with weaker bonding networks of social trust tend to report more days of poor physical and mental health per month, while, in contrast to our expectations, politically isolated respondents experience worse physical health despite strong diverse, bridging, social networks.

This study makes three main contributions to the literature. First, while past studies examined aggregate-level associations between partisanship and health (Bernstein et al. 2016; Bilal, Knapp, and Cooper 2017; Inglehart and Norris 2016), our data allow us to triangulate any such effects at the individual level. Second, while past studies investigated the effects of political partisanship and polarization *or* social capital on health separately (Bor 2017; Fujiwara and Kawachi 2008; Guo 2016), this study examines them together, where individuals' social networks and community partisan divides interact to shape health. Third, this study builds on past findings about the Janus-faced nature of social capital in community resilience (Aldrich 2012; Aldrich and Meyer 2015), showing that not *all* forms of social capital interact substantially with polarization to improve health. Instead, bonding social ties have the most consistent booster effect on health outcomes, while bridging ties appear to exert more nuanced effects, and linking ties were found to be less effective. By highlighting the relationship between polarization, social networks, and health, scholars, public health experts, and policymakers can use community social capital improvement projects as an intervention against declining health outcomes due to polarization.

Background and Hypotheses

This study examines how political polarization and social capital interact to shape individuals' physical and mental health. Below, we review the extant literature on how (1) health conditions and demographics, (2) policy, (3) partisan health behaviors, (4) political polarization, and (5) social networks shape health outcomes.

Health Conditions and Social Determinants of Health

The most common explanations for divergent health outcomes are health conditions, behaviors, and the social determinants of health. First, tobacco consumption, obesity, poor diet, alcohol and drug use, type II diabetes, and high blood pressure were found to be the top six causes of change in American life spans between 1990 and 2016 (Murray et al. 2013). Second, *deaths of despair* and opioid-related deaths have heavily increased mortality in high intensity drug trafficking areas in Appalachia and New Mexico (Monnat 2018).

Third, epidemiologists now take seriously the effects of the social determinants of health, which refers to upstream societal factors including social and economic conditions in which we are born, live, work and play. These conditions, along with gender, race/ethnicity, and socioeconomic position, shape our behaviors, biology, and levels of stress, and ultimately our levels of physical and mental health (Commission on Social Determinants of Health, World Health Organization 2008; Kim 2021). Race dramatically shifts life expectancy, largely due to race-related discrimination in work and health care access, health outcomes associated with racial profiling and incarceration, environmental exposure to stress and pollutants, lifestyle differences, and long-term inequalities in education and poverty (Sondik et al. 2010). Likewise, age and gender shape health as well; areas with more elderly residents experience greater mortality rates, while women tend to have greater life expectancy than men (Sondik et al. 2010). Finally, socioeconomic status (SES) also shapes health outcomes, via poverty, education, and SES-related stress (Mackenbach et al. 2017). An analysis of American Association of Retired Persons (AARP) members from 1925 to 1945 showed that *educational attainment* dramatically boosts overall health (Fletcher 2015), while increases in long-term unemployment are associated with increased mortality, due to stresses from covering expenses for family when unemployed (Bender and Theodossiou 2014). These social and economic conditions also impact access to health care, which can also shape individual behavior and stress.

Policy Determinants of Health

Alternatively, health outcomes might vary among individuals due to policy changes that affect health habits, environmental exposure, and stressors. For example, communities with better quality hospital care, commonly depicted through lower hospital readmission rates, tend to see lower mortality rates (Schoenbaum et al. 2011), while those with less access to affordable fresh produce face higher obesity rates. However, macro-level government policies also shape these health outcomes. Immunization rates, efforts to control smog pollution and exposure to particulate matter (PM 2.5), health insurance rates due to government enrollment efforts (Sondik et al. 2010), unemployment benefits and higher welfare spending (Bender and Theodossiou 2014; Mackenbach et al. 2017; Schoenbaum et al. 2011), and income assistance programs like Earned Income Tax Credits (Markowitz et al. 2017) have all been linked to better health outcomes.

The effects of Medicare expansion have been especially well studied. Medicaid expansion in 2014 has been linked to more frequent use of health care systems and earlier detection of diabetes and high cholesterol (Wherry and Miller 2016), improvements in overall health between 2014 and 2018 (Semprini et al. 2020), and declines in disease-related mortality up through 2017 (Miller, Johnson, and Wherry 2021).

Finally, certain party platforms have differing implications for health outcomes. In the 2010s, scholars noticed that states with governors and legislatures run by Democrats, rather than Republicans, were more likely to endorse and adopt nutrition and physical activity policies and CDC community intervention strategies for obesity, rather than personal responsibility approaches, in neighborhoods, parks, schools, and workplaces (Welch et al. 2012). Disentangling the effects of voter preferences at the county, state, and federal level on health is quite difficult. For example, presidential campaigns often drive support for down-ballot candidates, but these local officials have more direct effect on local health policies, like when state officials refuse to expand Medicaid under the Affordable Care Act (ACA), a county bans texting while driving, or a governor opposes mask mandates during the pandemic.

Partisan Health Behaviors

Other scholars maintain that voters of opposing parties *still* demonstrate divergent health outcomes, even after accounting for the factors discussed above (Shin and McCarthy 2013). Individual-level surveys showed that Republicans and conservatives tend to consume fewer fruits and vegetables and more fat and processed foods, exercise less, get flu vaccines less, and search for health information less, but also drink and smoke less often compared with Democrats and liberals (Kannan and Veazie 2018). At the same time, a study of Medicare Part D recipients found that residents in counties which voted for Trump in 2016 were more likely to receive prolonged opioid prescriptions than the average county (Goodwin et al. 2018). Likewise, adolescents in states that Obama won in 2012 were much more likely to have received vaccines for human papillomavirus (HPV), tetanus-diphtheria-acellular-pertussis (Tdap), and meningococcal conjugate (MCV4) compared with adolescents in states won by Romney (Bernstein et al. 2016). Not only can partisanship affect health, but health can also explain political outcomes; several scholars have argued that counties suffering higher levels of deaths of despair (Bilal, Knapp, and Cooper 2017; Guo 2016; Monnat and Brown 2017) and below-average gains in life expectancy (Bor 2017) were more likely to vote for Donald Trump in 2016. Alternatively, these relationships can be shaped by sociogeographic factors (rural America tends to exhibit poorer health outcomes and vote Republican), or differences in income, education, region, race, and ethnicity. In our analyses, we account for a wide variety of these confounding factors to isolate the relationship between social capital, polarization, and health.

Political Polarization

Recent scholarship asserts links between the surge in political polarization over the last two decades and changing health and anxiety levels. Since the 1990s, the views of political elites, such as congressional officials and party activists, have grown increasingly polarized (Fleisher and Bond 2001; Hetherington 2001; Layman, Carsey, and Horowitz 2006; Stonecash, Brewer, and Mariani 2018), competitive electoral districts have become decidedly partisan, and American voters have developed a bimodal distribution of electoral preferences, shifting considerably toward extremes (Abramowitz 2010; Abramowitz and Saunders 2008; Campbell 2008; Jacobson 2000). While some argued against this perspective (Fiorina and Abrams 2009; Fiorina, Abrams, and Pope 2005, 2008; Levendusky 2009), others have shown clear changes in voters' views of the other party. Negative advertising and increased exposure to campaigns has reinforced voters' partisan identities and beliefs about the opposing party (Iyengar et al. 2012). Anecdotal evidence suggests that voters and elites *perceive* that their communities are increasingly polarized, whether or not they are, and some attribute this to echo chambers in social media (Guess et al. 2020). Other studies disagree, showing that social media actually results in *more* exchanges of cross-cutting political views (Wojcieszak and Mutz 2009), and that ordinary users tend to share *mainstream* content

while political elites are responsible for sharing more partisan content (Shore, Baek, and Dellarocas 2019). Yet through social media, voters are learning about the political views of distant friends and acquaintances, which they would never have known otherwise, leading them to feel that partisan polarization is increasing (Settle 2018).

Recent studies also focus on partisanship as a social identity and suggest that partisans discriminate against out-group partisans, even more so than individuals of different races, leading citizens to consider politics increasingly important in selecting their spouse and facilitating echo chambers in the home (Iyengar and Westwood 2014). Strong partisans with extreme views are especially likely to perceive polarization occurring, viewing partisan others as caricatures, especially when provoked to anger, which motivates people to adopt political information biased toward their side (Van Boven, Judd, and Sherman 2012). Partisan media outlets capitalize on this, accelerating political information sharing by producing anger from consumers (Hasell and Weeks 2016); political disinformation on Facebook exacerbates this, fueling anger and incivility more so than real political news. Experimental research suggests a relationship between individuals' partisan polarization and intergroup anxiety, where people who are more open to talking about politics with members of other parties tend to be less anxious during post-election interactions with opposing partisans (Hackett, Gaffney, and Data 2018). Voters who experience anxiety toward their partisan candidates also tend to experience less deliberative reasoning and more partisan cue-taking (Johnston, Lavine, and Woodson 2015).

Scholars have linked these political divisions and the anxiety they generate to health impacts following recent elections: Nearly 40 percent of Americans reported stress due to politics after the 2016 election, with 20 percent losing sleep over these issues (Smith, Hibbing, and Hibbing 2019). Similarly, Musse and Schneider (2020) found that for every 10 percent increase in support for the losing candidate, households in those counties saw an extra 1.1 percent in alcohol sales. More recently, counties that voted more so for Trump over Clinton in 2016, as well as those which consumed more conservative media, were associated with reduced physical distancing, which were in turn associated with higher infection and fatality rates (Gollwitzer et al. 2020). In fact, several studies have found partisan divides associated with vaccine hesitancy before (Krupenkin 2020) and during the pandemic (Weisel 2021). Social solidarity may help ameliorate polarizations' effects on health; between 1980 and 2004, suicide rates decreased in states that voted against the winner of the presidential election, which scholars attributed to residents' relief at knowing that members of their community shared similar views, even if they failed to vote in their preferred candidate (Classen and Dunn 2011). Such research is still ongoing, but these studies suggest that political polarization may increase stress, anxiety, discrimination, and isolation, traits all linked to negative health outcomes.

Social Capital's Intervening Role in Health

Scholars also highlight that positive (or negative) health outcomes can result from social interactions and relationships, also known as social capital (Kim and Kawachi 2007). Several different kinds of social capital exert divergent effects, in what is known as the Janus-faced nature of social capital (Aldrich 2012; Aldrich and Meyer 2015; Szreter and Woolcock 2004). *Bonding* social ties link individuals to members of the same social, income, race, and ethnic background and share aid, information, and sense of belonging just with members in this group (Aldrich and Meyer 2015; McPherson, Smith-Lovin, and Cook 2001). Bonding ties have been linked to positive health outcomes, because of a sense of belonging and connection fostered by strong in-group affiliation (Kim, Subramanian, and Kawachi 2006; Poortinga 2006). However, *bridging* social ties link individuals to people different from themselves, helping information, aid, and reciprocity circulate throughout a community. Studies have indicated that residents with more bridging ties experience better health outcomes than those with bonding ties alone, including cognitive abilities for elderly and avoiding depression (Aldrich and Kiyota 2017), physical activity, and reducing hypertension (Iwase et al. 2010). Finally, linking social ties connect residents with decision-makers and people in power to help residents get access to the public goods they need (Aldrich 2019; Szreter and Woolcock 2004).

For example, after the Great East Japan Earthquake crippled coastal Japanese towns in 2011, those communities which experienced lower mortality rates and rebuilt more quickly were those which built bonding social ties among residents for self-support and called in favors to elected officials through linking ties (Aldrich 2019; Aldrich and Kiyota 2017). These results mirror a famous case study of social capital and health outcomes, the 1995 Chicago Heatwave, in which Latino neighborhoods experienced many fewer deaths than their African American peers due to strong social ties, which led neighbors and family members to check in on each other, share resources, and weather the crisis (Klinenberg 2002). Especially when the state does not provide health and welfare benefits, trust and associational membership are vital to buoying health outcomes (Szreter and Woolcock 2004).

Alternatively, social network scholars *also* suggest that people share health conditions and unhealthy behaviors like obesity and smoking through social ties. Data from the Framingham Heart Study from 1971 to 2003

showed that friends stopped smoking together, putting social pressure on other smokers to quit (Christakis and Fowler 2008). In contrast, obesity measured by body mass index spread among friends (Christakis and Fowler 2007). Scholars have also found social influence effects elsewhere; for example, peer group effects consistently predict tobacco, marijuana, and alcohol use by teens (Clark and Lohéac 2007) and even the mood of users' Facebook feed; a large-scale Facebook experiment found that users posted more positive and less negative content when their news feed pumped out more positive content (Kramer, Guillory, and Hancock 2014).

Although literatures on social capital and social influence are generally distinct, we view deleterious effects of social influence processes on health as an example of how bonding, in-group ties tend can lead individuals to form unhealthy habits from friends in an insular social network; meanwhile, bridging social ties that engage a diverse array of ideas and health habits reduce this risk. Below, we formulate three hypotheses about politically isolated residents, meaning those whose political preferences differ greatly from the average voter in their county, state, or country, exposing them to the social effects of political polarization in everyday interactions. First, we hypothesize that politically isolated residents with strong bonding ties experience better health outcomes, because close ties to like-minded others give them reassurance and possibly even echo chambers. Second, we hypothesize that politically isolated residents with more bridging ties experience better health outcomes, because these ties make residents realize they are not alone in their communities. Third, we hypothesize that politically isolated residents with stronger linking ties experience better health outcomes, because these ties to local officials make them feel voice and agency in their communities, despite being politically distinct from their peers. Accordingly, we expect bridging social capital to interact with political polarization to dispel distrust and anxiety, leading to improved physical and mental health outcomes, while bonding social capital might interact with polarization to erode health outcomes.

Methods

To examine whether political polarization and social capital interact to shape health, we analyze 2,752 responses by English-speaking U.S. residents from a nationally representative survey conducted by Qualtrics, an established, nationally reputable market research firm, conducted in December 2019. Standard quotas were used to match the sample to the U.S. population, in terms of gender, age, race, and party. Figure 1 shows that our respondents were closely matched to the U.S. population in terms of demographics and other traits including gender, race, income, marital status, education, employment, health insurance coverage, and smoking habits (defined by the BRFSS as having smoked at least 100 cigarettes in their lifetime and currently smoking every day or some days).

Outcomes

We examine two key health outcome measures: the number of days respondents reported in a month feeling (1) poor *physical* health and (2) poor *mental* health, from 0 to 30 days. In robustness tests, we examine recoded versions of these variables, including (3) whether the respondent reported 14 days of more poor *physical* health or (4) poor *mental* health in a month. These questions were taken directly from the BRFSS, the most comprehensive regular state-based health survey in the United States. To supplement this individual-level analysis, we also replicated our analyses using county-level data from the University of Wisconsin Madison's 2019 County Health Rankings, which report the average number of days respondents report (1) poor physical health or (2) poor mental health per month, as well as the percentage of respondents who report 14 or more days of poor physical health or poor mental health per month (University of Wisconsin Population Health Institute 2019). These outcomes were collected from the CDC's BRFSS in 2017.[1] Next, we describe our empirical strategy and provide details about the individual and county models we estimate below.

Independent Variables

Our study uses four measures to assess the combined effects of polarization and social capital on health. Past studies operationalized polarization by asking respondents (1) how upset they would be if their child married someone of the opposing party (Almond and Verba 1960; 3-point scale); (2) which positive and negative words they would associate with each party (Iyengar et al. 2012; continuous scale, nine words); (3) which candidates for office they would or would never vote for (Lauka, McCoy, and Firat 2018; dichotomous); as well as more complex strategies like implicit bias testing (Iyengar and Westwood 2014). These strategies have some advantages, notably being grounded in real-world scenarios (Almond and Verba's 1960 marriage question) and dodging desirability bias (e.g., Iyengar and Westwood's 2014 test of partisan implicit bias), but they were designed with national-level tests in mind. Instead, mindful of how political pressures may vary at different levels in imbedded communities, this study introduces several new measures that seek to determine how politically isolated individuals feel in their own communities. We list them in Table 1 and describe them briefly below (see Supplemental Appendix D for details and question wording).

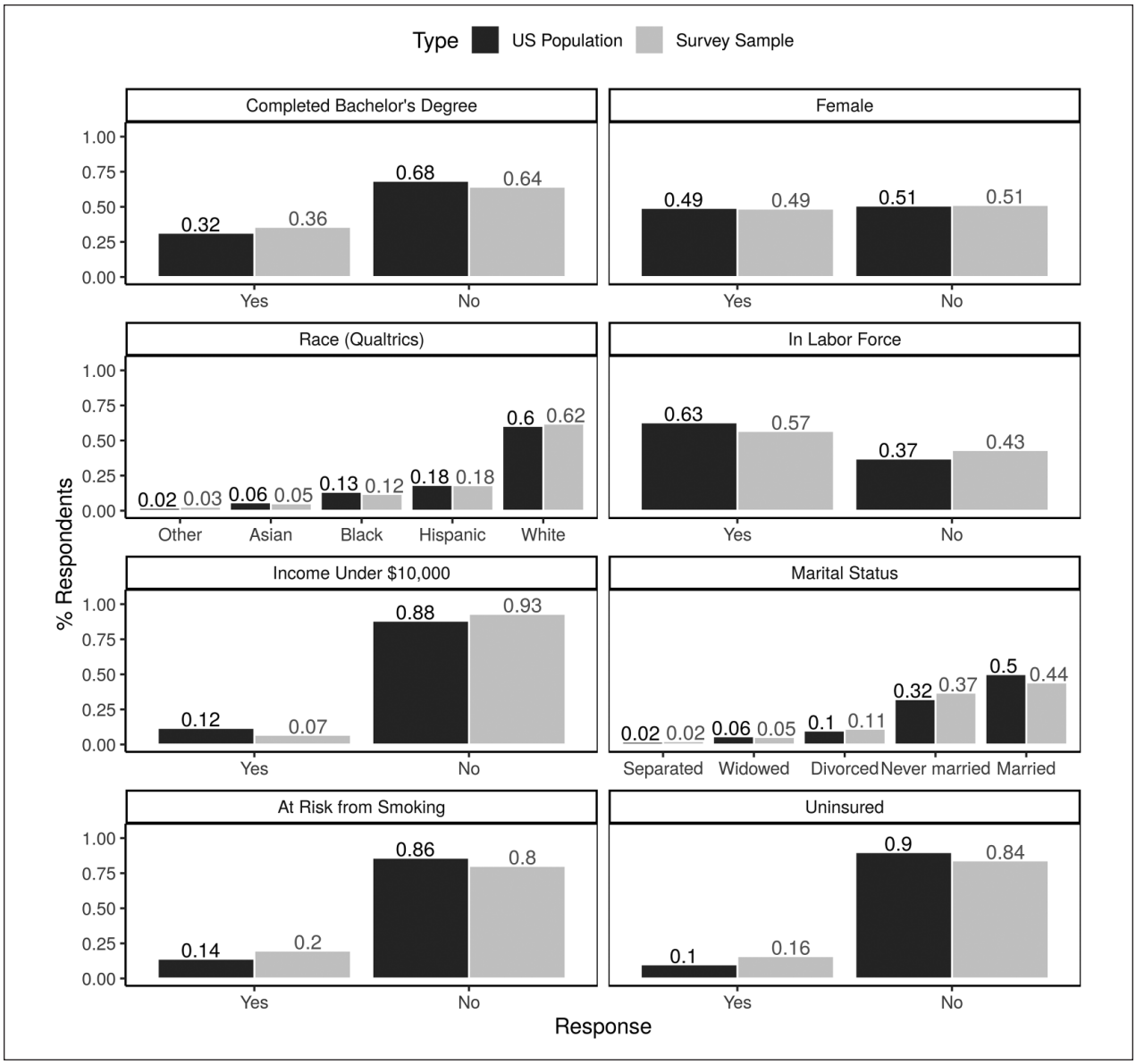

Figure 1. Survey representativeness.
Bars compare percentage of respondents who responded that they, for example, completed a bachelor's degree, compared with percentage of U.S. residents over age 18 who responded the same, according to census and CDC data. See replication code.

To capture political polarization, we deploy two conceptual approaches: *perceived polarization* and *actual polarization*. To measure *perceived polarization*, we asked respondents to rank themselves, the average voter in their state, and the average voter in the United States using a scale from 0 to 10, where 0 equals most liberal, 10 equals most conservative, and 5 equals neither liberal nor conservative. Then, we calculated (1) the absolute difference between each respondent and the average voter in their state, which represents their perceived political polarization, ranging from 0 (complete similarity) to 10 (complete difference), as well as (2) the same metric, but compared with the average voter in the United States. This measure has the advantage of being more granular (10-point scale) than previous studies that use 3-point ordinal or dichotomous measures; our measure is also captured at both the state and national levels.

Second, as a robustness check, we measured *actual polarization* as follows: (3) First, using the listed zipcode (or if unavailable, the IP address) of each respondent, we geocoded responses to the county level and matched the county vote share for the Democrat and Republican presidential candidates in 2016, creating a binary indicator for each respondent. This indicator determined whether they

Table 1. Measures of Political Polarization.

No.	Political polarization measures	Level of measurement	Models	Related figures	Appendix tables
1	Perceived Difference between Self vs. Average State Voter	Ordinal (0–10)	Individual	2–4	B1–B8
2	Perceived Difference between Self. vs. Average U.S. Voter	Ordinal (0–10)	Individual	2–4	B1–B8
3	Actual Difference between Self Party ID vs. Winning Party in Voter's County	Binary (Same / Different)	Individual	2–4	B1–B8
4	Actual (%) Difference between County Voteshare for Democrats vs. Republicans in 2016 Presidential Election	Numeric (0%–100%)	County	6	B9–B10

Caption: Indices 1 and 2 were measured 0–10 to reflect how politically different they perceive themselves and their larger community to be. This reflects political polarization. Index 3 coded any Strong, Weak, or Leaning Democrats (Republicans) who live in a county for which the average vote share skewed Democrat (Republican) as "Similar," reflecting aggregate-level political polarization.

identified as a strong, weak, or leaning member of a party and lived in a county that voted for the same party or for the opposing party. For our county-level models, we also use (4) the actual absolute difference in each county's percentage of votes for the Democratic vs. Republican candidate in the 2016 presidential election as an alternative indicator of polarization at the county level. One advantage is that these two measures allow us to determine whether respondents reside in politically (in)congruous or (hetero)homogeneous communities given their partisan predispositions, while the former measures evaluate whether or not individuals perceive their communities to be politically polarized.

Next, to represent social capital, we adopted three measures from extant studies. To represent bonding and bridging social capital, we use two indices built from questions borrowed from the 2006 Social Capital Benchmark Survey (Saguaro Seminar 2006). The Social Trust Index takes the mean of standardized responses to five questions, including how much you trust people in general, and how much you trust neighbors, co-workers, fellow religious congregants if applicable, store employees, and local police. These types of trust capture respondents' level of trust with people they may regularly interact with or be aware of in their community. In practice, this closely maps onto bonding social ties, which refer to close, in-group ties typically fostered between people like oneself. To better distinguish between trust in more homophilous or heterophilous settings, we also measure bridging ties: The Friendship Network Diversity Index counts how many of 11 different types of personal friends respondents have, including a friend who owns their own business, is a manual worker, has been on welfare, owns a vacation home, is of a different religious persuasion than them, is White, Latino or Hispanic, Asian, Black, gay or lesbian, or is a community leader. To receive a high score, a respondent must have many different types of friends. In contrast, if they just know a few friends with these traits, perhaps all sharing the same traits as the respondent, they would receive a low score (not zero, because technically they do have ties within this group, but likely a score of just 1 or 2). This closely maps onto bridging social ties, which describe how interconnected you are with people in social groups different from your own. Finally, drawing from an ongoing COVID-19 study and past studies of social capital (Grootaert et al. 2004; Harper 2001), we asked respondents how much they agree with the following statement on a 5-point scale ranging from strongly agree to strongly disagree: "My local elected officials will help me when I am in trouble." This closely approximates linking social capital, or connectedness to local officials.

To measure bonding, bridging, and linking social capital at the county level, we used Kyne and Aldrich's (Kyne and Aldrich 2020) validated Social Capital Indices (SCI), derived from publicly available data, each scaled from 0 (low) to 1 (high). The bonding social capital index measures how similar community members are in terms of race, ethnicity, income, gender, employment, age, and communication capacity, where greater similarity among community members entails stronger bonding social ties, in keeping with McPherson, Smith-Lovin, and Cook's (2001) perspective of social homophily. The bridging social capital index measures the density of associational ties in a community, in terms of charitable associations, volunteer groups, unions, fraternal organizations, and religious organizations, in keeping with Putnam's (2000) view of the importance of associational membership in social capital. Finally, the linking social capital index measures vertical ties, based on the share of persons eligible to vote, participation in political activities, and local, state, and federal government employees per community. These three indices allow us to measure each county's social capital, and therefore, the social capital of the community in which each respondent resides.

Controls

Our individual models incorporate several control variables. We adjusted for partisanship, body mass index, health insurance coverage, age, gender, race, religious affiliation, income, and geography (heavily urbanized area, urban cluster, rural).[2] The county-level models we estimate mirror the controls included in our individual models, adjusting for county-level partisanship, obesity, health insurance coverage, smoking, median age, gender distribution, median household income, rates of college education, unemployment, marital status, race/ethnicity, religious affiliation, and geography as described above.[3]

Modeling

We model the effects of these measures and proxies on respondents' reported days of poor physical and mental health per month at the individual and county levels using a series of 44 models that follow the basic format described below.[4] At the individual level, we estimate a series of *negative binomial* models (reported in Supplemental Appendix Table B1) to model the number of days of poor physical health reported by respondents, because it is a strongly right-skewed count variable.[5] We estimate (1) a basic model, with all individual-level variables and controls; and (2) an interaction model testing three interaction effects between polarization and individual-level indicators of (a) bonding (Social Trust Index), (b) bridging (Friendship Diversity Index), and (c) linking social capital (Help from Local Government). The interaction term indicates *how many more days of poor physical/mental health* we expect given an increase in our measure of polarization by 1 at the same time as an increase in the specific type of social capital. Finally, (3) we add three more interaction terms between individual-level polarization and county-level indicators of (a) bonding, (b) bridging, and (c) linking social capital. This enables us to differentiate between individual and county-level social capital, as a robustness check. Finally, we estimate these models separately for each polarization measure as described above (U.S. perceived polarization, state perceived polarization, and county actual polarization; measures 1–3 in Table 1). The detailed results of these nine estimations are reported in Supplemental Appendix Table B1; Supplemental Appendix Table B2 reports parallel models with the full battery of available controls included.

As robustness tests, we also model the likelihood that respondents reported 14 days or more of poor physical health per month, by estimating nine models using logistic regression. The results of the estimations are reported in Supplemental Appendix Tables B3 and B4 (with the full battery of controls). To model days of poor *mental health* per month, we estimate nine negative binomial models (Supplemental Appendix Tables B5 and B6, with controls), and verified nine additional models of the likelihood of reporting 14 days or more of poor mental health (reported in Supplemental Appendix Table B7, adding controls in Supplemental Appendix Table B8). Each of these models uses parallel modeling strategies discussed above. All models also include state fixed effects to account for geographic differences and apply multiple imputation to deal with low levels of missing data (see Supplemental Appendix C for further details). Nearly identical results obtained when models were estimated using original, unweighted responses, as well as when applying analytic survey weights (see Supplemental Appendix E).

Results

Our main goal in the current study is to examine whether political polarization and social capital interact to shape U.S. residents' health. We test whether respondents with stronger social capital report better health outcomes if they perceive themselves to be more politically distinct from voters in their communities. Our analyses reveal several compelling findings, summarized visually below.[6] First, we calculated the expected changes in days of poor health, based on 1,000 simulations generated in the Zelig package in R (Choirat et al. 2017; King, Tomz, and Wittenberg 2000). Figure 2 depicts the change in the number of days of poor physical (black) or mental (gray) health. Solid lines illustrate the median expected change, and violin plots and jittered points illustrate the 95 percent confidence interval. Any effects that do not cross the dashed line are statistically significant at the $p < .05$ level (detailed estimates are presented in Supplemental Appendix Table C1). We calculated the expected health outcomes for an average respondent with a level of perceived political difference of 0 (or, for county actual polarization, one who voted for the presidential victor in their county overall) and minimum social capital of that type. We compare these estimates to the expected health outcomes for otherwise identical respondents with a perceived political difference of 10 (or, for county actual polarization, one who did not vote for the presidential winner in their county overall) with the maximum social capital score of that type. All other traits were held at their means or modes. These simulations use our negative binomial models of days of poor physical (Supplemental Appendix Table B2) or mental (Supplemental Appendix Table B6) health, which control for interactions between polarization and individual-level social capital, as well as polarization and county-level social capital, controls, and state fixed effects.

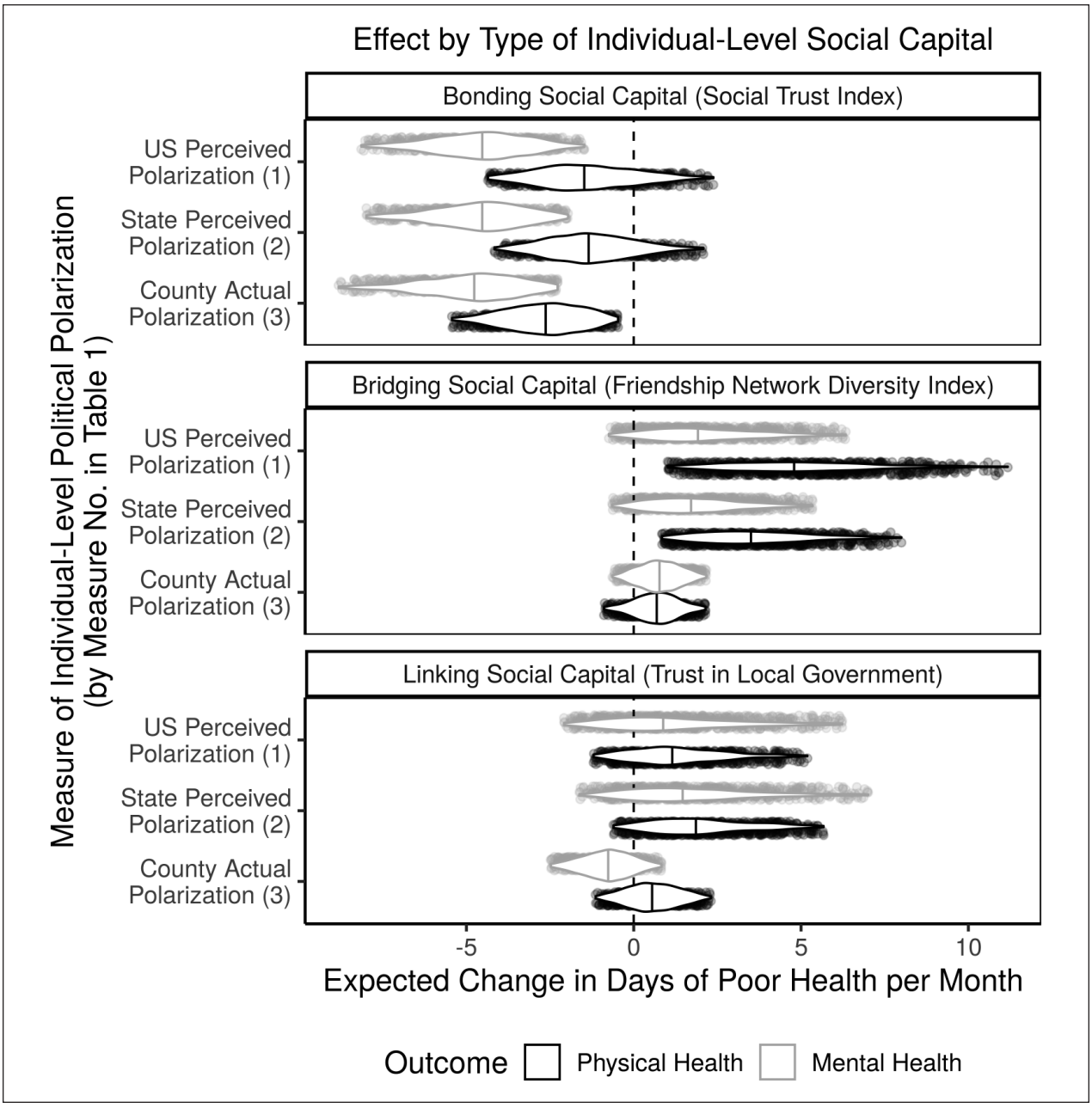

Figure 2. Expected change by level of polarization and type of social capital.

Hypothesis 1: Does Bonding Social Capital Aid Politically Isolated Residents?

Figure 2 reveals several important findings. First, our models project that politically isolated residents with stronger overall *social trust* in their local community, representing bonding social capital, are expected to report 4.51 days fewer of poor mental health per month than do politically mainstream residents with weak bonding social capital ($p < .05$). This effect was consistently statistically significant across United States, county, and state measures of political polarization, ranging from −4.5 to −4.72. We also find that individuals with strong bonding ties who voted for a different candidate than their county saw 2.62 fewer days of poor physical health ($p < .05$). These effects were more muted and statistically insignificant for measures of state- and national-level perceived polarization. Accordingly, these results imply strong support for our first hypothesis, that bonding social capital improves the health of politically isolated residents, especially for mental health.

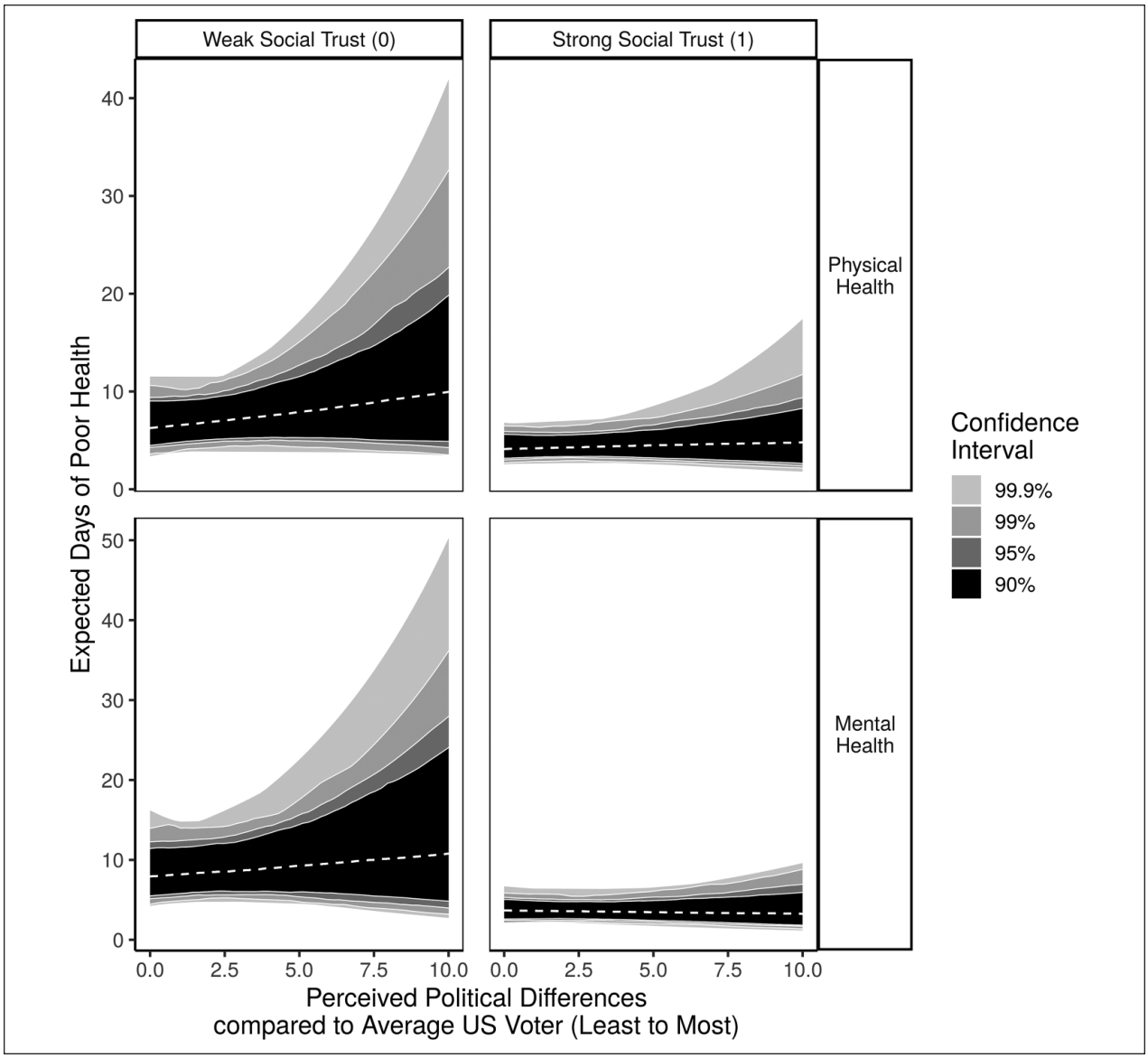

Figure 3. Effect of polarization and bonding social capital (social trust index) on physical and mental health.

To visualize these effects, Figure 3 displays simulations of the expected effect of national-level perceived polarization as it increases from 0 to 10 on both days of poor physical and mental health for an average respondent with weak bonding social capital (social trust index = 0) and strong bonding social capital (social trust index = 1). Moving from left to right panels, the estimates reveal the changing effects of perceived polarization depending on bonding social capital levels (with varying levels of confidence: 90%, 95%, 99%, and 99.9%). Although the expected change in days of poor physical health was not statistically significant, we can observe that the impact is quite substantial and parallels the significant change for days of poor mental health.

Hypothesis 2: Does Bridging Social Capital Benefit Politically Isolated Residents?

Figure 2 also reveals that politically isolated respondents with *more diverse friendship networks*, and thereby strong bridging social capital, likely experienced an expected 4.77 more days of poor physical health each month on average compared with a more politically mainstream respondent with weak bridging ties. This effect was statistically significant for perceived polarization at the state (3.46, $p < .05$) and national (4.77, $p < .05$) levels. Similar effects were detected for mental health, but these were not statistically significant at conventional levels.

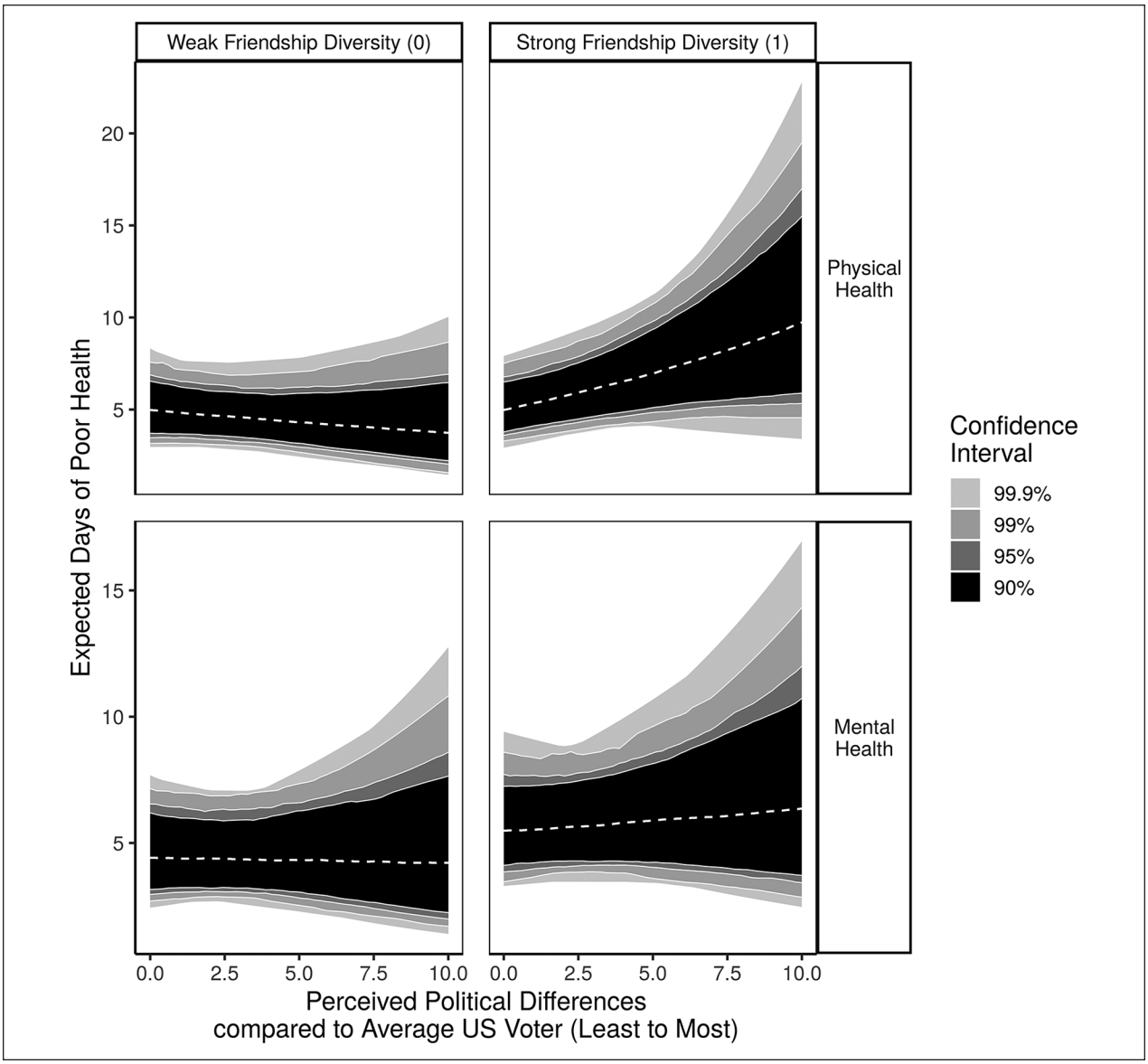

Figure 4. Effect of polarization and bridging social capital (friendship network diversity) on physical and mental health.

In Figure 4, we visualize the expected change in days of poor physical and mental health, given increases from 0 to 10 in national-level perceived polarization *and* changes in bridging social capital from low (friendship diversity = 0) to (friendship diversity = 1). This uses the same approach as in Figure 3. This reveals a sharp increase in the number of days of poor health in the right-hand panels with high bridging social capital compared with the left hand panels, although the effect is stronger for physical than mental health. This contrasts with our second hypothesis, that politically isolated residents with more bridging social capital may see better health. One possible explanation may be that diverse networks highlight how different respondents' views are compared with others and makes them less likely to seek or accept help from neighbors.

Hypothesis 3: Does Linking Social Capital Aid Politically Isolated Residents?

Figure 2 (bottom panel) shows that politically isolated residents with strong *trust in local government*, representing linking social capital, tended to experience only modestly more days of poor physical health, ranging from 0.55 given county actual polarization to 1.85 for state perceived polarization. However, these effects were not statistically significant at conventional levels, illustrated by how the violin plots cross the y-intercept at 0.

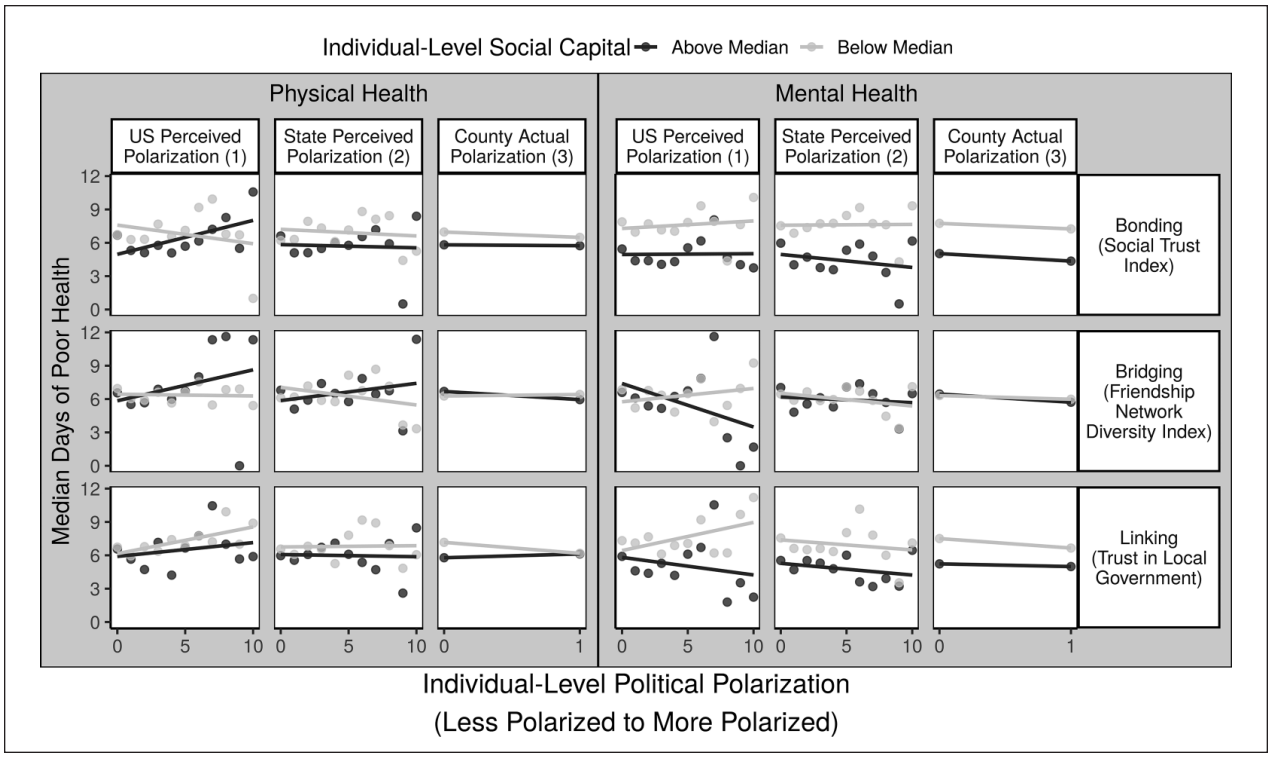

Figure 5. Average health outcomes by polarization, bonding, and bridging social capital.
Panels left to right depict Polarization Measures 1–3 from Table 1. For county actual polarization, 0 indicates respondents voted for the presidential winner in their county overall, while 1 indicates that they did not vote for the presidential victor in their county.

Effects for mental health are even more muted, ranging from −0.74 for county polarization and up to 1.45 for state polarization (see Supplemental Appendix Figure C2). This disproves our third hypothesis, that politically isolated residents with stronger linking social capital should experience better health outcomes, because their voice and agency in the political process may reduce anxiety and improve pro-social habits. Our analyses reveal scant evidence to support this claim.

Figure 5 presents additional visual representations of our findings. The top row highlights that as polarization increases, respondents with greater social trust than the median respondent (high bonding social capital) likely experience fewer days of poor mental health on average (upper right three panels). This is consistent for all three types of political polarization visualized. To some degree, the same occurs for days of poor physical health, given increases in county-level polarization. This matches our simulated expected changes in Figure 2, which also showed decreases in days of poor physical health given simultaneous increases in polarization and bonding social capital. (There was one exception in Figure 5; as national-level perceived polarization increases, individuals with greater social trust than the median respondent experience more days of poor physical health [upper-left most panel].) Perhaps for this reason, our statistical simulations in Figure 2 for the interaction effect of national-level perceived polarization and bonding social capital were statistically insignificant and smaller than for other types of polarization.)

The second row of Figure 5 highlights that as perceived polarization increases, residents with friendship networks more diverse than the median respondent (high bridging social capital) experience more days of poor physical health, while those with less diverse networks experience fewer days of poor physical health. This effect persists both when respondents compared themselves to the average voter in their state and the average U.S. voter (but not for county actual polarization, consistent with our findings in Figure 2 and Supplemental Appendix Table C1). Our estimates also imply that diverse friendship networks had more muted and mixed associations with days of poor mental health. Finally, similarly weak associations were obtained for linking social capital (see third row of Figure 5). Respondents with trust in local government above the median (high linking social capital) tended to see slightly better health outcomes as each type of polarization increased, or at least better health than respondents with weaker trust in local government. However, these descriptive effects were not matched by any statistically significant associations in our simulations in Figure 2.

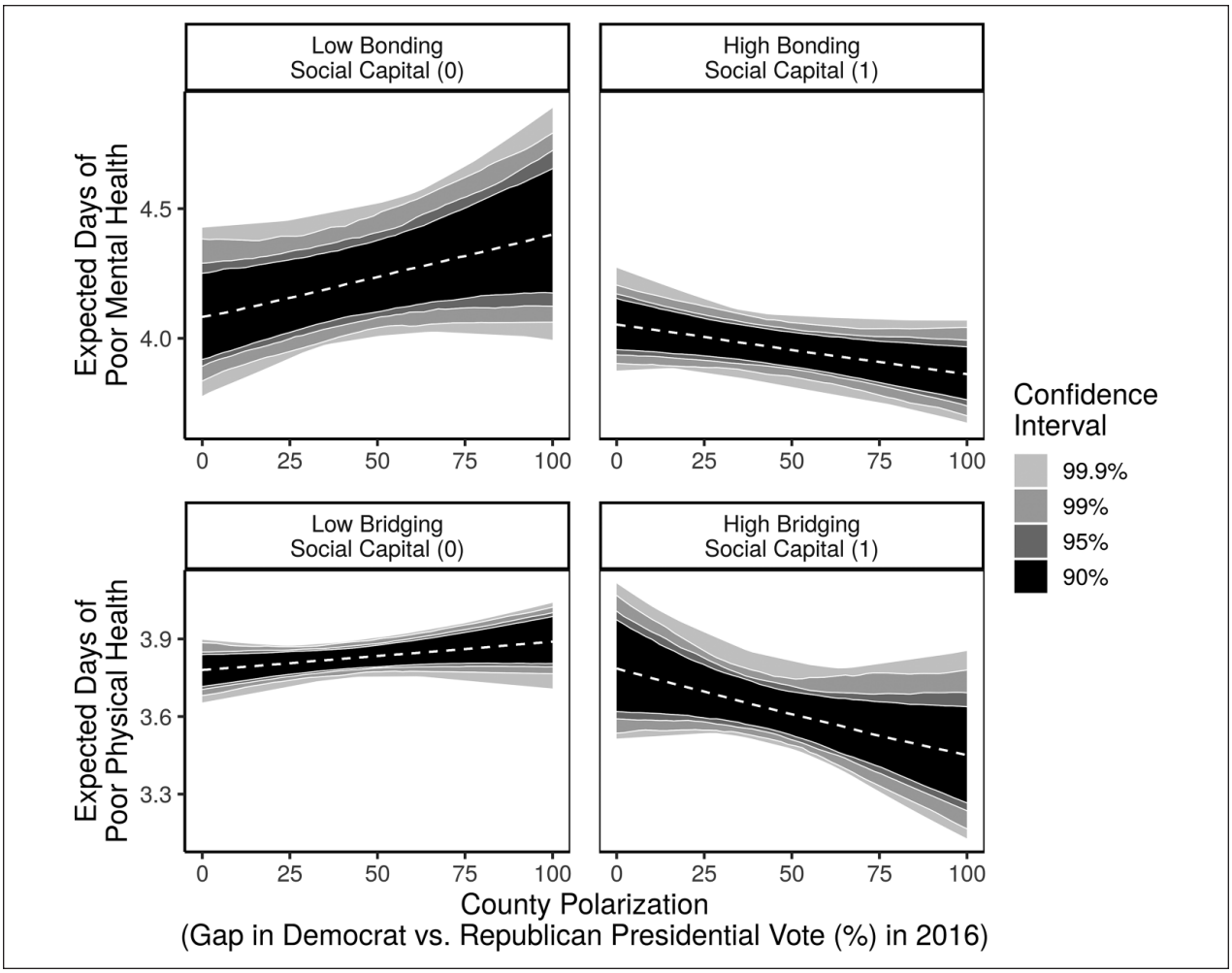

Figure 6. Bonding and bridging ties shift county polarization's effect on health.

As noted above, we replicate these analyses at the county level using a similar simulation approach. Overall, we find consistent evidence of a negative interaction effect between county-level polarization, bonding social capital, and poor health, albeit statistically insignificant; the change is stronger for mental health, but weaker for physical health. However, in contrast to the estimates yielded by our individual-level models, increases in polarization and bridging social capital are strongly related to fewer days of poor physical health. Figure 6 depicts these effects, simulating the expected days of health *at the county level*, with simulated confidence intervals. This uses the same approach as in Figures 3 and 4, highlighting expected days of poor health given increasing amounts of political polarization and low (0) vs. high (1) social capital. This focuses on the interaction effects between county-level actual polarization (measure no. 4 in Table 1) and bonding social capital on days of poor mental health and, for bridging social capital, on days of poor physical health.

Discussion

In the current study, we examine whether the physical or mental health outcomes individuals report depend on the interaction between levels of political polarization and their social ties. Overall, our evidence is mixed, but we find consistently that politically isolated individuals with stronger *bonding social ties*, represented by their social trust in local community members, tended to experience *fewer days of poor physical and mental health*, if they lived in or felt like they lived in a polarized community. However, if those same residents had stronger *bridging social ties*, represented by the diversity of their friendship networks, rather than bonding ties, they tended to experience *more days of poor physical health*. Complementing this individual-level analysis, we find strong county-level evidence of a beneficial association between political polarization, bonding social capital, and mental health outcomes. For bridging ties, the results of our individual-level models are at odds with our county-level estimates

(in the case of the former, bridging ties worsened physical health among politically isolated residents while they improved physical health among polarized communities in the latter).

Inconsistencies in our findings across levels of analysis may appear in tension, but it is conceivable that bridging ties may affect health differently in polarized communities versus for politically isolated individuals. The county-level results match past findings and theory about the beneficial impacts of bridging ties, which help bridge the divide in communities, reduce anxiety, and ultimately improve health (Kawachi, Subramanian, and Kim 2008). At the individual level, however, bridging ties may force people to reckon with how different their political views are from their diverse peers. At a minimum, however, these inconsistencies remain open questions worthy of subsequent scholarly scrutiny.

We concede several limitations with the current study. First, we recognize this is an observational study. As such, causal claims about the impact of polarization and social capital on health outcomes are tenuous at best. Future studies could deploy randomized interventions to test the effects of improvements in social capital on health in polarized neighborhoods. In addition, this study relied on self-reported physical and mental health outcomes; we might expect that respondents might underreport their degree of poor mental health out of a desirability bias. Our measures from the BRFSS examined just the *number of days of poor mental health*, but not how poorly they felt on those days. Alternative measures like the Kessler Psychological Distress Scale may be helpful for subsequent work, or future studies could consider using in-person evaluations. However, the fact that our individual-level findings match county-level findings from the BRFSS survey speaks to the reliability of our findings.

We also note that while this study was conducted before COVID-19 struck the United States, our findings have disturbing implications for the pandemic. If individuals in politically divided communities with weak bonding social ties were at risk for poor health outcomes *before* the pandemic, then these individuals are at even *greater risk* today. Furthermore, in communities with weak bridging social ties, these individuals are less likely to get critical information about social distancing, wearing masks, and public health advisories, and more likely to distrust opposing partisans. As a result, even if bridging ties were associated in 2019 with worse health for politically isolated residents, in 2021, the loss of these bridging ties has become more problematic. Future studies should further verify these results using qualitative field studies of residents in polarized communities and further quantitative survey projects to assess how these underlying political traits of communities shaped individuals' responses to COVID-19.

Fortunately, many communities have demonstrated successful interventions to build social ties within and across different social groups. These include San Francisco's Neighborfest grant to support block parties to build ties among neighbors (Homsey and Aldrich 2017), and the Ibasho project in northeast Japan, which connects elders at local community centers (Aldrich and Kiyota 2017). Logical next steps include field experiments like those conducted at the Urban Youth Vocational Training Program in Kaduna, Nigeria, which organized positive intergroup social contact and found measurable decreases in discrimination between Christian and Muslim residents (Scacco and Warren 2018).

These findings have broad implications for policymakers and scholars. First, the results we report echo a chorus of concerns about the corrosive effects of political polarization in America and reinforce the notion that polarization effects extend well beyond the social domain to citizens' health. Our findings are in line with a burgeoning literature that finds associations between health and electoral outcomes (Bernstein et al. 2016; Bilal, Knapp, and Cooper 2017; Bor 2017; Goodwin et al. 2018; Shin and McCarthy 2013). Second, this study shows that bonding social ties can play a central role, improving health outcomes in communities facing more polarization. These results build upon existing scholarship that suggests strong links between social capital and health (Kawachi, Subramanian, and Kim 2008; Kim and Kawachi 2007; Lee and Kim 2013; Szreter and Woolcock 2004), even after accounting for income inequality (Kim 2016). Our findings that politically isolated individuals tend to experience worse health outcomes given stronger bridging ties is especially problematic, considering that our county models show that bridging ties are broadly beneficial for polarized communities at large. Further research should examine under what circumstances bridging ties may mitigate against any harmful health effects for politically isolated individuals. Future studies could also investigate how the COVID-19 pandemic altered or amplified the relationship between social capital, polarization, and health found in this study. Public health experts and practitioners should consider the application of community-building techniques to improve health in polarized communities after COVID-19.

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ORCID iD

Timothy Fraser https://orcid.org/0000-0002-4509-0244

Supplemental Material

Replication codes are available in Harvard Dataverse at: https://doi.org/10.7910/DVN/LQVAAR. Appendices available in online supplementary materials.

Notes

1. See Supplemental Appendix Figure A1 for a visual presentation of variables' distributions for our individual-level survey and county-level averages from 2017 BRFSS.
2. We describe these variables and sources in Supplemental Appendix A Controls (continued). Descriptive statistics for variables in individual-level analyses are available in Supplemental Appendix Table A2 (continuous variables) and Table A3 (categorical variables).
3. These are described further in Supplemental Appendix A Controls (continued). Descriptive statistics for variables in our county-level analysis in Supplemental Appendix Table A4 (continuous variables) and Table A5 (categorical variables).
4. Detailed results presented in Supplemental Appendix Tables B1–B10.
5. See Supplemental Appendix Figure A1.
6. Detailed results for estimations from which visual evidence is derived are presented in the Supplemental Appendix.

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