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RESEARCH ARTICLE

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Health in citizen-state interactions: How physical and mental health problems shape experiences of administrative burden and reduce take-up

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Abstract

Public services represent a key means by which societies seek to reduce inequalities. However, some people may experience administrative procedures as more burdensome than others, creating inequality within programs intended to be equity-enhancing. Prior work has found human capital (e.g., education and conditions like scarcity) to affect burden and take-up. We build on this by examining the role of health in the form of attention disorders, pain, anxiety, and depression in the context of tax reporting in Denmark and college financial aid in Oklahoma, USA. Across cases, attention disorders and pain are associated with more burdensome experiences and in the financial aid case, they are associated with reduced take-up as well. Individuals suffering from multiple health problems have the most negative experiences and lowest take-up. The results suggest that extra support may be needed for people suffering from health problems in order to reduce inequities in experiences and outcomes.

Evidence for Practice

- Physical and mental health—including attention disorders and pain—matters to people's experience of the state, and their ability to access government benefits.
- Administrative arrangements that are nominally equal in their design and implementation can result in unequal outcomes because of health differences.
- Compared to people without health issues, those struggling with attention disorders, pain, and anxiety report more burdensome experiences with specific government programs.
- The effects of ill-health are cumulative: those with multiple health problems have the most burdensome experiences and lower levels of benefit take-up.
- Reducing administrative burdens or making extra help available would offer more equal access to public services.

Citizen interactions with the state raise fundamental questions for public administration, including how such encounters become venues for inequality.[1] One source of unequal experiences and outcomes is *state actions* in the form of policy designs and implementation practices. Some, such as groups relying on means-tested programs, tend to face more onerous experiences than others, such as middle and upper-middle class individuals, or those with access to universal, less administratively burdensome social insurance programs (Herd & Moynihan, 2018). These differences in policy designs matter for people's well-being (Baekgaard et al. 2021) and shape future encounters with government (Soss, 1999). Marginalized groups are especially vulnerable to state-imposed burdens, as documented, for example, in research on the experiences of immigrants

(Chudnovsky and Peeters 2021; Heinrich, 2018), indigenous people (Carey, Malbon, & Blackwell, 2021), low-income students applying for college financial aid (Dynarski & Scott-Clayton, 2006), individuals with non-conforming gender identity (Nisar, 2018), and women seeking an abortion (Herd & Moynihan, 2018). In addition to burdensome policy designs, such marginalized groups may more often face street-level bureaucrats who impose burdens on them (Olsen, Kyhse-Andersen, & Moynihan, 2020) and who lack the administrative capacity to cut through red tape and reduce burdens, even if they want to (Bell & Smith, 2021).

Another source of inequality is *individual-level differences* in human capital affecting citizens' ability to manage state-encounters (Christensen, Aarøe, Baekgaard, Herd, & Moynihan, 2020). People vary in their ability to cope with administrative burden, and some are better able to identify and access benefits they are eligible for, even within programs where all target group members are subject to the same administrative rules and procedures (Chudnovsky & Peeters, 2020; Döring, 2021; Masood & Nisar, 2021). In this paper, we focus on a specific kind of individual-level factor that might shape citizens' interactions with the state, one which has received minimal attention in public administration research despite playing a huge role in people's lives: physical and mental health. Health problems increase people's need for assistance. At the same time, health problems may exacerbate burdensome experiences of the state and make it more difficult to access government assistance.

Throughout the paper, we focus on four specific health problems: physical pain, anxiety, depression, and attention disorders in the form of Attention Deficit/Hyperactivity Disorder (ADHD) and Attention Deficit Disorder (ADD). These health conditions are relatively common forms of poor health. Just two forms of pain disorders (headache disorders and lower back pain) and depression have been the leading causes of disability across the globe for the last three decades. Across the globe, an estimated 264 million people experience depression, while another 284 million experience anxiety disorders, 366 million experience persistent adult ADHD, and 73 million experience ADD (James et al., 2018; Song et al., 2021). Moreover, pain, anxiety, depression, and attention disorders are all known to be associated with reduced cognitive resources, including but not limited to executive functions like working memory, attention, and planning abilities (Bell et al., 2018; Dotson et al., 2020; Lindert, Paul, Lachman, Ritz, & Seeman, 2021; Mazza, Frot, & Rey, 2018; McDermott & Ebmeier, 2009; Moriarty, McGuire, & Finn, 2011; Phelps, Navratilova, & Porreca, 2021; Shields, Moons, Tewell, & Yonelinas, 2016; Suchy, 2009; Whitlock et al., 2017).

Because of their impact on people's cognitive resources (as well as other mechanisms such as physical mobility), we expect that pain, anxiety, depression, and attention disorders will be associated with a lower ability to cope with administrative procedures, leading, in turn, to more administratively burdensome experiences as well as reduced access to benefits. We investigate the role of these four health conditions in the context of two cases that represent very different kinds of state-encounters (tax reporting and a means-tested financial benefit program targeted at low-income students). Our cases are set in different countries (USA and Denmark) and vary both in terms of the burdens they impose and the benefits they promise, thereby increasing our ability to assess the external validity of our results.

Our results show that health does shape peoples' experiences of government, but in ways that are more complex than expected. Attention disorders and pain are consistently associated with more intense experiences of administrative burden as well as lower take-up of benefits. However, the evidence regarding depression and anxiety is more mixed depending on model specification. Importantly, we find that the effects of health problems are cumulative: the most burdensome experiences and the lowest levels of benefit take-up are found among individuals who suffer from multiple health problems at once. The implication is that examining the effect of a single heath issue in isolation offers an incomplete picture. Instead, understanding the impact of health on the publics' ability to negotiate state processes requires attention to comorbidities.

The findings illustrate how attention to administrative burdens in citizen-state interactions creates an area of overlapping interest for researchers and practitioners in the fields of public health and public administration (Christensen et al., 2020; Herd & Moynihan, 2020). For example, previous work has documented how burdens can limit people's access to health insurance (Carey et al., 2021; Fox, Stazyk, & Feng, 2020), health care (Kyle, 2021), and disability supports (Deshpande & Li, 2019), and how burdens can trigger physiological as well as mental health responses among target group members (Baekgaard et al., 2021; Hattke, Hensel, & Kalucza, 2020). We contribute to this work by providing evidence that individual differences in both physical and mental health matter to people's experiences of burden, as well as to take-up of services and benefits. In turn, we advance current explanations of why administrative burdens are unequally distributed by highlighting and empirically demonstrating the role of physical and mental health in citizen-state interactions. Additionally, while public health scholars have demonstrated the challenges faced by people suffering from physical and mental health issues in completing everyday tasks (Whalen et al., 2006), we take this research a step further by examining the consequences of physical and mental health for citizens' interactions with the state, including their ability to access financial benefits. Our findings have important practical implications for public managers in the pursuit of equity and reducing administrative burden, which is a growing priority issue (U.S. OMB 2021). Ultimately, policies seeking to advance equity will be hampered if they fail

to consider how factors like health and disability interact with administrative experiences in ways that result in bureaucratic disentitlement for those who most need help.

HEALTH, ADMINISTRATIVE BURDEN, AND INEQUALITY IN CITIZEN-STATE INTERACTIONS

While studies of citizen-state interactions have traditionally focused on state actors (Andersen & Guul, 2019; Jilke & Tummers, 2018; Lipsky, 2010; Maynard-Moody & Musheno, 2003), researchers have recently begun to employ a more citizen-centered approach (Nielsen, Nielsen, & Bisgaard, 2021; Barnes, 2020; Herd & Moynihan, 2018; Madsen, Mikkelsen and Moynihan 2020). Studies have, for example, revealed how state-imposed hassles in policy design and implementation can cause psychological costs among target group members (e.g., Baekgaard et al., 2021; Hattke et al., 2020). Moreover, increases in administrative hassles have been found to be associated with lower take-up of public services and benefits (Bhargava & Manoli, 2015; Deshpande & Li, 2019; Fox et al., 2020; Homonoff & Somerville, 2020).

The fact that state-imposed hassles cause frustration and sometimes motivate people to exit out of state encounters might not in itself be a concern. For instance, according to the ordeal mechanism perspective from economics, state-imposed hassles serve to target benefits to those who truly desire and need them (Zeckhauser, 2021). The idea that those most in need of public assistance will also be the ones who are most willing to endure administratively burdensome processes to access benefits is intuitive. However, the administrative burden perspective suggests that the effects of hassles may often be larger than anticipated[2] and tend to be distributive in ways that are inconsistent with the ordeals model. For example, studies have found that more financially disadvantaged groups are often more negatively affected by administrative hassles (Bhargava & Manoli, 2015; Brodkin & Majmundar, 2010; Deshpande & Li, 2019; Homonoff and Somerville 2021).

These competing perspectives highlight the need to understand why people react differently to equivalent administrative procedures. Recent studies have begun conceptualizing and testing characteristics that may exacerbate experiences of burden, such as "administrative capital" (Masood & Nisar, 2021) and "administrative literacy" (Döring, 2021), defined as the specific skills and resources needed to manage administrative encounters. Other scholars have highlighted the role of social capital, poverty, scarcity, marginalization, and cultural capital in shaping the experienced level of administrative burden (Chudnovsky & Peeters, 2020; Masood & Nisar, 2021). All of these studies point to the broader human capital "Catch-22" argument: factors that increase people's need for public assistance (i.e., scarcity, poor health, and age-related cognitive decline), may simultaneously impede people's ability to manage interactions with the state (Christensen et al., 2020, 131). Despite these important contributions, however, our empirical knowledge is still limited as to the role of health in shaping experiences of administrative burden and access to public services and benefits.

We expect variations in physical and mental health to matter to people's experiences of administrative burden as well as to people's take-up of benefits. We focus specifically on the impact of pain, anxiety, depression, and attention disorders (ADHD and ADD) because, as noted, these conditions are associated with reduced cognitive resources—including but not limited to executive functions such as working memory, attention, planning abilities, etc. (Berryman et al., 2014; Jarrett & Ollendick, 2008; Snyder, 2013). Indeed, low levels of executive functioning is a *defining* symptom of attention disorders like ADHD and ADD (Barkley, 1997; Diamond, 2013). There is also robust evidence documenting the influence of depression on executive functions, including multiple recent meta-analyses (Bell et al., 2018; Dotson et al., 2020; Lindert et al., 2021; McDermott & Ebmeier, 2009). Similar evidence is present for anxiety (Lindert et al., 2021; Shields et al., 2016) and pain has robust relationships with cognitive resources (broadly speaking, executive functions included) (Berryman et al., 2014; James et al., 2018; Mazza et al., 2018; Moriarty et al., 2011; Whitlock et al., 2017). For instance, one of the most common complaints among people with chronic pain is difficulty paying attention and remembering things (Turk et al., 2008) and even short periods of experimentally induced (acute) pain have been found to reduce people's attention (Moore, Keogh, & Eccleston, 2012; Van Ryckeghem, Crombez, Eccleston, Legrain, & Van Damme, 2013).

Yet, why would pain, anxiety, depression, and attention disorders' associations with cognitive resources make us expect them to matter in the context of citizens' interactions with the state? To explain this, we point to Christensen et al.'s (2020) theoretical arguments about the impact of cognitive resources in the form of executive functions. There is no universally accepted approach to defining and categorizing executive functions (Suchy, 2009), but scholars concur that they are mental processes, mainly initiated from the prefrontal cortex of the brain, that affect people's ability to engage in purposeful, goal-directed, and future-oriented behavior (Ibid.). Examples of executive functions include working memory, attention, impulse control, and planning abilities. According to Christensen et al. (2020), executive functions may be expected to matter to people's interactions with the state, both prior to and after the initiation of such interactions. Prior to the encounters, impaired executive functions are expected to lower people's ability to learn about potentially relevant services and benefits, as well as their follow-through, should they learn about programs that could be of benefit to them. In effect,

people with reduced executive functions may struggle to access services and benefits, simply because they fail to identify what is available and because they fail to apply when services and benefits have been identified. If state encounters *are* initiated, executive functions are expected to affect people's ability to manage administrative procedures because they are needed to "plan activities ahead of time, act on those plans, and stay on tasks despite impulses and temptations to do something else when things get frustrating" (Christensen et al., 2020, 130). People with impaired executive functions may find it more burdensome to manage administrative rules and requirements, and they may be in a higher risk of losing access to services and benefits because of misunderstandings, missed administrative deadlines, etc. This could be why recent studies of voter turnout find that "individuals who were diagnosed with ADHD have the lowest turnout and are 28%–54% less likely to vote" (Aarøe et al., 2021, 283). Finally, because people with lower executive functioning are less psychologically resilient to stressors in life (Diamond, 2013; Genet & Siemer, 2011), they may be expected to be more psychologically burdened by hassles related to interactions with the state.

Although Christensen et al. (2020) focus on one causal pathway—cognitive resources in the form of executive functions—it is important to note that health may also have an impact through other mediating factors as well. First, effects of health may in some cases operate via other cognitive processes than executive functions. For example, conditions like depression and anxiety are associated with information-processing biases that make people interpret information in a more negative manner (Mathews & MacLeod, 2005). It is reasonable to expect that this will also affect people's experiences of administrative burden during interactions with the state. Second, health may in some cases impact experiences of administrative burden through non-cognitive processes as well. For example, administrative tasks that require physical activity—like walking or standing in line—also require some baseline physical health. A good illustration of this point comes from Burden, Fletcher, Herd, Jones, and Moynihan (2017) who find that cognitive functioning, general health, and physical functioning (measured through gait speed) all matter to voting, with effect sizes comparable to that of education, a well-established predictor of turnout. Thus, although our interest in pain, ADHD/ADD, anxiety, and depression is mainly due to their known effects on cognitive resources in the form of executive functions, we acknowledge the possibility of alternative mediating factors linking health, administrative burden, and take-up as well. It is also important to note that by focusing on the health problems we do, we cannot conclude about the effects of other specific kinds of health problems, for example, physical health conditions that do not manifest in physical pain.

The underlying logic of our theoretical approach is presented in Figure 1 below. As illustrated in the figure, pain, anxiety, and depression are associated with reduced cognitive resources but may, in theory, affect people's experiences and outcomes through other mechanisms as well. Pain, in particular, may have a more direct impact by making specific administrative tasks physically difficult to complete (Burden et al., 2017). Attention disorders, on the other hand, have cognitive impediments in the form of reduced executive functions as their *defining symptoms* (Barkley, 1997; Diamond, 2013), which is why all the figure's effects of attention disorders go through cognitive resources. We do not test the mediating role of cognitive resources empirically, but it serves as our main reason to expect that individuals with pain, depression, anxiety, and attention disorders will be more apt to experience administrative burdens and to opt-out of administrative processes.

We also consider the extent to which people's experiences and outcomes may be affected by the magnitude and complexity of their health problems. Pain, depression, anxiety, and attention disorders are common comorbidities (Bair, Robinson, Katon, & Kroenke, 2003; Jarrett & Ollendick, 2008; Tsang et al., 2008). In other words, many people suffer from multiple health problems at once. As a result, those with more complex health needs, and thus in more need of assistance, may also be more disadvantaged in their interactions with the state. Our expectations are summarized in the following four hypotheses:

> **H1.** *Physical pain, anxiety, depression, and attention disorders will be associated with higher experienced levels of administrative burden.*

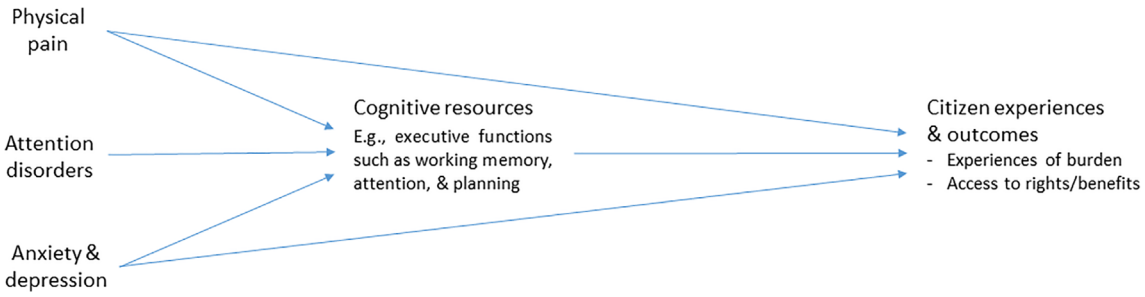

FIGURE 1 Theoretical model for the impact of health on citizen experiences & outcomes

TABLE 1 Data overview

Case	Data	Independent and control variables	Dependent variables and hypotheses tested
1. Tax reporting, DK	Survey data ($N = 1553$) collected among members of YouGov's online panel of Danish respondents in November–December, 2020, and February, 2021.	• Main independent variables: Pain, anxiety, depression, and attention disorders (measured in November–December 2020). • Control variables: Age, gender, education, geography, household income (YouGov background data).	• Experiences of administrative burden (measured in February 2021). • Hypotheses 1 & 3.
2. Financial aid for higher education-Oklahoma's Promise, USA	Survey data ($N = 2005$) collected among current and former applicants in collaboration with the Oklahoma's State Regents for Higher Education in May–June 2020.	• Main independent variables: Pain, anxiety, depression, and attention disorders. • Control variables: Gender, parent education, parent income, and year of enrollment.	• Experiences of administrative burden. • Take-up of benefits. • Hypotheses 1–4.

H2. *Physical pain, anxiety, depression, and attention disorders will be associated with lower take-up of public services and benefits.*

H3. *The relationship between pain, anxiety, depression, and attention disorders, and experiences of administrative burden will be strongest among individuals suffering from multiple health problems.*

H4. *The relationship between pain, anxiety, depression, and attention disorders, and people's take-up of public services and benefits will be strongest among individuals suffering from multiple health problems.*

RESEARCH DESIGN

We test our hypotheses in different political and programmatic settings, thereby increasing our ability to assess the external validity of our findings. Our two cases—tax reporting, and student financial aid—are set in different countries (Denmark and the US) and feature different kinds of citizen-state interactions. These cases vary both in terms of the expected burdens they produce and the potential benefits they offer. By testing our hypotheses in two significantly different policy contexts, we improve our ability to assess the external validity of our findings.

In our first case, tax reporting, participants need merely to update personal information, with the potential benefit or penalty that failure to do so might create tax over- or under-payments that must be remedied later. In the second case, student financial aid, participants might earn a very large benefit—state support that makes higher education affordable—but face a complex and intrusive administrative process to do so. More detail is provided on the cases below, and Table 1 provides an overview of the data used to analyze each case, as well as the hypotheses addressed in the analyses.

EMPIRICAL SETTINGS

Case 1: Tax reporting in Denmark

In the first case, we ask how differences in health are associated with experiences of administrative burden in the context of tax reporting in Denmark. The Danish tax authorities utilize financial information reported by employers, banks, etc., to make tax reporting less administratively burdensome than the US system, where individuals must reproduce that information themselves. However, Danes are responsible for monitoring their personal data via their "advance statement," an online form with their tax-related information. People can choose to ignore the advance statement throughout the year, and many do, but out-of-date information creates a risk of paying the wrong amount of taxes, meaning that people may have to pay residual taxes later, or claim a refund for overpayment. Since there is no tangible benefit to claim, there is no measure of "take-up" and so the focus of this case is purely on whether pain, anxiety, depression, and attention disorders predict experiences of burden related to managing and reporting taxes (H1 and H3).

Case 2: College financial aid: Oklahoma's Promise

The second case, Oklahoma's Promise, is a means-tested, hybrid merit-based and needs-based early commitment tuition-free college program, introduced in 1994 for the purpose of boosting college access and affordability for low-income families in Oklahoma, USA. Program participants are subject to strict curriculum, GPA, income, citizenship, attendance, and delinquency requirements and they must document their compliance with these requirements on a frequent basis. The number and stringency of eligibility rules give rise to high levels of experienced administrative burden, and many eligible students lose access to the program because of these administrative

hurdles (Bell, 2020; Bell & Smith, 2022; Bell, Ter-Mkrtchyan, Wehde, & Smith, 2021). In our analyses, we test whether pain, anxiety, depression, and attention disorders are associated with more intense experiences of burden—as well as a higher risk of losing access to the benefits of the Oklahoma's Promise program.

DATA AND MEASURES

For our Danish case, we rely on survey data collected among respondents that were all recruited using YouGov's online panel of Danish respondents. The data were collected through two surveys: One survey in November–December, 2020, where we asked the respondents about their health and a follow-up survey in February, 2021, where we asked about their experiences related to tax reporting. A total of 2220 respondents participated in the health survey in November–December, 2020. One thousand five hundred and thirteen of these respondents constituted a nationally representative sample of the Danish population (with regard to gender, age, geography, and education) whereas the remaining 707 respondents were recruited through targeted invitations to individuals who, according to YouGov's background data, suffered from either a chronic pain disease (either a rheumatic disease or a back disease) or anxiety/depression. Due to limitations in YouGov's available background data, it was not possible to target respondents with attention disorders. The oversampling of respondents with health problems ensured sufficient variation in health among our respondents. Our analytical sample is comprised of 1553 respondents (1021 from the nationally representative sample plus 532 from the sample of sick individuals) who answered both surveys.

For the Oklahoma's Promise case, we collected data in collaboration with the Oklahoma State Regents for Higher Education who distributed our survey to all current and former Oklahoma's Promise applicants with valid email addresses (over 20,000 people were sent the survey invitation, but some of these emails were unsuccessfully delivered). Data were collected in May–June 2020, during which 2005 respondents provided answers to our items.[3] Respondents were a combination of current and former students who received the scholarship for the full duration of their college enrollment, current, and former students who enrolled but later lost access to the program's benefits, and parents who applied for Oklahoma's Promise on behalf of one or more children.[4]

Independent variables

Across our cases, we focus on four specific kinds of health problems: pain, anxiety, depression, and attention disorders in the form of ADHD and ADD. To collect data on this, all Danish respondents were asked the following question:

"Do you currently struggle with any of the following health problems?

- *Physical pain*
- *Anxiety*
- *Depression*
- *ADHD/ADD"*

For each of the four health problems, possible answers were "No," "Yes, diagnosed," and "Yes, I think so but have not been diagnosed." In our analyses, we test Hypotheses 1 and 2 using dummy variables coded as 0 if respondents did not report a given health problem and 1 if they did so (either suspected or diagnosed). Furthermore, to test Hypotheses 3 and 4, we code variables to distinguish between respondents based on their number of health problems (again collapsing diagnosed and undiagnosed health problems).

It should be noted that self-reported measures of health are a common, and well validated, approach to assessing both physical and mental health (Fosse & Haas, 2009). Indeed, studies have found that self-reported measures of health are as good as, or in some cases better, long-term predictors of disability and mortality than are physician assessments (DeSalvo, Bloser, Reynolds, He, & Muntner, 2006; DeSalvo & Muntner, 2011; Ferraro & Su, 2000). Indeed, for measures of pain, self-reports are the only way to assess the outcome; this is how physicians assess pain levels as well (Younger, McCue, & Mackey, 2009). Self-reported mental health diagnoses are also valid and reliable, in some cases even predicting outcomes such as hospitalization, above and beyond physician assessments (Eisen et al., 2011; Koenig, Meador, Cohen, & Blazer, 1988; Sanchez-Villegas et al., 2008; Stuart et al., 2014). Further, there is evidence of a strong concordance between symptom-based assessments of depression and anxiety and the self-reported single question diagnoses employed in this study (Davies et al., 2022). In sum, there is little evidence that the self-reported measurement strategy employed here will bias our results.

The Oklahoma's Promise survey contained a question almost identical to the health question in the Danish data. The only difference was that in the Oklahoma's Promise survey, the pain item asked more narrowly about chronic pain and the question asked back in time to when the applicants were in middle/high school.[5] Because of the near-identical wording, we used the same coding as in the Danish data. Online Supplementary material S1 shows the distribution of health problems among the respondents (Table S1a,b), as well as the correlations between the different kinds of health problems (Table S1c).

Despite the near-identical wordings of the health items in our two surveys, it is relevant to note that one difference—the one regarding pain—is not trivial. In the Danish survey, the wording is less narrow and the respondents who answered "yes" may be a combination of people with acute pain (e.g., people with a broken bone) and

people with chronic pain. The question wording, including the fact that pain is listed alongside anxiety, depression, and ADHD, does, however, lead us to believe that most participants likely understood this as chronic rather than acute pain. Moreover, as noted above, the Danish sample included a large subsample (∼33%) of sick individuals, including individuals who have—according to YouGov background data—been diagnosed with a chronic pain disease (e.g., rheumatoid arthritis). Nonetheless, this is important context for interpreting the results of our findings.

DEPENDENT VARIABLES

Existing literature defines our first dependent variable—administrative burden—as peoples' experience of government as onerous (Burden et al. 2012), involving, for example, specific kinds of burden, such as learning, compliance, and psychological costs (Herd & Moynihan, 2018). In effect, to test Hypotheses 1 and 3 about associations between health and administrative burden, we need to ask our respondents about their (subjective) experiences of their interactions with the state. We do so, both in the Danish tax case and the Oklahoma's Promise case.

Table 2 details the items that we used to measure experiences of burden in the two cases, which we adapted from De Bruijn (2021). Some items concern learning costs (tax items 1–4 and OK Promise item 4), some concern compliance costs (tax items 5–7 and OK Promise items 1 and 7), and some concern psychological costs (tax items 8–10 and OK Promise items 2, 3, and 5) (Moynihan, Herd, & Harvey, 2015). Finally, one item (OK Promise item 6), does not refer specifically to any of the specific types of burden, instead measuring overall satisfaction/dissatisfaction with the requirements. [Correction added on 3 January 2023, after first online publication: the citation of 'De Bruijn (2021)' of the preceding sentence has been moved to the end of the first sentence of the same paragraph.] Because we do not have specific hypotheses about learning, compliance, or psychological costs, in each case, we combine all items into one administrative burden index (Cronbach's $\alpha = 0.93$ in the tax case and 0.86 in the Oklahoma's Promise case). In both cases, the index is coded to range from 0 to 1 with higher values indicating more burdensome experiences. In the tax reporting case, mean = 0.451 and SD = 0.245 whereas in the OK Promise case, mean = 0.274 and SD = 0.218.

Take-up of benefits

Hypotheses 2 and 4 concern relationships between health problems and take-up of benefits. We test this hypothesis

TABLE 2 Items measuring experiences of administrative burden

Tax reporting	As a citizen in Denmark, various factors affect how much you have to pay in taxes. It matters, for example, how much you earn and what tax deductions you are entitled to. Even though employers, etc., provide some information to the tax authorities, it is your own responsibility to ensure that the information in your advance statement is correct in order for you to pay the right amount of taxes throughout the year. Thus, if your life circumstances or your personal finances change during the year, you may have to adjust the advance statement in order for income, tax deductions, etc., to be correct. How much do you agree or disagree with the following statements? 1. I find it hard to understand how the tax-related rules apply to me (e.g., how much I have to pay and what tax deductions I am entitled to). 2. It takes too much time to learn about the tax-related rules that apply to me. 3. I find it easy to learn what tax deductions I am entitled to and why. (reversed) 4. It would be easy for me to learn how the advance statement's numbers are affected, should my personal finances change during the year. (reversed) 5. It takes a lot of time to update the advance statement during the year. 6. Keeping the advance statement up to date during the year is onerous. 7. It would not take much time to adjust my advance statement, should my personal finances change during the year. (reversed) 8. Managing taxes (e.g., ensuring that the information in the advance statement is correct) makes me in a bad mood. 9. Managing taxes (e.g., ensuring that the information in the advance statement is correct) is stressful and makes me nervous. 10. Managing taxes (e.g., ensuring that the information in the advance statement is correct) is frustrating.
Oklahoma's Promise	Please indicate how much you agree/disagree with the following statements about rules and obligations connected with Oklahoma's Promise program. 1. The rules and obligations for Oklahoma's Promise were easy for me to manage (Reversed) 2. The rules and obligations for Oklahoma's Promise cause(d) me irritation or frustration 3. The rules and obligations for Oklahoma's Promise cause(d) me stress and tension 4. The rules and obligations for Oklahoma's Promise were hard to understand 5. The rules and obligations for Oklahoma's Promise restricted my personal autonomy 6. I am satisfied with the rules and obligations for Oklahoma's Promise (Reversed) 7. It takes a lot of effort to comply with the rules and obligations for Oklahoma's Promise.

Note: In both surveys, respondents were asked to answer each item on a 5-point Likert scale with higher values indicating stronger agreement with the statement in question.

in the context of the Oklahoma's Promise case since this case involved benefits that people could fail or succeed in taking up.

In the Oklahoma's Promise case, we ask whether health problems are associated with higher risks of losing access *after* having entered the program. As noted earlier, benefit receipt depends on compliance with a strict set of administrative requirements. Many income-eligible students lost access to the program because they failed maintain compliance (Bell et al., 2021; Bell & Smith, 2022). We code a dependent dummy variable as 0 if respondents enrolled in the program and never lost access to it (are still in the program or were so throughout college) and 1 if respondents enrolled in the program but later lost access upon high school graduation or while in college. The variable has a mean value of 0.111 and a SD of 0.314, corresponding to 178 observations out of 1609 total observations with data on lost access.[6] We refer to online Supplementary material S2 for further details on the items used to code the variable.

Control variables

In our analyses, to minimize the risk of omitted variable bias, we control for available variables that might be associated with both health and our dependent variables. Our two cases differ somewhat regarding available control variables, but we do our best to ensure consistency across the modeling approaches in the main specification. Thus, in analyses of the Danish tax case, we control for respondents' age, gender, education, geography, and household income (all control variables are based on YouGov background data). In analyses of the Oklahoma's Promise case, we control for gender, parent education, parent income, and year of enrollment (as a proxy for age). We also add race, early childhood experiences of scarcity, and administrative literacy to the set of control variables for the Oklahoma's Promise case to test the robustness of our results (see online Appendix S6).

RESULTS

According to Hypotheses 1 and 2, pain, anxiety, depression, and attention disorders are expected to be associated with higher levels of experienced administrative burden (H1) as well as lower take-up of public services and benefits (H2). We test both of these hypotheses in Table 3, where models 1–2 test Hypothesis 1 and model 3 tests Hypothesis 2. As noted, pain, depression, anxiety, and attention disorders are common comorbidities, meaning that they are highly correlated with each other. We include all health problems in the same model to sort out which health conditions (if any) are driving associations with the outcome variables, even if the high correlations between the independent variables make this a rather conservative test of each health condition's impact.

Starting with Hypothesis 1, in the tax case, this hypothesis is supported when it comes to pain (Est = 0.036, SE = 0.012, $p = 0.004$), anxiety (Est = 0.040, SE = 0.019, $p = 0.033$), and ADHD/ADD, although only significant at the 10% level (Est = 0.053, SE = 0.028, $p = 0.060$). The only of the four health problems not significantly associated with tax-related experiences of burden is depression (Est = 0.026, SE = 0.018, $p = 0.147$). In the Oklahoma's Promise case, we find that all health problems are associated with experiences of burden, though some are only marginally statistically significant. In line with Hypothesis 1, pain (Est = 0.027, SE = 0.014, $p = 0.053$), ADHD/ADD (Est = 0.062, SE = 0.013, $p = 0.000$), anxiety (Est = 0.021, SE = 0.013, $p = 0.094$), and depression (Est = 0.021, SE = 0.013, $p = 0.089$) are all associated with more intense experiences of burden.

Moving on to our test of Hypothesis 2, we find that pain (Est = 0.049, SE = 0.021, $p = 0.022$) and ADHD/ADD (Est = 0.054, SE = 0.020, $p = 0.015$) are positively associated with the likelihood of losing access to Oklahoma's Promise. However, neither anxiety (Est = 0.009, SE = 0.020, $p = 0.660$) nor depression (Est = 0.007, SE = 0.020, $p = 0.720$) are significantly associated with loss of access to the Oklahoma's Promise benefits.

TABLE 3 Specific health problems, experiences of administrative burden, and access to benefits (OLS)

	Model 1: Administrative burden, tax reporting (H1)	Model 2: Administrative burden, OK Promise (H1)	Model 3: Loss of access, OK Promise (H2)
Pain	0.036** (0.012)	0.027^{+} (0.014)	0.049* (0.021)
Anxiety	0.040* (0.019)	0.021^{+} (0.012)	0.009 (0.020)
Depression	0.026 (0.180)	0.022^{+} (0.013)	0.007 (0.020)
ADHD/ADD	0.053^{+} (0.028)	0.062*** (0.014)	0.054* (0.022)
Intercept	0.582*** (0.021)	0.237*** (0.036)	0.366*** (0.063)
R^2	0.14	0.03	0.07
N	1553	2005	1609

Note: Results are ordinary least squares regression coefficients with standard errors in parentheses. $^{+}p < 0.1$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. Model 1 controls for gender, age, education, geography, and household income. Models 2 and 3 control for gender, parent education, parent income, and year of enrollment. Compared to model 2, model 3's *N* is smaller because there are more missing values in the scholarship receipt questions, compared to the experiences of burden.

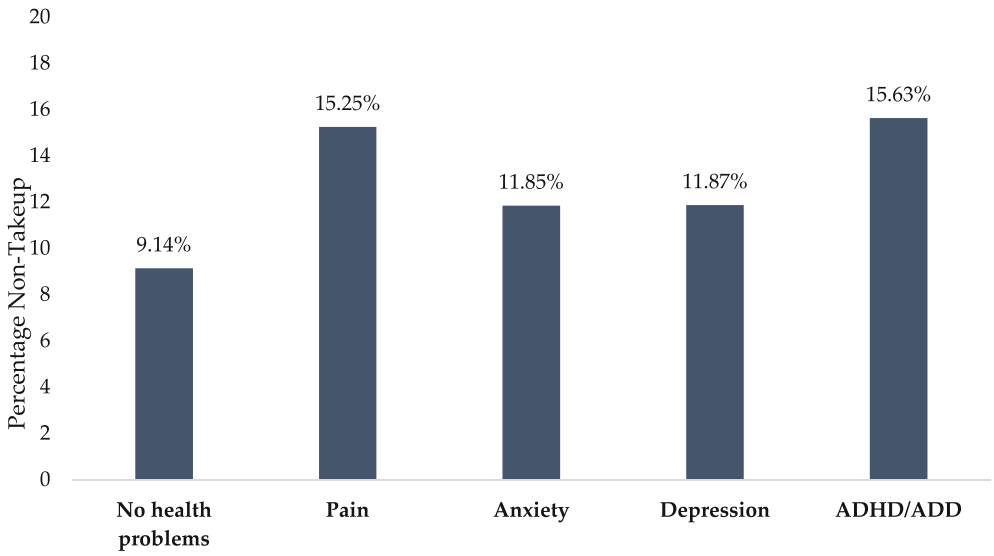

FIGURE 2 Percentage losing access to Oklahoma's Promise program, by specific health condition

It should be noted that even if not all health coefficients in Table 3 were significant, this does not mean that health conditions with insignificant coefficients are unrelated to our dependent variables. In Table 3's analyses, we test the impact of each health condition while controlling for the three remaining conditions. As mentioned, this is a conservative modeling strategy given the strong correlations between pain, depression, anxiety, and attention disorders. Supplementary analyses (reported in online Appendix S3) reveal that in both empirical cases, all four kinds of health problems *are* predictive of administrative burden (thereby Supporting hypothesis 1), when we investigate them in separate models. Moreover, all four kinds of health problems are predictive of loss of access to the Oklahoma's Promise benefits (thereby Supporting hypothesis 2), when we investigate them in separate models (see also Figure 2).

Next, we consider the evidence for Hypotheses 3 and 4, in which we predict that pain, anxiety, depression, and attention disorders have a cumulative effect on people's experiences of administrative burden (H3) as well as on people's access to benefits (H4). These hypotheses are tested in Table 4 where models 1–2 test Hypothesis 3 whereas model 3 tests Hypothesis 4. In the analyses, we combine individuals suffering from three health problems and individuals suffering from all four health problems, given that a very low number of respondents suffer from all four health problems at once.[7]

The results in Table 4 support both Hypotheses 3 and 4. The relative differences in coefficients (one vs. two and two vs. three or more health problems) vary but in all models, the largest coefficients are found for people suffering multiple health problems. In other words, people who have to deal with multiple health problems at once seem, as hypothesized, to face more intense challenges in their interactions with the state, both in terms of experienced administrative burden and access to services and benefits (see also Figure 3).

TABLE 4 Number of health problems, experiences of administrative burden and access to benefits (OLS)

	Model 1: Administrative burden, tax reporting (H3)	Model 2: Administrative burden, OK Promise (H3)	Model 3: Loss of access, OK Promise (H4)
# of health problems			
Zero (reference)	-	-	-
One	0.042** (0.013)	0.042** (0.013)	0.010 (0.021)
Two	0.111*** (0.020)	0.043** (0.012)	0.032 (0.020)
Three or more	0.098*** (0.023)	0.103*** (0.015)	0.079** (0.023)
Intercept	0.578*** (0.021)	0.239*** (0.036)	0.370*** (0.063)
R^2	0.14	0.03	0.07
N	1553	2005	1609

Note: Results are ordinary least squares regression coefficients with standard errors in parentheses. $^{+}p < 0.1$; $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$. Model 1 controls for gender, age, education, geography, and household income. Models 2 and 3 control for gender, parent education, parent income, and year of enrollment. Compared to model 2, model 3's *N* is smaller because there are more missing values in the scholarship receipt questions, compared to the experiences of burden.

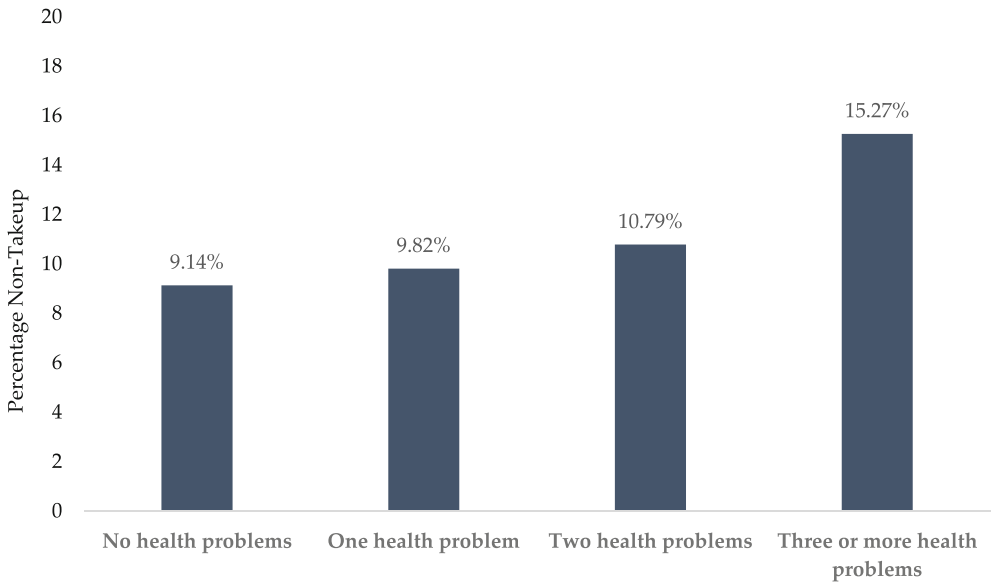

FIGURE 3 Percentage losing access to Oklahoma's Promise program, by the number of health conditions

ROBUSTNESS CHECK FOCUSING ON DIAGNOSED HEALTH PROBLEMS

In the analyses above, our independent health dummy variables were coded as 0 if respondents did *not* suffer from the health problem in question and 1 if they did (diagnosed) or thought that they did but had not been diagnosed. The coding strategy reflects a belief in people's ability to recognize that they have health problems, even if they have not been diagnosed by a medical expert. After all, the four health problems we ask about are common and it is reasonable to expect that most people will have at least some knowledge about the symptoms related to them.

However, we acknowledge that there is more uncertainty related to the health of individuals with suspected but undiagnosed problems compared to individuals who have been diagnosed. Thus, to assess the sensitivity of our results, we conduct a robustness test (see online Appendix S4) using an alternative coding strategy where only diagnosed health problems were coded as 1 (responses were coded as 0 if respondents did not suffer from the health problem or thought that they did but had not been diagnosed). We find that even with this more conservative coding strategy, there is some support for all four hypotheses, although the evidence does become a bit more mixed than when diagnosed and undiagnosed health problems are combined. In the Danish tax case, we find support for Hypothesis 1 (about specific health problems and experiences of administrative burden) when we examine pain and attention disorders. In the Oklahoma's Promise case, we find support for Hypothesis 1 when we examine depression, but none of the three other health problems are associated with administrative burden. We find support for Hypothesis 2 (about specific health problems and loss of access to benefits) when we analyze pain and attention disorders but find that anxiety and depression are not associated with loss of access. Finally, we find that the results regarding Hypotheses 3 and 4 (about the additive effects of suffering from multiple health problems at once) are robust to this alternative specification.

In online Appendix S6, we test the sensitivity of the Oklahoma's Promise case results to the inclusion of controls for administrative literacy, childhood scarcity, and race/ethnicity. We find that the results are robust to this alternative specification. In fact, while associations with health problems remain statistically significant, we find that scarcity—which has been a central variable in prior research—did not significantly predict either of our outcomes. Administrative literacy, on the other hand, did predict experiences of burden, but not loss of access to Oklahoma's Promise.

DISCUSSION: CONNECTING PUBLIC ADMINISTRATION AND PUBLIC HEALTH

This article contributes to a relatively novel but growing area of research at the intersection of public health and public administration. Until now, researchers have mainly investigated effects of administrative burdens on people's access to health programs and other programs with health-protective effects (Carey et al., 2021; Deshpande & Li, 2019; Fox et al., 2020; Kyle and Frakt 2021) as well as the potential for burdens to induce ill-health (Herd & Moynihan, 2020; Baekgaard et al. 2021). We have investigated the effects of health (pain, anxiety, depression, and attention disorders) on people's experiences of burden *and* take-up of desired benefits. We offer evidence that

health is associated with people's experiences of burden as well as to their success in accessing benefits.

While health mattered in all cases, the relative importance of the specific kinds of health conditions varied from case to case. Whereas pain and attention disorders were consistently related to experiences of burden as well as take-up, the evidence for anxiety and depression was less consistent. A lesson for future research is that the effects of health in citizen-state interactions seem to be multi-faceted: both physical and mental health matter, but even beyond that very simple distinction, a particular form of health might matter for one context while being less relevant for another. These insights build on literature showing that the connections between social contexts and health conditions likely vary depending on what specific health condition, and what specific social context, is examined (Herd, Goesling, & House, 2007). The broad question of "does health matter?" thus seems less useful than an analytical approach that maps the contingencies, reflected by the more nuanced question of "under what circumstances do certain aspects of health matter, and why?"

Another important finding was that not only does health matter to people's experiences of the state; the accumulation of ill-health matters as well. Individuals with multiple health problems struggle the most in terms of experiences of administrative burden and in terms of accessing public benefits. This finding further supports concerns about a human capital Catch-22 when it comes to administrative burdens and access to public benefits (Christensen et al., 2020): Those who are most in need of assistance also seem to be least able to manage state-encounters required for accessing the benefits to which they are entitled. Therefore, when resources are available to help citizens navigate administrative processes, public managers may be able to advance equity in access by targeting assistance to those who struggle with multiple health issues.

Before we conclude, we note some limitations and caveats to contextualize the findings. First, while confidence in our study's external validity is strengthened by the fact that the broad findings were similar across countries, and across very different types of citizen-state interactions, it needs to be noted that none of our cases were specifically targeted toward people with health problems. Therefore, our findings do not allow us to make conclusions about the role of health-differences within policy areas where *all* target group members suffer from health problems. The findings of additive effects of health problems (cf. Hypotheses 3 and 4) suggest that health-differences may indeed matter in settings like these as well. Future research could examine if and how street-level bureaucrats who are used to working with sick and injured citizens recognize and respond to people's health problems when it comes to managing burdens. To further address the generalizability of our findings, we also encourage replications of our investigation, including replications focusing on programs such as health insurance, health care, and disability supports.

Second, while our findings offer comparatively strong external validity, the analyses are observational, and thus, some caution is needed in terms of causal interpretations of our results. Future research would benefit from a focus on improving internal validity, for example, by establishing causality in controlled experimental settings. This could, for example, be through interdisciplinary collaborations with medical and psychological researchers who test treatments using randomized controlled trials, thereby making it possible to experimentally test the effects of health improvements on dependent variables like ours. The use of register data offers another potential avenue to track how health conditions are associated with outcomes related to citizen-state interactions (see, for example, Aarøe et al., 2021 who utilize register data to demonstrate associations between psychiatric diagnoses and voter turnout).

Third, our data do not allow us to make conclusions about all aspects of health and we have not tested the mediating mechanisms that link health to administrative burden and take-up. Health is a broad conceptual space. For example, there are kinds of physical health that are not related to pain and our data do not allow us to conclude about the impact of such health problems, even if other studies suggest they can have direct effects on people's ability to negotiate some administrative processes (Burden et al., 2017). When it comes to mediating mechanisms, as noted in the theory section, mediators other than cognitive resources may be at play as well. This includes both cognitive mechanisms (e.g., negative affect causing people with certain mental health conditions to evaluate the world more negatively) as well as mechanisms that are not cognitive (mobility issues, etc.). While contributing a demonstration of the relevance of specific physical and mental health conditions, we do thus leave an important unanswered research question about the causal pathways through which health matters to people's experiences of administrative burden and access to public services and benefits. We strongly encourage future research on the mediating mechanisms through which health plays a role (including cognitive resources as well as alternative—cognitive *and* non-cognitive—mediators).

Finally, it is important to note that while we are focusing on individual level determinants, these are shaped by a variety of factors, including broader upstream structural conditions. For example, there is robust evidence that children who grow up in poverty, especially with extended spells, are more likely to experience psychological distress, depression, and anxiety, all of which persist well into later life (McLeod & Shanahan, 1993; Reiss et al., 2019).[8] It is also the case that unemployment and financial shocks throughout life reduce mental health

(Reiss et al., 2019). Therefore, while we measure individual level health conditions, we also acknowledge the upstream structural conditions that factor into the health conditions of individuals in our study. A comprehensive understanding of how disadvantages emerge, and manifests itself through factors like health, needs to account for both these long-term and mediating variables.

CONCLUSION

The growing attention within public administration to citizen-state interactions has the welcome effect of inviting researchers to look more closely at the characteristics of members of the public—who they are and what challenges and skills they possess—and how this matters to their encounters with the state. How are these skills and resources distributed between different groups of society? Governments are increasingly interested in this question, and the ways in which burdens affect some groups more than other. For the example, the Biden administration issued an executive order that called for federal agencies to better identify "potential barriers that underserved communities and individuals may face in enrollment in and access to benefits and services in Federal programs" (EOP 2021).

Prior work has emphasized socioeconomic factors, such as income and education (Bhargava & Manoli, 2015; Brodkin & Majmundar, 2010; Deshpande & Li, 2019; Homonoff & Somerville, 2020), and specific administrative skills of relevance when interacting with the state (Döring, 2021; Masood & Nisar, 2021). In this paper, we offer evidence that health needs to be added to this list of critical individual level attributes that influence how people experience burdens and benefit from state encounters. By better understanding the role of health in citizen-state interactions, we can build a more developed behavioral model of individuals encountering the administrative state. Moreover, by incorporating health and disability into studies on citizen-state interactions, public management scholars can address an important source of inequality that could be counteracted by additional state resources or innovations in policy design.

Our study raises a practical question, one at the intersection of the applied fields of public health and public administration: what can be done to recognize and compensate for how health differences matter to people's interaction with the state? One approach could be to simplify administrative processes in programs that are specifically targeted toward sick individuals, or even auto-enroll individuals who are—according to administrative data—eligible for assistance (Herd, DeLeire, Harvey, & Moynihan, 2013). If programs cannot be designed to be simple, the provision of targeted help (from the state or from third parties) offers another strategy to help challenged groups of individuals during interactions with the state. In the context of the USA, for example, the Biden Administration is currently pushing for greater investments in "navigators" to help individuals access federal programs they are eligible for (Department of Health and Human Services, 2021; see also U.S. Office of Management and Budget, 2021). Healthcare workers, such as general practitioners, may play a positive role in terms of raising people's awareness of relevant services and benefits (alternatively, they could help facilitate contact to navigators) when encountering citizens suffering from health problems that make them prone to burdensome experiences and non-take-up of services and benefits.

There may be cost limitations on the provision of such help, and practical questions about whether it is provided by the government or third parties, but a deeper understanding of where more help is needed allows better targeting of supports. The evidence we provide on health disparities could help inform public managers of communities that may benefit most from such personalized assistance.

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ENDNOTES

[1] We utilize the term citizen to identify all individuals affected by state actions and policy, rather than a specific legal status–see Roberts (2021) for a discussion of this topic.

[2] For example, US workers spent the equivalent of $21.6 billion worth of time dealing with healthcare administration each year. The frustrations that resulted were associated with the equivalent of $26.4 billion in employee absences and $95.6 billion in lost productivity driven by reduced employee satisfaction (Pfeffer, Witters, Agrawal and Harter 2020). Another survey found that one quarter of US non-elderly adults reported delayed or skipped health care due to an administrative task (Kyle and Frakt 2021).

[3] This response rate reflects the challenges that researchers face when surveying low-income individuals who face challenges including a lack of technology or technological skills to complete online surveys, a lack of internet access and email access, and a lack of time and bandwidth (Sevelius et al., 2020). Despite these challenges, researchers have shown that online surveys still adequately approximate the overall population, which reduces concern over self-selection bias (Koch and Emrey, 2001).

[4] We do not know how many of the email addresses are still being used and we also do not know the number of emails that were undeliverable, meaning it is impossible to estimate a precise response rate. The survey invitation contained two links, one for parents and one for students, and we asked people to respond if they were the one who was responsible for completing the paperwork associated with applying for and participating in the Oklahoma's Promise program. In other words, parents were asked to answer the survey if they, and not their child or children, completed the paperwork associated with the program.

[5] By asking about prior decisions, we minimize the risk of reverse causality (e.g., loss of access to the scholarship causing people to drop out of college, causing again anxiety and depression because of reduced quality of life).

[6] In our Oklahoma's Promise loss of access analyses, 25 reported that they did so because they were no longer income eligible. Additional analyses (reported in online Appendix S5) show that our findings are robust to the exclusion of these respondents from the analyses.

[7] In Table 4, the number of respondents suffering from zero health problems is 520 in model 1, 820 in model 2, and 681 in model 3. The number of respondents suffering from one health problem is 736 in model 1, 394 in model 2, and 305 in model 3. The number of respondents suffering from two health problems is 172 in model 1, 482 in model 2, and 372 in model 3. The number of respondents suffering from three health problems is 100 in model 1, 240 in model 2, and 196 in model 3. And finally, the number of respondents suffering from all four health problems is 25 in model 1, 69 in model 2, and 55 in model 3.

[8] We note, however, that in the Oklahoma's Promise case, our results are robust to the inclusion of control variables capturing childhood experiences of scarcity (see online Supplementary material S6).

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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