

REVIEW SUMMARY

ECONOMICS

Poverty, depression, and anxiety: Causal evidence and mechanisms

Matthew Ridley, Gautam Rao, Frank Schilbach*, Vikram Patel

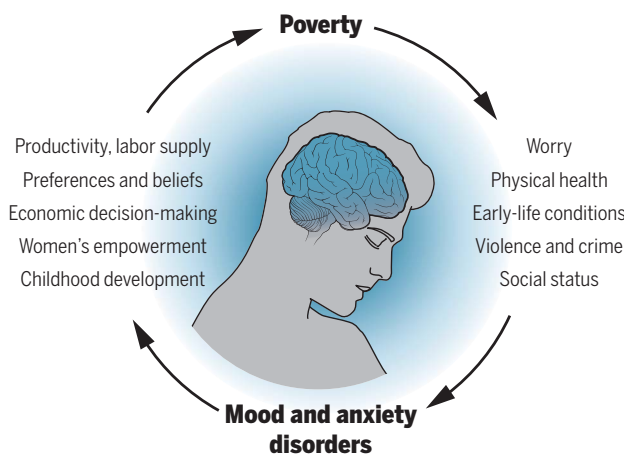
BACKGROUND: Depression and anxiety disorders are together responsible for 8% of years lived with disability globally. Contrary to widely held preconceptions, these are not diseases of affluence. Within a given location, those with the lowest incomes are typically 1.5 to 3 times more likely than the rich to experience depression or anxiety.

ADVANCES: Recent research has established a bidirectional causal relationship between poverty and mental illness. Researchers have begun to isolate the underlying mechanisms, which can guide effective policies to protect the mental health of those living in poverty.

We now know that loss of income causes mental illness. Negative income shocks, such as bad harvests due to poor rainfall or job losses due to factory closures, worsen mental health. Conversely, cash transfers and broader antipoverty programs reduce depression and anxiety in randomized trials. Multiple mechanisms mediate this causal chain. Poverty is associated with volatile income and expenditures. The resulting worries and uncertainty can worsen mental health. Providing health, employment, or weather insurance, or other ways of smoothing shocks, may thus lower depression and anxiety. Living in inadequate housing in low-income neighborhoods, the poor are also more exposed to environmental stresses such as pollution, temperature extremes, and challenging sleep environments, which can cause mental illness. Early-life conditions—poverty experienced in childhood and in utero— increase the likelihood of poor nutrition and other stressors, resulting in impaired cognitive development and adult mental illness. This makes a strong case for providing financial support to pregnant women and caregivers of young children. Poverty is also associated with worse physical health; greater exposure to trauma, violence, and crime; and lower social status, each of which may affect mental health.

Mental illness in turn worsens economic outcomes for individuals. Studies show

that randomized interventions to treat mental illnesses increase days worked. Depression and anxiety directly affect the way people think, by capturing their attention and distorting their memory. Such effects are likely to influence economic preferences and beliefs and thus distort important economic decisions made by individuals, such as how much to work, invest, and consume. Reduced concentration and greater fatigue reduce work productivity, and the social stigma of men-



The causal relationship between poverty and common mental illnesses. This schematic shows the principal mechanisms we identify, on the basis of theory and empirical evidence, through which poverty and depressive and anxiety disorders interact.

tal illness may further worsen labor-market outcomes. Mental illness appears to increase the likelihood of catastrophic health expenditures for individuals through its comorbidity with chronic illnesses such as diabetes and heart disease. Mental illness may also hinder education and skill acquisition among youth and exacerbate gender inequalities through its disproportionate prevalence among women. Parental mental illness can also influence children's cognitive development and educational attainment, transmitting mental illness and poverty across generations.

OUTLOOK: The burden of mental illness is likely to increase in the coming decades. Although richer individuals within a given lo-

cation are less likely to be mentally ill, richer countries do not have lower rates of mental illness. Thus, aggregate economic growth alone is unlikely to reduce mental illness. Climate change is likely to worsen mental health, both directly through the effect of higher temperatures on mood and through reductions in agricultural yields because of changes in rainfall and water supply, more frequent weather-related disasters, and an increased likelihood of violent conflict. Technological change and globalization create large overall economic gains but also concentrated groups of losers whose mental health may be compromised. The spread of social media and associated technologies may also be harming mental health, especially among adolescents.

Policy action on mental health is vital, as is interdisciplinary research on the mechanisms that link poverty and mental illness. Recently developed approaches to psychotherapy, delivered through nonspecialist providers, provide a scalable and effective approach to improving mental health in low-income countries. Given the associated economic benefits of improved mental health, such interventions should be a part of the antipoverty toolkit alongside more traditional economic interventions. Understanding the most effective combination of economic and psychological support in different populations is an important next step. A priority for research is testing for a mental health-based “poverty trap.” If such poverty traps exist, then powerful one-time interventions will have large long-run effects as gains in mental health and economic outcomes reinforce one another. Evaluations of economic interventions should routinely measure mental health, and long-run evaluations of mental health interventions should measure potential impacts on poverty and other key

economic outcomes. The causal relationship between poverty and mental health is even more pertinent given the ongoing pandemic, which has disproportionately affected the poor and may have lasting impacts on their economic and mental well-being. A massive investment in mental health was already long overdue. It has now become critically urgent. ■

The list of author affiliations is available in the full article online.
*Corresponding author. Email: fschilb@mit.edu
Cite this article as M. Ridley *et al.*, *Science* 370, eaay0214 (2020). DOI: 10.1126/science.aay0214

S READ THE FULL ARTICLE AT
<https://doi.org/10.1126/science.aay0214>

REVIEW

ECONOMICS

Poverty, depression, and anxiety: Causal evidence and mechanisms

Matthew Ridley¹, Gautam Rao², Frank Schilbach^{1*}, Vikram Patel^{3,4}

Why are people who live in poverty disproportionately affected by mental illness? We review the interdisciplinary evidence of the bidirectional causal relationship between poverty and common mental illnesses—depression and anxiety—and the underlying mechanisms. Research shows that mental illness reduces employment and therefore income, and that psychological interventions generate economic gains. Similarly, negative economic shocks cause mental illness, and antipoverty programs such as cash transfers improve mental health. A crucial step toward the design of effective policies is to better understand the mechanisms underlying these causal effects.

Depression and anxiety are the most common mental illnesses: 3 to 4% of the world's population suffers from each at any given time, and they are together responsible for 8% of years lived with disability globally (1). Contrary to widely held preconceptions from the 20th century, these are not “diseases of affluence” (2, 3). Within a given location, those living in poverty are at least as likely to suffer as the rich. By some measures, the poor are substantially more likely than the affluent to experience mental ill-health. Rates of depression, anxiety, and suicide correlate negatively with income (4–7) and employment (5, 8). Those with the lowest incomes in a community suffer 1.5 to 3 times more frequently from depression, anxiety, and other common mental illnesses than those with the highest incomes (5). For example, in India, 3.4% of those in the lowest income quintile experience depression at any given time, compared with 1.9% of those in the highest quintile (Fig. 1).

In this Review, we explore the evidence for the bidirectional causal relationship between poverty and mental health and its underlying mechanisms. Poverty is also correlated with poor physical health (9, 10), but the relationship between mental illness and poverty has been overlooked and is worth emphasizing. Mental health has historically not been considered a priority by economists and policymakers, and until recently, mental health care had not been evaluated as an antipoverty tool. Mental health services are underresourced relative to physical health systems. On average, countries spend 1.7% of their health budgets on mental health, even though 14% of

years lived with disability globally are known to be caused by depression, anxiety, and other mental illnesses (1). Low- and middle-income countries spend an even smaller share of already small health budgets on mental health (Fig. 2). Despite the existence of cost-effective treatments, such low investments in mental health have contributed to treatment gaps of more than 80% globally for common mental illnesses, which is much larger than for major physical health conditions (11–14). Mental and physical health are tightly connected: When mental health problems coexist with physical health problems, health outcomes, disability, and costs tend to be much worse (15–17). However, unlike most physical health conditions, mental disorders may directly distort economic decision-making in ways that perpetuate poverty, by directly affecting cognitive function, preferences, and beliefs.

What are the causal links between poverty and mental illness? Can economic policies improve psychological well-being? Can psychological interventions reduce poverty? Any attempt to understand this relationship must acknowledge the complexity and multidimensional nature of both mental health and poverty. Mental health in the broadest possible sense has been defined as “a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community” (18). This definition includes both happiness or life satisfaction, which also correlate positively with income (19), and symptoms associated with anxiety and mood disorders, such as depression. The two are clearly related; depression and anxiety are strong determinants of happiness (20), and ultimately, mental health and even mental illnesses such as depression and anxiety exist along a continuum.

We focus on the causal evidence that links poverty with depressive and anxiety disorders, the most common mental illnesses, which we refer to here using the more general terms “mental health” and “mental illness.” Definitions of these illnesses and a brief primer on their measurement are provided in Box 1. Although other more serious mental illnesses, such as schizophrenia, are also correlated with poverty, and may have powerful effects on economic outcomes, we do not discuss them here (21).

Like mental health, poverty is multidimensional. We examine causal links between mental illness and important economic dimensions of poverty, particularly income and unemployment. We also touch on other dimensions

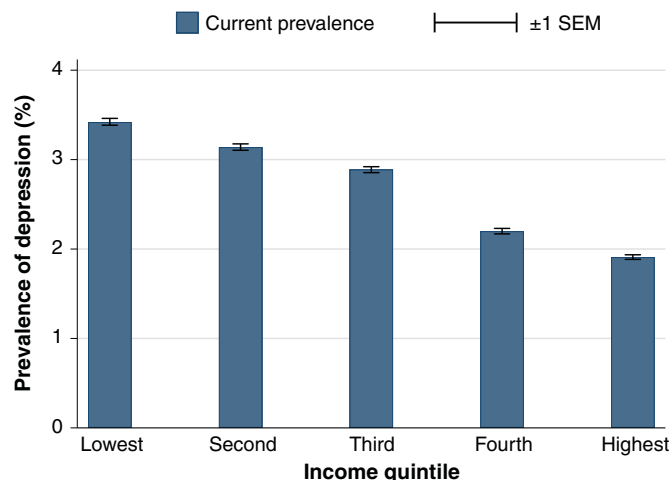


Fig. 1. Prevalence of depression by income quintile in India. The average percentage of people in each income quintile in India who have had depression within the past 2 weeks (“current” prevalence). Error bars show ± 1 SEM. These numbers come from (130), an analysis of the Indian National Mental Health Survey, 2015–2016.

¹Department of Economics, Massachusetts Institute of Technology, Cambridge, MA 02139, USA. ²Department of Economics, Harvard University, Cambridge, MA 02138, USA. ³Harvard Medical School, Harvard University, Boston, MA 02115, USA. ⁴Harvard TH Chan School of Public Health, Harvard University, Boston, MA 02115, USA. *Corresponding author. Email: fschilb@mit.edu

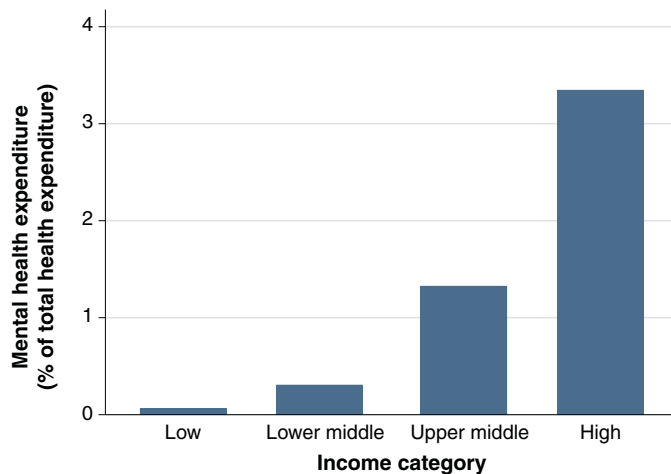


Fig. 2. Mental health expenditure by country income category. The average percentage of overall health budgets spent on mental health across countries in each of the four income categories used by the World Bank. Percent spent on mental health comes from the authors' own calculations, using data on overall mental health spending from the WHO Mental Health Atlas 2017 (www.who.int/mental_health/evidence/atlas), with data on total overall health spending from the WHO's Global Health Expenditure Database (<https://apps.who.int/nha/database>).

Box 1. Definition and measurement of depression and anxiety.

Depression, by which we refer here to major depressive disorder, is a constellation of symptoms that includes changes in psychomotor function, weight loss, oversleeping or undersleeping, decreased appetite, fatigue, difficulty concentrating, extreme feelings of guilt or worthlessness, and suicidal thoughts. According to the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (DSM-5), diagnosis of depression requires a set of these symptoms to be present over a 2-week period.

Anxiety, by which we refer here to generalized anxiety disorder, is characterized in the DSM-5 by long-lasting and excessive fear and worries over at least a 6-month period, with three or more of the following symptoms: restlessness, fatigue, concentration problems, irritability, muscle tension, and problems with sleep. Other definitions require the presence of at least one physical symptom such as heart palpitations, difficulty breathing, nausea or abdominal distress, dizziness, and numbness.

Measuring depression and anxiety in large population samples is feasible by using nonspecialist surveyors or even through self-administration of questionnaires. Reliable short-form diagnostic tools can predict professional diagnosis with rates of false positives and false negatives of 10 to 20% and have been validated in low-income countries (151–154). Widely used tools include the Generalized Anxiety Disorder 7-item (GAD-7) scale for anxiety, the Patient Health Questionnaire (PHQ-9) for depression, or the Self-Reporting Questionnaire 20-Item (SRQ-20) scale for any common mental illness. These scales typically ask respondents how much they experienced symptoms of depression or anxiety (such as sadness, lack of concentration, or poor sleep) in the past few weeks. The PHQ-9 and GAD-7 ask one question for each of the symptoms that are used to define major depressive disorder and generalized anxiety disorder, respectively. In practice, depression and anxiety are correlated, as evidenced by the fact that they share some symptoms.

The Center for Epidemiologic Studies Depression Scale (CES-D) is a popular measure among studies of the effect of economic interventions or shocks on mental health. Several studies also use custom indices of psychological well-being, typically an average of a life satisfaction scale, a "stress index," and some measure of worry or anxiety. In practice, such indices often measure several of the same symptoms as the PHQ-9 and GAD-7.

Some national surveys already include short-form screening tools, such as the UK Longitudinal Household Panel Survey and the South Africa National Income Dynamics Study.

of poverty, including a lack of capabilities resulting from low education and physical health, as well as relative poverty and associated low social status. Because of a relative scarcity of studies, we focus less on the rela-

tionship between mental health and the consumption of goods and services, which is a more direct economic measure of poverty. The existing evidence of this relationship is contentious, but the cross-sectional correlation of

mental illness with consumption appears to be weaker than that between mental health and income (22–25). Income is more volatile than consumption in the short run. The stronger correlation of mental health with income suggests that mental health may be more affected by short-run changes to economic status than long-run or permanent changes.

We discuss evidence on poverty-alleviation programs and mental health treatments obtained from randomized controlled trials (RCTs). These generate variation in individuals' poverty and mental health status, respectively, that is entirely by chance and therefore uncorrelated with all other shared risk factors. Such studies allow us to isolate evidence of causal relationships. We also discuss studies of "natural experiments" in which naturally occurring variation in economic circumstances or mental health is argued to be "as good as random." Examples range from financial windfalls, such as lottery wins—for which lottery winners may be thought of as a treatment group and lottery losers as a control group—to weather shocks that affect some farmers' incomes more than others'.

The causal impact of poverty on mental ill-health

Job loss and income declines are drivers of poverty and often precede episodes of mental illness (26, 27). Evidence from natural experiments confirms that this relationship is causal. For example, reduced agricultural output and income because of extreme rainfall caused increased rates of depression and suicide in rural parts of Indonesia (Fig. 3 and Box 2) (28). Similarly, job losses because of plant closures in Austria were associated with higher subsequent antidepressant use and mental health-related hospitalization (29). Areas in the United States more exposed to trade liberalization with China saw reduced income and employment for some groups of workers and increased mortality through drug overdoses among those same groups (30). Whether job loss worsens mental health beyond the impacts of the associated loss of income is unclear, but both mechanisms are argued to play a role in the phenomenon of "deaths of despair" (31). Conversely, income or wealth increases can improve mental health. For example, Native American tribes that opened casinos have seen substantial rises in income and reductions in anxiety relative to those that did not (32). Some studies have shown that lottery winners enjoy better mental health compared with those who win less or play but do not win (33). However, when fully controlling for the number and frequency of lottery tickets bought, winnings have small or no impacts on mental health (34, 35).

The most compelling causal evidence that poverty causes mental illness comes from

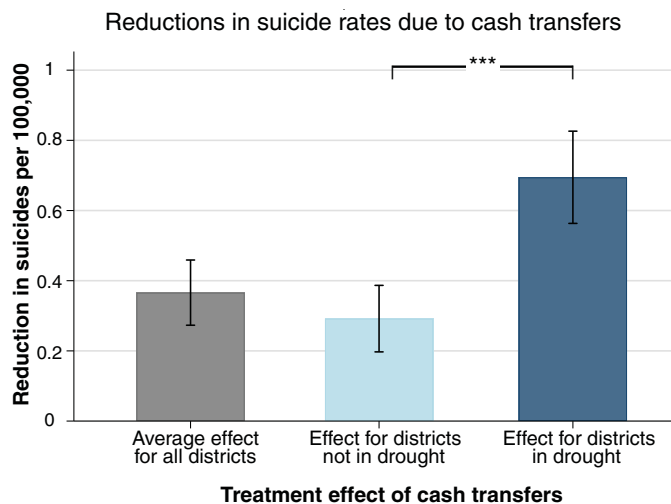


Fig. 3. Cash transfers, suicide rates, and droughts. The estimated effect of the cash transfer roll-out on district suicide rates, for all districts and separately by whether or not they were experiencing a drought (bottom 20% of the rainfall distribution) when the cash transfers reached them. Error bars show ± 1 SEM. Asterisks denote a significant difference between effects: $***P < 0.01$.

Box 2. Cash transfers, rainfall shocks, and suicides.

Christian, Hensel, and Roth examined how income shocks affect suicide rates and depression in Indonesia (28). They examined two natural experiments: the staggered roll-out across subdistricts of a conditional cash transfer program and annual and spatial variation in rainfall that affects farmers' incomes. They measured depression using a 10-question CES-D scale that is included in the Indonesian Family Life Survey. They also used the incidence of suicides, as measured by the reports of village leaders in census surveys.

Subdistricts that received the cash transfer program in the first wave of roll-out saw an 18% drop in suicides ($P < 0.01$) relative to those that received it later, even though both sets of districts had similar trends in suicide before the program's start. Meanwhile, rural subdistricts that experienced excess rainfall that increased crop yields between census years saw decreases in depression and suicides relative to subdistricts experiencing drought. The cash transfer had its largest effects on suicide in districts undergoing droughts, suggesting that policy can play a role in mitigating the mental health effects of economic shocks (Fig. 3).

Because suicide was only measured at the subdistrict level in this study, it is not possible to fully disentangle the direct effects of the cash transfers on recipients from spillover effects to others in the village. This highlights the need for better routine data collection on mental health outcomes alongside economic variables.

RCTs that evaluate antipoverty programs. Several studies that evaluated cash transfer and broader antipoverty programs have found substantial positive impacts on mental health, including over long time horizons, after the effects of any initial celebratory reactions among recipients have worn off. A meta-analysis of these studies is provided in Fig. 4. For example, cash transfers to Kenyan households worth \$400 to \$1500 at purchasing power parity (about 3 to 12 months of household income) increased consumption and happiness while reducing depression, stress, and worries (36, 37). Scores on a depression scale were 0.12 standard deviations (SD; closely related to Cohen's d) lower 4 months after

completion and 0.16 SD lower after almost 3 years, with larger transfers causing substantially larger effects.

Similarly, multifaceted antipoverty programs beyond cash transfers yield mental health benefits. A recent large-scale randomized evaluation of a "graduation program" in six countries that provided extremely poor participants with a mix of assets, intensive training, temporary cash support, savings incentives, and help to access health care found increases in consumption and assets 3 years later. The program also improved an index of psychological well-being by 0.1 SD, which was driven by an increase in happiness and a decrease in mental distress (38). Prog-

rams in other settings with similar approaches have found similar effects (39, 40). Longer-run effects of such programs, when measured, appear to be even larger for both economic outcomes and mental health. In India, for example, an index of psychological well-being was 0.24 SD higher in the treatment group 7 years after the completion of a graduation program (41).

Hence, across a wide range of populations and study designs, positive economic shocks to individuals are shown to improve mental health, whereas negative economic shocks undermine mental health. This robust evidence, on the effects of changes in economic circumstances, indicates that poverty does cause mental illness. However, with two exceptions (35, 41), the above studies consider the consequences of changes in economic status for a few years at most. An important question is whether these short-run effects can persist or grow over time. For example, some of the causal mechanisms we discuss below could take decades to manifest. However, there may be a hedonic adaptation effect in which mental health eventually adapts to the change in circumstances, so that even permanent increases in one's income level have a limited long-run effect. Of course, it could also be that the positive economic shocks are themselves undone by future negative shocks, causing mental health to revert to initial levels or even worsening. Ongoing long-run evaluations of cash-transfer programs are expected to provide evidence on this question (42).

Mechanisms for poverty causing mental ill-health

How does poverty cause mental illness? We discuss several plausible causal mechanisms and the limited evidence for each. The worries and uncertainty that come with living in poverty seem to be an important driver of mental illness, as do the effects of poverty on childhood development and one's living environment. We have more limited causal evidence for other plausible channels, including worsening of physical health caused by poverty, increased exposure to violence or crime, and the effects of low relative social status and social isolation. Understanding which of these mechanisms are important may have implications for policy choices. For example, if worries and uncertainty play a major role, then providing health and unemployment insurance may be crucial, whereas if early-life conditions are the key drivers, then cash transfers to parents of young children could be the most appropriate policy response.

Worries and uncertainty

The anticipation of economic shocks, not just their occurrence, may cause mental illness. People living in poverty face substantial

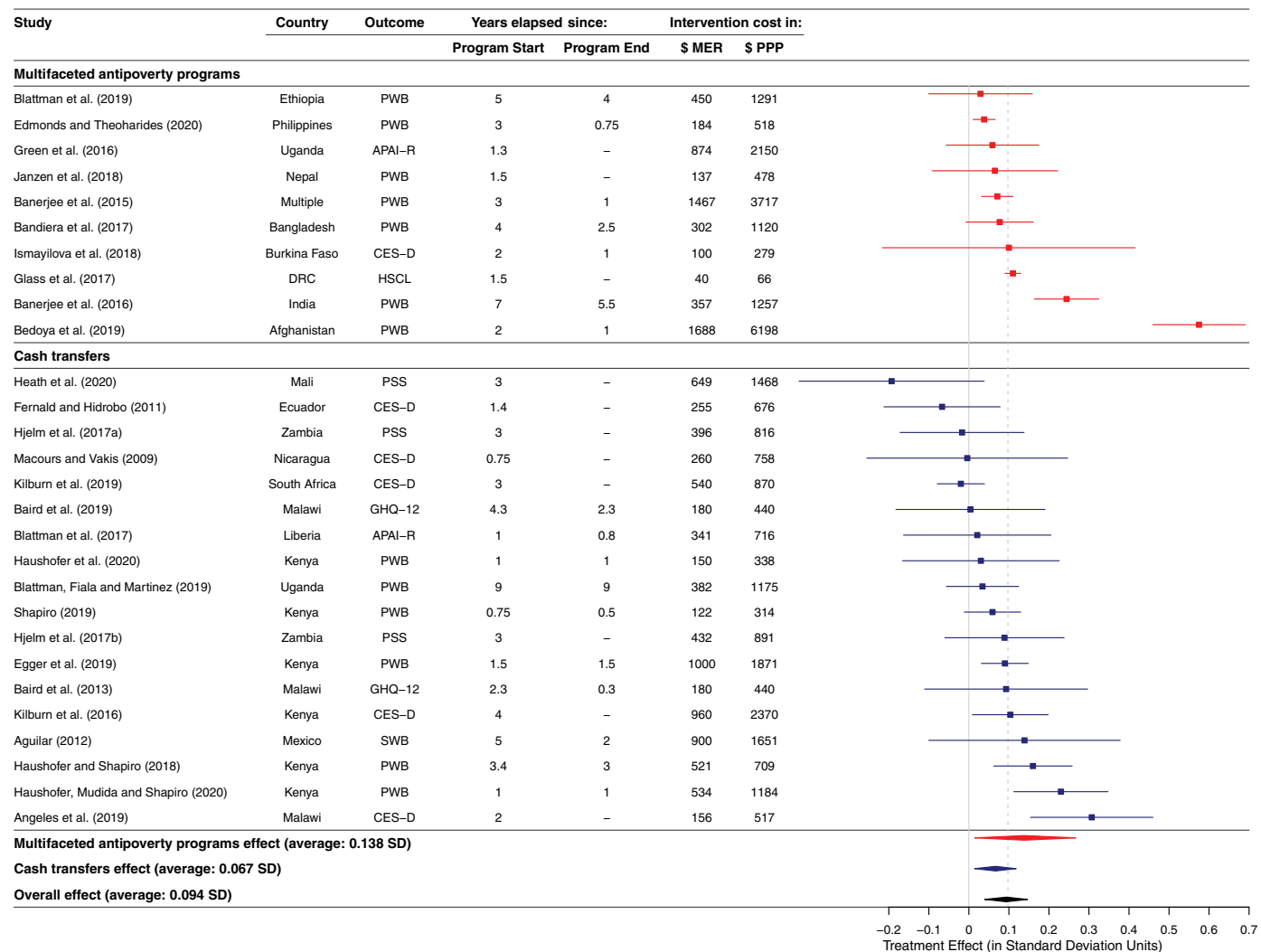


Fig. 4. The impacts of antipoverty programs on mental health. The estimated treatment effects of RCTs that evaluated antipoverty programs in low- or middle-income countries on indices of mental health (37-41, 56, 119, 131-149). Positive treatment effects imply better mental health. "Cash Transfers" refers to studies of unconditional cash transfers to low-income households, with the exception of Baird *et al.* and Kilburn *et al.*, who examined conditional cash transfer programs (135, 150). "Multifaceted antipoverty programs" refers to interventions that aimed to lift people out of poverty by providing a range of elements, typically including asset transfers, skills training, cash support, and access to savings and health care opportunities. Treatment effects are expressed in SD units. If multiple follow-up measures were available, this figure shows the final measure. The outcomes vary across studies and include screening instruments to

detect common mental illnesses [Short General Health Questionnaire (GHQ-12)] and symptoms of depression [Center for Epidemiologic Studies Depression Scale (CES-D) and Acholi Psychosocial Assessment (APAI-R)], indices of psychological well-being (PWB), and a perceived stress scale (PSS). "Intervention cost" refers to the total cost of implementing the intervention, when this is available. When implementation costs are unavailable (as with most of the cash transfer studies), it refers to the total undiscounted value of the transfer. MER, market exchange rates; PPP, purchasing power parity (which adjusts exchange rates to reflect the true cost of living). A missing value of years elapsed since program end means that the transfer was still ongoing when outcomes were measured. A complete description of the methodology of this analysis and details on each of the studies is provided in the supplementary materials.

uncertainty and income volatility and juggle what are, in effect, complex financial portfolios, often without access to formal insurance (43). Sustained long-run exposure to stress from managing this volatility may threaten mental health (44). Consistent with this hypothesis, a large-scale randomized experiment among low-income individuals in Oregon found that receiving largely free health insurance worth \$550 to \$750 per year reduced rates of depression by about a quarter

within a few months (45). This effect did not appear to be explained by increased mental health care or changes in physical health. Although the increase in recipients' effective income may have played a role, it represented a much smaller relative increase than the cash transfer programs described above and yet generated a similar effect size on depression. Further suggestive evidence for uncertainty as a mechanism comes from the small or zero effect of wealth shocks on mental health in

countries with generous and comprehensive systems of social insurance, such as Sweden (34, 35).

Environmental factors

Those living in poverty are generally more exposed to environmental irritants posed by pollution, temperature extremes, and challenging sleep environments (46). Many of these factors have been linked directly to mental illness. Days with extreme heat see worse

self-reported mental health and increased rates of self-harm and suicide (47, 48). Similarly, sleep deprivation is widespread among the urban poor in developing countries (49), and sleep is thought to be a mechanism affecting mental health (50, 51). Some evidence exists that clinical interventions to improve sleep reduce depression (49, 52). Exposure to air pollution is associated with living in poverty and may influence mental health through multiple channels, through restriction of physical activity or directly owing to neurotoxicity (53). Changes in air pollution in China have been associated with changes in mental health (54). In the United States, randomly selected low-income households that were paid to move to more affluent neighborhoods saw reductions in depression and anxiety despite little effect on income (55). However, it is not clear whether environmental factors or other features of high-income neighborhoods generated this effect.

Physical health

Lower income is robustly associated with worse physical health (9). Poverty increases exposure to the environmental factors described above and often also implies lower access to health care, which increases the burden of acute and chronic health conditions. Worse physical health may affect mental health through various channels. Chronic pain, worries about health and mortality, the financial costs of illness, and reduced physical activity may all worsen mental health. It is therefore unsurprising that physical ill-health often co-occurs with depressive and anxiety disorders (15). However, only limited causal evidence exists of poverty affecting mental health through changes in physical health. Many of the randomized interventions described in the previous section had no detectable effect on physical health even as they reduced mental illness (36, 38, 56). However, changes in physical well-being may manifest over a longer time frame, which may not be captured by these short-run studies.

Early-life conditions

Exposure to poverty early in life can threaten mental health in later years. Such effects can be generated in utero, by exposing pregnant women to malnutrition or stress. For example, the death of a mother's relative during pregnancy (compared with after childbirth) predicts depression and anxiety among her grown children later in life (57). Poverty may also disproportionately expose children to adverse shocks while their brains are highly plastic. Such shocks can profoundly affect brain development, cognitive ability, and mental health in adolescence and adulthood (58, 59). Economic stresses around the time of birth also have long-term mental health costs; in Ghana,

a decrease in crop prices by 1 SD at an individual's time of birth was found to increase incidence of anxiety or depression in adulthood by 50%, associating with maternal nutrition, breastfeeding duration, vaccination rates, and improved adult health (60). These results imply that programs that provide financial support for households with pregnant women or young children may have high long-run mental health and economic returns.

Trauma, violence, and crime

Living in poverty disproportionately exposes individuals to crime, including violent offenses (61). People living in poverty are also more likely to suffer traumatic events such as the early deaths of loved ones (62). Likewise, within the household, women and children in poor households are disproportionately affected by intimate partner violence (63). The relationship between poverty and experiencing violence itself may be causal: Cash transfers to households reduce intimate partner violence (64). In turn, both exposure to violence within the household and exposure to violent crime in general predict depression and other mental illnesses (65, 66). Causal evidence on the effect of reductions in crime and violence on mental illness is needed to shed further light on this mechanism.

Social status, shame, and isolation

Relative poverty—consumption or income relative to others in one's society—may play a role in the relationship between poverty and mental illness through the resulting social status and interpersonal comparisons. In an interesting natural experiment, Norwegian tax records were posted online in 2001, making citizens' income easily searchable. Using survey data from 1985 to 2013, a study showed that the gap in happiness and life-satisfaction between the rich and poor within Norway increased sharply once relative income became easily visible (67). Although similar causal evidence is lacking for mental illness, it is plausible that diminished social status resulting from poverty causes or exacerbates depression and anxiety. Frequent marginalization of people living in poverty may also result in social isolation and loneliness (68), which in turn are correlated with depression (69).

The causal impact of mental ill-health on poverty

Mental illness predicts worse labor market outcomes later in life. After a diagnosis of depression or anxiety, employment rates and incomes have been estimated to fall by as much as half, relative to the nondepressed or nonanxious (70, 71). Beyond such comparisons, which may be driven in part by unknown factors such as physical health, there is little evidence from natural experiments to link

depression or anxiety to incomes. A study showed that the approval of lithium for treatment of bipolar disorder reduced the earnings penalty associated with bipolar illness by a third in Denmark, from 38 to 26%, with larger effects in the lower half of the earnings distribution (72). Studying similar natural experiments for depression and anxiety would be valuable.

There is, however, a substantial body of experiments that show a causal effect of treating mental illness on employment. A meta-analysis that aggregated results across 31 RCTs in developing countries showed a positive average effect of various interventions to treat mental illness on labor supply (73). Among these interventions, pharmacological and psychological treatments had similar positive effects on labor supply (0.1 to 0.15 SD), and combining both types of treatments had even larger effects (0.34 SD). For example, a cheap and scalable cognitive behavioral therapy (CBT) administered in India reduced depression by 25 percentage points compared with that in the control group and in turn increased reported days of work by 2.3 days per month (Fig. 5 and Box 3). Although these studies do not directly show that treatment of mental illness reduces poverty rates, higher labor supply and earnings naturally reduce the likelihood of living in poverty. Whether treatment of mental illness has larger long-run effects on consumption per unit cost than the cash transfers described above is unknown (73).

Mechanisms for mental ill-health causing poverty

Cognitive function

Like any illness, depression and anxiety may have economic effects because they directly reduce individuals' ability to work. Unlike most physical conditions, however, depression and anxiety also directly affect the way people think. Poverty itself can influence cognitive function by capturing attention and taxing mental bandwidth (74, 75). Mental illness may have similar effects, by capturing attention, causing excessive rumination, and distorting people's memories and beliefs about their abilities (76). Such cognitive impacts could alter a range of economic decisions and outcomes, from finding jobs to saving to education and by exacerbating "behavioral biases" that economists increasingly recognize as important (77). For example, depressed individuals might avoid making active choices and may stick with "default options," may have decreased sensitivity to incentives because of anhedonia, or may have difficulty choosing among several options. Understanding the importance of this mechanism relative to more "direct" economic effects through disability or health expenditures



Fig. 5. Impacts of behavioral activation on depression, labor supply, and health costs. The mean values for the treatment and control groups of depression [measured with a Patient Health Questionnaire–9 (PHQ-9) score greater than 10], days unable to work, and health costs (excluding the intervention cost) at 3 months. Error bars denote ± 1 SEM. Asterisks denote a significant difference between treatment and control after adjusting for covariates: * $P < 0.1$; *** $P < 0.01$.

Box 3. An example of a psychotherapy intervention with positive economic effects.

Patel *et al.* conducted an RCT of a brief behavioral activation (BA) therapy program, administered by nonspecialist counselors in a sample of 495 depressed adults in Goa, India (155). Compared with a control group that received enhanced usual care, treated patients were >60% more likely to be in remission 3 months later (64 versus 39%), as measured with a PHQ-9 score (Box 1) below 10, and maintained these gains after 12 months.

Those patients also reported being able to work 2.3 more days per month on average ($P = 0.004$) and reduced health costs, excluding intervention costs, of \$20 per month ($P = 0.07$) (Fig. 5). For comparison, a month's wages for a low-skilled worker in the study context was around \$415. Given an average intervention cost of \$66 per patient, in economic terms the intervention was highly cost-effective and may have paid for itself within a few months. After 12 months, the fall in treated patients' health costs alone had already significantly outpaced the cost of intervention, although the difference in days worked was no longer significant (94).

Other evaluations of inexpensive psychotherapies implemented by nonspecialist counselors in low-income settings have found similarly large effects on mental health (122). More evidence on the effect of such psychological interventions on broader economic outcomes would be highly valuable. For example, future trials could be linked to administrative or standardized survey data on wages, earnings, and consumption.

is crucial for correctly measuring the economic burden of mental illness and designing economic policy for those whose mental health is compromised.

Beliefs

Beliefs about one's own and others' abilities, circumstances, and actions are central to economic decision-making. Mental illness may distort such beliefs in various ways. Depression is associated with more negative beliefs about oneself and the external world (78, 79). Depressed individuals are more likely to remember negative stimuli and have trouble disengaging from negative information once it grabs their attention (76). As such, although healthy individuals tend to protect overly optimistic beliefs about themselves by ignoring negative information (80), correlational evidence suggests that the depressed update their beliefs more pessimistically (81). Anxiety, meanwhile, is associated with greater selective attention toward threatening stimuli (82), which could lead to overestimation of

risks and thus reduced risk-taking. Such evidence is consistent with mental illness causing pessimistic beliefs, pessimistic beliefs causing mental illness, or both. Causal evidence on how treatment of depression or anxiety affects beliefs would help disentangle these potential explanations.

Preferences

Mental illness may affect economic preferences, such as the extent to which people are willing to defer gratification (time preferences), tolerate risk for higher expected rewards (risk preferences), or split rewards between themselves and others (social preferences). For example, depression may diminish a person's patience and altruism. Similarly, anxiety disorders may reduce people's willingness to take on even modest levels of potentially profitable risk. Such impacts could in turn change a variety of economic behaviors, such as labor supply decisions, savings and investment choices, consumption behavior, and the take-up of social programs. The limited evidence

on correlations between mental illness and economic preferences is mixed (83–85).

Labor supply and productivity

Depression and anxiety often affect individuals in the prime of their economic lives and can be highly recurrent (86). The depressed beliefs and distorted preferences described above may reduce motivation and labor supply. In addition, depression can have a direct effect on productivity, such as through increased fatigue and lack of concentration. Depressed individuals may therefore work fewer and shorter days and produce less per hour (87). Depressed workers might also be more easily discouraged during their job search or when facing setbacks at work. As described above, substantial causal evidence exists that treatment of mental illnesses increases employment (73). However, there is little evidence on whether this happens through higher at-work productivity, greater job search intensity, changed beliefs, or other mechanisms.

Stigma

Mentally ill individuals contend with substantial social stigma and negative stereotyping (88). This may result in discrimination in employment (89), which could lower wages and limit employment opportunities relative to equally productive mentally healthy workers. On top of this, those living with a mental illness are excluded from disability benefit schemes in many low-income countries (90). More generally, others' reluctance to interact socially with mentally ill people (88) may exclude them from social networks that provide economic opportunities. Stigma may also affect the formation and dissolution of households in ways that disadvantage the mentally ill (91). Depression and anxiety may come with a "discount" on the marriage market, causing mentally ill individuals to form households with less well-off partners, increasing the chances of living in poverty.

Health expenditures

Mental illnesses may deepen poverty through its impacts on health and health expenditures. In developing countries, people living in poverty usually pay most of their health costs out of pocket (92). Globally, 150 million people are estimated to have catastrophic health expenditures each year, which are defined as health care payments totaling more than 40% of a household's nonsubsistence expenditures (93). Costs associated with treatment of mental illness rarely account for large shares of individuals' budgets because most affected individuals remain untreated. However, depression and anxiety frequently co-occur with other health conditions (15), and such comorbidity with depression is associated with substantially higher health expenditures for a range of health conditions (16, 17). Indeed, treatment of depression has been found to reduce overall health care costs (94).

Women's empowerment

The burden of mental illness falls disproportionately on women (1). A large-scale ($n = 903$ participants) RCT that evaluated CBT intervention for depressed pregnant women in Pakistan found a 17% reduction in depression rates compared with a control group 7 years after the intervention (95). Reduced depression among these women was accompanied by increased economic empowerment by 0.29 SD as measured in increased control over household and personal expenditures. Such impacts may have implications for women's consumption and relative poverty within the household.

Intergenerational effects

Improving a parent's mental health can benefit the next generation. In the above study in Pakistan, women who had received the intervention sent their children to better schools and had more learning materials in their homes (95). Similarly, other RCTs found that treatment of mothers' depression improves their interaction with their children and their children's mental health (96). Although little direct evidence shows that such interventions lead to improved educational outcomes or earnings, there is reason to believe they may. A substantial body of work from other contexts shows that early-childhood investments have large effects on children's income as adults (97).

Human capital accumulation

The onset of common mental illnesses often coincides with secondary and tertiary education and the early stages of an adult's work career (86). Mental illness may therefore cause long-run economic hardship by reducing school and college completion rates, worsening early-career job placements and hindering skill

acquisition (98). This suggests the possibility of particularly high economic returns from improving mental health among adolescents and young adults. Although longitudinal studies show a substantial correlation between mental illness among students and subsequent educational outcomes, there is little experimental evidence to date that treatment of depression or anxiety among adolescents leads to improved educational outcomes (99).

Outlook

Having discussed some of the mechanisms that influence the relationship between poverty and mental health, we can speculate more broadly on how the relationship between poverty and mental illness may evolve, what this means for policy, and what directions may be fruitful for research.

Aggregate economic conditions

Economic growth and other ongoing global trends are unlikely to improve mental health by themselves. Higher income causes better mental health at the individual level, yet on average, the prevalence of mental illness is not lower in rich countries. To the contrary, existing evidence shows a higher prevalence of common mental illness in richer countries (Fig. 6) (100). This cross-country difference cannot be interpreted causally, and concerns remain about differences in methodology, diagnosis, or reporting across contexts (101). However, one way to reconcile the contrasting within-country and cross-country relationships is the possibility that relative, rather than absolute, poverty is the more relevant cause of mental illness. Risk factors, including inequality and relative poverty, or the stresses of urban environments, may deteriorate rather than improve as whole economies expand. Within-country inequality has increased in many countries in recent decades, despite substantial reductions in extreme poverty and global inequality (102). Complacency about mental health among the poor is therefore not warranted even in the presence of aggregate economic growth. For example, the burden of disease attributable to mental and neurological disorders in India and China increased by 61 and 28%, respectively, between 1990 and 2013, despite impressive economic growth (103).

Climate change

The more frequent occurrence of extreme heat because of climate change is anticipated to exacerbate mental illness directly (104, 105). The increased frequency of weather-related disasters, such as floods and hurricanes, poses a threat to mental health through greater exposure to trauma (106). Climate change also threatens mental health through its negative economic consequences, which are likely to

be more pronounced in low-income countries (104). Extreme temperatures during the agricultural growing season that damage crops and thus economic well-being have been reported to increase suicides in agricultural regions in India (107). Predicted increases in water scarcity and droughts are also likely to worsen economic and in turn psychological well-being. Climate change is also expected to lead to increased violence and political conflict over the next century through increased pressure on resources, such as productive land and, possibly, psychological effects of heat on aggression (108). This combination of economic and political consequences of climate change may increase the flow of refugees and economic migrants, with concomitant challenges to mental health (109).

Technological change and globalization

For many of those living in poverty across the world, technological change and globalization offer enormous economic opportunities; however, both phenomena produce winners and losers. The costs to losers, especially low-wage workers in high- and middle-income countries who lose jobs as a result of changes in patterns of trade or automation, can be long lasting and substantial (110), resulting in worse mental health (29, 30). Although most economic research on these topics focuses on rich countries, there is an urgent need to understand the mental-health effects of these economic changes in poorer countries.

Offering social insurance and welfare, skills training, and job transition programs, including psychotherapies for workers exposed to the harmful effects of technological change and globalization, will be important to protect mental health. One example is the ongoing Building Bridges and Bonds evaluation, which provides a tailored CBT intervention to unemployed (formerly incarcerated) men in the United States, in conjunction with traditional job-seeking services, in an attempt to increase employment and wages.

Pandemics

Public-health crises such as the ongoing COVID-19 pandemic tend to disproportionately affect those living in poverty (111). They may worsen mental health on average and particularly among the poor. Income and employment losses as a result of morbidity can be large, which in turn can reduce mental health through the mechanisms described above. In addition, the exposure to trauma, increased worries and uncertainty, and worse physical health will tend to impair mental health, in turn reducing income and employment. However, ongoing progress in reducing the burden of other diseases that disproportionately affect the poor—such as cholera and diarrhoeal infections, tuberculosis, malaria, and other

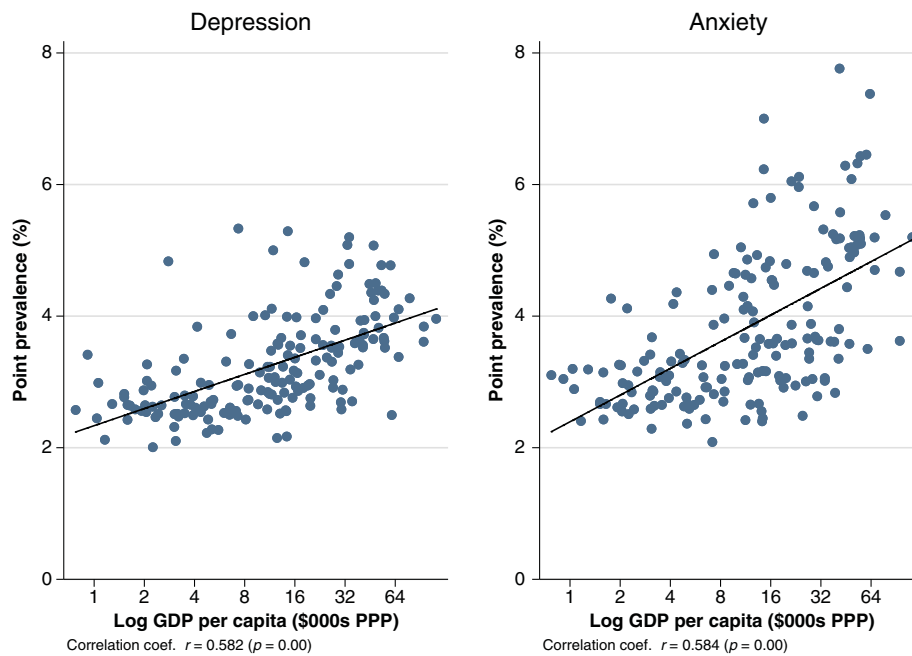


Fig. 6. Prevalence of common mental illnesses by country. For each country, the percentage of the population estimated to have a (left) depressive disorder or (right) anxiety disorder is shown at a given point in time against that country's log gross domestic product (GDP) per capita. Each scatter point represents one country. The line shown is an ordinary least squares regression line of country prevalence rates on a constant and log GDP per capita. Prevalence rate data come from the Global Burden of Disease Study, 2017 (<http://ghdx.healthdata.org/gbd-results-tool>). GDP per capita data are for 2017, measured in constant 2017 international \$, and come from the World Bank's World Development Indicators dataset (<https://databank.worldbank.org/source/world-development-indicators>).

insect-borne diseases—will provide a counter-vailing force likely to improve mental health among the poor. The COVID-19 pandemic has the potential to set back progress in reducing the enormous burden of these diseases.

Social media

The spread of mobile phones and the internet opens up opportunities for poverty alleviation (112) and new ways to deliver mental health care. However, some of these technologies may pose new threats to mental health. Although more causal evidence is needed, some studies have found that depression is correlated with internet addiction and with the intensity of use of social media among young adults and adolescents (113, 114). Recent randomized interventions show that deactivating social media accounts for 4 weeks led to 0.1 SD reductions in depression and anxiety scores (115, 116). Increased access to the internet and social media among the global poor, although presenting enormously valuable benefits, may therefore also pose some threat to mental health among the poor (117).

Implications for research and policy

Because mental health and poverty are intimately linked, interdisciplinary collaborations between mental-health researchers and social scientists studying poverty are essential (Box 4). Evaluations of economic interventions should carefully measure impacts on mental health,

and vice versa. An example of such work is Bhat *et al.*, in which a team of psychiatrists and economists followed up on psychotherapy clinical trials in India and deployed the tools of behavioral economics and psychiatry to study long-run effects of psychotherapy on mental health, economic well-being, and decision-making (118).

Policy tools

There is a strong economic case for investing in the mental health of people in poverty. A recent meta-analysis showed that mental health interventions in low- and middle-income countries, including psychotherapy and pharmacotherapy, had similar or larger effects on employment than economic interventions such as cash transfers, job training programs, and multifaceted antipoverty programs (73). Yet, they were an order of magnitude less expensive to deliver. Such treatments could therefore be the most cost-effective antipoverty intervention, at least among the subset of people who are mentally ill. However, we know little about how to optimally combine, dose, sequence, and target economic and mental health interventions. For example, combining psychological and economic interventions may lead to treatment effects that are greater than the sum of their parts. In particular, improved mental health could increase the economic returns of receiving cash or asset transfers by improving decision-making and productivity.

Recently, innovative studies have compared the effects of providing psychotherapy, cash support, or both among low-income populations. An RCT measured the effect of 8 weeks of CBT and/or \$200 in cash support to 999 criminally engaged men in Liberia (119). Although the psychotherapy targeted antisocial behavior rather than mental illness per se, the study found that the combination of cash transfer and psychotherapy improved an index of self-regard and mental health by 0.2 SD a year later ($P = 0.024$), accompanied by a modest reduction in depression and psychological distress (-0.11 SD, $P = 0.24$). The combined treatment not only reduced antisocial behavior but also increased patience and self-control, whereas neither cash nor therapy alone had detectable effects. However, none of the treatments apparently influenced consumption or income a year later. More studies along these lines would be valuable.

Treatment gaps

In poor countries, the fraction of individuals diagnosed with depression and anxiety who do not receive treatment often exceeds 90% (11–14). Such treatment gaps likely result from a combination of poor supply and low demand for mental health services.

Increasing supply

Resources for mental health care are extremely limited in low-income countries (Fig. 7), and

Box 4. Priorities for future research on poverty and common mental illnesses.**1. Measurement of mental health in economic surveys to estimate**

The comparative impacts of diverse economic interventions, such as insurance, social safety, and employment support, relative to cash transfers

The longer-run effects of antipoverty programs

The effects of absolute versus relative poverty

The effect of technological change and globalization on high and low-wage workers

The impact of the looming global economic recession resulting from COVID-19

2. Measurement of economic outcomes in intervention studies for depression and anxiety, which includes

Income, labor supply, productivity, and profits from self-employment

Economic preferences and beliefs; investment and savings behaviors

Household expenditures and consumption, including within-household allocation of resources

3. Evaluations of interventions to reduce stigma and to boost demand for mental health care, which includes

Diverse mental health literacy approaches, from mass-media campaigns to grass-root awareness building

Subsidies and incentives for seeking and engaging with mental health care

The effects of interventions on marginalized and underserved communities

4. Evaluation of technologies to increase the coverage of effective psychotherapies, which includes

Text, phone, or video delivery

Digital approaches to training, supervision, and quality assurance for frontline providers

Artificial intelligence bot-based and other guided self-help approaches, adapted to different languages and cultural contexts

5. Evaluation of interventions to interrupt the intergenerational transmission of poverty and mental illness, such as through

School mental health-promotion programs and measurement of effects also on educational attainment, labor supply, productivity, and earnings

Treatment of parental mental illness and measurement of effects on children's cognitive and educational outcomes

people living in poverty often lack access to basic mental health care (120). For example, some estimates suggest that India has only 3900 psychiatrists for more than 1.3 billion people, and 13 psychiatrists serve Zimbabwe's 14 million people (121). However, cost-effective and scalable strategies for treating mental illness in low-resource settings do exist. Evidence from multiple countries shows that “psychosocial” treatments such as manualized talk therapies can be highly effective at low cost, even when delivered by nonspecialist community health workers (122, 123). An even more pared-down—but still effective—approach is the “friendship benches” of Zimbabwe, in which nonspecialist health workers (popularly known as “community grandmothers”) provide problem-solving therapy with components of behavior activation to patients (124).

Reliance on in-person training and supervision of the community health workers by experts is a major barrier to scaling these approaches. The Empower initiative seeks to address these structural barriers through the deployment of digital platforms to enable frontline workers to learn, deliver, and master evidence-based brief psychological treatments for mental health problems, using innovative practices such as coach-supported learning and peer-supervised quality assurance, all delivered through digital tools (125). Empower will roll out the brief behavioral activation treatment developed and evaluated in India and Nepal (Box 3) to community health workers in India and the United States from 2021 onward.

Stimulating demand

Even in settings with affordable and effective mental health services, many people do not

seek or adhere to treatment (126). People often lack mental health literacy and may not possess basic information about mental health conditions and their risk factors, symptoms, and potential treatment options (127). Stigma and shame can further depress demand for mental health services. But there are examples of successful community-based programs that increase mental-health literacy and boost the share of mentally ill individuals who seek treatment; for example, the VISHRAM (Vidarbha Stress and Health Programme) initiative, rolled out in 30 villages in rural India, deployed “change agents”—typically, persons already playing leadership roles in the villages—to engage the community in conversations around mental health and illness, using a range of contextually appropriate strategies such as group discussions; the program led to a sixfold increase in help-seeking by persons with depression in just 18 months (128). A priority for future work should be the evaluation of such programs at scale, as well as testing approaches that bundle mental health treatments with other un-stigmatized services, subsidizing or even rewarding the take-up of treatment, or using remote technologies such as app-based therapy that are less likely to expose individuals to stigma.

Poverty traps

A classic idea in development economics is the existence of a “poverty trap” (129). This is the idea that below a certain threshold level of wealth, people are not able to earn and save their way out of poverty. They remain trapped in poverty precisely because of the deprivations associated with poverty and not because of any intrinsic lack of ability. Such poverty traps could exist for many reasons. For example, the very poor may not be able to afford enough food to be productive at work. Recent evaluations of multifaceted antipoverty programs have provided some evidence for the existence of such poverty traps (39, 41). However, the underlying mechanisms are unclear. The evidence of a bidirectional causal relationship between poverty and mental health presented in this Review suggests that mental health could be a key mechanism: There could be psychological poverty traps. Some of those living in poverty may be ensnared in a vicious cycle of poverty and mental illness (5). If this is the case, a one-time economic or psychological intervention of sufficient magnitude may “push” people into a state of sustainably higher income and better mental health.

Conclusion

The causal relationship between poverty and mental health we have described could not be more pertinent than in the ongoing pandemic, which has already adversely affected both of these outcomes. Given the surge of deaths

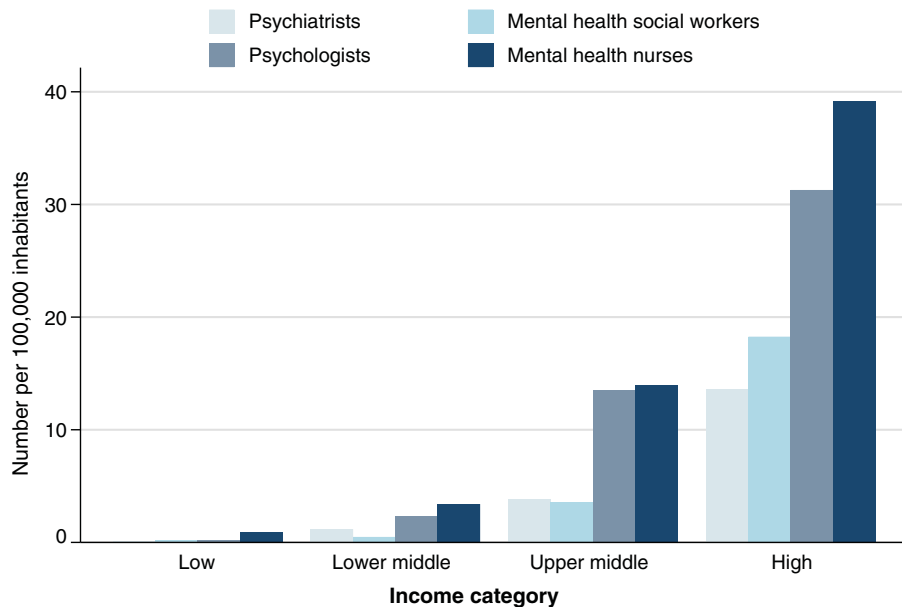


Fig. 7. Availability of mental health workers across countries. The mean numbers of psychiatrists, social workers, psychologists, and nurses working in the mental health sector (per 100,000 people) are shown for countries in each of the four income categories used by the World Bank. Data on mental health workers come from the WHO's Global Health Observatory (<http://apps.who.int/gho/data/node.main.MHHR?lang=en>) and are for the most recent year available (which ranges from 2013 to 2017).

of despair in the United States in the wake of the Great Recession of 2008 (31), we have grave concerns about the mental-health implications of the economic recession confronting the world. The pandemic has disproportionately affected the poor and may have lasting adverse impacts on their economic and mental well-being. A massive investment in mental health was long overdue even before the pandemic and has become critically urgent now. Beyond more money, this is also an important opportunity to invest wisely in lower-cost innovations that provide quality care to low-income and disadvantaged communities and to integrate economic interventions with mental health care to reduce historic disparities in both wealth and mental health.

REFERENCES AND NOTES

- GBD 2017 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990–2017: A systematic analysis for the Global Burden of Disease Study 2017. *Lancet* **392**, 1789–1858 (2018). doi: [10.1016/S0140-6736\(18\)32279-7](https://doi.org/10.1016/S0140-6736(18)32279-7); pmid: [30496104](https://pubmed.ncbi.nlm.nih.gov/30496104/)
- R. Desjarlais, *World Mental Health: Problems and Priorities in Low-income Countries* (Oxford Univ. Press, 1995).
- C. J. L. Murray, A. D. Lopez, Others, "The global burden of disease: a comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020: summary" [World Health Organization (WHO), 1996]; <https://apps.who.int/iris/handle/10665/41864>.
- J. Sareen, T. O. Afifi, K. A. McMillan, G. J. G. Asmundson, Relationship between household income and mental disorders: Findings from a population-based longitudinal study. *Arch. Gen. Psychiatry* **68**, 419–427 (2011). doi: [10.1001/archgenpsychiatry.2011.15](https://doi.org/10.1001/archgenpsychiatry.2011.15); pmid: [21464366](https://pubmed.ncbi.nlm.nih.gov/21464366/)
- C. Lund *et al.*, Poverty and common mental disorders in low and middle income countries: A systematic review. *Soc. Sci. Med.*

- Psychosom. Med.* **71**, 501–507 (2009). doi: [10.1097/PSY.0b013e3181a5a7ad](https://doi.org/10.1097/PSY.0b013e3181a5a7ad); pmid: [19528291](https://pubmed.ncbi.nlm.nih.gov/19528291/)
- C. Shen, U. Sambamoorthi, G. Rust, Co-occurring mental illness and health care utilization and expenditures in adults with obesity and chronic physical illness. *Dis. Manag.* **11**, 153–160 (2008). doi: [10.1089/dis.2007.0012](https://doi.org/10.1089/dis.2007.0012); pmid: [18564027](https://pubmed.ncbi.nlm.nih.gov/18564027/)
- WHO, "Promoting mental health: concepts, emerging evidence, practice: a report of the World Health Organization, Department of Mental Health and Substance Abuse" (WHO/Victorian Health Promotion Foundation/Univ. Melbourne, 2005); <https://apps.who.int/iris/bitstream/handle/10665/43286/9241562943-tha.pdf>.
- J. Haushofer, E. Fehr, On the psychology of poverty. *Science* **344**, 862–867 (2014). doi: [10.1126/science.1232491](https://doi.org/10.1126/science.1232491); pmid: [24855262](https://pubmed.ncbi.nlm.nih.gov/24855262/)
- R. Layard, J. F. Helliwell, J. D. Sachs, "World Happiness Report 2012" (Earth Institute, Columbia University, 2012).
- C. Lund, S. Stansfeld, M. De Silva, Social determinants of mental health, in *Global Mental Health: Principles and Practice* (Oxford Univ. Press, 2014), pp. 116–136.
- G. Tampubolon, W. Hanandita, Poverty and mental health in Indonesia. *Soc. Sci. Med.* **106**, 20–27 (2014). doi: [10.1016/j.socscimed.2014.01.012](https://doi.org/10.1016/j.socscimed.2014.01.012); pmid: [24524962](https://pubmed.ncbi.nlm.nih.gov/24524962/)
- J. Das, Q.-T. Do, J. Friedman, D. McKenzie, Mental health patterns and consequences: Results from survey data in five developing countries. *World Bank Econ. Rev.* **23**, 31–55 (2009). doi: [10.1093/wber/lhn010](https://doi.org/10.1093/wber/lhn010)
- J. Corrigan, C. Lund, V. Patel, S. Plagerson, M. K. Funk, Poverty and mental illness: fact or fiction? A commentary on Das, Do, Friedman, McKenzie & Scott (65:3, 2007, 467–480). *Soc. Sci. Med.* **66**, 2061–2063, discussion 2064–2066 (2008). doi: [10.1016/j.socscimed.2008.01.005](https://doi.org/10.1016/j.socscimed.2008.01.005); pmid: [18325649](https://pubmed.ncbi.nlm.nih.gov/18325649/)
- J. Das, Q.-T. Do, J. Friedman, D. McKenzie, K. Scott, Revisiting the relationship between mental health and poverty in developing countries: A response to Corrigan. *Soc. Sci. Med.* **66**, 2064–2066 (2008). doi: [10.1016/j.socscimed.2008.01.004](https://doi.org/10.1016/j.socscimed.2008.01.004)
- S. C. Olesen, P. Butterworth, L. S. Leach, M. Kelaher, J. Pirakis, Mental health affects future employment as job loss affects mental health: Findings from a longitudinal population study. *BMC Psychiatry* **13**, 144 (2013). doi: [10.1186/1471-244X-13-144](https://doi.org/10.1186/1471-244X-13-144); pmid: [23705753](https://pubmed.ncbi.nlm.nih.gov/23705753/)
- M. Alloush, Income, psychological well-being, and the dynamics of poverty: Evidence from South Africa (2018); https://ageconsearch.umn.edu/record/274223/files/Abstracts_18_05_23_17_38_40_27_23_123_4_199_0.pdf.
- C. Christian, L. Hensel, C. Roth, Income shocks and suicides: Causal evidence from Indonesia. *Rev. Econ. Stat.* **101**, 1–16 (2019).
- A. Kuhn, R. Lalive, J. Zweimüller, The public health costs of job loss. *J. Health Econ.* **28**, 1099–1115 (2009). doi: [10.1016/j.jhealeco.2009.09.004](https://doi.org/10.1016/j.jhealeco.2009.09.004); pmid: [19833399](https://pubmed.ncbi.nlm.nih.gov/19833399/)
- J. R. Pierce, P. K. Schott, Trade liberalization and mortality: Evidence from U.S. counties. *Am. Econ. Rev. Insights* **2**, 47–63 (2020). doi: [10.1257/aeri.20180396](https://doi.org/10.1257/aeri.20180396)
- A. Case, A. Deaton, *Deaths of Despair and the Future of Capitalism* (Princeton Univ. Press, 2020).
- B. Wolfe, J. Jakubowski, R. Haveman, M. Courey, The income and health effects of tribal casino gaming on American Indians. *Demography* **49**, 499–524 (2012). doi: [10.1007/s13524-012-0098-8](https://doi.org/10.1007/s13524-012-0098-8); pmid: [22427279](https://pubmed.ncbi.nlm.nih.gov/22427279/)
- B. Apouey, A. E. Clark, Winning big but feeling no better? The effect of lottery prizes on physical and mental health. *Health Econ.* **24**, 516–538 (2015). doi: [10.1002/hec.3035](https://doi.org/10.1002/hec.3035); pmid: [24677260](https://pubmed.ncbi.nlm.nih.gov/24677260/)
- D. Cesarini, E. Lindqvist, R. Östling, B. Wallace, Wealth, health, and child development: Evidence from administrative data on Swedish lottery players. *Q. J. Econ.* **131**, 687–738 (2016). doi: [10.1093/qje/qjw001](https://doi.org/10.1093/qje/qjw001)
- E. Lindqvist, R. Östling, D. Cesarini, Long-run effects of lottery wealth on psychological well-being. *Rev. Econ. Stud.* **87**, 2703–2726 (2020). doi: [10.1093/restud/rdaa006](https://doi.org/10.1093/restud/rdaa006)
- J. Haushofer, J. Shapiro, The short-term impact of unconditional cash transfers to the poor: Experimental evidence from Kenya. *Q. J. Econ.* **131**, 1973–2042 (2016). doi: [10.1093/qje/qjw025](https://doi.org/10.1093/qje/qjw025); pmid: [33087990](https://pubmed.ncbi.nlm.nih.gov/33087990/)
- J. Haushofer, J. Shapiro, "The long-term impact of unconditional cash transfers: experimental evidence from Kenya" (Busara Center for Behavioral Economics, 2018); <https://pdfs.semanticscholar.org/2454/746163854dd855ac0d93f13f9556232bdf7.pdf>.
- Psychosom. Med.* **71**, 517–528 (2010). doi: [10.1016/j.socscimed.2010.04.027](https://doi.org/10.1016/j.socscimed.2010.04.027); pmid: [20621748](https://pubmed.ncbi.nlm.nih.gov/20621748/)
- V. Lemmi *et al.*, Suicide and poverty in low-income and middle-income countries: A systematic review. *Lancet Psychiatry* **3**, 774–783 (2016). doi: [10.1016/S2215-0366\(16\)30066-9](https://doi.org/10.1016/S2215-0366(16)30066-9); pmid: [27475770](https://pubmed.ncbi.nlm.nih.gov/27475770/)
- L. M. Banks, H. Kuper, S. Polack, Poverty and disability in low- and middle-income countries: A systematic review. *PLOS ONE* **12**, e0189996 (2017). doi: [10.1371/journal.pone.0189996](https://doi.org/10.1371/journal.pone.0189996); pmid: [29267388](https://pubmed.ncbi.nlm.nih.gov/29267388/)
- D. Frascquillo *et al.*, Mental health outcomes in times of economic recession: A systematic literature review. *BMC Public Health* **16**, 115 (2016). doi: [10.1186/s12889-016-2720-y](https://doi.org/10.1186/s12889-016-2720-y); pmid: [26847554](https://pubmed.ncbi.nlm.nih.gov/26847554/)
- D. M. Cutler, A. Lleras-Muney, T. Vogl, in *The Oxford Handbook of Health Economics*, S. Glied, P. Smith, Eds. (Oxford Univ. Press, 2011), pp. 124–163.
- H. Bleakley, Health, human capital, and development. *Annu. Rev. Econom.* **2**, 283–310 (2010). doi: [10.1146/annurev.economics.102308.124436](https://doi.org/10.1146/annurev.economics.102308.124436); pmid: [2147187](https://pubmed.ncbi.nlm.nih.gov/2147187/)
- D. Chisholm *et al.*, Scaling-up treatment of depression and anxiety: A global return on investment analysis. *Lancet Psychiatry* **3**, 415–424 (2016). doi: [10.1016/S2215-0366\(16\)30024-4](https://doi.org/10.1016/S2215-0366(16)30024-4); pmid: [27083119](https://pubmed.ncbi.nlm.nih.gov/27083119/)
- V. Patel, G. Simon, N. Chowdhary, S. Kaaya, R. Araya, Packages of care for depression in low- and middle-income countries. *PLOS Med.* **6**, e1000159 (2009). doi: [10.1371/journal.pmed.1000159](https://doi.org/10.1371/journal.pmed.1000159); pmid: [19806179](https://pubmed.ncbi.nlm.nih.gov/19806179/)
- P. S. Wang *et al.*, Use of mental health services for anxiety, mood, and substance disorders in 17 countries in the WHO world mental health surveys. *Lancet* **370**, 841–850 (2007). doi: [10.1016/S0140-6736\(07\)61414-7](https://doi.org/10.1016/S0140-6736(07)61414-7); pmid: [17826169](https://pubmed.ncbi.nlm.nih.gov/17826169/)
- R. Kohn, S. Saxena, I. Levav, B. Saraceno, The treatment gap in mental health care. *Bull. World Health Organ.* **82**, 858–866 (2004). pmid: [15640922](https://pubmed.ncbi.nlm.nih.gov/15640922/)
- K. M. Scott *et al.*, Association of mental disorders with subsequent chronic physical conditions: World mental health surveys from 17 countries. *JAMA Psychiatry* **73**, 150–158 (2016). doi: [10.1001/jamapsychiatry.2015.2688](https://doi.org/10.1001/jamapsychiatry.2015.2688); pmid: [26719969](https://pubmed.ncbi.nlm.nih.gov/26719969/)
- E. P. Vamos, I. Mucsi, A. Keszei, M. S. Kopp, M. Novak, Comorbid depression is associated with increased healthcare utilization and lost productivity in persons with diabetes: A large nationally representative Hungarian population survey.

38. A. Banerjee *et al.*, Development economics. A multifaceted program causes lasting progress for the very poor: Evidence from six countries. *Science* **348**, 1260799 (2015). doi: [10.1126/science.1260799](https://doi.org/10.1126/science.1260799); pmid: 25977558
39. O. Bandiera *et al.*, Labor markets and poverty in village economies. *Q. J. Econ.* **132**, 811–870 (2017). doi: [10.1093/qje/qjx003](https://doi.org/10.1093/qje/qjx003)
40. G. Bedoya, A. Coville, J. Haushofer, M. R. Isaqzadeh, J. Shapiro, *No Household Left Behind: Afghanistan Targeting the Ultra Poor Impact Evaluation*, policy research working papers (The World Bank, 2019).
41. A. Banerjee, E. Duflo, R. Chattopadhyay, J. Shapiro, The long term impacts of a “Graduation” program: Evidence from West Bengal. Unpublished paper, Massachusetts Institute of Technology, Cambridge, MA (2016); https://trickleup.org/wp-content/uploads/2016/12/2016_Banerjee_Long_Term_Impacts_Bandhan_Full.pdf.
42. A. Banerjee, P. Niehaus, T. Suri, Universal basic income in the developing world. *Annu. Rev. Econ.* **11**, 959–983 (2019). doi: [10.1146/annurev-economics-080218-030229](https://doi.org/10.1146/annurev-economics-080218-030229)
43. D. Collins, J. Morduch, S. Rutherford, O. Ruthven, *Portfolios of the Poor: How the World’s Poor Live on \$2 a Day* (Princeton Univ. Press, 2009).
44. S. M. Staufenbiel, B. W. J. H. Penninx, A. T. Spijker, B. M. Elzinga, E. F. C. van Rossum, Hair cortisol, stress exposure, and mental health in humans: A systematic review. *Psychoneuroendocrinology* **38**, 1220–1235 (2013). doi: [10.1016/j.psychneuen.2012.11.015](https://doi.org/10.1016/j.psychneuen.2012.11.015); pmid: 23253896
45. A. Finkelstein *et al.*, The Oregon health insurance experiment: Evidence from the first year. *Q. J. Econ.* **127**, 1057–1106 (2012). doi: [10.1093/qje/qjs020](https://doi.org/10.1093/qje/qjs020); pmid: 23293397
46. E. B. Dean, F. Schilbach, H. Schofield, in *The Economics of Poverty Traps*, C. B. Barrett, M. R. Carter, J.-P. Chavas, Eds. (Univ. Chicago Press, 2018), pp. 57–118.
47. N. Ding, H. Berry, L. O’Brien, The effect of extreme heat on mental health—Evidence from Australia. *Int. J. Epidemiol.* **44** (suppl. 1), i64–i64 (2015). doi: [10.1093/ije/dyv097.238](https://doi.org/10.1093/ije/dyv097.238)
48. M. N. Williams, S. R. Hill, J. Spicer, Do hotter temperatures increase the incidence of self-harm hospitalizations? *Psychol. Health Med.* **21**, 226–235 (2016). doi: [10.1080/13548506.2015.1028945](https://doi.org/10.1080/13548506.2015.1028945); pmid: 25849087
49. P. Bessone, G. Rao, F. Schilbach, H. Schofield, M. Toma, The Economic Consequences of Increasing Sleep Among the Urban Poor, National Bureau of Economic Research (NBER) working paper no. 26746 (2020); www.nber.org/papers/w26746.
50. A. G. Harvey, Sleep and circadian functioning: Critical mechanisms in the mood disorders? *Annu. Rev. Clin. Psychol.* **7**, 297–319 (2011). doi: [10.1146/annurev-clinpsy-032210-104550](https://doi.org/10.1146/annurev-clinpsy-032210-104550); pmid: 21166537
51. S. Grubb, M. Lauritzen, Deep sleep drives brain fluid oscillations. *Science* **366**, 572–573 (2019). doi: [10.1126/science.aaz5191](https://doi.org/10.1126/science.aaz5191); pmid: 31672882
52. R. Manber *et al.*, Cognitive behavioral therapy for insomnia enhances depression outcome in patients with comorbid major depressive disorder and insomnia. *Sleep* **31**, 489–495 (2008). doi: [10.1093/sleep/31.4.489](https://doi.org/10.1093/sleep/31.4.489); pmid: 18457236
53. Z. Jia *et al.*, Exposure to ambient air particles increases the risk of mental disorder: Findings from a natural experiment in Beijing. *Int. J. Environ. Res. Public Health* **15**, 160 (2018). doi: [10.3390/ijerph15010160](https://doi.org/10.3390/ijerph15010160); pmid: 29351245
54. T. Xue, T. Zhu, Y. Zheng, Q. Zhang, Author correction: Declines in mental health associated with air pollution and temperature variability in China. *Nat. Commun.* **10**, 3609 (2019). doi: [10.1038/s41467-019-11660-5](https://doi.org/10.1038/s41467-019-11660-5); pmid: 31383856
55. J. Ludwig *et al.*, Neighborhood effects on the long-term well-being of low-income adults. *Science* **337**, 1505–1510 (2012). doi: [10.1126/science.1224648](https://doi.org/10.1126/science.1224648); pmid: 22997331
56. D. Egger, J. Haushofer, E. Miguel, P. Niehaus, M. W. Walker, General Equilibrium Effects of Cash Transfers: Experimental Evidence from Kenya. NBER working paper no. 26600 (2019); www.nber.org/papers/w26600.
57. P. Persson, M. Rossin-Slater, Family ruptures, stress, and the mental health of the next generation. *Am. Econ. Rev.* **108**, 1214–1252 (2018). doi: [10.1257/aer.20141406](https://doi.org/10.1257/aer.20141406); pmid: 30091569
58. K. G. Noble *et al.*, Family income, parental education and brain structure in children and adolescents. *Nat. Neurosci.* **18**, 773–778 (2015). doi: [10.1038/nn.3983](https://doi.org/10.1038/nn.3983); pmid: 25821911
59. C. Blair, C. C. Raver, Poverty, stress, and brain development: New directions for prevention and intervention. *Acad. Pediatr.* **16** (Suppl.), S30–S36 (2016). doi: [10.1016/j.jacp.2016.01.010](https://doi.org/10.1016/j.jacp.2016.01.010); pmid: 27044699
60. A. Advharyu, J. Fenske, A. Nyshadham, Early life circumstance and adult mental health. *J. Polit. Econ.* **127**, 1516–1549 (2019). doi: [10.1086/701606](https://doi.org/10.1086/701606)
61. P. Sharkey, M. Besbris, M. Friedson, in *The Oxford Handbook of the Social Science of Poverty*, D. Brady, L. M. Burton, Eds. (Oxford Univ. Press, 2016).
62. M. Marmot, Social determinants of health inequalities. *Lancet* **365**, 1099–1104 (2005). doi: [10.1016/S0140-6736\(05\)71146-6](https://doi.org/10.1016/S0140-6736(05)71146-6); pmid: 15781105
63. C. B. Cunradi, R. Caetano, C. Clark, J. Schafer, Neighborhood poverty as a predictor of intimate partner violence among White, Black, and Hispanic couples in the United States: A multilevel analysis. *Ann. Epidemiol.* **10**, 297–308 (2000). doi: [10.1016/S1047-2797\(00\)00052-1](https://doi.org/10.1016/S1047-2797(00)00052-1); pmid: 10942878
64. J. Haushofer, C. Ringdal, J. P. Shapiro, X. Y. Wang, Income changes and intimate partner violence: Evidence from unconditional cash transfers in Kenya. NBER working paper no. 25627 (2019); www.nber.org/papers/w25627.
65. L. A. Goodman, K. F. Smyth, A. M. Borges, R. Singer, When crises collide: How intimate partner violence and poverty intersect to shape women’s mental health and coping? *Trauma Violence Abuse* **10**, 306–329 (2009). doi: [10.1177/1524838009339754](https://doi.org/10.1177/1524838009339754); pmid: 19776085
66. F. Cornaglia, N. E. Feldman, A. Leigh, Crime and mental well-being. *J. Hum. Resour.* **49**, 110–140 (2014). doi: [10.3368/jhr.49.1.110](https://doi.org/10.3368/jhr.49.1.110)
67. R. Perez-Truglia, The effects of income transparency on well-being: Evidence from a natural experiment. *Am. Econ. Rev.* **110**, 1019–1054 (2020). doi: [10.1257/aer.20160256](https://doi.org/10.1257/aer.20160256)
68. R. Walker, G. Bantebya-Kyomuhendo, *The Shame of Poverty* (Oxford Univ. Press, 2014).
69. J. T. Cacioppo, M. E. Hughes, L. J. Waite, L. C. Hawkey, R. A. Thisted, Loneliness as a specific risk factor for depressive symptoms: Cross-sectional and longitudinal analyses. *Psychol. Aging* **21**, 140–151 (2006). doi: [10.1037/0882-7974.21.1.140](https://doi.org/10.1037/0882-7974.21.1.140); pmid: 16594799
70. C. Hakulinen *et al.*, Mental disorders and long-term labour market outcomes: Nationwide cohort study of 2 055 720 individuals. *Acta Psychiatr. Scand.* **140**, 371–381 (2019). doi: [10.1111/acps.13067](https://doi.org/10.1111/acps.13067); pmid: 31254386
71. R. Mojtabai *et al.*, Long-term effects of mental disorders on employment in the National Comorbidity Survey ten-year follow-up. *Soc. Psychiatry Psychiatr. Epidemiol.* **50**, 1657–1668 (2015). doi: [10.1007/s00127-015-1097-z](https://doi.org/10.1007/s00127-015-1097-z); pmid: 26211661
72. B. Biasi, M. S. Dahl, P. Moser, Career effects of mental health. Working paper (2018); <https://papers.ssrn.com/abstract=2544251>.
73. C. Lund, K. Orkin, M. Witte, T. Davies, J. Haushofer, J. Bass, P. Bolton, S. Murray, L. Murray, W. Tol, G. Thornicroft, V. Patel, The economic effects of mental health interventions in low and middle-income countries. Working paper (2019); <https://custom.event.com/4e714122f8b441b97e483c88b51cc4/files/Event/159bd4dc083941a79dd0211437d5d7dc/d79476623ef7451884092864b1d7116b.pdf>.
74. A. Mani, S. Mullainathan, E. Shafrir, J. Zhao, Poverty impedes cognitive function. *Science* **341**, 976–980 (2013). doi: [10.1126/science.1238041](https://doi.org/10.1126/science.1238041); pmid: 23990553
75. S. Kaur, S. Mullainathan, F. Schilbach, Does financial strain lower productivity? Working paper (2019); <https://economics.mit.edu/files/16997>.
76. I. H. Gotlib, J. Joormann, Cognition and depression: Current status and future directions. *Annu. Rev. Clin. Psychol.* **6**, 285–312 (2010). doi: [10.1146/annurev-clinpsy.121208.131305](https://doi.org/10.1146/annurev-clinpsy.121208.131305); pmid: 20192795
77. M. Kremer, G. Rao, F. Schilbach, in *Handbook of Behavioral Economics, Foundations and Applications 2*, B. D. Bernheim, S. DellaVigna, D. Laibson, Eds. (North-Holland, 2019), vol. 2 of *Handbooks in Economics*, pp. 345–458.
78. A. T. Beck, *Depression: Clinical, Experimental, and Theoretical Aspects* (Univ. Pennsylvania Press, 1967).
79. J. de Quidt, J. Haushofer, Depression for economists. NBER working paper no. 22973 (2016). doi: [10.3386/w22973](https://doi.org/10.3386/w22973)
80. D. Eil, J. M. Rao, The good news-bad news effect: Asymmetric processing of objective information about yourself. *Am. Econ. J. Microecon.* **3**, 114–138 (2011). doi: [10.1257/mic.3.2.114](https://doi.org/10.1257/mic.3.2.114)
81. C. W. Korn, T. Sharot, H. Walter, H. R. Heekeren, R. J. Dolan, Depression is related to an absence of optimistically biased belief updating about future life events. *Psychol. Med.* **44**, 579–592 (2014). doi: [10.1017/S0033291713001074](https://doi.org/10.1017/S0033291713001074); pmid: 23672737
82. T. Armstrong, B. O. Olatunji, Eye tracking of attention in the affective disorders: A meta-analytic review and synthesis. *Clin. Psychol. Rev.* **32**, 704–723 (2012). doi: [10.1016/j.cpr.2012.09.004](https://doi.org/10.1016/j.cpr.2012.09.004); pmid: 23059623
83. Y. M. Bayer, S. Shtudiner, O. Suhorukov, N. Grisar, Time and risk preferences, and consumption decisions of patients with clinical depression. *J. Behav. Exp. Econ.* **78**, 138–145 (2019). doi: [10.1016/j.soec.2019.01.003](https://doi.org/10.1016/j.soec.2019.01.003)
84. D. A. Cobb-Clark, S. Dahmann, N. Kettlewell, “Depression, risk preferences and risk-taking behavior,” research paper 12285 (Institute for the Study of Labor, 2019); <https://papers.ssrn.com/abstract=3390275>.
85. J. S. Rounds, J. G. Beck, D. M. Grant, Is the delay discounting paradigm useful in understanding social anxiety? *Behav. Res. Ther.* **45**, 729–735 (2007). doi: [10.1016/j.brat.2006.06.007](https://doi.org/10.1016/j.brat.2006.06.007); pmid: 16890909
86. R. C. Kessler *et al.*, Age of onset of mental disorders: A review of recent literature. *Curr. Opin. Psychiatry* **20**, 359–364 (2007). doi: [10.1097/YOC.0b013e32816ebc8c](https://doi.org/10.1097/YOC.0b013e32816ebc8c); pmid: 17551351
87. S. Mall *et al.*, Days out of role due to mental and physical illness in the South African stress and health study. *Soc. Psychiatry Psychiatr. Epidemiol.* **50**, 461–468 (2015). doi: [10.1007/s00127-014-0941-x](https://doi.org/10.1007/s00127-014-0941-x); pmid: 25096982
88. B. A. Pescosolido, T. R. Medina, J. K. Martin, J. S. Long, The “backbone” of stigma: Identifying the global core of public prejudice associated with mental illness. *Am. J. Public Health* **103**, 853–860 (2013). doi: [10.2105/AJPH.2012.301147](https://doi.org/10.2105/AJPH.2012.301147); pmid: 23488508
89. J. Sharac, P. McCrone, S. Clement, G. Thornicroft, The economic impact of mental health stigma and discrimination: A systematic review. *Epidemiol. Psychiatr. Soc.* **19**, 223–232 (2010). doi: [10.1017/S1121189X00001159](https://doi.org/10.1017/S1121189X00001159); pmid: 21261218
90. S. Saxena, P. Sharan, M. Garrido, B. Saraceno, World Health Organization’s Mental Health Atlas 2005: Implications for policy development. *World Psychiatry* **5**, 179–184 (2006). pmid: 17139355
91. C. Lauber, W. Rössler, Stigma towards people with mental illness in developing countries in Asia. *Int. Rev. Psychiatry* **19**, 157–178 (2007). doi: [10.1080/09540260701278903](https://doi.org/10.1080/09540260701278903); pmid: 17464793
92. A. V. Banerjee, E. Duflo, The economic lives of the poor. *J. Econ. Perspect.* **21**, 141–167 (2007). doi: [10.1257/jep.21.1.141](https://doi.org/10.1257/jep.21.1.141); pmid: 19212450
93. K. Xu *et al.*, Protecting households from catastrophic health spending. *Health Aff. (Millwood)* **26**, 972–983 (2007). doi: [10.1377/hlthaff.26.4.972](https://doi.org/10.1377/hlthaff.26.4.972); pmid: 17630440
94. B. Weobong *et al.*, Sustained effectiveness and cost-effectiveness of the Healthy Activity Programme, a brief psychological treatment for depression delivered by lay counsellors in primary care: 12-month follow-up of a randomised controlled trial. *PLOS Med.* **14**, e1002385 (2017). doi: [10.1371/journal.pmed.1002385](https://doi.org/10.1371/journal.pmed.1002385); pmid: 28898283
95. V. Baranov, S. R. Bhalotra, P. Biroli, J. Masello, Maternal depression, women’s empowerment, and parental investment: Evidence from a large randomized control trial (2017); <https://papers.ssrn.com/abstract=3081421>.
96. P. Cuijpers, E. Weitz, E. Karyotaki, J. Garber, G. Andersson, The effects of psychological treatment of maternal depression on children and parental functioning: A meta-analysis. *Eur. Child Adolesc. Psychiatry* **24**, 237–245 (2015). doi: [10.1007/s00787-014-0660-6](https://doi.org/10.1007/s00787-014-0660-6); pmid: 25522839
97. J. J. Heckman, S. Mosso, The economics of human development and social mobility. *Annu. Rev. Econom.* **6**, 689–733 (2014). doi: [10.1146/annurev-economics-080213-040753](https://doi.org/10.1146/annurev-economics-080213-040753); pmid: 25346785
98. G. C. Patton *et al.*, Our future: A Lancet commission on adolescent health and wellbeing. *Lancet* **387**, 2423–2478 (2016). doi: [10.1016/S0140-6736\(16\)00579-1](https://doi.org/10.1016/S0140-6736(16)00579-1); pmid: 27174304
99. D. Prinz, M. Chernen, D. Cutler, A. Frakt, “Health and economic activity over the lifecycle: Literature review,” NBER working paper series 24865 (NBER, 2018). doi: [10.3386/w24865](https://doi.org/10.3386/w24865)
100. M. L. A. Dückers, L. Reifels, D. P. De Beurs, C. R. Brewin, The vulnerability paradox in global mental health and its applicability to suicide. *Br. J. Psychiatry* **215**, 588–593 (2019). doi: [10.1192/bjp.2019.41](https://doi.org/10.1192/bjp.2019.41)
101. P. Brhlikova, A. M. Pollock, R. Manners, Global burden of disease estimates of depression—How reliable is the epidemiological evidence? *J. R. Soc. Med.* **104**, 25–34 (2011). doi: [10.1258/jrsm.2010.100080](https://doi.org/10.1258/jrsm.2010.100080); pmid: 21205775
102. B. Milanovic, *Global Inequality: A New Approach for the Age of Globalization* (Harvard Univ. Press, 2016).

103. F. J. Charlson, A. J. Baxter, H. G. Cheng, R. Shidhaye, H. A. Whiteford, The burden of mental, neurological, and substance use disorders in China and India: A systematic analysis of community representative epidemiological studies. *Lancet* **388**, 376–389 (2016). doi: [10.1016/S0140-6736\(16\)30590-6](https://doi.org/10.1016/S0140-6736(16)30590-6); pmid: [27209143](https://pubmed.ncbi.nlm.nih.gov/27209143/)
104. V. Masson-Delmotte, *Global Warming of 1.5°C: An IPCC Special Report on the Impacts of Global Warming of 1.5°C Above Pre-industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty* (World Meteorological Organization, 2018).
105. P. M. Trang, J. Rocklöv, K. B. Giang, G. Kullgren, M. Nilsson, Heatwaves and hospital admissions for mental disorders in northern Vietnam. *PLOS ONE* **11**, e0155609 (2016). doi: [10.1371/journal.pone.0155609](https://doi.org/10.1371/journal.pone.0155609); pmid: [27195473](https://pubmed.ncbi.nlm.nih.gov/27195473/)
106. H. L. Berry, T. D. Waite, K. B. G. Dear, A. G. Capon, V. Murray, The case for systems thinking about climate change and mental health. *Nat. Clim. Chang.* **8**, 282–290 (2018). doi: [10.1038/s41558-018-0102-4](https://doi.org/10.1038/s41558-018-0102-4)
107. T. A. Carleton, Crop-damaging temperatures increase suicide rates in India. *Proc. Natl. Acad. Sci. U.S.A.* **114**, 8746–8751 (2017). doi: [10.1073/pnas.1701354114](https://doi.org/10.1073/pnas.1701354114); pmid: [28760983](https://pubmed.ncbi.nlm.nih.gov/28760983/)
108. M. Burke, S. M. Hsiang, E. Miguel, Climate and conflict. *Annu. Rev. Econ.* **7**, 577–617 (2015). doi: [10.1146/annurev-economics-080614-115430](https://doi.org/10.1146/annurev-economics-080614-115430)
109. C. McMichael, J. Barnett, A. J. McMichael, An ill wind? Climate change, migration, and health. *Environ. Health Perspect.* **120**, 646–654 (2012). doi: [10.1289/ehp.1104375](https://doi.org/10.1289/ehp.1104375); pmid: [22666739](https://pubmed.ncbi.nlm.nih.gov/22666739/)
110. D. H. Autor, D. Dorn, G. H. Hanson, The China shock: Learning from labor-market adjustment to large changes in trade. *Annu. Rev. Econ.* **8**, 205–240 (2016). doi: [10.1146/annurev-economics-080315-015041](https://doi.org/10.1146/annurev-economics-080315-015041)
111. A. Adams-Prassl, T. Boneva, M. Golin, C. Rauh, “Inequality in the Impact of the Coronavirus Shock: Evidence from Real Time Surveys,” Cambridge-INET working paper no. 2020/18 (2020); https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3594297.
112. T. Suri, W. Jack, The long-run poverty and gender impacts of mobile money. *Science* **354**, 1288–1292 (2016). doi: [10.1126/science.aah5309](https://doi.org/10.1126/science.aah5309); pmid: [27940873](https://pubmed.ncbi.nlm.nih.gov/27940873/)
113. J. H. Ha et al., Depression and Internet addiction in adolescents. *Psychopathology* **40**, 424–430 (2007). doi: [10.1159/000107426](https://doi.org/10.1159/000107426); pmid: [17709972](https://pubmed.ncbi.nlm.nih.gov/17709972/)
114. L. Y. Lin et al., Association between social media use and depression among U.S. young adults. *Depress. Anxiety* **33**, 323–331 (2016). doi: [10.1002/da.22466](https://doi.org/10.1002/da.22466); pmid: [26783723](https://pubmed.ncbi.nlm.nih.gov/26783723/)
115. H. Alcott, L. Braghieri, S. Eichmeyer, M. Gentzkow, The welfare effects of social media. *Am. Econ. Rev.* **110**, 629–676 (2020). doi: [10.1257/aer.20190658](https://doi.org/10.1257/aer.20190658)
116. R. Mosquera, M. Odonowo, T. McNamara, X. Guo, R. Petrie, The economic effects of Facebook. *Exp. Econ.* **10**, 2139/3312462 (2019).
117. World Bank Group, *World Development Report 2016: Digital Dividends* (World Bank Publications, 2016).
118. B. Bhat, J. Haushofer, J. de Quidt, V. Patel, F. Schilbach, G. Rao, P.-L. Vautrey, The economics consequences of depression: Evidence from Goa. AEA RCT Registry (2019). doi: [10.1257/rct.3823-10](https://doi.org/10.1257/rct.3823-10)
119. C. Blattman, J. C. Jamison, M. Sheridan, Reducing crime and violence: Experimental evidence from cognitive behavioral therapy in Liberia. *Am. Econ. Rev.* **107**, 1165–1206 (2017). doi: [10.1257/aer.20150503](https://doi.org/10.1257/aer.20150503); pmid: [29553237](https://pubmed.ncbi.nlm.nih.gov/29553237/)
120. M. Thirunavukarasu, P. Thirunavukarasu, Training and national deficit of psychiatrists in India—A critical analysis. *Indian J. Psychiatry* **52** (suppl. 1), S83–S88 (2010). doi: [10.4103/0019-5545.69218](https://doi.org/10.4103/0019-5545.69218); pmid: [21836723](https://pubmed.ncbi.nlm.nih.gov/21836723/)
121. WHO, “Mental health atlas 2017” (WHO, 2017); available at www.who.int/mental_health/evidence/atlas/mental_health_atlas_2017/en.
122. D. R. Singla et al., Psychological treatments for the world: Lessons from low- and middle-income countries. *Annu. Rev. Clin. Psychol.* **13**, 149–181 (2017). doi: [10.1146/annurev-clinpsy-032816-045217](https://doi.org/10.1146/annurev-clinpsy-032816-045217); pmid: [28482687](https://pubmed.ncbi.nlm.nih.gov/28482687/)
123. V. Patel, N. Chowdhary, A. Rahman, H. Verdelli, Improving access to psychological treatments: Lessons from developing countries. *Behav. Res. Ther.* **49**, 523–528 (2011). doi: [10.1016/j.brat.2011.06.012](https://doi.org/10.1016/j.brat.2011.06.012); pmid: [21788012](https://pubmed.ncbi.nlm.nih.gov/21788012/)
124. D. Chibanda et al., Effect of a primary care-based psychological intervention on symptoms of common mental disorders in Zimbabwe: A randomized clinical trial. *JAMA* **316**, 2618–2626 (2016). doi: [10.1001/jama.2016.19102](https://doi.org/10.1001/jama.2016.19102); pmid: [28027368](https://pubmed.ncbi.nlm.nih.gov/28027368/)
125. R. Waters, Community workers lend human connection to COVID-19 response. *Health Aff. (Millwood)* **39**, 1112–1117 (2020). doi: [10.1377/hlthaff.2020.00836](https://doi.org/10.1377/hlthaff.2020.00836); pmid: [32634347](https://pubmed.ncbi.nlm.nih.gov/32634347/)
126. V. Patel et al., The magnitude of and health system responses to the mental health treatment gap in adults in India and China. *Lancet* **388**, 3074–3084 (2016). doi: [10.1016/S0140-6736\(16\)00160-4](https://doi.org/10.1016/S0140-6736(16)00160-4); pmid: [27209149](https://pubmed.ncbi.nlm.nih.gov/27209149/)
127. A. F. Jorm, Mental health literacy. Public knowledge and beliefs about mental disorders. *Br. J. Psychiatry* **177**, 396–401 (2000). doi: [10.1192/bjp.177.5.396](https://doi.org/10.1192/bjp.177.5.396); pmid: [11059991](https://pubmed.ncbi.nlm.nih.gov/11059991/)
128. R. Shidhaye et al., The effect of VISHRAM, a grass-roots community-based mental health programme, on the treatment gap for depression in rural communities in India: A population-based study. *Lancet Psychiatry* **4**, 128–135 (2017). doi: [10.1016/S2215-0366\(16\)30424-2](https://doi.org/10.1016/S2215-0366(16)30424-2); pmid: [28063879](https://pubmed.ncbi.nlm.nih.gov/28063879/)
129. P. Dasgupta, D. Ray, Inequality as a determinant of malnutrition and unemployment: Theory. *Econ. J. (Lond.)* **96**, 1011 (1986). doi: [10.2307/223171](https://doi.org/10.2307/223171)
130. B. A. Arvind et al., T. M. Shibukumar, NMHS Collaborators Group, Prevalence and socioeconomic impact of depressive disorders in India: Multisite population-based cross-sectional study. *BMJ Open* **9**, e027250 (2019). doi: [10.1136/bmjopen-2018-027250](https://doi.org/10.1136/bmjopen-2018-027250); pmid: [31253618](https://pubmed.ncbi.nlm.nih.gov/31253618/)
131. E. P. Green, C. Blattman, J. Jamison, J. Annan, Does poverty alleviation decrease depression symptoms in post-conflict settings? A cluster-randomized trial of microenterprise assistance in Northern Uganda. *Glob. Ment. Health (Camb.)* **3**, e7 (2016). doi: [10.1017/gmh.2015.28](https://doi.org/10.1017/gmh.2015.28); pmid: [28596876](https://pubmed.ncbi.nlm.nih.gov/28596876/)
132. C. Blattman, S. Dercon, S. Franklin, Impacts of industrial and entrepreneurial jobs on youth: 5-year experimental evidence on factory job offers and cash grants in “Ethiopia,” NBER working paper no. 25788 (2019); www.nber.org/papers/w25788.
133. C. Blattman, N. Fiala, S. Martinez, “The Long Term Impacts of Grants on Poverty: 9-year Evidence From Uganda’s Youth Opportunities Program,” NBER working paper no. 24999 (2018); www.nber.org/papers/w24999.
134. L. Hjelm, S. Handa, J. de Hoop, T. Palermo; Zambia CGP and MCP Evaluation Teams, Poverty and perceived stress: Evidence from two unconditional cash transfer programs in Zambia. *Soc. Sci. Med.* **177**, 110–117 (2017). doi: [10.1016/j.socscimed.2017.01.023](https://doi.org/10.1016/j.socscimed.2017.01.023); pmid: [28167339](https://pubmed.ncbi.nlm.nih.gov/28167339/)
135. S. Baird, B. de Hoop, B. Özler, Income shocks and adolescent mental health. *J. Hum. Resour.* **48**, 370–403 (2013). doi: [10.3368/jhr.48.2.370](https://doi.org/10.3368/jhr.48.2.370)
136. K. Kilburn, H. Thirumurthy, C. T. Halpern, A. Pettifor, S. Handa, Effects of a large-scale unconditional cash transfer program on mental health outcomes of young people in Kenya. *J. Adolesc. Health* **58**, 223–229 (2016). doi: [10.1016/j.jadohealth.2015.09.023](https://doi.org/10.1016/j.jadohealth.2015.09.023); pmid: [26576822](https://pubmed.ncbi.nlm.nih.gov/26576822/)
137. G. Angeles et al., Government of Malawi’s unconditional cash transfer improves youth mental health. *Soc. Sci. Med.* **225**, 108–119 (2019). doi: [10.1016/j.socscimed.2019.01.037](https://doi.org/10.1016/j.socscimed.2019.01.037); pmid: [30826585](https://pubmed.ncbi.nlm.nih.gov/30826585/)
138. J. Haushofer, R. Mudida, J. Shapiro, “The comparative impact of cash transfers and psychotherapy on psychological and economic well-being,” working paper (2020); www.researchgate.net/profile/Robert_Mudida/publication/340435415_The_Comparative_Impact_of_Cash_Transfers_and_Psychotherapy_on_Psychological_and_Economic_Well-being.
139. J. Haushofer, M. Chemin, C. Jang, J. Abraham, Economic and psychological effects of health insurance and cash transfers: Evidence from a randomized experiment in Kenya. *J. Dev. Econ.* **144**, 102416 (2020). doi: [10.1016/j.jdeveco.2019.102416](https://doi.org/10.1016/j.jdeveco.2019.102416)
140. E. Edmonds, C. Theoharides, The short term impact of a productive asset transfer in families with child labor: Experimental evidence from the Philippines. *J. Dev. Econ.* **146**, 102486 (2020). doi: [10.1016/j.jdeveco.2020.102486](https://doi.org/10.1016/j.jdeveco.2020.102486)
141. S. Janzen, N. Magnan, S. Sharma, W. Thompson, Short-term impacts of a pay-it-forward livestock transfer and training program in Nepal. *AEA Pap. Proc.* **108**, 422–425 (2018). doi: [10.1257/pandp.20181120](https://doi.org/10.1257/pandp.20181120)
142. N. Glass, N. A. Perrin, A. Kohli, J. Campbell, M. M. Remy, Randomised controlled trial of a livestock productive asset transfer programme to improve economic and health outcomes and reduce intimate partner violence in a postconflict setting. *BMJ Glob. Health* **2**, e000165 (2017). doi: [10.1136/bmjgh-2016-000165](https://doi.org/10.1136/bmjgh-2016-000165); pmid: [28589002](https://pubmed.ncbi.nlm.nih.gov/28589002/)
143. S. Baird, C. McIntosh, B. Özler, When the money runs out: Do cash transfers have sustained effects on human capital accumulation? 30 March 2019 (socialprotection.org, 2019); https://socialprotection.org/sites/default/files/publications_files/Baird%20McIntosh%20Ozler_When%20the%20Money%20Runs%20Out_COMBINED_Revision_FINAL.pdf.
144. J. Shapiro, The impact of recipient choice on aid effectiveness. *World Dev.* **116**, 137–149 (2019). doi: [10.1016/j.worlddev.2018.10.010](https://doi.org/10.1016/j.worlddev.2018.10.010); pmid: [30944504](https://pubmed.ncbi.nlm.nih.gov/30944504/)
145. A. Aguiar, Cash and conditionalities’ effects on early childhood: medium-term effects on physical and cognitive development (2012); www.aguiarstevea.com/wp-content/uploads/2012/09/Progesa_ECD_paper.pdf.
146. K. Macours, R. Vakis, *Changing Households’ Investments and Aspirations Through Social Interactions: Evidence From a Randomized Transfer Program* (The World Bank, 2009).
147. L. C. H. Fernald, M. Hidrobo, Effect of Ecuador’s cash transfer program (Bono de Desarrollo Humano) on child development in infants and toddlers: A randomized effectiveness trial. *Soc. Sci. Med.* **72**, 1437–1446 (2011). doi: [10.1016/j.socscimed.2011.03.005](https://doi.org/10.1016/j.socscimed.2011.03.005); pmid: [21531060](https://pubmed.ncbi.nlm.nih.gov/21531060/)
148. L. Ismayilova et al., Improving mental health among ultra-poor children: Two-year outcomes of a cluster-randomized trial in Burkina Faso. *Soc. Sci. Med.* **208**, 180–189 (2018). doi: [10.1016/j.socscimed.2018.04.022](https://doi.org/10.1016/j.socscimed.2018.04.022); pmid: [29743136](https://pubmed.ncbi.nlm.nih.gov/29743136/)
149. R. Heath, M. Hidrobo, S. Roy, Cash transfers, polygamy, and intimate partner violence: Experimental evidence from Mali. *J. Dev. Econ.* **143**, 102410 (2020). doi: [10.1016/j.jdeveco.2019.102410](https://doi.org/10.1016/j.jdeveco.2019.102410)
150. K. Kilburn et al., Cash transfers, young women’s economic well-being, and HIV risk: Evidence from HPTN 068. *AIDS Behav.* **23**, 1178–1194 (2019). doi: [10.1007/s10461-018-2329-5](https://doi.org/10.1007/s10461-018-2329-5); pmid: [30415429](https://pubmed.ncbi.nlm.nih.gov/30415429/)
151. V. Patel et al., Detecting common mental disorders in primary care in India: A comparison of five screening questionnaires. *Psychol. Med.* **38**, 221–228 (2008). doi: [10.1017/S0033291707002334](https://doi.org/10.1017/S0033291707002334); pmid: [18047768](https://pubmed.ncbi.nlm.nih.gov/18047768/)
152. K. Kroenke, R. L. Spitzer, The PHQ-9: A new depression diagnostic and severity measure. *Psychiatr. Ann.* **32**, 509–515 (2002). doi: [10.3928/0048-5713-20020901-06](https://doi.org/10.3928/0048-5713-20020901-06)
153. R. L. Spitzer, K. Kroenke, J. B. W. Williams, B. Löwe, A brief measure for assessing generalized anxiety disorder: The GAD-7. *Arch. Intern. Med.* **166**, 1092–1097 (2006). doi: [10.1001/archinte.166.10.1092](https://doi.org/10.1001/archinte.166.10.1092); pmid: [16717171](https://pubmed.ncbi.nlm.nih.gov/16717171/)
154. G.-C. Aili, G. Ryan, M. J. De Silva, Validated screening tools for common mental disorders in low and middle income countries: A systematic review. *PLOS ONE* **11**, e0156939 (2016). doi: [10.1371/journal.pone.0156939](https://doi.org/10.1371/journal.pone.0156939); pmid: [27310297](https://pubmed.ncbi.nlm.nih.gov/27310297/)
155. V. Patel et al., The Healthy Activity Program (HAP), a lay counsellor-delivered brief psychological treatment for severe depression, in primary care in India: A randomised controlled trial. *Lancet* **389**, 176–185 (2017). doi: [10.1016/S0140-6736\(16\)31589-6](https://doi.org/10.1016/S0140-6736(16)31589-6); pmid: [27988143](https://pubmed.ncbi.nlm.nih.gov/27988143/)

ACKNOWLEDGMENTS

We thank V. Baranov, T. Cruz Vital, J. Das, E. Gallagher, J. Haushofer, A. Karing, J. Li, C. Lund, M. Mani, K. Orkin, J. Pan, and K. Rao, for helpful comments and suggestions. We thank six anonymous referees for detailed comments and helpful suggestions. We thank C. Roth and L. Hensel for kindly providing us the data needed to construct Fig. 3. **Funding:** None declared. **Author contributions:** All authors contributed equally to this work. **Competing interests:** The authors have no competing interests or financial conflicts of interest.

SUPPLEMENTARY MATERIALS

science.sciencemag.org/content/370/6522/eaay0214/suppl/DC1
Supplementary Text
Figs. S1 to S3
References (156–164)

10.1126/science.aay0214

Poverty, depression, and anxiety: Causal evidence and mechanisms

Matthew Ridley, Gautam Rao, Frank Schilbach and Vikram Patel

Science **370** (6522), eaay0214.
DOI: 10.1126/science.aay0214

Taxing mental health

Mental equilibrium is essential for an economically productive life in both industrialized and developing countries. Accumulating evidence shows that mental ill-health and poverty tend to be traveling partners, but which is the cause? Ridley *et al.* reviewed the literature on natural and controlled economic experiments involving individuals living in poverty. The authors sought to resolve the mechanisms whereby poverty triggers mental illness and how mental illness compounds poverty. Their results reveal the benefits of cash support and of low-cost therapeutic interventions for those suffering from mental illness under poverty.

Science, this issue p. eaay0214

ARTICLE TOOLS

<http://science.sciencemag.org/content/370/6522/eaay0214>

SUPPLEMENTARY MATERIALS

<http://science.sciencemag.org/content/suppl/2020/12/09/370.6522.eaay0214.DC1>

REFERENCES

This article cites 120 articles, 13 of which you can access for free
<http://science.sciencemag.org/content/370/6522/eaay0214#BIBL>

PERMISSIONS

<http://www.sciencemag.org/help/reprints-and-permissions>

Use of this article is subject to the [Terms of Service](#)

Science (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. The title *Science* is a registered trademark of AAAS.

Copyright © 2020 The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works