

Psychology of Poverty

14.771 guest lecture Fall 2021

Frank Schilbach (MIT)

What explains these behaviors?

- Environmental conditions
 - Transportation
 - Predatory lending
 - Institutional structure (defaults)
 - ...
- Selection/omitted variables
 - Education
 - Intelligence
 - Effort
 - Mistakes
 - ...
- **Treatment effect of poverty**
 - Poverty *itself* causes these behaviors.

A different motivation

- Recent work shows evidence of poverty traps (Banerjee et al. 2020; Balboni et al. 2021)
 - What is the underlying mechanism?
 - Could psychological factors play an important role?
- A behavioral poverty trap?
 - Poverty affects cognition, stress, mental health, etc.
 - These factors impede economic decision-making and productivity.
 - This in turn influences future poverty.

Different lines of research

(I) Scarcity

- Monetary concerns capture cognitive function.

(II) Stress

- Poverty causes stress and stress causes future poverty.
- Some evidence on the former, but not much evidence on the latter.
- However, long-term stress can impair mental health.

(III) Sleep deprivation

- The poor are more likely to be tired, in pain, or to drink excessively.

(IV) Mental health: depression and anxiety

- Poverty is associated with mental ill-health.

(V) Other factors: Sadness, hope, self-efficacy, substance abuse, pain, etc.

Mullainathan and Shafir (2013): scarcity

- Scarcity: not having enough of something
 - Money, time, friends, hair, etc.
- Scarcity *captures* mental cognitive capacity ('bandwidth').
 - Happens automatically
 - *Not* intentional
- Poverty makes monetary concerns top of mind.
 - Implies that the poor act more rational in financial choices
 - Greater focus and improved decision making (Shah et al. 2015)
- But overall cognitive capacity is limited.
 - Scarcity deteriorates performance at other cognitive tasks.

Evidence of scarcity effects

- Mani et al. (2013): Two complementary studies
 - ‘Mall study’: making low-income people in a mall in Trenton NJ think about monetary troubles lowers their cognitive function as measured by IQ-type tests.
 - ‘Harvest study’: lower cognitive scores after harvest (when people are cash-rich) vs. before harvest in rural India
- Enormously influential study but few successful replications
 - Carvalho et al. (2015): no differences around payday among US households.
 - Fehr et al. (2021): no differences in cognition before vs. after harvest in Zambia.
 - Schofield and Venkataramani (2021): evidence consistent with mall study
 - Excellent recent review of evidence by de Bruijn and Antonides (2021)
- Does scarcity affect economic behaviors?

This paper

- Do these forces have economically important effects? [Duquenois 2019, Banerjee et al 2020]
- One particularly meaningful domain: worker productivity → labor income
- Research question: Can relieving financial strain make a person more productive at work?
- Field experiment with 408 manufacturing workers in India
 - Alleviate financial constraints (vary timing of income)
 - Effects on productivity
 - Pathways: attentional errors in production
 - Note: no stance on specific psychological mechanism (stress, worry, affect, sadness, etc.)

Immediate increase in expenditures

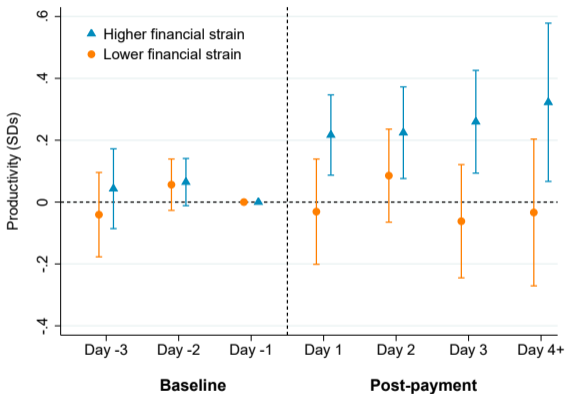
	Loans and Credits		Household expenditures		
	Amount (1)	Any Payment (2)	Total (3)	Food (4)	Clothes (5)
PANEL A: Overall Impacts					
Cash	275.81*** (53.01)	0.40*** (0.04)	155.07*** (39.05)	70.02*** (23.96)	30.76* (16.04)
PANEL B: Daily Impacts					
Cash × Day of payment	171.13*** (44.96)	0.17*** (0.04)	71.92*** (16.80)	50.12*** (13.66)	0.70 (4.17)
Cash × 1 day post-pay	68.27*** (26.18)	0.13*** (0.03)	40.83* (21.50)	18.15 (15.01)	5.49 (5.57)
Cash × 2 days post-pay	40.94* (20.94)	0.16*** (0.04)	47.60* (25.91)	1.97 (12.29)	27.63* (16.41)
Control group mean, overall	94.20	0.18	377.65	270.36	14.31
Control group mean, day of payment	22.72	0.07	102.43	79.20	3.86
N: worker-days	1,160	1,160	1,160	1,160	1,160

- 287% increase in loan payments (majority on same day as when cash is disbursed)
 - 41% increase in household expenditures (food clothing, etc)
- Cash infusion could meaningfully reduce financial stress

Cash infusion increases productivity

	Hourly Production		
	(1)	(2)	(3)
Cash × Post-pay	0.102*** (0.037)	0.115** (0.058)	0.253*** (0.092)
Cash × Post-pay × Lower financial strain			-0.365** (0.175)
Controls?	No	Yes	Yes
N: worker-hours	22,849	22,849	22,789

Notes: Difference in differences regressions. Standard errors clustered by worker.



- 6-13% increase in hourly productivity

- Effects persist until the end of contract period

Examine *how* workers produce →
Insight into what has changed



Making a leaf plate

- Stitch to form circle (cannot be too small)
- No holes or gaps, leaf stems must not be visible
- Each leaf is irregular shape → easy to make mistakes

Planning & strategic placement can reduce work

- Fewer leaves or stitches
- Less chance of having to undo a mistake (e.g. oblong shape)
- Less physical effort and time – *for same piece rate*

3 measures of attentiveness in production

- Number of double holes (undoing a stitch)
- Number of leaves; number of stitches
- (Collection unknown to workers)

Cash infusion increases attentiveness while working

	Attentiveness index (1)	High attentiveness (2)	Attentiveness index (3)	High attentiveness (4)
Cash × Post	0.080** (0.037)	0.077*** (0.025)	0.229*** (0.086)	0.186*** (0.055)
Cash × Post × Lower financial strain			-0.287** (0.122)	-0.185** (0.075)
P-val: cash effect + interaction			0.513	0.985
N: worker-hours	15,265	15,265	15,227	15,227

Notes: Difference in differences regressions. Standard errors clustered by worker.

→ Cash infusion: work faster (more efficiently) and with less mistakes

- Consistent with a potential range of psychological mechanisms, e.g. worry, stress
- Attentiveness effect also persistent until the end of contract [Table]

Potential confounds and channels

(1) Fairness and gift exchange?

- Strong fairness norms for wage levels, but not other aspects of wage [e.g. Kaur 2019]
- Core results inconsistent with basic fairness model
 - (i) Heterogeneity results: A priori may not expect no effects for less strained workers
 - (ii) Attentiveness results: Don't respond to motivation, workers work faster (less care per plate)
- 2 direct tests in data
 - (i) No evidence of announcement effect [Table]
 - (ii) No evidence that control group works less hard after cash infusion [Table]

(2) Investment channels: nutrition?

- Short-run effects must operate through breakfast (dinner horizon too long)
- Breakfast consumption similar across groups (98% eat rice for breakfast, inelastic)
- Productivity effects persistent near the end of the work day [Table]

Conclusion: Financial concerns and worker productivity

- Use payment timing within context of liquidity constrained workers to construct clean test
 - Ability to pay for expenses at home boosts productivity and attentiveness at work
 - Financial strain itself may be detrimental for earnings exactly when money is most needed
- Proof of concept that productivity effects can occur in high-stakes setting (labor income)
 - Potential implication: Additional channel through which policy levers (pay structure, social programs) could affect productivity
 - Example: cash transfer programs could also have productivity benefits
- Many open questions:
 - Are such effects present in other settings, e.g. cash or other transfer programs?
 - What is the optimal pay structure?
 - Do interventions to support employees' financial well-being have productivity benefits?

Sleep experts believe people under-invest in sleep

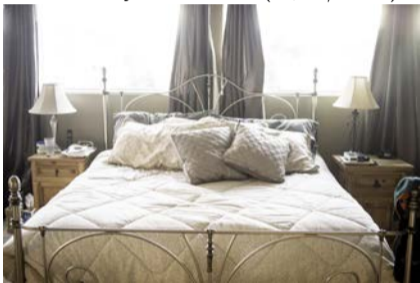
"If we all slept enough? ...our healthcare burden would plummet, we would have better mental health and fewer suicides... our business would be more productive, global economies would be healthier, our roads would be safer and our children would be smarter.... sleep is the very best health insurance policy you could ever wish for."

- Matthew Walker PhD

Professor of Neuroscience & Founder and Director of the Center for Human Sleep Science, University of California, Berkeley

Sleep environments vary a lot across settings

Howard family, Colorado, US (\$4,650/month)



Shaw family, Calcutta, India (\$48/month)



Source: Gapminder (Dollar Street)

- We know next to nothing about sleep in developing-country environments
- Sleep might be worse given the difficult living conditions
 - Marginal benefits of sleep may therefore be high

This paper

- (1) Objectively measure sleep in Chennai, India
 - 452 participants hired to do data-entry work for one month each

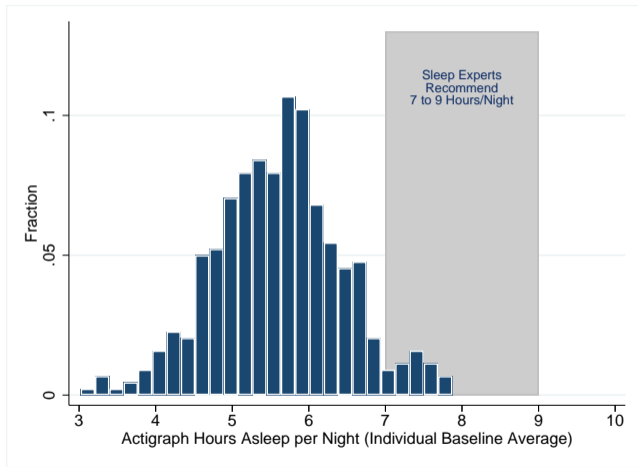
- (2) Randomized interventions to increase sleep
 - Encouragement/incentives to increase night sleep
 - Afternoon naps

- (3) Measure impacts of increased sleep
 - Work outcomes
 - Cognition (attention, working memory)
 - Preferences and decision-making
 - Well-being

Actigraphs: sleep measurement technologies allow for field studies

- Wrist-watch-like devices: infer sleep from motion [PSG]
- 90% accurate relative to sleep-lab measures (Ancoli-Israel et al., 2003) [ACCURACY]
 - Found to also perform well with problematic sleepers (e.g. sleep apnea)
- Primarily measure sleep quantity and sleep efficiency

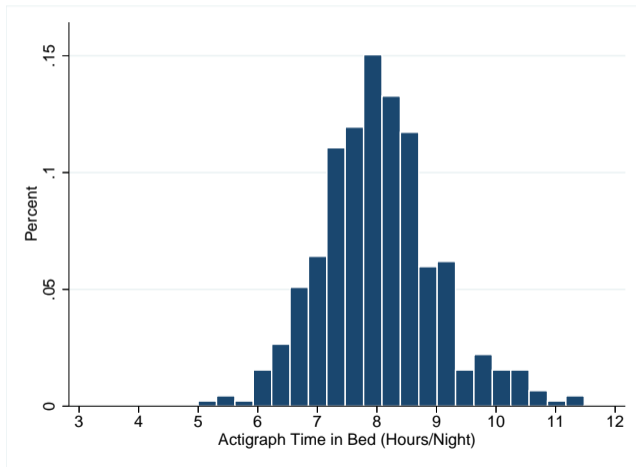
Finding 1: How much do the urban poor in Chennai sleep?



- Self-reported time asleep:
 - 7.2 hours in our study
 - Similar in US and India overall
- Objectively measured sleep
 - 5.6 hours in our study
 - 6.25 to 6.5 hours in US
- More representative study in Chennai
 - 5.5 hours of sleep per night
 - 5.7 hours including naps

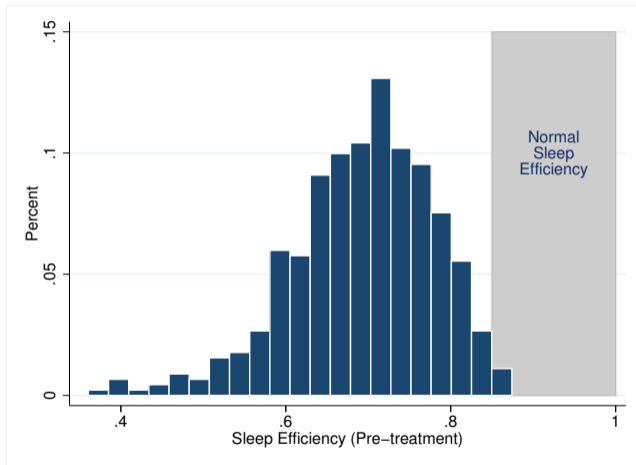
[VARIATION] [FACTORS] [SCORING]
[POP STUDY] [OTHER COUNTRIES]

People spend plenty of time in bed



- Actigraphs: 8 hours in bed/night
- Self-reports: 7.9 hours in bed/night
[SELF-REPORTS]
- Broader Study: 7.7 hours in bed/night

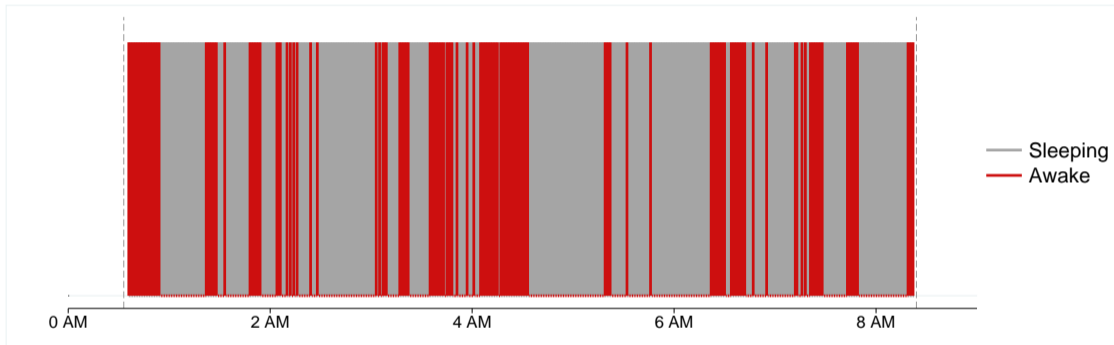
Strikingly low sleep quality



[VARIATION] [SLEEP FACTORS] [ACTIGRAPH SCORING]
[LITERATURE] [OTHER POPULATIONS]

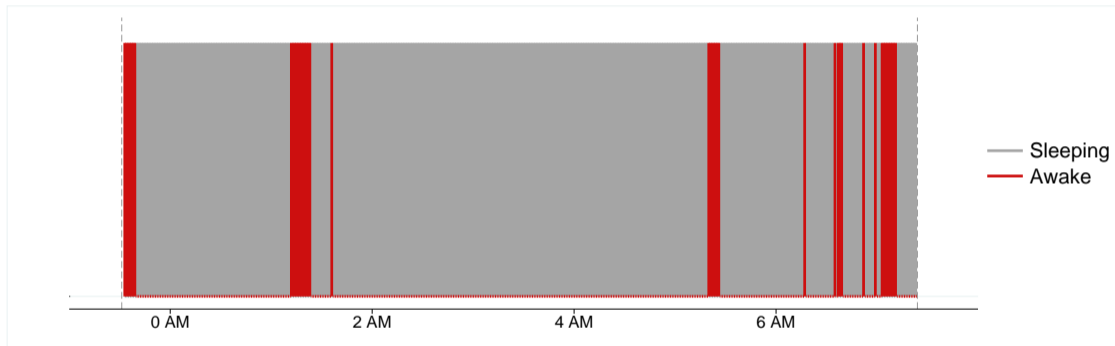
- Efficiency: (time asleep/time in bed)
 - 85 to 95% in US (Walker, 2017)
- 70% on average in our sample
 - Low even in middle of night
 - Similarly low in broader sample
 - Lower than for people with sleep apnea or elderly populations
- Other measures
 - Awakenings (≥ 5 min): 10/night
 - Longest sleep episode: 55 minutes (sleep cycle: 70 to 120 min)
- Implications
 - Low quality of sleep
 - High opportunity costs of time

A typical night of sleep in Chennai



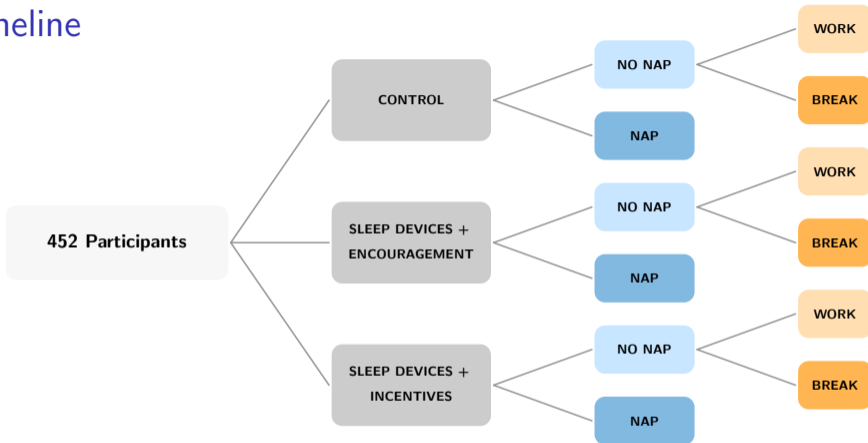
- Low quantity: in bed 7 hrs 45 mins, asleep 5 hrs 20 mins
- Sleep Efficiency (time asleep/time in bed) = 69%
- Fragmented sleep: 31 awakenings, longest sleep episode of 45 mins

What sleep *should* look like

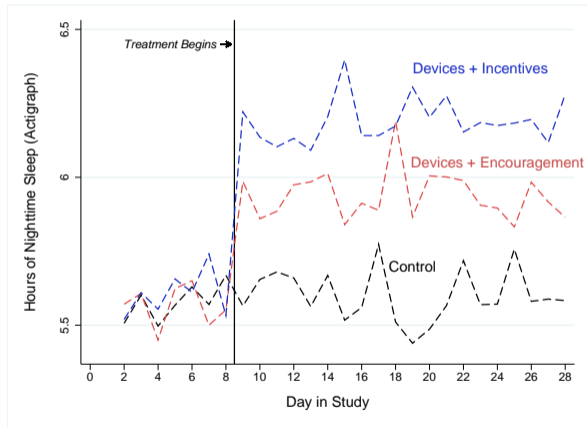


- Time in bed: 7 hr 53 mins; asleep 7 hr 8 mins - 90% efficiency
- 9 awakenings; longest sleep episode of 202 mins

Study timeline



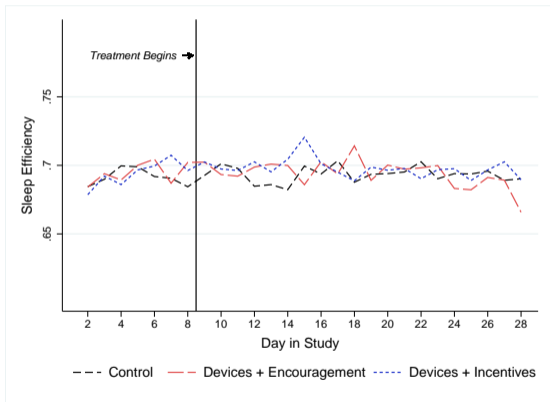
Finding 2: Night-sleep treatments increase sleep duration but not efficiency



[TABLE] [PILLS]

- Control Group sleeps 5.6 hours per night
- Sizable impacts on time asleep
 - 20 mins for Devices + Encouragement
 - 33 mins for Devices + Incentives
- Large increases in sleep; e.g. compared to sleeping pills

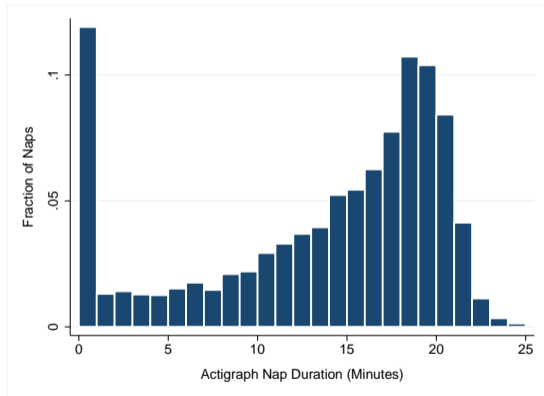
No treatment effect on sleep efficiency



[TAKE-UP]

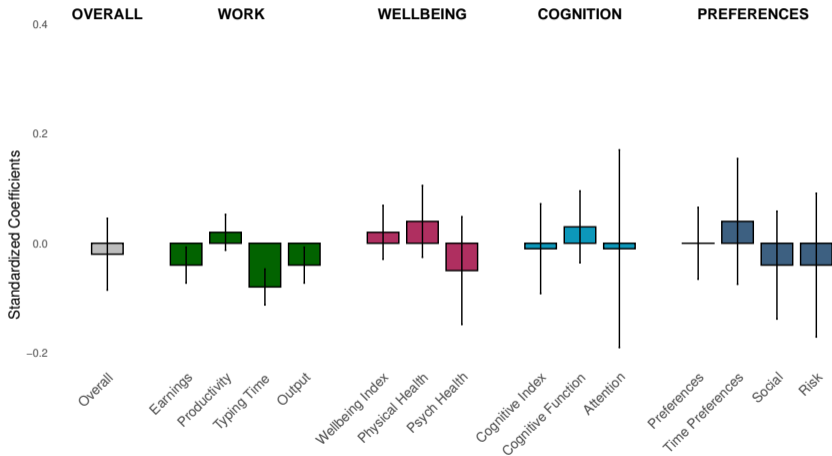
- Entire increase in sleep comes from 30-45 min increase in time in bed
- High opportunity cost of increased sleep
 - Mix of going to bed earlier and staying in bed longer
 - Less time spent watching TV, socializing, using cellphones, exercise

Most treated participants sleep during nap period on any given day

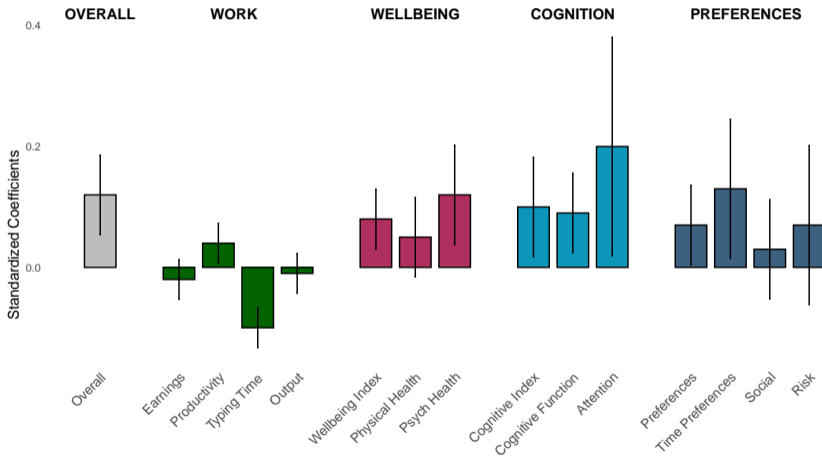


- About 90% sleep according to actigraphs and self-reports
- Median objectively measured nap sleep duration: 16 minutes

Finding 3: No discernible positive impacts of increased night sleep



Finding 4: Naps impact a range of outcomes



Discussion - no effects of increasing night sleep

- No average impact of increasing night sleep on a range of outcomes
 - Contrast to expert (and our own!) predictions
 - Striking contrast to medical literature from rich countries
 - Maybe due to the very low quality of sleep we found
 - Or maybe the findings from sleep labs do not generalize to the field
- No evidence that people in our setting under-invest in night sleep
 - Low benefits and high opportunity costs
 - Although health effects could emerge over the longer run

Discussion - effects of naps

- Naps have impacts on a range of important outcomes
 - Proof that sleep can matter even in this setting
 - Naps more effective than night sleep per minute of sleep
 - Could be due to higher quality or due to different timing (or both)
 - Naps crowded out by Western work schedules, which may be costly

Many open questions (Rao et al. 2021)

- Effects of sleep in other field settings
 - In rich countries, especially among low-income populations
 - In rural areas in developing countries
 - Using actigraphs, fitbits etc. (e.g. Handel and Kolstad 2017; Avery et al. 2019)
 - Studying naps in natural sleep environments
- What are the impacts of improving sleep quality?
 - Cognitive Behavioral Therapy for Insomnia (CBT-I) shows promising results
- Short- vs. long-run effects
- Sleep and learning outcomes in children, e.g. Jagnani (2021)
- How do people decide how much to sleep? (Avery et al. 2021)

Why this paper works

- Novel, potentially important and incredibly under-studied (in economics) topic
- Huge evidence base in other fields (medicine) that we delved deep into
- Clear contributions: new facts; taking sleep to the 'field' from the lab; economic outcomes; linked to agenda on psychology of poverty

Mistakes we made on this paper

- This experiment was way too complicated, and therefore took too much work and money
 - Started first scoping surveys and pilots in 2014-15. Final RCT run 2017-2019.
 - Wrote over 30 grant proposals over the years
 - Can't recommend to a grad student – you should simplify!
- Why did we do something with so many pieces? Because we had a very diffuse prior on outcomes + the treatment itself is quite hard, so did not anticipate many low-cost replications
- Ex post: Too many outcomes for most readers. Readers want a simpler story (mostly interested in sleep and work outcomes).

Poverty, Depression, and Anxiety: Causal Effects and Mechanisms

Matthew Ridley (MIT) Gautam Rao (Harvard)

Frank Schilbach (MIT) Vikram Patel (Harvard)

What are depression and anxiety?¹

- **Depression (Major Depressive Disorder)**
 - Constellation of symptoms including changes in psychomotor function, weight loss, oversleeping or under-sleeping, decreased appetite, fatigue, difficulty concentrating, extreme feelings of guilt or worthlessness, and suicidal ideation.
 - Diagnosis requires a set of these symptoms to be present over a two-week period
- **Anxiety (Generalized Anxiety Disorder)**
 - Characterized by long-lasting and excessive fear and worries over at least a six-month period, with three or more of the following symptoms: restlessness, fatigue, concentration problems, irritability, muscle tension, and problems with sleep.
 - Other definitions (e.g. ICD-10) require presence of at least one physical symptom such as heart palpitations, difficulty breathing, nausea or abdominal distress, dizziness, or numbness.

¹American Psychiatric Association's Diagnostic & Statistical Manual of Mental Disorders (DSM-5)

How can we measure depression and anxiety?

- Gold standard: in-depth diagnosis by trained psychiatrist
 - Not feasible in many settings
- Short screening surveys
 - PHQ-9 survey for depression
 - GAD-7 survey for anxiety
 - Geriatric Scale for the elderly
 - Ali et al. 2016: overview of validated screening tools
- Phone surveys feasible but privacy concerns and possibly downward bias

How common are depression and anxiety?

- About 3 to 4% of the world's population suffers from each at any given time
 - Jointly responsible for 8% of years lived with disability globally
 - About 20% lifetime prevalence of clinical significant episode of depression in the US
 - Highly recurrent: 75% of depressed patients have more than one depressive episode;
 - 1/2 to 2/3 of people ever clinically depressed have an episode in any given year
 - Covid has made things a lot worse
- Who is most affected?
 - Higher prevalence among women (about twice as high)
 - Higher prevalence among the poor in given location (about 1.5 to 3 times as high)
 - Beyond severe disorders, mental health affects a much broader share of population.
- Large treatment gaps, especially in low-income populations

Why study mental health as an economist?

- Mental ill-health makes people profoundly unhappy.
 - Remember our objective function: maximize well-being!
- Mental health can affect economic behavior.
- Economic forces can affect mental health.

How might mental health affect economic behavior and outcomes?

- Labor supply, productivity, earnings
 - Performance at work; might vary by type of work
 - Dealing with failure; job search
 - Earnings
- Economic primitives
 - Beliefs (levels and updating)
 - Time, risk, and social preferences
 - Decision-making (e.g. default effects, choice overload)

How might mental health affect economic behavior and outcomes? (cont'd)

- Stigma and discrimination
 - People with mental illness might be treated worse (or managed wrongly).
 - Such issues might prevent people from seeking treatment
- Health behavior (e.g. medical adherence; exercise) and expenditures
- Female empowerment (control over resources; IPV)
- Human capital accumulation (schooling); inter-generational effects

How might economic forces affect mental health?

- Economic shocks (e.g. unemployment, health shocks, death of a loved one)
- Volatility and uncertainty (lack of insurance, social safety)
- Environmental factors (e.g. sleeping conditions, pollution, heat)
- Early-life conditions (e.g. bad harvest, recession)
- Exposure to trauma, violence, and crime
- Social status (relative vs. absolute poverty), shame, and isolation

Increasing supply of mental health treatment

- Treatments highly effective (Cuijpers et al. 2010; 2013)
 - But only few trained psychiatrists available in many settings
 - Pharmacotherapy can help but not broadly available (Angelucci and Bennett 2021)
- Alternative 1: Inexpensive and scalable psychotherapy interventions can effectively treat depression and anxiety in low-income contexts (Singla et al. 2017)
 - Bolton et al. (2003): Interpersonal group therapy in Uganda
 - Rahman et al. (2008): Cognitive behavioral therapy in Pakistan
 - Patel et al. (2017) Behavior activation in India
 - Chibanda et al. (2016): Problem-solving therapy in Zimbabwe
- Alternative 2: New technologies using internet, apps
 - Promising results but mostly in efficacy trials (Cuijpers et al. 2019)
 - Key issues: take-up and adherence
 - Very little work in developing countries (Arjadi et al. 2015)

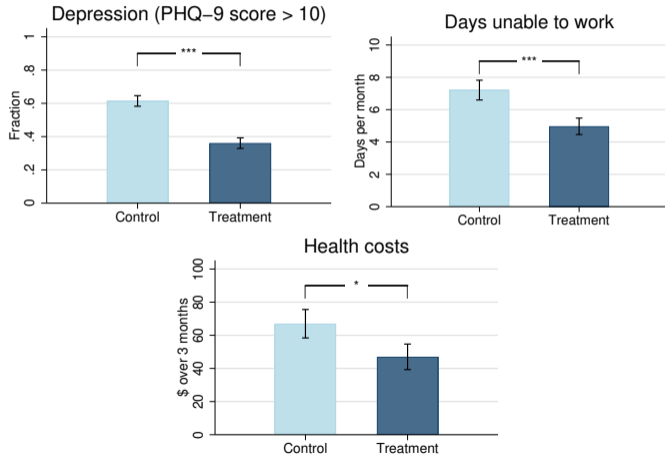
Emerging evidence: mental health impacts economic outcomes

- Baranov et al. (2019): long-run impacts (7 years after treatment!) of CBT
 - Reduced depression, increased female empowerment and investment in children
- Lund et al. (2020): meta-analysis shows impacts on labor supply
 - Some measurement concerns
 - What are the underlying channels?
- Biasi et al. (2019): Labor-market effects of bipolar illness
 - 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 percent,
 - Studying similar natural experiments for depression and anxiety would be valuable.

Bhat et al. 2021: Long-run follow-up of two RCTs in Goa, India

- Long-run follow-up study of behavior activation intervention
 - Healthy Activity Program (Patel et al. 2017)
 - Highly effective intervention in the short-run (see next slide)
- Three broad sets of outcomes:
 - (1) Mental health (depression)
 - (2) Economic well-being (consumption, labor supply, earnings)
 - (3) Preferences and beliefs
 - Time, risk, and social preferences
 - Beliefs (levels and updating)

Large short-run effects of Healthy Activity Program



- Clear reduction in depression 3 months after treatment; benefits largely retained after 12 months.
- Increases in days worked; reductions in health costs
- Intervention likely paid for itself within a few months.

Some open questions (I)

- (1) How exactly does mental health affect economic outcomes?
 - Precise measurement of income, labor supply, earnings
 - Economic preferences, beliefs, decision-making
 - Disentangle effects of depression vs. anxiety

- (2) Can online tools effectively improve mental health and economic well-being?
 - Potential impacts on education, job search, health behaviors
 - Can AI bot-based approaches work?
 - How to avoid harmful effects of social media on mental health?

- (3) Can interventions to increase take-up of mental health tools improve outcomes?
 - Financial or other incentives
 - Interventions tackling stigma or social norms
 - Interventions to increase perceived efficacy

Some open questions (II)

- (4) Impacts of different economic interventions relative to cash
 - Insurance and social safety programs
 - What is the psychosocial value of labor (Hussam et al. 2021)?
 - Employment programs (vs. UBI)

- (5) Impacts of relative vs. absolute poverty
 - Does inequality harm mental health?

- (6) Optimal mix of economic and mental health interventions
 - Longer-run effects of anti-poverty programs: what is the role of mental health?
 - Can mental health interventions help people escape poverty traps?
 - Studies of comparative effects of cash vs. therapy (Haushofer et al. 2021; Karlan et al. 2021)

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