FUTURE DIRECTIONS FOR BEHAVIORAL ECONOMICS IN K-12 EDUCATION

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BE in K-12

Incorporate behavioral insights into the design of incentives/interventions

- Loss aversion
- Present bias
- Incomplete information

Teachers

Loss-framed incentives can improve performance and longer-run outcomes

Students

Near-term incentives can increase effort but have limited longer-run impact

Mentors/Tutors

Tutors can effectively guide students but new models are needed at scale

Why BE and teachers?

- Teacher quality matters for the short and long-term
 - Better 3rd-8th grade teachers increase student test scores, college attendance and earnings; decrease teenage parenthood (Chetty et al., 2014)
- Improving quality of one teacher helps many students
 - Estimated increase in lifetime student earnings from replacing bottom 5% of teachers with average ≈\$250,000 per classroom per year
- Employees with contracts that can include incentives
 - But limited impact of traditional performance pay

Loss-framed incentives

- Performance pay based on student performance or growth on standardized tests
- At the start of the year, give teachers an <u>upfront bonus</u> equivalent to the average reward (\$4,000 in K-8 context)
- At the end of the year, if student performance is above average, receive additional rewards
- If student performance is below average, the teacher must pay back the difference between their upfront bonus and end of the year bonus

Teacher performance pay



Meta-analysis (Pham et al., 2020) Meta-analysis (Fryer, 2017)

Tennessee (Springer et al., 2011) New York (Fryer, 2013) New York (Marsh et al., 2011) Texas (Springer et al., 2012) Ten U.S. school districts (Chiang et al., 2020) Gain-framed - Illinois (Fryer et al., 2022) Loss-framed - Illinois (Fryer et al., 2022)

Fryer et al. (2022). Estimated effects on math test scores in standard deviation (S.D.) units from U.S. K-12 randomized experiments except: Pham et al. (2020) includes non-experimental studies; Brownback & Sadoff (2020) conducted in community college setting, includes multiple subjects. For comparison, 1 S.D. increase in teacher quality improves student test scores by 0.1-0.2 S.D.

Broader impacts

- Evidence of long-run impacts on students
 - Among community college students, improves overall performance and transfer rates to four-year colleges
- Evidence of sustained impact on teachers
 - K-8 teachers show improved performance for up to 6 years
 - Community college instructors improve their preference for loss-framed incentives after experiencing them
- Future work could explore scale-up, generalizability, incorporation into employee contracts and applications to recruitment/retention in hard-to-staff schools

Why BE and students?

- Student effort in school may be low because most of the returns to education are far in the future
- Children and adolescents may not be forward looking, may exhibit present bias (Bettinger & Slonim, 2007)
- Near-term incentives can increase motivation and effort by bringing the rewards closer

Student effort incentives

- Incentives for test performance or improvement
- Announced just before students take the test so the only mechanism for improvement is increased effort on the test (distributed at the test, framed as losses)
- Can improve performance if baseline motivation and effort are low (e.g., low-stakes tests)
- Less room to move performance if students are already trying or don't know the material

Incentives for test effort



Gneezy et al. (2019). Incentives increase PISA-based math test scores 13-16% (0.24-0.28 S.D.) in U.S. No effect in Shanghai. Similar incentives improve math test scores among Chicago-area students by 0.12 S.D. (Levitt et al., 2022)

Longer-run student incentives

- Near-term incentives for student behavior and performance offered over the school year have little impact on average, ≈ 0.024 S.D. (Fryer (2017) meta-analysis)
- Prior studies identify subgroups that experience significant impacts (Fryer, 2011)
- Future work could examine heterogeneity in order to target incentives to students most likely to benefit
 - E.g., Using machine learning in large samples (Burgess et al., 2021)

Why BE and mentors/tutors?

- Over the longer-run, students may need help staying focused and may lack information on what to do to improve their performance
- Mentors/tutors can work with students in small groups to keep them on task and individualize their instruction





Kraft and Falken (2021). Nickow et al. (2020) estimate effects of 0.37 S.D. in a meta-analysis.

Fryer, 2017

Potential broader impacts

- Help close widening
 achievement gaps among
 low-income students and
 students of color
- Address students' increasing mental health struggles
- Relieve strain on teachers who are quitting/retiring at high rates



The pandemic widened the education gap for students of color



Do

education system



Mental health



Barbieri et al. (2021). Multiple waves of undergraduates at the University of Pittsburgh. Center for Epidemiological Depression (CESD) scale: self-reported responses to 20 questions on 0-3 scale. Score of 15 or higher is considered at risk of clinical depression. Blue bars indicate averages from pre-COVID—19 periods. Red bars indicate averages from COVID-19 periods.

Scale up

- The most effective tutoring programs are expensive
 - \$3,500-\$4,300 per student
 - vs. Loss-framed teacher incentives: \$25-\$200 per student
- New models offer promise
 - Online tutoring can allow for more flexible mentor models and reach more students at lower cost (Carlana and La Ferrara, 2021; Kraft et al., 2022; Gortazar et al., 2022)
 - Draw on AmeriCorps/City Year, High school/college students, retirees (Kraft and Falken, 2021)

Future directions

- Future work could explore how insights from behavioral economics can help recruit, retain and improve the performance of teachers and mentors/tutors <u>at scale</u>
- Critical outcomes include not only students' educational performance, but also their socio-emotional well-being and <u>mental health</u>

Please reach out with any questions or feedback

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