Overview

Much of my research studies how informational and behavioral barriers affect human capital investments and inequality. More recently, my research with Raj Chetty and Opportunity Insights has explored broader barriers to reducing inequality and promoting economic opportunity, such as housing policies, and my ongoing work with Jens Ludwig and Sendhil Mullainathan explores machine learning applications to policy decisions.

I often conduct large-scale, randomized trials to study these topics, but I also use structural estimation and quasi-experimental methods. Many of my projects involve partnerships with early-to-mid-stage technology companies, and I am working with Schmidt Futures to start a research lab that partners with technology companies to leverage their data and platforms to innovate, test and scale interventions that reduce inequality.

Below, I begin describing my work in education and my efforts to scale a low-cost technology solution to improve education outcomes, my more recent work spanning housing and other topics, and then I discuss my teaching and service work.

Parent-Child Information Frictions

Most models of parental investments in their child’s human capital do not incorporate information problems between parents and their children. While this assumption is plausible when children are young, it may be less so as children get older and develop greater agency. Parents need to track their child’s progress in school to motivate them, but their child may have an incentive not to communicate all of the relevant information if their preferences over schooling diverge. This agency problem could make it difficult for parents to foster their child’s learning.

In my paper, “Parent-Child Information Frictions and Human Capital Development: Evidence from a Field Experiment,” which is conditionally accepted at the Journal of Political Economy, I conducted a field experiment to understand the information frictions between parents and their children, and the extent to which reducing these frictions can improve student achievement. The intervention provided detailed information to parents about their child’s missed assignments and grades via bi-weekly text messages.
I found that parents overestimated their child’s effort in school. When asked to estimate the number of assignments their child had missed in math class, parents vastly underestimated the correct number. The size of this inaccuracy negatively correlated with children’s GPA. The intervention improved the accuracy of parents’ beliefs about their child’s effort while making it easier for parents to monitor their child’s effort. Their effort and achievement in school improved significantly as a result. Even though the information sent to parents was gathered and transmitted to families without any sort of automation, the intervention was still low cost compared to other effective education interventions.

Based on these results, I modeled the parent-child interaction as a game of strategic-information disclosure, or a persuasion game (Dye, 1985; Shin, 1994). Children can choose to disclose their performance, parents can monitor and incentivize their child, and parents have potentially biased beliefs about their child’s effort. Estimating the model allowed me to decompose the treatment effect into changes due to making it easier for parents to monitor their child’s progress versus changes due to revised parental beliefs. Understanding these mechanisms has implications for when and how additional information may be effective. I found that a substantial portion of the treatment effect can be attributed to changes in parents’ beliefs (42%) and reductions in monitoring costs (54%).

I also used the model to test an alternative policy that improved school reporting—how quickly teachers grade and record assignments—rather than providing information directly to parents. Improving school reporting increased student effort as well, though by half the magnitude of providing information. Nonetheless, encouraging teachers to grade papers and enter them into gradebooks may be more scalable and less controversial than alternative policies to improve student achievement. Many teachers-union contracts stipulate how often gradebooks must be updated.

I received the Distinguished CESifo Affiliate award for this paper. This paper was also cited in the The New York Times, an Op-Ed I wrote for CNN with Lucas Coffman and Todd Rogers, and by the Brookings Institution.

**Education Technologies**

My findings in Los Angeles inspired a research agenda around what it takes to scale a seemingly-easy-to-scale intervention. I wrote a series of papers about the development, adoption and diffusion of technologies capable of communicating timely, actionable information to parents at scale.

In previous work, I concluded that web-based communication technologies aiming to scale school-to-parent communication may *exacerbate* the gaps in information access that I arise
across income and performance levels. This result spurred my effort to scale the ability to push information to families. However, such an automated technology did not exist at the time. In our paper, “Leveraging Parents through Low-Cost Technology: The Impact of High-Frequency Information on Student Achievement,” forthcoming at the Journal of Human Resources, Eric Chan (a then-graduate student) and I developed and tested a low-cost technology that synchronized with Student Information Systems and teacher gradebooks to push high-frequency information to parents about their child’s class absences, missed assignments, and low grades via automated text messages.

The promise of this automation is that, relative to other interventions, communicating with parents via these alerts is extremely low cost. We conducted a field experiment with a pre-registered analysis plan to evaluate this technology in 22 middle and high schools. In one year, we sent 32,472 messages to treatment group families, or an average of 52 messages per treated family. The total cost of sending these messages was approximately $63.

We found that the automated alerts caused a substantial decrease in the number of courses students failed. Students failed one course on average, and automated alerts reduced this by nearly 30%. High school students’ GPA improved by 0.17. Treatment group students attended 12% more classes and district retention increased by 1.5 percentage points.

However, automation alone also does not guarantee scalability. In joint work with Jessica Lasky-Fink and Todd Rogers, published in Organizational Behavior and Human Decision Processes, we surveyed over 100 district leaders serving more than 3,000,000 students to discern how they would release this parent-communication technology. Overwhelmingly, districts ask parents to sign up or “opt in.” We studied how such enrollment defaults affect the adoption and efficacy of the automated-alert technology. We randomized 6,900 families in Washington, D.C. into three groups who received an initial text message. In the standard enrollment group, the message told parents about the alert service and directed them to the district website to enroll. The simplified enrollment group was told they could sign up by replying “start” to the introductory text message. The automatic enrollment group was told they would receive alerts, but could opt out at any point by replying “stop” to a text message.

Almost nobody signed up in the standard enrollment group (<1%). Under simplified enrollment, 11% of families signed up. However, fewer than 5% of families opted out (at any point) under automatic enrollment. Moreover, those who opted in tended to have higher-performing children. While there were no significant treatment effects under the first two conditions, automatic enrollment led to substantial reductions in course failures, as found

previously.

This made us ask: why would a school district ask parents to opt in? Our survey of district leaders led to a novel contribution in the defaults literature: we found that these leaders vastly overestimated take-up under standard enrollment—by 40 percentage points—and vastly underestimated take-up under automatic enrollment—by 29 percentage points. We asked them to report their willingness to pay for the intervention under each condition. After learning the actual take-up rates, leaders’ reported willingness to pay increased by over 100% under automatic enrollment compared to standard enrollment. Our findings have implications for how defaults affect technology adoption, and how the policies districts use to deploy new technologies affect their efficacy. Richard Thaler highlighted our paper as one of his favorites of the past year in his keynote address to the Behavioral Science and Policy Association, and Cass Sunstein described our paper as one of the “most dramatic behavioral findings” of the year.

Since I conducted the first experiment in Los Angeles described above, which I began in 2010, a number of researchers have used field experiments to study the impacts of similar school-to-parent communication interventions. The finding that this communication improves student achievement at a low cost has been replicated in a wide-variety of settings: Brazil, Chile, China, England, France, Malawi, Mozambique, and multiple cities in the United States, which I cite in a peer-reviewed paper, “Low-cost strategies to empower parents through behavioral science,” forthcoming at Behavioral Science & Policy. I review the evidence and describe the behavioral and informational frictions that impede parents’ ability to improve their child’s learning. I show how information interventions targeted to parents can address these frictions to improve outcomes cheaply. With support from the Carnegie Corporation, I am exploring how to create an entity that can scale this work sustainably.

Information Interventions and their Implications for Equity

Several of my papers look at information interventions in other contexts. In joint work with Jeff Denning and Day Manoli, “Is Information Enough? The Effect of Information about Education Tax Benefits on Student Outcomes” (Journal of Policy Analysis and Management, 2019) we explore the limits of information provision. At the time we began the project, several information-related interventions had shown positive impacts on college enrollment (Castleman and Page, 2015), and separately, tax-benefit take up (Bhargava and Manoli, 2015).

We randomized the provision of emails and letters with information on tax benefits for college and financial aid to 1 million students or prospective students across all public Texas
colleges. We also randomly varied providing information about college costs and benefits, the salience of certain features of tax benefits (e.g. amounts, complexity), and information about filing the FAFSA. Our intervention contrasted with previous work in that, in addition to our focus on tax credits, we isolated the effects of providing information without additional supports. Across more than two dozen treatment variations, we found precisely zero effect on college enrollment or re-enrollment outcomes.

We argue that salience alone is not the reason that tax credits for college do not affect enrollment. This result is important, in part, because the limits of information provision are difficult to discern. While potentially cost effective, this may be true because the effects are small but the costs quite low. Finding a precise zero, despite multiple variations of the information provided, required an enormous sample size to rule out meaningful effects.

My paper with Matt Hill, “The Effects of Making Performance Information Public: Evidence from Los Angeles Teachers and a Regression Discontinuity Design,” (Economics of Education Review) examines the impacts of making individual teacher performance information public. Performance information is publicly available in a variety of employment settings, and increasingly so in the education sector. The effects are theoretically ambiguous: performance may improve due to informative feedback, reputational and self-image concerns, and peer advising, or performance may decrease because publication crowds out intrinsic motivation and increases job anxiety. Moreover, parents and students who value teacher quality may vote with their feet to seek out better teachers.

We took advantage of a natural experiment in Los Angeles to study these effects. In 2010, the Los Angeles Times obtained teacher and student data from the Los Angeles Unified School District via a Freedom of Information Act request, rated teachers’ performance based on their value added scores, and then placed this information into a database searchable by teachers’ names on their website. These ratings were only made public for teachers who, over their career, had taught 60 students or more with test scores and lagged test scores. I obtained data via a Freedom of Information Act request and information from the Los Angeles Times. Using a regression discontinuity design around the 60-student threshold, we found that students sorted into classrooms with highly-rated teachers, and there was some evidence that publication increased teacher attrition. However, it was only high-performing students who sorted into the classrooms of highly-rated teachers. The release of information made it more likely that lower-performing students were taught by lower-quality teachers. We suggested that if, despite this caution, school districts do want to publish teachers value-added, they should ensure that every family has an equal capacity to respond to teacher ratings accordingly.
New Research on Neighborhood and School Choice

More recently, I have worked on several papers related to school choice, some of which extends beyond information provision. My paper, “The Risks and Benefits of School Integration for Participating Students: Evidence from a Randomized Desegregation Program,” (revision requested at *The Journal of Political Economy*) studies the effects of a program that uses inter-district choice to integrate schools. The integration program offers to transfer a small population of minority students from a low-income, predominantly Black and Hispanic school district to school districts that serve high income, predominantly-white students. The inter-district choice component is important because the largest share of segregation occurs across districts rather than within them; white flight and the changing demographics limit the scope of within-district integration programs.

The program is oversubscribed so a fixed number of applicants, primarily kindergarteners, are selected at random and assigned to a receiving district. Once assigned, students can remain in the district as long as they do not move from the sending district’s boundaries. Thus, students who win the lottery gain access to higher-resource, majority-white schools at an early age but cannot change neighborhoods without being removed from the program.

I found that access to low-minority share, higher-income districts had short-run and long-run impacts on students. In the short run, students who received an offer to transfer were more likely to be classified as requiring special education and their test scores increased in several subjects. In the long run, college enrollment increased by 8 percentage points for these students, particularly at two-year colleges. There is no overall effect on the likelihood of voting. However, the offer to transfer significantly increased the likelihood of arrest. This was driven primarily by increases in arrests for non-violent offenses. Almost all of these effects—both the risks and the benefits—stemmed from impacts on male students. Male students had higher test scores, higher college enrollment rates, and were significantly more likely to vote, but they also experience nearly all of the effects on arrests. In the paper, I further explored some of the mechanisms for these results, including whether school resources drove improvements in education outcomes and why arrest rates increased. I received the Dean’s Faculty Diversity Research Award to support this research.

In a recent paper with Eric Chan and Adam Kapor, “Housing Search Frictions: Evidence from Detailed Search Data and a Field Experiment,” we combined a nationwide field experiment with a structural model of neighborhood choice to understand how low-income families search for housing and whether additional information can help them move to neighborhoods with better schools. For most families in the United States, residential choice is school choice. While there is substantial variation in school quality across districts and within cities, many
low-income families do not move to neighborhoods zoned to high-performing schools (Ellen et al., 2016). One contributing factor in these choices may be a lack of information on school quality at the time families make their housing choice. We collaborated with the largest provider of housing listings for Housing-Choice Voucher recipients (www.gosection8.com) to add school-quality information onto their listings for a random sample of users.

Like many of my projects, it took multiple partnerships, several rounds of fund raising, and a lot of time to launch this project. In addition to GoSection8, we partnered with GreatSchools to obtain school-quality ratings for the universe of public schools across the country, we obtained school attendance zones for the entire country so that we could map properties to neighborhood assigned schools, and we partnered with the Department of Housing and Urban Development to obtain location data on the universe of voucher recipients so that we could track families’ location decisions. I was the principal investigator on grants from the Laura and John Arnold Foundation, Walton Family Foundation, and the Gates Foundation/Jameel Poverty Action Lab to support the project.

We found that adding school quality information onto listings caused families to search for and move to neighborhoods zoned to higher-performing schools. The magnitude of the effect is roughly one third of a GreatSchools rating point. These families moves would also reduce segregation in the schools as well.

We estimated a dynamic model of households’ search and location decisions that incorporates imperfect information about school quality. We used the model to estimate how much families value school quality (relative to other neighborhood attributes) and how much they would appear to value it if we were to ignore information frictions. We show that if we naively ignored information frictions, we would understate families’ valuations of school quality by nearly 100%. Going forward, GoSection8 has agreed to let us A/B the effects of providing value added information on schools versus test-score-level information onto housing listings. I have presented these findings to the Department of Housing and Urban Development, and GoSection8 has scaled our intervention across the entire platform.

Lastly, Isaac McFarlin and I use a novel field experiment to study schools’ ability to “cream skim” students perceived as easier to educate within areas of school choice. Regulators often attempt to minimize this practice by using application lotteries, common applications and financial offsets. However, information frictions may allow schools to influence who decides to apply. Families often lack information about schools’ eligibility requirements, quality, and admission processes; the first of these is the most commonly-cited barrier to choosing a school (DeArmond et al., 2014; Hastings and Weinstein, 2008; Kapor et al., 2017). These frictions raise the possibility that schools manipulate the applicant pool by providing less
application information to families they would prefer not to enroll.

Isaac and I conducted a nationwide experiment to test whether schools provide less application information to lower-performing or costlier-to-educate students. We sent emails from fictitious parents to 6,452 charter and traditional public schools of choice across 29 states and the District of Columbia—more than half of the charter schools in the United States. The fictitious parent asked whether any student is eligible to apply to the school and how to apply. Each email signaled one of the following randomly-assigned attributes about the student: disability status, poor behavior, high or low prior academic performance, or no indication of these characteristics. We also randomly varied students implied race, household structure, and gender. We found that schools were significantly less likely to respond to inquiries from students with poor behavior, low achievement, or a special need. These results held for traditional public schools in areas of school choice and high-value added schools, with the important exception that lower response rates to students with a potentially significant special need were driven entirely by charter schools.

This paper was covered by *The Atlantic* and *US News*, among other outlets. Isaac and I worked hard to make sure our findings were received constructively by policymakers. We spoke to a number of organizations to discuss the implications of our work, including the National Center for Special Education in Charter Schools, the ACLU, the New York State Education Department, and New York Lawyers for the Public Interest. Currently, we are completing an analysis of the response text from each email; our preliminary results indicate that the tone and content of each response reinforce our findings based on response rates.

**Research Agenda Going Forward: Neighborhoods, Economic Mobility, and Big Data**

My recent research has led to two new strands of research: one studying housing and economic mobility and the other applying machine learning techniques to ameliorate inequality.

On the first topic, I am working with Raj Chetty, Stefanie DeLuca, Nathan Hendren, Larry Katz and Christopher Palmer on our paper, “Creating Moves to Opportunity: Experimental Evidence on Barriers to Neighborhood Choice.” We note that many low-income families do not live in neighborhoods with high-upward mobility, despite affordable opportunities. We test two competing explanations for this phenomenon. One explanation is that low-income families prefer to stay in low-opportunity areas because these neighborhoods have other valuable amenities, such as easier commutes or closer proximity to friends and family. An alternative explanation is that families cannot move to high-opportunity areas because of liquidity constraints, search frictions, or landlords’ tastes. Distinguishing between these explanations is useful for understanding the determinants of neighborhood choice as well as
for housing policy. If constraints and frictions are central, redesigning affordable housing policies to help more families move to opportunity may be especially valuable for increasing upward mobility.

We test the importance of each explanation using a randomized controlled trial in the Seattle area. In collaboration with the Seattle and King County Housing Authorities, we designed the Creating Moves to Opportunity (CMTO) intervention to reduce the constraints and frictions families face when trying to move to high-opportunity areas. We first defined high-opportunity neighborhoods as Census tracts that have historically high rates of upward mobility for children, based on tax-return data. We then provided information, liquidity, and search assistance to help families find units and lease up in these areas. The intervention has had large impacts on families’ moves to opportunity areas—enough that this project has entered the conversation about how to study and scale our work nationwide. I presented these findings at the NBER Summer Institute last summer. I spent the past year visiting the Harvard Economics Department and Opportunity Insights—a center started by Raj Chetty, Nathan Hendren and John Friedman—to continue working on this project and to begin new projects on housing, schooling and economic mobility.

Lastly, in a paper “Better Together? Social Networks in Truancy and the Targeting of Treatment” (forthcoming at the *Journal of Labor Economics*) with another graduate student, Magdalena Bennett, we used machine learning and social network analysis on class-level absence data to identify whether students systematically skipped class together, and how to maximize the impact of an attendance intervention in the presence of these networks. This research is one of two papers I have using “big data” and machine learning; the second is an experiment testing the benefits of using predictive analytics versus widely-used placement exams to track students into remedial or college level courses across seven colleges in New York. This work has led to two joint efforts. The first is with Jens Ludwig and Sendhil Mullainathan, and we are working with New Visions for Public Schools, a network of roughly 100 high schools in New York City, to explore applications of machine-learning techniques. The second, Susan Athey and Hunt Allcott invited me to help organize the EdTech sessions for their Innovation for Shared Prosperity Conference. The conference aims to bring together economists, entrepreneurs, and venture capitalists to foster collaborations between researchers and technology businesses that will benefit lower-income families in the United States. As I mentioned, I am also working with Schmidt Futures to develop a laboratory, akin to a small J-PAL, that can facilitate collaborations between researchers and private companies to leverage their data and platforms to reduce inequality.
Teaching and Advisement

I have taught four different courses: *Microeconomic Theory, Advanced Microeconomic Theory*, the *Workshop in Economics and Education*, and *Conducting Field Experiments: Design and Implementation*. With course releases and buy outs from grants, I typically teach three course per year.

The first course I have taught, *Microeconomic Theory*, is a core requirement for our Economics and Education Master’s degree. This course provides foundations in microeconomic theory for students who may have no background in economics. Calculus is not a prerequisite for this course, so I used graphical methods and algebra to teach topics such as utility maximization, income and substitution effects, elasticities, short-run and long-run market equilibria, Pareto efficiency, consumer surplus and deadweight loss, production and cost functions, supply and demand, and market failures. To further engage students with these topics, I included empirical papers that test theories or introduced examples of behavioral deviations from them. The first year I taught this course, more than 50 students enrolled with wide-ranging abilities and backgrounds. Across all categories of evaluation and both years of teaching, my median rating was no less than a 4 out of 5.

The second course I have taught, *Advanced Microeconomic Theory*, is a microeconomic theory course aimed at our Ph.D. students. I designed this course from scratch as there are few textbook resources for human capital theory and courses dedicated to it at the Ph.D. level. Though it is difficult to cover microeconomics in a single semester, I teach constrained optimization, human-capital investment models using continuous and discrete time, credit constraints, income and substitution effects, incidence, production functions and game theory, with applied theory papers discussed in class. Take-home exams are formative in the sense that students are asked to develop their own model through an extension of a paper covered in class or a model of their own design.

The third course I have taught is the *Workshop in Economics of Education*. This workshop consists of presentations by external and internal faculty and students throughout the year. I invited researchers studying domestic and international topics on the economics of education to expose students to frontier research pertaining to variety of contexts. In collaboration with the Columbia Committee on the Economics of Education, I helped expand this seminar series to include more outside speakers from across the country. Attendance far exceeds formal enrollment because the latter is not required for attendance and the quality of our speakers is high. Students are able to see papers presented at all stages of preparation and our Ph.D. graduate students have opportunities to meet with speakers.

Lastly, I designed and taught a course on field experiments for our Ph.D. students. The
The purpose of this course is to introduce students to the design and implementation of field experiments and facets of this process not typically taught in graduate school. The course covers a range of topics both practical and theoretical. I begin with an introduction to the ethics of experimentation and the role of theory in experiments. I follow up with several strategies for conceiving a compelling research topic (e.g., one such that the results are interesting whether or not there are positive effects). We then study power calculations with various techniques (simulations and formulas) and different types of random assignment. Much of the remainder of the course covers how to mitigate what can go wrong: noncompliance and attrition; spillovers and general equilibrium effects; Hawthorne, John Henry and placebo effects; multiple-hypothesis testing; and threats to external validity. Throughout the course, students formulate a research proposal for their own field experiment by writing pre-analysis plans, IRB applications, and detailing costs and possible partnerships. Perhaps distinct from other courses, the proposals are aimed at funders and formatted based on my own funding applications. Students present these proposals at the end of the term.

With respect to advising, I have advised more than 30 MA students and I am the primary advisor to at least one Ph.D. student per cohort (our Ph.D. cohorts range from 2-5 students). I have served on the committees of more than 30 students so far. Having only been allowed to sponsor dissertations relatively recently, I am sponsoring or have sponsored four students, two of whom accepted tenure-track positions (one at Babson College and the other at Universidad Católica, a top university in Chile). These are among the top placements for our Ph.D. students. I hold informal meetings of my advisees so they can present their ideas and progress in low-pressure settings while practicing their presentation skills and learning how to provide constructive feedback to others.

I support students in several additional ways. I use grant funding to pay for graduate students’ stipends, their conference travel, and other research expenses. With my J-PAL affiliate status, I also sponsored the successful grant application (for $43,000) of two of my advisees to J-PAL’s post-primary education initiative.

Lastly, I have written several papers with students. One paper has been accepted to the Journal of Human Resources, another paper has been accepted at the Journal of Labor Economics, and another is a working paper that is going to be presented at the Cowles Conference on Structural Microeconomics at Yale and the Stanford Institute for Theoretical Economics this summer. Two other papers are in the works. I make sure my co-authors have the opportunity to present our work and I help my advisees network with other economists.
Service to the College

Within the college, I have served on the Institutional Review Board Committee, which meets one-to-two times per month to review multiple proposals on all human subjects research for faculty, staff and students. I have served on various award committees each year, including the Education Policy Dissertation Fellowship Committee and the Columbia Committee on the Economics of Education, which support students pursuing promising dissertation work. I am also involved in the admissions and recruitment process for the Economics and Education program. I review applications and actively recruit admitted students to both the MA and Ph.D. programs. I have been on the faculty recruitment committee for the Economics of Education Program twice and I supported the Education Policy program’s faculty search by providing feedback on applications, attending every candidate’s job talk, and meeting each presenter. I have also been an active participant in the formulation of the Columbia Committee on the Economics of Education, which brings together faculty across the university studying economics and education. This committee draws attention and resources to faculty and student research in education, and is an asset to help recruit new students and faculty as well. I have coordinated the Committee’s economics and education seminar in multiple years, which brings in a diverse set of outside speakers, in addition to reviewing papers to award the Committee’s annual prize for best paper by a graduate student.

Lastly, I have been the principal investigator several million dollars in research grants. These grants come from a number of foundations such as the Smith Richardson Foundation, the Walton Family Foundation, the Laura and John Arnold Foundation, the W.T. Grant Foundation, the Lincy Foundation, the Poverty Action Lab, and the Carnegie Corporation.

Service to the Profession


On the policy side, I have provided consultation to the Office of Management and Budget, the Urban Institute’s Evidence-Building and Opportunity initiative, the Coalition for Evidence Based Policy, the Laura and John Arnold Foundation, the Smith Richardson Foundation, the Flamboyan Foundation, GreatSchools, New York Small City School Districts, the District of Columbia Public Schools, Grand Rapids Public Schools, New York City Department of Education, New York City’s iZone schools, the New York State Education Department, and Santa Clara and San Mateo County school districts. We are also currently working to integrate our Creating Moves to Opportunity findings into recent legislation providing $25,000,000 in funding for a mobility demonstration for families with children.

Lastly, I am extremely excited to serve as Co-Chair to J-PAL’s Education, Technology and Opportunity Initiative alongside Phil Oreopoulos. This initiative aims to build the evidence base around education technologies that have the potential to improve learning, particularly for disadvantaged students. We issue two requests for proposals, one to education leaders and organizations interested in evaluating a technology and another to researchers. I evaluate applications, identify and recruit organizations and affiliates to apply, help raise funds for this initiative, interact with policymakers to share evidence, and discuss how the initiative should proceed going forward.
References


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