FEATURE ARTICLES

The Inequity of Opt-in Educational Resources and an Intervention to Increase Equitable Access

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Billions of dollars are invested in opt-in educational resources to support struggling students. Yet there is no guarantee these students will use these resources. We report results from a school system's implementation of on-demand tutoring. The take-up was low. At baseline, only 19% of students ever accessed the platform, and low-performing students were even less likely to log in. We conducted a randomized controlled trial (N = 4,763) testing behaviorally informed messages directed at students and/or their parents to increase participation. Communications to students alone had no impact, whereas those to parents and students together increased usage by 46%. We found suggestive evidence that receiving these communications led to a four-percentage point decrease in course failures. Nonetheless, take-up remained low, highlighting that opt-in resources may increase—instead of reduce—inequality. Without targeted outreach, opt-in educational resources are unlikely to reach many students who could benefit.

Keywords: descriptive analysis; educational policy; experimental research; technology; tutoring

States, districts, and nonprofit organizations are spending billions of dollars to provide programs and products that supplement students' in-classroom experiences to accelerate learning recovery (Randazzo, 2022). Many of these resources are offered to students and their families free of cost. For instance, Khan Academy offers free SAT test prep services, and the Arkansas Department of Education offered free literacy resources for all children and their families in the state (Hester et al., 2022). However, we have no guarantee that students will take advantage of educational resources, especially when they need to opt in to use them. Research provides evidence that struggling and marginalized students will be less likely to take advantage of elective educational options, leading to the expansion of educational disparities instead of a reduction (see Hansen & Reich, 2015; Reich, 2020). In this article, we demonstrate that providing access to educational resources will not mitigate learning gaps because the students who need support most are the least likely to use them. Through a randomized controlled trial (RCT), we show that targeted communications to parents and students together can substantially increase the likelihood students use a beneficial, opt-in educational resource—but not enough to address the learning disruptions that impacted a generation of students.

Tutoring: A Promising Intervention That Can Take Many Forms

Tutoring is one of the most promising interventions for accelerating student learning and reducing educational disparities (Nickow et al., 2024). Over 100 RCTs have assessed the effectiveness of this approach—high-quality individualized instruction—with findings showing greater effectiveness than from reducing class sizes or teacher professional development programs (Dietrichson et al., 2017; Fryer, 2014). Individualized instruction can target students' learning needs and provide the support needed for students, even students far behind grade level, to succeed in school (Dietrichson et al., 2017; Neitzel et al., 2022).

As a result of the unusually strong evidence of the effectiveness of tutoring, many school districts, and even entire states, have offered students free access to on-demand tutoring programs (Goldstein, 2022). These programs can provide students with high-quality, well-trained tutors available for timely one-on-one educational support. Moreover, virtual, on-demand tutoring alleviates many of the logistical constraints schools

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Educational Researcher, Vol. 54 No. 6, pp. 328–338
DOI: 10.3102/0013189X251331518

perpetually face because it does not rely on the local labor supply and students can access tutor support outside of school hours (e.g., Kraft & Falken, 2021; White et al., 2021).

Policymakers and educational leaders invested in tutoring, at least in part, to help the students whose learning dropped during the pandemic (U.S. Office of the Press Secretary, 2022). Ample research shows that these declines were largest for students who had lower prior achievement and come from lower income families and marginalized groups (Dorn et al., 2021; Fahle et al., 2023; Goldhaber et al., 2022). For on-demand tutoring to benefit student learning, however, students need to sign on and request help from a tutor. We have little evidence about whether providing open access to tutoring leads these students to use the resource or how to enhance take-up among the students who need it most.

Targeted Behavioral Interventions to Promote Positive Educational Behaviors

Opt-in educational resources fundamentally require people to actively choose to use them, making them ideal candidates for behavioral interventions. Prior successful interventions leveraged reminders (e.g., Calzolari & Nardotto, 2017), social norms (e.g., Allcott & Rogers, 2014), accountability (e.g., Gerber et al., 2008), and value (e.g., Robinson, Lee, et al., 2018) to induce behavior change. In the past decade, an influx of research has demonstrated how behavioral interventions targeted at students and parents can impact preK–16 educational behaviors. However, the evidence on whether targeting behavioral interventions at students effectively improves student outcomes has been mixed (see Damgaard & Nielsen, 2018; C. D. Robinson et al., 2021). Studies have found evidence that behavioral interventions can increase the take-up of optional educational resources, such as peer tutoring or coaching initiatives, for college students (Angrist et al., 2009; Paloyo et al., 2016; Pugatch & Wilson, 2018). Yet most of these student-focused studies attempt to change the behaviors of students in college or planning to attend college (e.g., Castleman & Page, 2015; Oreopoulos & Petronijevic, 2018; Page & Gehlbach, 2017). Few studies testing behavioral interventions focus on impacting the educational behaviors of middle school and high school students.

Conversely, strategic reminders and communications to parents consistently have positive impacts on students' educational outcomes (Bergman & Chan, 2021; Bergman et al., 2020; Kraft & Rogers, 2015; Lasky-Fink et al., 2021; Mayer et al., 2019; C. D. Robinson et al., 2022; C. D. Robinson, Lee, et al., 2018; Rogers & Feller, 2018; York et al., 2019). However, few rigorous studies have targeted students and parents simultaneously. An exception is a study by Castleman and Page (2017) that found no additional effect on college enrollment when providing reminders to parents and students as opposed to just students. We are not aware of studies that test the comparative and marginal benefits of targeting an intervention to both students and parents as opposed to just one or the other. Given that resources are required to encourage students to engage in beneficial educational behaviors, this study formally tests what combination of targeted interventions to students and their parents is worth the investment.

On one hand, when trying to increase the usage of an optional educational resource among middle school and high school students, we might hypothesize that sending messages to students—who have more say over how to direct their time and energy—will be most effective. As students transition from elementary school to secondary school, they have greater agency over their education. Parent involvement in their child's education decreases drastically (Heckman & Mosso, 2014), and education-related information tends to flow through the student to the parent (Bergman, 2021). On the other hand, as noted previously, students may not be responsive to these types of behavioral nudges—although the literature does not focus much on secondary students.

On the caregiver side, parents continue to care about their child's outcomes through secondary school and may see greater returns to academic-focused resources than students (e.g., Akabayashi, 2006; Cosconati, 2013). Therefore, targeting parents to encourage their children to use available resources may be a more effective lever for increasing student usage. Or perhaps, the impact of targeting both students and their parents at the same time will amount to more than just the sum of its parts, leveraging dynamic parent-child interactions and opportune communications to maximize just-in-time support.

The Present Study

This article reports results from the implementation of opt-in, on-demand tutoring in a school system in California serving low-income secondary school students. The implementation occurred during the spring 2021 semester and included a large-scale RCT testing behaviorally informed approaches to increase take-up of the program. The intervention delivered repeated rounds of personalized communications to students and/or their parents encouraging student usage of the platform over the course of a semester (N = 4,763). The RCT provides insights into both the potential of increasing take-up of opt-in educational resources and the effectiveness of the program for improving the educational outcomes of students who use it. Data from the study also shed light on the take-up rates for different groups of students in the absence of targeted encouragements.

Take-up of the program was low. Only 19% of students in the control group ever accessed the platform. Struggling students most in need of support those who received a D or an F in at least one class in the prior semester were far less likely to access the platform than students who passed all their classes (with take-up rates of 12% vs. 23%, respectively). Our effort to increase take-up, tested by the RCT, was relatively successful. Sending personalized communications to both students and parents (the most effective treatment arm) increased use of the on-demand tutoring platform by 46%. These effects were even larger for struggling students, leading to a 122% increase in take-up. Nonetheless, this increase still only resulted in 26% of struggling students choosing to opt in even once. And sending communications to students only, without communicating directly to their parents, had no impact on take-up.

A potential explanation for not choosing to access the program would be if the program were not effective. Although quantifying impacts on student achievement during the height of the pandemic is challenging, we find suggestive causal evidence that use benefits students. Being assigned to the most

effective treatment arm translated into a 4 percentage point (pp) increase in the likelihood students passed all their courses.

The concerns that opt-in, open-access educational resources can enhance—instead of reduce—inequality are valid. Without targeted investments in increasing take-up, opt-in educational resources are unlikely to reach many students who could benefit from it. We find that a scalable intervention that engages students and their parents increases the likelihood struggling students use and benefit from on-demand tutoring. However, providing tutoring during the school day and integrating tutoring with a school's instructional program so that the school determines which students participate in this high-return educational opportunity is far more likely to reach and benefit struggling students (e.g., Guryan et al., 2023).

Study Details

We conducted our study in partnership with Aspire Public Schools (Aspire), a public charter district in California. All Aspire middle school and high school students (N = 6,999) receive personal electronic devices and had free access to an on-demand tutoring platform for the spring 2021 semester. We randomly assigned households to a control group or to one of three treatment arms involving communications to students only, parents only, or both students and parents together. Each communication to students and parents had a specific content focus drawing on prior successful behavioral interventions: reminders, social norms, accountability, and valuing of the subject.

We addressed two primary research questions:

Research Question 1: To what extent do students take advantage of a free, on-demand tutoring resource provided by their school?

Research Question 2: Can we increase take-up of on-demand tutoring with personalized communications to students and/or parents?

We also addressed two exploratory research questions:

Research Question 3: Does take-up of on-demand tutoring lead to student learning gains?

Research Question 4: What moderates the effect of personalized communications on take-up of on-demand tutoring and student learning gains?

Our article contributes to several different literatures and has immediate implications for the role of open-access technology, schools, and parents to support the provision of beneficial educational resources. First, we provide some of the first large-scale evidence on the extent to which students take advantage of free, open-access educational resources provided by their school district. Several studies have explored the instructional supports offered during the pandemic, but few parse the difference between the offer of these supports and take-up (e.g., Haderlein et al., 2021). As the availability of free, online-based educational resources continues to expand, understanding student patterns of usage is a first step toward considering the implications for equity. Second, we advance knowledge on how to effectively target and deploy behavioral interventions to encourage positive educational behaviors. Few studies to date examine K–12 students' take-up of optional educational learning resources and what might motivate usage. Moreover, we are among the first to present the comparative and marginal benefits of messaging parents *instead of* students and *in addition to* students on educational outcomes. Finally, to our knowledge, this is the first rigorous study to test the causal impact of on-demand tutoring on middle school and high school student academic outcomes. Although we consider the achievement results exploratory because of the low quality of the academic data collected during the 2020–2021 school year, we do see suggestive evidence that increasing students' usage of on-demand tutoring may reduce the likelihood students fail their academic courses.

Methods

Sample and Randomization Procedure

We included all Aspire middle school and high school students who were enrolled during the spring 2021 semester in our descriptive analyses (N = 6 ,999). Column 1 of Table 1 shows the baseline characteristics for Aspire students.

Middle school and high school students enrolled during fall 2020 were eligible for inclusion in the RCT sample (N = 6,981; for exclusion criteria, see Table S2, available on the journal website). Because our intervention involved communications to parents, we identified which students likely lived in the same household by shared parent contact information. In households with multiple students eligible for the intervention (n = 2,980), we randomly selected one student as the focal student for the intervention. Ultimately, our RCT sample consisted of 4,763 students.

We then randomly assigned these students to a control group (n = 1,188) or to one of three treatment arms, with randomization stratified by students' school, grade, and home language (Spanish or English/other): (1) student only (n = 1,202), (2) parent only (n = 1,192), or (3) student+parent (n = 1,181).

Intervention Details

We partnered with Aspire to send communications to students and parents on behalf of the school to increase student usage of the on-demand tutoring platform during the spring 2021 semester. We sent emails to the student body and text messages to parents.[1] These study-related communications supplemented the outreach school staff received from their leadership and the tutoring provider, which involved trainings and materials to facilitate and encourage student use. Aspire, like most California schools at the time, offered a combination of in-person and remote instruction during the spring 2021 semester (for more details on the context, see the Appendix, available on the journal website). For this reason, the district encouraged the tutoring platform to be a resource accessed both during the school day and after school. The tutoring platform itself was available 24 hours a day, 7 days a week, and individual schools and even individual teachers could encourage usage among their students in whatever way they chose. We did not document these use cases, but Figures S3A and S3B, available on the journal website, suggest that schools incorporated the resource in vastly different ways and that usage often occurred during school hours.

Table 1
Sample Details by Student Background Characteristics

	All Students	Students Excluded From RCT Sample	Students in RCT Sample	% Point Difference (Excluded vs. Sample)	*p* Value (Excluded vs. Sample)	Students in Treated Households – Siblings Excluded From RCT
Female	0.487	0.508	0.482	–0.022	.321	0.494
FRPL	0.766	0.789	0.756	–0.018	.352	0.788
Special education indicator	0.126	0.122	0.125	–0.006	.681	0.132
Spanish-speaking household	0.560	0.554	0.563	0.000	.328	0.551
Asian	0.064	0.049	0.059	–0.006	.690	0.089
Black	0.088	0.096	0.097	0.008	.576	0.055
Hispanic	0.754	0.708	0.756	0.036	.006	0.772
White	0.044	0.021	0.047	0.020	.015	0.045
Other race	0.029	0.025	0.030	0.001	.950	0.028
Passing all courses (fall 2020)	0.757	0.735	0.761	0.042	.026	0.758
No Fs in courses (fall 2020)	0.570	0.512	0.582	0.089	.000	0.559
Passing math courses (fall 2020)	0.888	0.858	0.892	0.048	.003	0.893
No Fs in math courses (fall 2020)	0.742	0.682	0.751	0.080	.001	0.742
N	6,999	749	4,763			1,487

Note. "Passing all courses" means students earned a C– or better in all courses. The *p* values are computed from ordinary least squares regressions with a fixed effect for strata (School × Grade × Spanish-Speaking Household) testing the difference between students included and excluded from the RCT sample. RCT = randomized controlled trial; FRPL = free or reduced-price lunch.

Students assigned to the student only or student+parent treatment arms received an initial mailer sent to their home address that included a letter that introduced the on-demand tutoring platform and provided information on how to access the platform and tips on how to engage (see Figure S1A, available on the journal website). Letters were printed double-sided, one side written in English and the other in Spanish. The letter was accompanied by Post-It notes that we branded with the on-demand tutoring platform's logo and "Unlimited 1-on-1 Tutoring." For those students assigned to the parent only or student+parent treatment arms, one parent received a similar initial mailer (see Figure S1B, available on the journal website) and branded Post-It notes. These mailers arrived in mailboxes starting on February 23, 2021.

Additionally, all students and their parents in the RCT sample received an initial communication on February 11, 2021. Students and parents who were not assigned to receive messages received messages wishing them a good semester. This was the only communication these students and parents received as a part of the study. On the same day, students assigned to student only or student+parent treatment arms received an email that introduced the on-demand tutoring platform and provided information on how to access the platform along with a link. Parents assigned to parent only or student+parent treatment arms received either a two-part text message or an email introducing the platform and explaining how their child could log on and get help from a tutor. For more details on these communications, including a timeline that provides details on the date, message type, and message target, see the "Methods" section of the supplemental material available on the journal website.

After the first introductory email or text message, students and parents received an additional 15 communications that encouraged students to access the on-demand tutoring platform. All student communications were sent at 3 p.m., and the parent communications were sent between the hours of 3 p.m. and 6 p.m. Students could receive help from tutors in any core subject; however, the communications focused on encouraging students to use the resource specifically for math-related coursework.[2] Each communication was written to align with one of four types of behavioral strategies: reminders, social norms, accountability, and valuing of the subject. For example messages, see Figure S2, available on the journal website. For Communications 2 through 6, we randomly assigned students in each treatment arm to receive one of the four messages (rerandomizing for each subsequent communication). Thus, we were able to test whether specific behavioral strategies drove more engagement in the 48 hours after receipt. For Communications 7 through 16, all participants assigned to the treatment arms received the same communication, which rotated among the four behavioral strategies.

Data

At the end of the school year, we received student-level administrative data from the school district (demographic and academic data) and student-by-session platform usage data from the on-demand tutoring provider. For additional details on the data, see the supplemental material available on the journal website.

Our primary outcome was whether students take up the on-demand tutoring platform. We defined take-up as logging on and engaging in at least one session with a tutor that lasts more than 1 minute during the intervention period. As additional measures of engagement, we also explored how many sessions students engaged in on the platform and the number of messages they exchanged with tutors.

We used student course performance data available during the 2020–2021 school year to assess academic outcomes. This aligned with the goal of the implementation: Aspire district leaders observed a sharp rise in the number of students earning nonpassing grades in fall 2020. This observation was a primary reason why the leadership team contracted with an on-demand tutoring provider that could serve all middle school and high school students—they wanted to reduce the likelihood students were receiving Ds and Fs in core courses. We used students' fall 2020 course performance as a measure of students' prior academic performance. Specifically, we used an indicator for whether a student passed all their fall 2020 core courses with a C– or higher.

The COVID-19 pandemic caused many U.S. districts—including Aspire—to forgo standardized testing and alter their standard grading schemes, making it hard to assess student achievement (outlined in the supplemental material available on the journal website). Given the specific context, we focused on three academic outcome measures: (a) an indicator for whether a student passed all their spring 2021 core courses with a C– or higher (passed), which aligned with the district's prepandemic standards and University of California/California State University graduation requirements; (b) whether a student passed all their spring 2021 core courses with no failures (no Fs) to reflect the district's relaxed standards during the pandemic; and (c) spring 2021 semester grade point average (GPA).

Because the intervention itself focused on encouraging students to use the resource specifically for math, we also measured whether a student passed their math courses, did not receive an F in a math course, and their math GPA for the spring 2021 semester.

Results

Descriptive Statistics

Table 1 shows the baseline characteristics of students and how the RCT sample differs from the overarching school sample. Students were similar on most characteristics; however, students excluded from the RCT sample were less likely to have passed all their courses the prior semester. In the RCT sample, students were balanced on baseline covariates across conditions (see Table S2, available on the journal website).

To What Extent Do Students Take Advantage of a Free, On-Demand Tutoring Resource Provided by Their School?

In the control group, only 18.69% of students ever accessed the platform and engaged in a tutoring session. Students excluded from the RCT took up the resource at a similar rate (18.38%), suggesting that our RCT sample did not differ from the broader school population. On average, students in the control group participated in 0.80 sessions ($SD = 3.76$) and exchanged 27.29 messages with a tutor ($SD = 146.33$). We also found that there was substantial variation between grade levels and schools, with take-up rates ranging from 11.62% in seventh grade to 26.53% in ninth grade, with a much wider range among schools (3.4% to 92.7%; for more details, see Figure S3 and Table S3, available on the journal website). Among students who ever accessed the platform in the control group, they, on average, attended 4.3 sessions ($SD = 7.79$) and exchanged 146.05 messages with a tutor ($SD = 312.38$).

We then explored how take-up differs by student characteristics (see Table S4, available on the journal website). Take-up of on-demand tutoring differed by students' prior course performance. Among control students who passed all their fall 2020 courses, 22.69% took up the resource compared to only 11.64% of students who received a D or F in the prior semester. Take-up of on-demand tutoring did not meaningfully differ by students' special education status, eligibility for free or reduced-price lunch (FRPL), race, or primary home language in the control group. However, 23.15% of female students used on-demand tutoring compared to only 14.8% of male students.

Can We Increase Take-Up of on-Demand Tutoring With Personalized Communications to Students and/or Parents?

Table 2 (Column 1) shows how each of the treatment arms impacted student take-up of on-demand tutoring compared to the control group. For precision, our preferred model includes student covariates, an indicator for student prior course performance, and strata (School × Grade × Home Language) fixed effects (for more analytic details, see the supplemental material available on the journal website). The estimates do not differ based on which covariates we include in the model (see Table S5, available on the journal website). Students assigned to the student only treatment arm did not increase their usage of the resource relative to the control group. Students assigned to the parent only treatment arm were 5.66 pp more likely to use on-demand tutoring than the control group. The student+parent treatment arm was most effective, leading to a 8.57 pp increase in the likelihood students took advantage of the on-demand tutoring resource compared to the control group. The difference in take-up between the student only arm compared to the parent only and student+parent arms were statistically significant at the .1% level. Students assigned to the student+parent arm were 2.91 pp more likely to use on-demand tutoring than those assigned to the parent only arm, $SE = 0.016$, $t = 1.77$, 95% confidence interval = [–0.003, 0.061], $p = .077$ (for the details on how each treatment arm performed compared to one another, see Table S6, available on the journal website).

In Columns 2 and 3 of Table 2, we show the impact of each condition on the number of on-demand tutoring sessions students engaged in and the number of messages they exchanged with virtual tutors, respectively. On average, students assigned to the student+parent treatment arm attended 1.4 sessions ($SD = 6.3$) and exchanged 64.55 messages with tutors ($SD = 405.63$), which was more than students in each of the other conditions. Students in neither the student only nor parent only arms meaningfully increased their number of sessions or messages exchanged. Overall, directing messages to students alone had no impact on their own usage. Targeting parents alone seems to induce a one-time sign-on but not students' continued usage of the platform, whereas targeting students alongside their parents did result in greater overall usage.

Figure 1 illustrates how usage of the on-demand tutoring resource varied over time for students assigned to the control group (blue line) and those assigned to the student+parent

Table 2
Impact of Experimental Condition on Engagement With Tutoring Platform

	(1)	(2)	(3)
	Take-Up	Number of Sessions	Number of Messages Exchanged
Student	0.008	–0.129	4.070
	(0.014)	(0.112)	(7.706)
Parent	0.057***	0.076	4.761
	(0.015)	(0.119)	(5.476)
Student+Parent	0.086***	0.593**	37.867**
	(0.015)	(0.188)	(12.502)
Control mean	0.188	0.806	27.232
Student controls	Yes	Yes	Yes
Prior achievement	Yes	Yes	Yes
Strata fixed effects	Yes	Yes	Yes
Adjusted R^2	.197	.242	.073
Observations	4,763	4,763	4,763

Note. Controls include indicator variables for gender, free or reduced-price lunch eligibility, special education status, and race/ethnicity categories. The prior course performance indicator includes a category for missing. All columns are ordinary least squares regressions, with robust standard errors in parentheses. Each estimate indicates the coefficient compared to the reference category (the control group). The *p* values are computed from two-sided *t* tests that each coefficient is equal to zero. $^{**}p < 0.01$. $^{***}p < .001$.

treatment arm (orange line). In general, students were less likely to sign on to receive help from a tutor as the semester progressed. Visually, the personalized communications to students and their parents resulted in sustained yet modest increases in students accessing tutoring after each communication.

Does Take-Up of On-Demand Tutoring Lead to Student Learning Gains?

We estimated the impact of our RCT on student performance in their core courses (including math; Table 3, Columns 1–3) and in their math courses alone (Table 3, Columns 4–6). Students assigned to the student+parent treatment were 4.02 pp more likely to pass all their spring 2021 courses. At the same time, students assigned to the parent only and student+parent treatments were equally likely to earn an F in a course during the spring 2021 semester. Unexpectedly, students assigned to the student only condition appear to be 3.42 pp more likely to earn an F in at least one course during the spring 2021 semester. Compared to the control group, we found no evidence the treatment affected whether students earned higher GPAs and no consistent impact on math course performance during the spring 2021 semester. Compared to students assigned to the student only and parent only arms, students assigned to the student+parent arm were 4.36 pp and 3.3 pp more likely to pass their spring 2021 courses, respectively (for the difference between treatment arms, see Table S6,; Columns 4–6, available on the journal website). In Table S7, available on the journal website, we also present the results from an instrumental variable approach using the exogenous assignment to one of the treatment arms as an instrument for taking up the resource. Overall, although we consider our results on student academic outcomes to be exploratory, our findings suggest that students may benefit academically if they log on and request help from on-demand tutors.

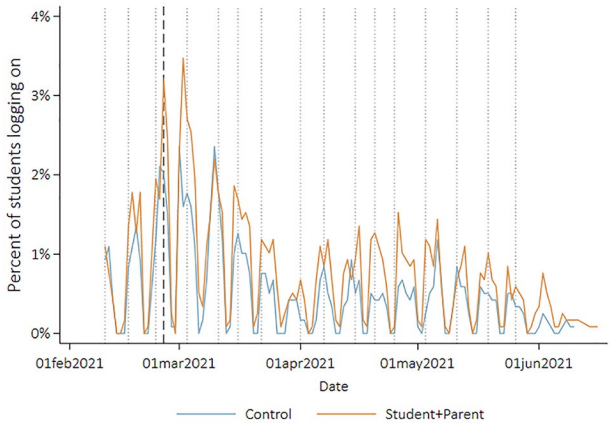

FIGURE 1. *Usage of tutoring by condition over time: student+parent versus control.*
Note. Each dotted line represents the date email and text message communications to students and parents were sent. The dashed line represents the date the mailers started to hit households. Tutoring was available 24 hours a day, 7 days a week, although the weekly dips in the figure demonstrate how few students ever accessed the platform on the weekends.

What Moderates the Effect of Personalized Communications on Take-Up of On-Demand Tutoring and Student Learning Gains?

Finally, we assessed heterogeneity in the treatment effect based on message type and students' underlying characteristics. We found no evidence that the content of the personalized messages (i.e., reminder, social norms, accountability, valuing) had any impact on whether students logged on to use the on-demand tutoring resource in the subsequent 48 hours (see Table S8, available on the journal website). The variation in these messages,

Table 3
Impact of Experimental Condition on Spring 2021 Course Performance

	All Core Courses			Math		
	(1)	(2)	(3)	(4)	(5)	(6)
	Passing	No Fs	GPA	Passing	No Fs	GPA
Student	–0.003	–0.034*	–0.063	–0.007	–0.004	–0.056
	(0.015)	(0.014)	(0.041)	(0.015)	(0.012)	(0.047)
Parent	0.007	–0.011	0.012	0.008	0.003	0.054
	(0.015)	(0.015)	(0.041)	(0.015)	(0.012)	(0.048)
Student+Parent	0.040*	0.004	0.028	0.024	0.014	0.087+
	(0.016)	(0.015)	(0.042)	(0.015)	(0.012)	(0.047)
Control *M*	0.552	0.752	2.682	0.742	0.905	2.582
Student controls	Yes	Yes	Yes	Yes	Yes	Yes
Prior achievement	Yes	Yes	Yes	Yes	Yes	Yes
Strata fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.465	0.364	0.509	0.392	0.252	0.508
Observations	4542	4542	3616	4346	4346	3240

Note. Each model controls for student-level characteristics and prior course performance, includes a fixed effect for strata, and uses cluster robust standard errors. Student controls include dummy variables for gender, free or reduced-price lunch, special education status, race/ethnicity categories, and a missing indicator for race/ethnicity. All columns are ordinary least squares regressions. The *p* values are computed from two-sided *t* tests that each coefficient is equal to zero. Standard errors are in parentheses. The sample changes as a result of the availability of outcome data, and pass/fail grades are not calculated in grade point average.
$^{+}p < .10$. $^{*}p < .05$.

however, does ease any worry that the results of this study depend on the specific wording we used in the messages.

We also explore how the treatment effect interacted with student gender, eligibility for FRPL, fall 2020 course performance, primary home language, and special education status (see Tables 9a–9e, available on the journal website). In general, we saw that the impact of personalized communications tended to be largely consistent across student subgroups: Students assigned to the student+parent treatment were the most likely to use the on-demand tutoring and tended to perform better academically. However, there is suggestive evidence that the intervention did have oversized impacts on students who were struggling academically or who may face additional stressors (e.g., living in households that have lower incomes). As shown in Figure 2 (and Table S10, available on the journal website), among students assigned to the student+parent treatment, those students who struggled in the fall semester were 14.21 pp more likely to use the resource. Comparatively, students who passed all their fall 2020 courses experience only a 4.22 pp increase. Encouraging usage among students and parents effectively eliminated the gap in take-up between students who struggled in the fall and those who passed all their courses. Table S11, available on the journal website, breaks down take-up by whether students were eligible for FRPL. Among students assigned to the student+parent treatment, we found that those eligible for FRPL were 5.69 pp more likely to pass all their spring courses, whereas there was no difference in passage rates for students from higher-income households.

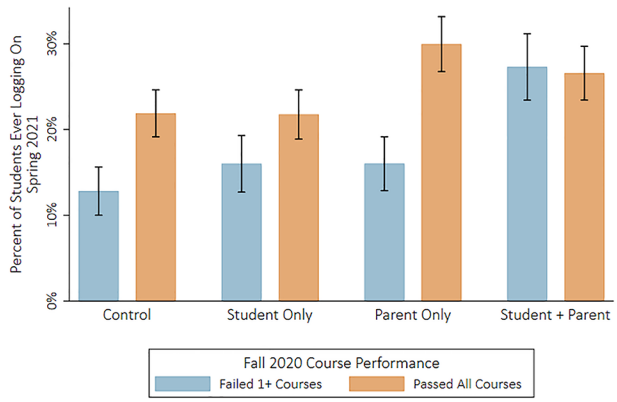

FIGURE 2. *Take-up by condition and prior performance.*
Note. The blue bars represent students who failed at least one course during the prior semester. The orange bars represent students who passed all their courses the prior semester. Error bars represent 95% confidence intervals.

Discussion

In this article, we provide evidence that mere access to quality educational resources may not reduce inequalities and may in fact increase them. We found that the vast majority of students do not take up an opt-in educational resource, even when it can promote learning, and that struggling students are the least likely to proactively access and benefit from the additional support. We show that strategic communications to students and their families can increase the likelihood that students take up the resource by almost 50%—and more for struggling students—but the most effective treatment arm still resulted in only a quarter of students ever logging on to receive help from a tutor.

This study is among the first large-scale studies to document take-up of educational resources and opt-in tutoring and to quantify the differences between students who opt in to using the resource and those who do not. Although this study takes

place at a unique time point in history, the appetite for additional educational resources was at an all-time high (e.g., Bacher-Hicks et al., 2021). Therefore, we hypothesize that the demand for on-demand tutoring and other educational resources that we document was likely inflated compared to non-COVID times. Moreover, districts—like the one we studied—were prioritizing providing students with personal devices, suggesting that usage of these technology-based resources would be even lower and more inequitable if it relied on families to provide their children with digital access (L. Robinson et al., 2015).

Recognizing who benefits from the provision of on-demand tutoring is key to understanding the potential of these resources to accelerate student learning (Geith & Vignare, 2008). Schools can offer opt-in tutoring to their entire student body at a fraction of the cost it would take to implement a more targeted resource during school time. Moreover, students can customize their opt-in tutoring experience to their specific needs (Reigeluth, 2014), and there is often no limit to how much a student can use the resource. As a result, on-demand tutoring has the potential to be high-impact if students choose to access tutors several times per week and the tutors are well trained and supported (Nickow et al., 2024; C. D. Robinson & Loeb, 2021). However, this flexibility and customization that on-demand tutoring affords also means that educators have less control over how and when students use the resource. Without targeted interventions, struggling students are unlikely to opt in to the supports and will continue to fall behind as high-achieving students benefit from the resource.

Our study also builds on and extends the literature on using behavioral interventions in education. First, this study is one of the few focusing on impacting the educational behaviors of secondary students. Second, it is the first to target both middle school and high school students and their parents and explore the effect on engagement and academic outcomes. Finally, the study design allowed us to test the comparative and marginal benefits of targeting an intervention to both students and parents as opposed to just one or the other.

We found that sending communications to students alone did not increase the likelihood students used the resource and may have even resulted in worse course performance. Like prior research, we found that communications to parents can positively impact student engagement behaviors (see Bergman, 2019). Sending communications to parents, as opposed to students, increased the likelihood students ever logged in to the tutoring platform but did not meaningfully increase the number of tutoring sessions students had overall or lead to academic gains. However, students who received communications alongside their parents were most likely to take up the resource and attend a greater number of sessions overall compared to all other conditions. Moreover, the effect of the communications was largest for students who struggled during the prior semester, which translated into students being more likely to pass their courses. If the goal is to encourage students to engage in beneficial educational behaviors, our findings suggest that we cannot rely on student agency alone—even as students mature and progress through secondary school. However, communicating relevant information to both students and parents can facilitate beneficial parent engagement throughout the K–12 schooling experience. There are several reasons why the intersection of the communications to students and parents might be so valuable. For instance, it would seem parents are instrumental in orchestrating the first-time sign-on among students. And once the initial barrier of logging on has been overcome, students are more likely to use the resource when prompted in the future. Relatedly, parents may feel they have "completed" their task once they successfully help their child sign on to the platform, and continued messaging to them alone is insufficient. Whatever the reason, these results suggest a coordinated approach to engaging parents and students may be most effective at motivating positive educational behaviors and improving student outcomes.

The question of who accesses optional educational resources and how to increase access is only pressing if the resource benefits students. Exploiting the exogenous difference in take-up between experimental conditions, we found suggestive evidence that assignment to the most effective treatment arm led to a 4 pp increase in the likelihood students passed all their courses with grades that qualified for admission into the state university system. Although the communications led to greater take-up of the tutoring resource, we cannot disentangle the impact of the targeted outreach from students' increased usage of the platform on student grades. Our academic-focused analyses are further limited by the overall low take-up rate of on-demand tutoring by students overall and the quality of academic outcomes available during the implementation and thus should be interpreted with caution.

Our results have immediate and broad implications for education policy. In the near term, states and districts are spending billions of dollars to provide students and their families with resources to support learning after the disruptions to education (FutureEd, 2022). If the goal is to mitigate learning gaps for students who struggled the most, providing opt-in access to personalized tutoring and other educational resources is unlikely to help. These findings mirror prior research showing that opt-out approaches (as opposed to those requiring students to opt in) increase student participation in beneficial programs (C. D. Robinson, Pons, et al., 2018). Students will be much more likely to access these resources if they are embedded into their school learning experience. For instance, districts using on-demand tutoring services could provide teachers with directives and support to embed the use of the resource into their classroom activities and assigned homework. For students to benefit the most, however, schools might consider scheduling personalized, high-impact tutoring during the school day for students who need it most. Recent evidence suggests that tutoring programs designed to be high-impact (i.e., scheduled, subject-specific instructional sessions with a consistent tutor for the duration of the program) can be effective when delivered virtually (e.g., C. D. Robinson et al., 2024). However, the recent research on middle school and high school tutoring programs examined the impact among students who opted in to the optional, out-of-school time tutoring (Carlana & La Ferrara, 2024; Gortazar et al., 2023; Kraft et al., 2022)—they do not consider the students who did not actively participate and how that might contribute to inequality or how to induce greater participation among these students.

More broadly, the findings of this study point to the importance of further considering what access means in education. At the individual level, we know that families and students who

have more means are more likely to seek out supplemental educational resources (Bacher-Hicks et al., 2021; Hansen & Reich, 2015). Given that marginalized students who come from low-income households and lack opportunity were most affected by the pandemic (Dorn et al., 2021), our results suggest that taking an opt-in approach to distributing educational resources is going to perpetuate inequality.[3]

The findings from this study suggest that we should not conflate the availability of educational resources with equity. Opt-in approaches are unlikely to address the persistent and increasing disparities in learning between struggling students and their peers. Helping the students who need it most will require a coordinated effort between educators and families to provide students with embedded, personalized learning opportunities.

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NOTES

We are grateful to our partners in this research, including Aspire Public Schools. We especially thank Audrey Boochever, Ronnie Ernandes, Liliana Garcia, Jennifer Garcia, Chenny Ng, and Nii Sai for their invaluable contribution to project implementation and Sara White for their research assistance. We received insightful feedback and support from the National Student Support Accelerator team, in particular, Kristine Gaffaney and Nancy Waymack. We thank the Smith Richardson Foundation and Arnold Ventures/Accelerate for their support of our full research program.

[1]We did not have access to student cell phone numbers, and we sent parents emails if we did not have a cell phone number.

[2]The program historically was used most for math-related content, which is why we focused on encouraging using the resource for math. Over 70% of sessions in this sample were focused on math content.

[3]At the organizational level, opt-in approaches may be equally inequitable. State education agencies are providing districts with a host of resources and trainings to support pandemic recovery efforts. For instance, the state education agencies across the country have developed comprehensive programs of offerings to support districts to develop tutoring programs (e.g., the Rhode Island Department of Education). However, the districts who serve the most high-need students often have the least capacity to take advantage of these resources (Duke & VanGronigen, 2021).

REFERENCES

Akabayashi, H. (2006). An equilibrium model of child maltreatment. *Journal of Economic Dynamics and Control, 30*(6), 993–1025.

Allcott, H., & Rogers, T. (2014). The short-run and long-run effects of behavioral interventions: Experimental evidence from energy conservation. *American Economic Review*, *104*(10), 3003–3037.

Angrist, J., Lang, D., & Oreopoulos, P. (2009). Incentives and services for college achievement: Evidence from a randomized trial. *American Economic Journal: Applied Economics*, *1*(1), 136–163.

Bacher-Hicks, A., Goodman, J., & Mulhern, C. (2021). Inequality in household adaptation to schooling shocks: Covid-induced online learning engagement in real time. *Journal of Public Economics*, *193*, Article 104345. https://doi.org/10.1016/j.jpubeco.2020.104345

Bergman, P. (2019). How behavioral science can empower parents to improve children's educational outcomes. *Behavioral Science & Policy*, *5*(1), 52–67.

Bergman, P. (2021). Parent-child information frictions and human capital investment: Evidence from a field experiment. *Journal of Political Economy*, *129*(1), 286–322.

Bergman, P., & Chan, E. W. (2021). Leveraging parents through low-cost technology: The impact of high-frequency information on student achievement. *Journal of Human Resources*, *56*(1), 125–158.

Bergman, P., Lasky-Fink, J., & Rogers, T. (2020). Simplification and defaults affect adoption and impact of technology, but decision makers do not realize it. *Organizational Behavior and Human Decision Processes*, *158*, 66–79.

Calzolari, G., & Nardotto, M. (2017). Effective reminders. *Management Science*, *63*(9), 2915–2932.

Carlana, M., & La Ferrara, E. (2024). *Apart but connected: Online tutoring, cognitive outcomes, and soft skills* (No. w32272). National Bureau of Economic Research.

Castleman, B. L., & Page, L. C. (2015). Summer nudging: Can personalized text messages and peer mentor outreach increase college going among low-income high school graduates? *Journal of Economic Behavior & Organization*, *115*, 144–160.

Castleman, B. L., & Page, L. C. (2017). Parental influences on postsecondary decision making: Evidence from a text messaging experiment. *Educational Evaluation and Policy Analysis*, *39*(2), 361–377.

Cosconati, M. (2013). *Optimal parenting styles: Evidence from a dynamic model with multiple equilibria*. Technical report, Bank of Italy.

Damgaard, M. T., & Nielsen, H. S. (2018). Nudging in education. *Economics of Education Review*, *64*, 313–342. https://doi.org/10.1016/j.econedurev.2018.03.008

Dietrichson, J., Bøg, M., Filges, T., & Klint Jørgensen, A.-M. (2017). Academic interventions for elementary and middle school students with low socioeconomic status: A systematic review and meta-analysis. *Review of Educational Research*, *87*(2), 243–282. https://doi.org/10.3102/0034654316687036

Dorn, E., Hancock, B., Sarakatsannis, J., & Viruleg, E. (2021). *COVID-19 and education: An emerging K-shaped recovery*. https://www.mckinsey.com/industries/education/our-insights/covid-19-and-education-an-emerging-k-shaped-recovery

Duke, D. L., & VanGronigen, B. A. (2021). Small City School Districts' Capacity for Improvement and the Struggle for Educational Equity. *Urban Education, 56*(7), 1195–1229. https://doi.org/10.1177/0042085918772625

Fahle, E. M., Kane, T. J., Patterson, T., Reardon, S. F., Staiger, D. O., & Stuart, E. A. (2023). *School district and community factors associated with learning loss during the COVID-19 pandemic*. Center for Education Policy Research at Harvard University. https://hwpi.harvard.edu/files/cepr/files/explaining_covid_losses_5.23.pdf

Fryer, R. G. (2014). Injecting charter school best practices into traditional public schools: Evidence from field experiments. *The Quarterly Journal of Economics*, *129*(3), 1355–1407.

FutureEd. (2022). *An analysis of local school districts' ambitious post-Covid tutoring plans*. https://www.future-ed.org/an-analysis-of-local-school-districts-ambitious-post-covid-tutoring-plans/

Geith, C., & Vignare, K. (2008). Access to education with online learning and open educational resources: Can they close the gap? *Journal of Asynchronous Learning Networks*, *12*(1), 105–126.

Gerber, A. S., Green, D. P., & Larimer, C. W. (2008). Social pressure and voter turnout: Evidence from a large-scale field experiment. *American Political Science Review*, *102*(1), 33–48.

Goldhaber, D., Kane, T. J., McEachin, A., Morton, E., Patterson, T., & Staiger, D. O. (2022). *The consequences of remote and hybrid instruction during the pandemic*. Center for Education Policy Research at Harvard University. https://cepr.harvard.edu/files/cepr/files/5-4.pdf?m=1651690491

Goldstein, D. (2022, January 22). Back to school, but still learning online. *The New York Times*. https://www.nytimes.com/2022/01/21/us/online-tutoring-stimulus-funding.html

Gortazar, L., Hupkau, C., & Roldan, A. (2023). *Online tutoring works: Experimental evidence from a program with vulnerable children*. SSRN. http://dx.doi.org/10.2139/ssrn.4390248

Guryan, J., Ludwig, J., Bhatt, M. P., Cook, P. J., Davis, J. M., Dodge, K., Farkas, G., Fryer, R. G., Jr., Mayer, S., & Pollack, H. (2023). Not too late: Improving academic outcomes among adolescents. *American Economic Review*, *113*(3), 738–765.

Haderlein, S. K., Saavedra, A. R., Polikoff, M. S., Silver, D., Rapaport, A., & Garland, M. (2021). Disparities in educational access in the time of COVID: Evidence from a nationally representative panel of American families. *AERA Open*, *7*. https://doi.org/10.1177/23328584211041350

Hansen, J. D., & Reich, J. (2015). Democratizing education? Examining access and usage patterns in massive open online courses. *Science*, *350*(6265), 1245–1248.

Heckman, J. J., & Mosso, S. (2014). The economics of human development and social mobility. *Annual Review of Economics*, *6*(1), 689–733.

Hester, C., Jaciw, A., Kurki, A., Zacamy, J., Pierson, A., Lai, G., & Feygin, A. (2022). *Encouraging families to visit a literacy website: A randomized study of the impact of email and text message communications* (REL 2023-143). Regional Educational Laboratory Southwest. https://ies.ed.gov/ncee/rel/Products/Publication/100918

Kraft, M. A., & Falken, G. T. (2021). A blueprint for scaling tutoring and mentoring across public schools. *AERA Open*, *7*. https://doi.org/10.1177/23328584211042858

Kraft, M. A., List, J. A., Livingston, J. A., & Sadoff, S. (2022). Online tutoring by college volunteers: Experimental evidence from a private program. *AEA Papers and Proceedings*, *112*, 614–618.

Kraft, M. A., & Rogers, T. (2015). The underutilized potential of teacher-to-parent communication: Evidence from a field experiment. *Economics of Education Review*, *47*, 49–63.

Lasky-Fink, J., Robinson, C. D., Chang, H. N.-L., & Rogers, T. (2021). Using behavioral insights to improve school administrative communications: The case of truancy notifications. *Educational Researcher*, *50*(7), 442–450 https://doi.org/10.3102/0013189x211000749

Mayer, S. E., Kalil, A., Oreopoulos, P., & Gallegos, S. (2019). Using behavioral insights to increase parental engagement the parents and children together intervention. *Journal of Human Resources*, *54*(4), 900–925.

Neitzel, A. J., Lake, C., Pellegrini, M., & Slavin, R. E. (2022). A synthesis of quantitative research on programs for struggling readers in elementary schools. *Reading Research Quarterly*, *57*(1), 149–179.

Nickow, A., Oreopoulos, P., & Quan, V. (2024). The promise of tutoring for preK–12 learning: A systematic review and meta-analysis of the experimental evidence. *American Educational Research Journal*, *61*(1), 74–107. https://doi.org/10.3102/00028312231208687

Oreopoulos, P., & Petronijevic, U. (2018). Student coaching: How far can technology go? *Journal of Human Resources*, *53*(2), 299–329.

Page, L. C., & Gehlbach, H. (2017). How an artificially intelligent virtual assistant helps students navigate the road to college. *AERA Open*, *3*(4). https://doi.org/10.1177/2332858417749220

Paloyo, A. R., Rogan, S., & Siminski, P. (2016). The effect of supplemental instruction on academic performance: An encouragement design experiment. *Economics of Education Review*, *55*, 57–69.

Pugatch, T., & Wilson, N. (2018). Nudging study habits: A field experiment on peer tutoring in higher education. *Economics of Education Review*, *62*, 151–161.

Randazzo, S. (2022, April 15). Students are so behind due to pandemic schools pay millions for tutoring. *The Wall Street Journal*.

Reich, J. (2020). *Failure to disrupt: Why technology alone can't transform education* (pp. 148–170). Harvard University Press.

Reigeluth, C. M. (2014). The learner-centered paradigm of education: Roles for technology. *Educational Technology*, *54*(3), 18–21.

Robinson, C. D., Andersen, T. L., Davison, C., Demić, E., Evans, H., Mascarenhas, M. F., Gibson, S. P., Hlavová, R., Lam, W. Y., & Mareva, S. (2021). Education and behavior. In K. Ruggeri (Ed.), *Psychology and behavioral economics* (2nd ed., pp. 130–156). Routledge.

Robinson, C. D., Chande, R., Burgess, S., & Rogers, T. (2022). Parent engagement interventions are not costless: Opportunity cost and crowd out of parental investment. *Educational Evaluation and Policy Analysis*, *44*(1), 170–177. https://doi.org/10.3102/01623737211030492

Robinson, C. D., Lee, M. G., Dearing, E., & Rogers, T. (2018). Reducing student absenteeism in the early grades by targeting parental beliefs. *American Educational Research Journal*, *55*(6), 1163–1192. https://doi.org/10.3102/0002831218772274

Robinson, C. D., & Loeb, S. (2021). *High-impact tutoring: State of the research and priorities for future learning* (EdWorkingPaper No. 21-384). Annenberg Institute at Brown University. https://doi.org/10.26300/qf76-rj21

Robinson, C. D., Pollard, C., Novicoff, S., White, S., & Loeb, S. (2024). The effects of virtual tutoring on young readers: Results from a randomized controlled trial. *Educational Evaluation and Policy Analysis*. Advance online publication. https://doi.org/10.3102/01623737241288845

Robinson, C. D., Pons, G. A., Duckworth, A. L., & Rogers, T. (2018). Some middle school students want behavior commitment devices (but take-up does not affect their behavior). *Frontiers in Psychology*, *9*, Article 206. https://doi.org/10.3389/fpsyg.2018.00206

Robinson, L., Cotten, S. R., Ono, H., Quan-Haase, A., Mesch, G., Chen, W., Schulz, J., Hale, T. M., & Stern, M. J. (2015). Digital inequalities and why they matter. *Information, Communication & Society*, *18*(5), 569–582. https://doi.org/10.1080/1369118X.2015.1012532

Rogers, T., & Feller, A. (2018). Reducing student absences at scale by targeting parents' misbeliefs. *Nature Human Behaviour*, *2*(5), 335–342.

U.S. Office of the Press Secretary. (2022). *FACT SHEET: Biden-Harris administration launches national effort to support student success* https://www.whitehouse.gov/briefing-room/statements-releases/2022/07/05/fact-sheet-biden-harris-administration-launches-national-effort-to-support-student-success/?utm_content=&utm_medium=email&utm_name=&utm_source=govdelivery &utm_term=

White, S., Carey, M., O'Donnell, A., & Loeb, S. (2021). *Early lessons from implementing high-impact tutoring at scale*. https://studentsupportaccelerator.org/sites/default/files/Early%20Lessons%20from%20Implementing%20High-Impact%20Tutoring%20at%20Scale.pdf

York, B. N., Loeb, S., & Doss, C. (2019). One step at a time: The effects of an early literacy text-messaging program for parents of preschoolers. *Journal of Human Resources*, *54*(3), 537–566.

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Manuscript received January 4, 2024
Revision received October 17, 2024
Accepted January 27, 2025