Cash and Cognition: The Effect of Monetary Transfers on Standardized Test Performance*

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Abstract

This paper shows that the timing of monetary transfers targeted to low-income families affects students' cognitive performance as measured by their test scores on a high-stakes standardized test. We combine administrative records from the largest conditional cash transfer (CCT) program worldwide with the college admission exam results of 185,000 high school students from CCT-beneficiary families. Exploiting plausibly exogenous variation in the date of the CCT disbursements, we find that receiving the transfer in the days preceding the exam increases test scores by 0.01 standard deviations relative to receiving it the subsequent week. These cognition effects have long-term consequences for human capital accumulation. We find that students who receive the largest transfers before the exam are more likely to enroll in college, with suggestive evidence of increased access to competitively-allocated scholarships as the primary mechanism. We discuss the implications of our findings for the design of social safety net programs.

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1 Introduction

Cash transfer programs are one of the main government social policies in developing countries. For example, in Latin America, over 135 million individuals in 18 countries benefit from a cash transfer program (García and Saavedra, 2022). This paper asks whether these programs have direct and immediate impacts on cognition—a fundamental determinant of decision-making and predictor of life success (e.g., Heckman et al., 2006; Kuncel and Hezlett, 2007; Hanushek and Woessmann, 2008; Burks et al., 2009; Dohmen et al., 2010; Benjamin et al., 2013; Fe et al., 2022).

Under standard assumptions, the neoclassical consumption-smoothing model predicts that the timing of anticipated, recurring monetary transfers should have no impact on cognition. In these models, households smooth consumption over time and, in the presence of liquidity constraints, they accumulate precautionary savings for extraordinary expenses (Carroll, 2001; Campbell and Hercowitz, 2019; Anukriti et al., 2022). Yet, this prediction may fail if households do not smooth consumption over time (e.g., due to optimization errors (Augenblick et al., 2023), or present bias (Shapiro, 2005)), or if financial-related concerns directly impede cognitive functioning (Mani et al., 2013).

We use data from Brazil to investigate whether a conditional cash transfer (CCT) program targeted at poor households affects cognition. Our base dataset contains information on all households who receive CCTs from the *Bolsa Familia Program* (BFP), which grants, on average, US$93 in 2023 US$, or roughly 40% of beneficiaries' income.[1] Over 13 million households are enrolled in BFP, making it the world's largest CCT by coverage (Brollo et al., 2020a). To measure cognition, we link BFP records to test-score data from 185,000 high school students from BFP-beneficiary families who took a high-stakes college admission exam called ENEM .

Our identification strategy relies on plausibly-exogenous variation in transfer receipt dates. When enrolling in BFP, households receive a randomly generated ID called NIS. The day of the month a household's BFP payment is disbursed depends on the last digit of their NIS. Some households receive the transfer the week before the ENEM takes place, while other observationally-equivalent households receive the transfer the week following the ENEM. In our baseline specification, we compare students' test scores in households who received the transfer before the exam ("early recipients") with those who received the transfer after the exam ("late recipients"). By focusing on short-term impacts, our

[1] Throughout the paper, all monetary values are in 2023 US$.

"differential-exposure design" rules out many indirect channels through which cash transfers can impact cognition.[2]

Our main result is that receiving the cash transfer on the days preceding the exam improves test scores. On average, early recipients have a one percent of a standard deviation (or 1.68%) higher test score than late recipients. This effect is comparable to the impact of a policy that increases spending by $300 per student for four years (Jackson and Mackevicius, 2023). We find substantially stronger effects (nearly twice the size of the average effects) for students who receive larger transfers. Importantly, these effects are not driven by changes in test-taker composition, as early recipients have the same probability of attending the exam as late recipients.

After establishing the immediate impact of the cash transfer on cognition, we assess if this effect can have persistent consequences for human capital accumulation. The ENEM is used in Brazil's higher education system for many purposes, including to allocate scholarships, student loans, and university spots through a centralized system (Machado and Szerman, 2021). Thus, even small increases in ENEM scores could substantially affect college outcomes. To test this, we link the exam records to a census of all college students in Brazil and study the college trajectories of early and late recipients.

We find positive impacts on college enrollment rates for students who receive the largest transfer size. On average, the college attendance rate of students who receive the largest amounts increases by 0.8 percentage points (or 4.2%, on a baseline of 18.9%). This corresponds roughly to 325 additional students living in extreme poverty enrolling in university. We also find positive impacts on the probability of attending college for the average recipient, but for this sample, our estimates are less precise and thus indistinguishable from zero. In addition, we document positive effects on the six-year graduation rate, suggesting that the students induced to attend college succeed academically. However, these estimates tend to be imprecise and not statistically different from zero at the usual levels.

To understand why the cash transfer improves college access, we analyze the type of institutions attended and funding access. In Brazil, there are both public and private universities. Public universities are the most prestigious institutions. They are tuition-free but highly selective, with admissions determined solely by test scores. Private universities tend to be of lower quality, and many do not have a selective admission process. We estimate null effects on public university attendance and positive impacts on private university

[2]For instance, one of the conditions to remain enrolled in BFP is for school-age children to be enrolled in school and attend. Thus, BFP could have long-term impacts on cognition partly due to their impact on schooling (Hansen et al., 2004; Brown et al., 2022).

attendance, with effects of a similar magnitude to the effect on overall college attendance. In addition, we find positive effects on the probability of fulfilling the test score requirements to be eligible for a government scholarship, as well as imprecisely estimated positive impacts on the probability of receiving these scholarships. Together, our findings suggest that the cognition improvement induced by the cash transfer helped some students access funding to pay for a private college education.

This paper contributes to the literature that studies the impacts of CCTs on educational outcomes.[3] Much of this work studies impacts on school enrollment, attendance, and dropout rates (e.g., Glewwe and Kassouf, 2012; García and Saavedra, 2017). This literature mostly measures the long-run impacts of a CCT and typically finds null effects (Millán et al., 2019).[4] We contribute by studying the immediate effects of the transfer. The positive effects that we document are of a similar magnitude as recent meta-analysis of the test-score impacts (García and Saavedra, 2022). We further show that these effects can have long-term consequences for human-capital accumulation.

A closely related literature studies the immediate impacts of income shocks on cognitive performance. "Scarcity theory" posits that poverty has a direct and deleterious effect on cognitive functioning (Mullainathan and Shafir, 2013; Schilbach et al., 2016; Dean et al., 2019). Consistent with this theory, empirical work has shown that income shocks affect performance on cognitive tests (Mani et al., 2013; Lichand and Mani, 2020; Kansikas et al., 2023), and that task performance is impacted by financial concerns (Kaur et al., 2021; Duquennois, 2022).[5] This work measures cognition on the individual who receives the income shock, whereas our focus is on potential spillover effects on other household members. In addition, much of the existing work relies on relatively small sample sizes and measures cognition in low-stakes settings. Our sample size is substantially larger than that of previous studies, and we study impacts on a high-stakes test.[6] Because our treatment

[3]For overviews of this literature, see Fiszbein and Schady (2009); Baird et al. (2014); Millán et al. (2019); García and Saavedra (2022).

[4]A challenge to identify the impact of CCTs on test scores is that the benefits are often conditional on school attendance, which changes the composition of test takers (García and Saavedra, 2022). Thus, most existing work relies on strong parametric assumptions (e.g., Behrman et al., 2000; Garcia and Hill, 2010; Báez and Camacho, 2011). We circumvent this problem by leveraging variation in *when* households receive the transfer, allowing us to measure impacts on test scores under weaker identification assumptions.

[5]Though other work fails to find impacts on cognition (Carvalho et al., 2016; Fehr et al., 2022), and recent reviews suggest the overall evidence is mixed (De Bruijn and Antonides, 2022; Haushofer and Salicath, 2023).

[6]Incentives are important for measuring cognitive performance because in their absence, cognitive tests capture not only cognitive ability but also other performance determinants such as intrinsic motivation(Wise and DeMars, 2005; Duckworth et al., 2011; Segal, 2012; Finn, 2015; Gneezy et al., 2019).

is an existing policy, the treatment size that we study is directly relevant to policymaking.

Finally, our work also contributes to the literature on the design of cash transfer programs. Existing work has analyzed the impact of conditioning the transfer on household behaviors, "labeling" the intended use of the benefits, and compared in-kind to cash transfers (see, among others, Baird et al., 2011; Cunha, 2014; Attanasio et al., 2015; Benhassine et al., 2015; Cunha et al., 2019). The *timing* of cash transfers has received less attention as a design feature, even though evidence from other social programs has shown it can substantially affect household behavior (e.g., Hastings and Washington, 2010; Goldin et al., 2022; Bond et al., 2022).[7] We provide novel evidence on how the timing can impact longer-run outcomes like college attendance and graduation, thereby offering insights into the human capital accumulation gains that can be achieved through improved design of cash transfer programs.

2 Institutional Context and Data

2.1 Cash Transfer Program

The *Bolsa Família Program* (BFP) is a conditional cash transfer (CCT) program that provides monthly benefits to low-income families. BFP covers about 14 million households in Brazil, reaching over 50 million individuals (approximately 25% of the country's population), making it the largest CCT program worldwide (Brollo et al., 2020b). The transfer size varies depending on household demographic composition and poverty level. Households in extreme poverty are eligible for an unconditional "basic benefit," in addition to a conditional "variable benefit" based on children's school attendance and health check-ups.[8] Poor households above the extreme poverty threshold are only eligible for the conditional benefits. In 2013, the year we analyze, the average beneficiary family received a monthly payment of US$93 and had a monthly household income of US$138, in 2023 US$.

To enroll in BFP, households must have a per capita income below ≈ US$43 per month and register in the Social Programs Registry (*Cadastro Único*).[9] Upon registration, households are assigned a randomly generated eleven-digit identification number called *NIS*.

[7] Notable exceptions include Barrera-Osorio et al. (2011) and Kansikas et al. (2023).

[8] The variable benefits include payments for pregnant women and lactating women who fulfill health monitoring requirements, for school enrollment and attendance of children under 17 years of age, and for immunization of children under 7.

[9] There are additional conditions to remain in the program, like minimum school attendance for household children and up-to-date vaccination records. See Glewwe and Kassouf (2012).

The disbursement schedule of the benefits each month is directly linked to the last digit of the NIS number.[10] Households whose NIS ends with the digit '1' are the first ones to receive the transfer, typically on the third Monday of the month. Thereafter, transfers are made sequentially, with each subsequent day serving those whose NIS ends with the next sequential digit, and with no disbursements occurring over the weekends and public holidays. Figure 1 shows the October 2013 payment schedule. Our identification strategy (described in Section 3) exploits the variation in transfer timing induced by the NIS last digit.

2.2 ENEM Exam

The High School Assessment Exam (*Exame Nacional do Ensino Médio*, or ENEM for short) is an achievement test created in 1998 by the National Institute of Educational Studies (INEP), a unit of the Brazilian Ministry of Education, with the goal of evaluating student performance at the end of high school. The exam is designed to measure students' mastery of the material they are expected to learn by the end of high school. In 2009, the Ministry of Education reformed the ENEM with the aim of encouraging colleges to use it as an admission exam (Machado and Szerman, 2021).

In our empirical analysis, we use the post-2009 version of the ENEM. This new ENEM consists of 180 multiple-choice questions conducted over two consecutive days of testing during a weekend. The exam contains questions on four subjects: mathematics, natural sciences (which includes biology, physics, and chemistry questions), social sciences (which includes history, geography, philosophy, and sociology questions), and language arts (which includes questions on Portuguese language, literature, foreign language, arts, physical education, and information and communication technologies). Each exam subject is graded based on Item Response Theory (IRT).

2.3 Data

We combine three administrative databases from Brazil. The first dataset contains information on all individuals who enrolled to take the ENEM during 2013. This dataset contains both individual-level and question-level information. At the individual level, this dataset provides demographic and socioeconomic status (SES) measures, including sex, race, type of high school attended, and family income. At the question level, the dataset includes

[10] The schedule for every month of the calendar year is made public in early January.

each student's responses to each exam question, along with the specific skill assessed by the question.

To identify students whose household received the CCT, we cross-referenced the ENEM records with information from the Social Programs Registry and BFP. These datasets include the NIS of the household (which determines the day in which the household receives BFP) and the amount received. Finally, to measure college outcomes we link the ENEM records to Brazil's higher education census for the years 2013–2019. This dataset includes information on all college enrollee's university, field of study, degree progress, and graduation year.

2.4 Sample, Summary Statistics, and Balance

In our main sample, we focus on high school seniors from BFP-beneficiary households who enrolled to take the 2013 ENEM. First, we exclude individuals who take the exam in their junior year, who typically take the exam as practice. Second, we exclude individuals who take the exam after dropping out of high school, who typically take the exam to use their test scores to get a high school certificate. Third, we exclude individuals who take the exam after graduating from high school, who often take the exam to enroll in a college degree or switch from college degrees. Fourth, we exclude students from households that were enrolled in BFP, but which did not receive the cash transfer in October 2013, the month of the ENEM.[11] After these restrictions, the high school-students sample contains information on 185,000 students who enrolled to take the ENEM in 2013.

Table 1 shows summary statistics on various sub-groups. Column 1 considers all high school seniors, columns 2-3 disaggregate the statistics by whether the student's family was enrolled in the Social Programs Registry, and columns 4-5 by whether the family was a BFP beneficiary. Summary statistics for our estimating sample – students in BFP-recipient families– are shown in column 4. The average student is 20.5 years old. 34.8% are male, and 72.4% are self-identified Black/Brown (Panel A). About 2% attended a private high school, and only 2% have mothers who attained a college education (Panel B). Geographically, students are spread across the country, with the majority (48.6%) living in the Northeast (Panel C). The majority of students who enrolled (78.4%) took at least one of the subject tests (Panel D).

[11] The percentage of students from BFP families that are excluded in this step is small, 2.5%. The reason for non-payment is either a failure to comply with conditionalities, or households becoming ineligible once their income surpasses the poverty line.

The sample is balanced on observable characteristics. Table 2 compares the characteristics of students whose households receive BFP before the ENEM (column 1) with those that receive BFP after the ENEM (column 2). Across all covariates, the differences between the two groups are small (column 3), and for most variables, we cannot reject equality of coefficient at the usual levels of significance. We find similar results by combining these characteristics into an index of predicted test scores (Panel E). The results are similar when analyzing student characteristics according to the last NIS digit of the student family (Appendix Table A1). Consistent with this, the last NIS digit is uniformly distributed across students (Appendix Figure A1).

3 Research Design

3.1 Regression model

Our empirical strategy consists of comparing the average test score of students in households that received the transfer before the ENEM exam with those who received the transfer after taking the exam. As described in section 2, this variation is entirely determined by the last digit of the randomly-assigned NIS number. Therefore, whether a student's family was scheduled to receive the transfer before or after the exam is exogenous. We restrict the sample to students scheduled to receive BFP in October, the month of the exam, and estimate the following equation:

$$\text{TestScore}_i = \alpha + \beta \text{BFPBeforeENEM}_i + \varepsilon_i, \tag{1}$$

where TestScore_i is either the average test score across all exam subjects or the test score on a given subject, BFPBeforeENEM_i equals one if the last NIS digit of i's family allows them to receive the transfer before the exam. The parameter of interest is β, which identifies the intention-to-treat impact of being scheduled to receive the transfer before taking the exam on test scores. We cluster the standard errors at the student level.

In addition, we study treatment effect heterogeneity based on student characteristics, such as gender and SES, and transfer size. To measure the heterogeneous effect based on a covariate X_i, we estimate a version of equation (1) where we control for the covariate X_i and the interaction between the covariate X_i and the treatment indicator.

3.2 Longer-run outcomes

Finally, we ask whether any immediate cognition effects have lasting consequences for human-capital accumulation. For this, we estimate equation (1) using a college outcome as the dependent variable. Intuitively, this specification compares the average college outcomes of students who received the transfer before the exam with the outcomes of students who received the transfer after the exam. We mainly focus on college attendance, college selectivity, and graduation likelihood. Appendix B.2 defines these and other outcomes.

4 The Impact of Monetary Transfers on Exam Performance

4.1 Exam Attendance

We begin by studying selection into attending the ENEM. Receiving the cash transfer in the days preceding the exam could impact the individual's decision to take the exam. Moreover, if the students induced to take the exam have systematically different cognitive abilities, this effect could lead to test-score differences between early- and late-receivers, irrespective of any cognition effects.

To measure the impact of BFP on the probability of attending the exam, we define indicator variables for whether students were present on both exam days, at least one day, and respectively on the first and second day. Table 3 presents estimates of equation (1) using these attendance indicators as outcomes. Additionally, Appendix Figure A3 plots the proportion of BFP beneficiaries who attended both exam days (blue circles) and at least one day (red triangles) against the days elapsed since receiving the transfer.

We find that BFP does not significantly affect the probability of attending the ENEM. The impact of BFP on attendance for both days is of -0.1 percentage points (on a baseline of 75.8 percent), and the impact on attending at least one day is of -0.2 percentage points (on a baseline of 78.5 percent). These effects are small in magnitude and statistically insignificant (columns 1 and 2). The results are analogous when examining the probability of attending the first testing day (column 3) or the second testing day (column 4). Consistent with the regression results, Appendix Figure A3 shows that attendance does not systematically vary according to the number of days since the student's household received the transfer.

4.2 Test Scores

Next, we examine the relationship between student test scores and the timing of the cash transfer disbursement. Figure 2 plots the average test score (y-axis) against the BFP disbursement date relative to the exam date (x-axis). We standardized each test score to be mean zero and standard deviation (SD) one among all test-takers (not just those who recieve BFP).

Students who receive the cash transfer prior to the exam tend to have higher test scores than those who received it afterwards. For example, the average test score of students who received the BFP benefits five days *before* the exam is $-0.458X$ SD (s.e. $= 0.009$ SD), whereas that of students who received the cash transfer five days *after* is $-0.477X$ SD (s.e. $= 0.009$ SD). The average test score of early recipients (those who received the transfer prior to the exam) tends not to vary much based on the transfer date. The same holds for late recipients (those who received the transfer after the exam). Thus, for the remainder of the analysis we group students into early- and late- recipients.

Table 4 reports regression estimates of β from equation 1. Each column shows the results for a different dependent variable. In column 1, the outcome is the average test score across the subjects tested. In columns 2–6, we show the results separately for each subject tested and the essay. Additionally, Appendix Figure 3 shows the average test score of early and late recipients in each subject tested.

Receiving the cash transfer in the days preceding the exam increases test scores. On average, receiving BFP early improves test scores by $\beta = 0.008$ SD ($p < 0.05$), as shown in column 1. This figure represents a 1.69 percent increase relative to the late-recipients' average score. Notably, the performance of early-recipients is better on all subjects tested (Appendix Figure 3). The impact of BFP is larger for the language arts test ($\beta = 0.013$ SD, $p < 0.01$) and the essay ($\beta = 0.010$, $p < 0.10$), with test score increases of approximately 2.5 percent relative to the late recipients mean (columns 4 and 6). While we also estimate positive impacts on the sciences and math (columns 2, 3, and 5), these effects are not statistically distinguishable from zero. These results are robust to controlling for socioeconomic and demographic characteristics (Appendix Table A2).

One potential concern with these results is that other government programs may also disburse their benefits based on households' last NIS digit. If the timing of other government programs coincides with the BFP disbursement, it could potentially confound our results. To address this concern, we examine students in our sample whose households

possess an NIS identifier but do not receive BFP.[12] This subgroup allows us to isolate the impact of any non-BFP programs that distribute benefits based on the last NIS digit. Our regression results for this subgroup, presented in Appendix Table A4, show coefficients substantially smaller than our baseline findings and consistently statistically insignificant.[13]

Taken together, the evidence indicates that receiving BFP early increases student performance on the exam by about 1 percent of a SD, which represents a 2 percent increase compared to the late-receivers' mean. This effect is comparable to improving teacher value added by 0.06 SD, improving air quality during the test by 0.20 SD (Ebenstein et al., 2016), decreasing ambient pollen levels during the exam by 0.32 SD (Bensnes, 2016), or taking the exam under one degree Fahrenheit hotter condition (Park, 2020).

Another way to benchmark our effect size is to estimate the public funds that would be required to achieve a corresponding test score increase. In a meta-analysis of the impact of public school spending on student test scores, Jackson and Mackevicius (2023) finds that increasing spending by $1,000 per student for four years leads to a test-score increase of 0.031 SD. Extrapolating this US-based estimate to Brazil and assuming that the impact of public funds scales linearly, our estimated increase of 0.008 SD (Table 4, column 1) would require approximately $260 per student for four years (or about $115 million, given the number of students who are early-recipients).

4.3 Heterogeneous Treatment Effects

4.3.1 Transfer Size. We proceed to test if the impact of BFP scales with the size of the transfer. In our sample, we observe substantial variation in transfer sizes. The average household receives US$92 per month, with a standard deviation of US$49. The values corresponding to the 5th and 95th percentiles are US$39 and US$197. To examine whether the impact of BFP varies depending on transfer size, we group students into terciles of transfer size and estimate equation 1 separately for each tercile.[14] Although

[12] As detailed in Section 3, households are assigned an NIS when they first enroll in the Social Registry Program, which is required to receive benefits from any Government program (including, but not limited to, BFP).

[13] This result is consistent with conversations between the authors and staff of the Ministry of Citizenship, the government agency in charge of managing BFP. According to the staff, the last digit of the NIS did not determine the benefit disbursement schedule of any other programs. For example, the *Benefício de Prestação Continuada* uses the last digit of a different beneficiary number.

[14] The average transfer sizes in the bottom, middle and top terciles are US$49, US$84 and US$152, respectively.

transfer size is endogenous, within a given tercile, the timing of the benefits is exogenous[15] Table 5 shows the results. Each panel shows the estimates for a different tercile and each column for a different subject tested.

The impact of BFP on test scores is larger for students who receive the largest transfers. For the average student in the top transfer size tercile, receiving BFP early improves test scores by $\beta = 0.018$ SD ($p < 0.01$). This effect represents a 3.3 percent increase compared to the average score of late-recipients in the top transfer size tercile (Panel A, column 1). The impact is positive for all subjects tested and the magnitude is largest for the language arts test ($\beta = 0.023$ SD, $p < 0.01$, column 4) and the essay ($\beta = 0.024$ SD, $p < 0.05$, column 6). In contrast, we find considerably smaller and typically statistically insignificant effects for students in the middle and bottom transfer size terciles (Panels B and C). These results are robust to controlling for socioeconomic and demographic characteristics (Appendix Table A5).

4.3.2 Student characteristics We investigate whether student characteristics mediate the impact of BFP on test scores. Understanding whether specific types of students particularly benefit from the cash transfer is important for program targeting. We define indicator variables measuring student gender, race, mother's educational attainment, and household income below the minimum wage. Then, we separately estimate equation 1 for each sub-group of students. Appendix Table A6 shows estimates of β for each of these sub-groups, as well as the p-value of the test that the coefficients are equal.

We find little evidence of heterogeneity based on student characteristics. The impact of BFP on test scores is the same for males and females (in both cases equal to $\beta = 0.08$ SD), as shown in Panel A. The effect on white students tends to be slightly higher than that for non-white students (0.011 SD vs. 0.007 SD), though the difference is small and not statistically significant (Panel B). The impact on students with a college-educated mother is significantly larger than that for students without a college-educated mother (0.053 SD vs. 0.008 SD), and the difference in treatment effects is statistically significant at the 10% level (Panel C). Finally, the impact on lower-income students is larger than that on higher-income students (0.010 SD vs. 0.006 SD), though the difference is not statistically significant (Panel D).

[15] Transfer size is endogenous because it is based on household composition and income, with larger and poorer households generally receiving larger transfers.

5 Human Capital Accumulation

In this section, we analyze whether the immediate impact of the cash transfer on test scores had effects on college outcomes.

5.1 ENEM Test Scores and College Access

ENEM test scores play an important role for students seeking higher education in Brazil. Primarily, these scores are used for college admissions by many institutions, including those in the Brazilian centralized admission system. Additionally, ProUni (*Programa Universidade para Todos*), a government initiative for low-income students, uses ENEM scores to allocate scholarships. Finally, ENEM scores are required to apply for government student loans through a program called FIES (*Fundo de Financiamento ao Estudante do Ensino Superior*). Given that millions of students annually compete for university spots, scholarships, and loans, even a modest improvement in ENEM scores can significantly influence their college prospects and outcomes.

To assess whether the increase in test scores due to BFP impacts college outcomes, we link the ENEM records to the Higher Education Census, which contains information on all college enrollees from Brazil. With this data, we can assess whether an individual taking the ENEM exam enrolled in college during the subsequent year, and analyze their academic journey throughout college.

We use the Census to measure three sets of college outcomes. First, we define college enrollment as an indicator for appearing in the census one year after taking the ENEM. We additionally create indicators for enrolling in a publicly- and privately-operated college. Second, we define earnings-based indices of college and degree quality. To do this, we group all college-educated workers in an employee-employer matched data (RAIS) based on the university they attended and compute the average earnings of the graduates from each university.[16] We create analogous measures of degree quality and program (institution *times* degree) quality. Third, we define measures of degree progress, including the fraction of credits completed at the end of each academic year and an indicator for graduating one to five years after enrolling in college.

[16]This index is analogous to the college quality measure used by Chetty et al. (2011) and Chetty et al. (2014) to study the long-term impacts of kindergarten quality and teachers, respectively.

5.2 The Impact of BFP on College Enrollment, Quality, and Graduation

We measure the impact of receiving the BFP transfer on each college outcome by estimating equation (1).[17] Tables 6 through 8 present the results. Table 6 presents the results for college enrollment, Table 7 for college and degree quality, and Table 8 for degree progress and on-time graduation. Panel A of each table shows the results for the overall sample, while Panels B–C present the results for students receiving different transfer sizes.

We find that BFP increased access to college for some students (Table 6). On average, across all students, receiving BFP in the days preceding the exam increases college enrollment by $\beta = 0.2$ percentage points, although this effect is not statistically different from zero (column 1, Panel A). For the subset of students receiving the largest transfer size, BFP increases college enrollment by $\beta = 0.8$ percentage points ($p < 0.10$). This effect represents a 4.2 percent increase in enrollment relative to the late-recipients enrollment rate of 18.9 percent (column 1, Panel B). This effect is driven by increases in private-college enrollment ($\beta = 0.7$ percentage points, $p < 0.10$, column 2), whereas we find no increases in public-college enrollment (column 3). We find no evidence that BFP affected the enrollment rates of students who received smaller transfers (Panels C and D).

We do not find significant impacts of BFP on college or degree quality (Table 7). The average late-recipient attends a college with expected monthly earnings of 1364.9 US$ (column 1, Panel A).[18] The impact of BFP on this outcome equals β = -3.9 US$, an effect that is economically small and statistically insignificant. We also estimate small and insignificant effects on degree quality (column 2) and program quality (column 3). Similarly, we find that the impact of BFP on college and degree quality across the transfer size distribution is small and never statistically different from zero (Panels B–D). In Appendix Table A7, we show that the results are analogous using a test-score-based index of college and degree quality.

We do not find statistically significant effects on degree progression or college graduation (Table 8). On average, 56.5 percent and 35.1 percent of late recipients remain enrolled in their programs one and three years after enrolling, respectively. The impact of BFP on these persistence rates is negligible and statistically insignificant (columns 1 and 2). Similarly, late recipients complete 29.0 percent and 58.8 percent of required credits by the end of their first and fourth year of college, respectively. We do not find evidence that

[17] To reduce measurement error and ensure we capture new entrants into higher education, we exclude from our sample students in the census who report having been enrolled in a college during or prior to the year of the ENEM exam.

[18] Average earnings are calculated using data for the years 2016-2018.

BFP impacts the fraction of credits accumulated (columns 3 and 4). Finally, the five-year graduation rate among late recipients is 32.5 percent. We estimate that receiving BFP before the exam increases this graduation rate by 0.5 percentage points, but this effect is indistinguishable from zero.

Taken together, these results indicate that receiving BFP shortly before the exam increased private college enrollment rates for students who received the largest transfers. This effect is consistent with the significant test score improvements observed for these students, as documented in Section 4. In contrast, we find no impacts for students who received smaller transfers. We also document no negative impacts on the quality of colleges or degrees chosen. Notably, students who were induced to attend college due to BFP were just as successful, if not more so, in terms of college persistence and graduation rates, compared to late recipients.

5.3 Mechanisms

The improvement in test scores resulting from early receipt of the BFP transfer could impact college enrollment through two primary channels. First, it could increase the probability of being admitted into a university. This is possible if the score improvements push marginal students above admission cutoffs, or if obtaining a higher score affects application behavior (i.e., the composition and number of colleges students apply to). Second, higher test scores could allow students to access competitively-allocated funding to pay for college expenses, which may be particularly binding for students from BFP households.

We first consider the null effects on public university enrollment. Public universities are generally highly selective. Figure A4 compares the distribution of admission cutoffs in public-college programs in 2017 to the distribution of ENEM scores in the same year.[19] Cutoffs tend to be substantially higher than the ENEM score of the typical student, ranging from 540 to 830 points, with a median of 640 points. By contrast, the median and 95th percentile ENEM score are 512 and 655 points, respectively. This suggests that any improvements in test scores resulting from the BFP transfer would need to be at the higher end of the score distribution to significantly affect public university enrollment. Consistent with the null effects on public college enrollment, Table A8 shows that the effects of BFP are concentrated in the middle of the distribution, where score improvements are unlikely

[19]The information on admission cutoffs comes from a publicly-available version of *SISU*, the centralized admission system the Ministry of Education uses to allocate students into public universities based on their ENEM scores. The year 2017 was the earliest period for which we had this information.

to affect admission. Although the probability of scoring in the 500-600 point range increases by 0.8 percentage points for large-transfer recipients (column 2 in panel B), there are no effects on the probability of scoring above 600 points.

Turning to the positive impact on private university enrollment, our findings indicate that an increased probability of admission is unlikely to be a primary mechanism. First, only a small minority of private colleges use the ENEM to make admission decisions.[20] Second, we test this channel by estimating equation 1 on a binary outcome variable that equals one for students who enrolled in a college that used ENEM scores during the admission process.[21] We report precisely-estimated null effects in column 1 of Table 9, indicating that the ENEM score improvements resulting from the BFP transfer are unlikely to have affected admission into private colleges.

Lastly, we assess whether the test score improvements impacted private college enrollment by increasing access to financial assistance. In Brazil, the *ProUni* government-sponsored program provides full and partial scholarships to low-income students admitted into *private* higher education institutions.[22] Scholarships are allocated competitively by ranking students based on their ENEM exam score. Crucially, to be eligible, applicants must satisfy two requirements: (i) their average ENEM score across all subjects must be higher than 450 points, and (ii) their score on the essay cannot be zero.

To examine the financial aid mechanism, we begin by estimating effects on the probability of fulfilling the scholarship eligibility requirements. We define two binary outcome variables that equal one for students who fulfill the respective requirement and estimate equation 1. Table 9 reports the results. For the full sample of beneficiaries (Panel A), BFP increased the probability of fulfilling the average score requirement (column 1) by 0.6 percentage points ($p < 0.05$), but not the essay score requirement (column 2). For the subset of students receiving the largest transfers (Panel B), we find positive effects on the probability of fulfilling both the average score requirement – 0.8 percentage point increase ($p < 0.1$) – and the essay score requirement – 0.4 percentage point increase ($p < 0.05$).

Next, we use the Census of Higher Education to assess whether early BFP recipients are more likely to receive a scholarship. Table 9 reports results from estimating equation 1 on the probability of receiving either a full or partial *ProUni* scholarship (columns 4-5).

[20] According to the Census of Higher Education, only 16% of students who enrolled in a private college in 2014 report using ENEM scores during the admission process.

[21] In the Census of Higher Education, students report whether the admission process for the program they are enrolled in involved ENEM scores.

[22] In 2014, a total of 191,625 scholarships were allocated.

Although the estimates are not statistically significant, we find that students who received the largest transfers (Panel B), are 0.3 and 0.5 percentage points more likely to receive a full or partial scholarship, respectively.

We conclude from this section that the positive impact of the BFP transfer on college enrollment seems primarily driven by increased access to competitively-allocated scholarships. The pattern of effects on scholarship access closely mirrors the pattern of effects on college enrollment and on ENEM test scores – in all cases, impacts are largest and statistically significant for students in households that receive the largest transfers.

6 Discussion

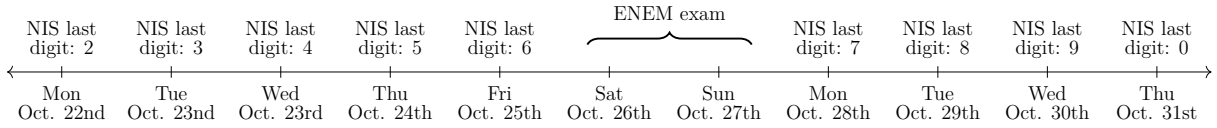
In this paper, we show that cash transfer programs have immediate and significant effects on cognition. Students who received a cash transfer program in the days preceding a high-stakes exam performed significantly better than observationally equivalent students who received the transfer afterward. Moreover, because test scores are a central component in college admissions, this improvement in exam performance translated into higher college access.

Our results suggest a previously unexplored mechanism by which persistence in low-income status can perpetuate. A precarious financial situation directly impairs performance on cognitive tasks, which subsequently influences access to education and human capital accumulation. Human capital, in turn, shapes future financial outcomes. By highlighting this linkage, our findings suggest that well-timed policy interventions that affect immediate financial stress can have long-term consequences.

Finally, our findings suggest that the timing of cash transfer programs can be an effective policy tool to improve the outcomes of low-income households. There are many critical one-time events where maximizing performance or making the right decision can have long-lasting consequences (e.g., job interviews, choosing the right savings plan or insurance provider, etc.). Although personalizing the timing of each transfer to align with the unique needs of each household might be infeasible, offering households the flexibility to select their preferred timing within a time window could be a practical approach.

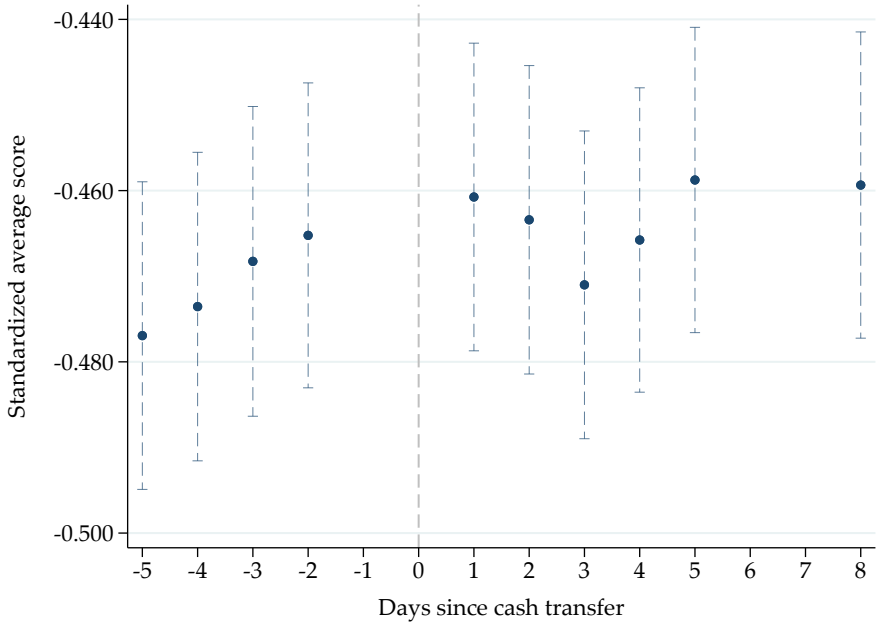
Figures and Tables

Figure 1: Timing of Bolsa Familia disbursements and ENEM exam during 2013



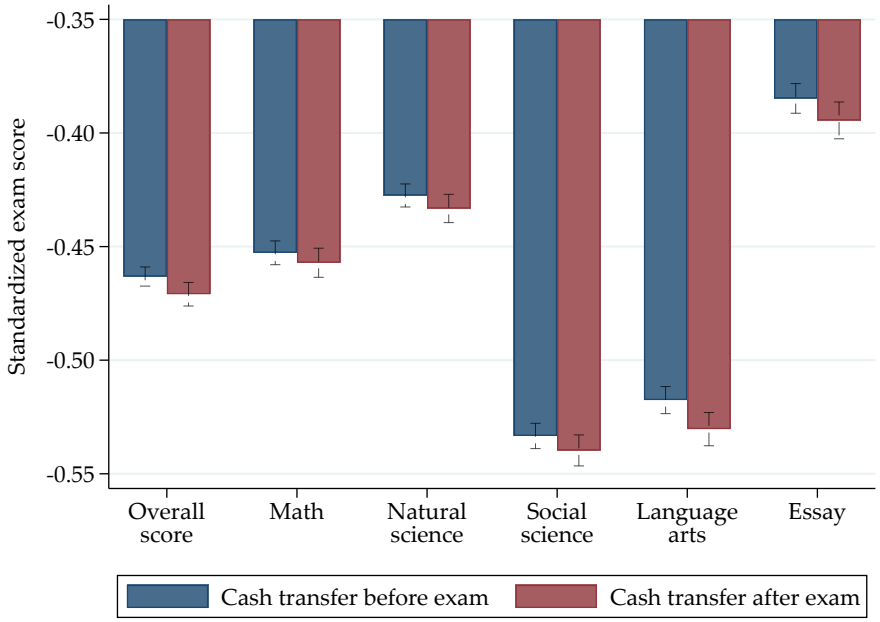
Notes: This figure shows the BF transfer disbursement schedule for October 2013. Every month, payments are sequentially disbursed across 10 consecutive weekdays (excluding public holidays), typically starting on the third Monday of the month. Which of these ten days a beneficiary receives the transfer is fully determined by the last digit of each beneficiary's randomly assigned NIS number. NIS numbers ending in '1' are paid the first day. Thereafter, payments are made sequentially, with each subsequent day serving NIS numbers ending in the next sequential digit. As a result of this disbursement rule, in October 2013, a subset of BF beneficiaries received the transfer before the ENEM exam, while others received it the following week.

Figure 2: Average ENEM score by days since BFP cash transfer



Notes: This figure plots the average standardized ENEM score of BFP recipients and corresponding 95 percent confidence intervals (y-axis) against the days elapsed between the BFP disbursement date and the ENEM exam (x-axis). Positive x-axis values correspond to students in households that received the transfer before the ENEM, while negative values correspond to those who received it after the ENEM. Test scores are standardized to be mean zero and standard deviation one among all test-takers (not just those who recieve BFP).

Figure 3: ENEM score in each exam subject



Notes: This figure compares the average standardized ENEM scores of students in households that received the BFP transfer before the exam (in blue) to the average scores of students in households that received BFP after the exam (in red). The overall score is computed as the average score across the five subjects. Test scores are standardized to be mean zero and standard deviation one among all test-takers (not just those who recieve BFP). Confidence intervals with a 95 percent confidence level are shown.

Table 1: Summary Statistics on students in the sample

	Full	In Cadastro Unico?		In Bolsa Familia?	
	sample	Yes	No	Yes	No
	(1)	(2)	(3)	(4)	(5)
Panel A. Demographic characteristics and race					
Age	18.869	20.582	18.441	20.525	18.656
Male	0.412	0.367	0.423	0.348	0.420
White	0.465	0.324	0.500	0.276	0.490
Black/Brown	0.535	0.676	0.500	0.724	0.510
Panel B. SES and household characteristics					
Went to a private HS	0.187	0.026	0.227	0.019	0.209
Family size	4.208	4.387	4.163	4.601	4.157
Mom completed high school	0.464	0.244	0.517	0.202	0.497
Mom completed college	0.163	0.033	0.194	0.020	0.180
Family earns above 2x M.W.	0.363	0.120	0.424	0.069	0.401
Family earns above 5x M.W.	0.043	0.001	0.054	0.000	0.048
Panel C. Geographic location					
Lives in the North	0.092	0.100	0.090	0.120	0.088
Lives in the Northeast	0.275	0.392	0.245	0.486	0.247
Lives in the Southeast	0.411	0.326	0.432	0.266	0.429
Lives in the South	0.139	0.097	0.150	0.061	0.149
Lives in the Midwest	0.084	0.085	0.083	0.068	0.086
Panel D. Exam Attendance and test scores					
Took at least one test	0.854	0.782	0.873	0.784	0.863
Took all tests	0.832	0.753	0.852	0.757	0.842
Overall score	-0.015	-0.406	0.071	-0.466	0.037
Math	0.020	-0.390	0.111	-0.454	0.075
Natural science	0.031	-0.373	0.120	-0.430	0.084
Social science	-0.090	-0.474	-0.005	-0.536	-0.038
Language arts	-0.033	-0.449	0.060	-0.523	0.024
Essay	-0.006	-0.343	0.068	-0.389	0.038
Panel E. Cadastro Unico and Bolsa Familia benefits					
Enrolled in Cadastro Unico	0.200	1.000	0.000	1.000	0.097
Enrolled in Bolsa Familia	0.114	0.569	0.000	1.000	0.000
Receives BF in bank account	0.257	0.257		0.256	
Total BF benefits (US$)	93.4	93.4		94.2	
Panel F. Exam cohort and sample size					
Number of test-takers	1,626,986	325,695	1,301,291	185,459	1,441,527

Notes: This table shows the average characteristics of all high school seniors that registered for the ENEM (column 1), disaggregated by whether the student's household is registered in the Registry of Social Programs (columns 2-3), and by whether the student's household is a Bolsa Familia beneficiary (columns 4-5). Panels A through D use administrative data from the ENEM exam, including a socioeconomic questionnaire that students answer when registering. Test scores are standardized to be mean zero and standard deviation one among all test-takers (not just those who recieve BFP). Panel E uses administrative data from the Registry of Social Programs (Cadastro Unico) and from the BFP program.

Table 2: Balance test of students receiving BF before relative to after the exam

	Receives Bolsa Familia		
	Before exam (1)	After exam (2)	Difference (3)
Panel A. Demographic characteristics and race			
Age	20.509	20.548	-0.039
Male	0.348	0.349	-0.001
White	0.276	0.276	0.001
Black/Brown	0.724	0.724	-0.001
Panel B. SES and household characteristics			
Went to a private HS	0.018	0.019	-0.000
Family size	4.601	4.600	0.002
Mom completed high school	0.202	0.202	0.000
Mom completed college	0.020	0.020	0.000
Family earns above 2x M.W.	0.069	0.070	-0.001
Family earns above 5x M.W.	0.000	0.001	-0.000
Panel C. Geographic location			
Lives in the North	0.119	0.121	-0.002
Lives in the Northeast	0.486	0.485	0.001
Lives in the Southeast	0.266	0.265	0.001
Lives in the South	0.061	0.062	-0.001
Lives in the Midwest	0.068	0.068	-0.000
Panel D. Bolsa Familia benefits			
Receives BF in bank account	0.258	0.254	0.003*
Total BF benefits value	154.175	154.492	-0.317
Panel E. Predicted test scores			
Predicted mean score	-0.483	-0.484	0.001
N	111,519	73,940	185,459

Notes: This table compares the average characteristics of students in households that received BFP before the exam (column 1) to students in households that received BFP after the exam (column 2). Column 3 tests whether the difference in means between both groups is statistically significant. It shows the coefficient from a regression at the student level of each characteristic on an indicator variable for receiving BFP before the exam. ***, ** and * denote significance at the 10%, 5% and 1% levels, respectively.

Table 3: The effect of Bolsa Familia on the probability of attending the ENEM

	Dependent variable:			
	Showed-up both days (1)	Showed-up any day (2)	Showed-up day 1 (3)	Showed-up day 2 (4)
BF before exam	-0.001	-0.002	-0.002	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)
Mean after	0.758	0.785	0.782	0.761
N	185,459	185,459	185,459	185,459

Notes: This table reports estimates of β from equation 1. The sample is composed of all final-year high school students who registered for the ENEM. The outcomes, displayed in the column headers, are indicator variables for attending both exam days (col. 1), attending any of the two exam days (col. 2), attending the first day (col. 3) and attending the second exam day (col.4). Standard errors, clustered at the student level, shown in parentheses. ***, ** and * denote significance at the 10%, 5% and 1% levels, respectively.

Table 4: The effect of Bolsa Familia on test scores

	Dependent variable:					
	Average score	Social science	Natural science	Lang. arts	Math	Essay
	(1)	(2)	(3)	(4)	(5)	(6)
BF before exam	0.008**	0.006	0.006	0.013***	0.004	0.010*
	(0.003)	(0.004)	(0.004)	(0.005)	(0.004)	(0.005)
Mean after	-0.471	-0.540	-0.433	-0.530	-0.457	-0.394
N	140,475	140,475	140,475	140,475	140,475	140,475

Notes: This table reports estimates of β from equation 1. The sample is composed of final-year high school students who attended both exam days. The outcomes, displayed in the column headers, are the average standardized test score across all subjects (col. 1) and the standardized test score in each subject (cols. 2-6). Test scores are standardized to be mean zero and standard deviation one among all test-takers (not just those who recieve BFP). See Appendix B.2 for variable definitions. Standard errors, clustered at the student level, shown in parentheses. ***, ** and * denote significance at the 10%, 5% and 1% levels, respectively.

Table 5: The effect of Bolsa Familia on test scores by transfer size

	Dependent variable:					
	Average score	Social science	Natural science	Lang. arts	Math	Essay
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Top transfer size tercile						
BF before exam	0.018***	0.016*	0.008	0.023***	0.016**	0.024**
	(0.006)	(0.008)	(0.007)	(0.009)	(0.008)	(0.010)
Mean after	-0.541	-0.608	-0.483	-0.622	-0.524	-0.468
N	40,571	40,571	40,571	40,571	40,571	40,571
Panel B. Middle transfer size tercile						
BF before exam	0.000	-0.005	-0.000	0.001	-0.001	0.006
	(0.006)	(0.008)	(0.007)	(0.008)	(0.007)	(0.009)
Mean after	-0.450	-0.516	-0.420	-0.500	-0.439	-0.375
N	46,037	46,037	46,037	46,037	46,037	46,037
Panel C. Bottom transfer size tercile						
BF before exam	0.007	0.009	0.009	0.015*	-0.001	0.002
	(0.006)	(0.007)	(0.007)	(0.008)	(0.007)	(0.009)
Mean after	-0.436	-0.508	-0.407	-0.487	-0.422	-0.356
N	53,867	53,867	53,867	53,867	53,867	53,867

Notes: This table reports estimates of β from estimating equation 1 separately for three sub-samples of students grouped according to the size of the cash transfer: transfers in the top size tercile (Panel A), transfers in the middle size tercile (Panel B) and transfers in the bottom size tercile (Panel C). All sub-samples are restricted to final-year high school students who attended both exam days. The outcomes, displayed in the column headers, are the average standardized test score across all subjects (col. 1) and the standardized test score in each subject (cols. 2-6). See Appendix B.2 for variable definitions. Test scores are standardized to be mean zero and standard deviation one among all test-takers (not just those who recieve BFP). Standard errors, clustered at the student level, shown in parentheses. ***, ** and * denote significance at the 10%, 5% and 1% levels, respectively.

Table 6: The effect of Bolsa Familia on college enrollment

	Dependent variable:		
	Enrolled in college (1)	Enrolled in private college (2)	Enrolled in. public college (3)
Panel A. All BFP test-takers			
BF before exam	0.002	0.000	0.002
	(0.003)	(0.002)	(0.001)
Mean after	0.226	0.163	0.061
N	119,571	119,571	119,571
Panel B. Top transfer size tercile			
BF before exam	0.008*	0.007*	0.001
	(0.004)	(0.004)	(0.003)
Mean after	0.189	0.128	0.060
N	34,778	34,778	34,778
Panel C. Middle transfer size tercile			
BF before exam	-0.003	-0.004	0.002
	(0.004)	(0.004)	(0.003)
Mean after	0.233	0.170	0.062
N	39,131	39,131	39,131
Panel D. Bottom transfer size tercile			
BF before exam	0.003	-0.000	0.003
	(0.004)	(0.004)	(0.002)
Mean after	0.248	0.184	0.062
N	45,662	45,662	45,662

Notes: This table reports estimates of β from estimating equation 1 using four estimating samples. Panel A includes all test-takers whose household received BFP in October 2013. Panels A-C separately estimate equation 1 for three sub-samples of students grouped according to the size of the cash transfer: transfers in the top size tercile (Panel A), transfers in the middle size tercile (Panel B) and transfers in the bottom size tercile (Panel C). All estimating samples are restricted to final-year high school students who attended both exam days. The outcomes, displayed in the column headers, are indicator variables for student i being enrolled in any college (col. 1), a private college (col. 2) and a public college (col. 3) in 2014, the year following the ENEM exam. See Appendix B.2 for variable definitions. Standard errors, clustered at the student level, shown in parentheses. ***, ** and * denote significance at the 10%, 5% and 1% levels, respectively.

Table 7: The effect of Bolsa Familia on college and degree quality

	Average graduate earnings (in 2023 US$) in enrolled...		
	College	Degree	Program
	(1)	(2)	(3)
Panel A. All BFP test-takers			
BF before exam	-3.879	-0.981	-4.580
	(4.323)	(5.049)	(6.657)
Mean after	1364.676	1386.805	1263.857
N	31,338	38,016	37,627
Panel B. Top transfer size tercile			
BF before exam	-10.518	-2.990	-5.551
	(8.530)	(9.815)	(12.815)
Mean after	1353.308	1361.426	1240.704
N	7,733	9,550	9,466
Panel C. Middle transfer size tercile			
BF before exam	-0.198	-4.316	0.686
	(7.339)	(8.643)	(11.338)
Mean after	1359.351	1385.553	1255.330
N	10,471	12,671	12,535
Panel D. Bottom transfer size tercile			
BF before exam	-2.694	2.942	-8.211
	(6.843)	(8.002)	(10.659)
Mean after	1375.521	1403.131	1284.730
N	13,134	15,795	15,626

Notes: This table reports estimates of β from estimating equation 1 using four estimating samples. Panel A includes all test-takers whose household received BFP in October 2013. Panels A-C separately estimate equation 1 for three sub-samples of students grouped according to the size of the cash transfer: transfers in the top size tercile (Panel A), transfers in the middle size tercile (Panel B) and transfers in the bottom size tercile (Panel C). All estimating samples are restricted to final-year high school students who attended both exam days and who enrolled in a college in the year following the exam. The outcomes are the average earnings among graduates of the college (col. 1), degree (col. 2) and program (col. 3) the student is enrolled in. See Appendix B.2 for variable definitions. Standard errors, clustered at the student level, shown in parentheses. ***, ** and * denote significance at the 10%, 5% and 1% levels, respectively.

Table 8: The effect of Bolsa Familia on college progression and graduation

	Dependent variable:					
	1-year persist. (1)	3-year persist. (2)	1-year credits (3)	4-year credits (4)	4-year grad (5)	5 -year grad. (6)
Panel A. All BFP test-takers						
BF before exam	0.000	-0.002	0.000	0.001	0.001	0.005
	(0.005)	(0.005)	(0.003)	(0.005)	(0.005)	(0.006)
Mean after	0.565	0.351	0.290	0.588	0.245	0.325
N	31,519	31,519	24,638	25,045	31,519	31,519
Panel B. Top transfer size tercile						
BF before exam	-0.014	0.009	0.004	0.006	0.006	0.005
	(0.010)	(0.010)	(0.006)	(0.011)	(0.010)	(0.011)
Mean after	0.581	0.349	0.285	0.579	0.239	0.322
N	7,778	7,778	6,149	6,243	7,778	7,778
Panel C. Middle transfer size tercile						
BF before exam	0.004	-0.005	-0.005	0.000	-0.001	0.006
	(0.009)	(0.009)	(0.005)	(0.009)	(0.009)	(0.010)
Mean after	0.565	0.356	0.295	0.595	0.248	0.327
N	10,530	10,530	8,213	8,350	10,530	10,530
Panel D. Bottom transfer size tercile						
BF before exam	0.005	-0.005	0.002	-0.001	-0.001	0.005
	(0.008)	(0.008)	(0.004)	(0.008)	(0.008)	(0.009)
Mean after	0.557	0.348	0.288	0.588	0.248	0.325
N	13,211	13,211	10,276	10,452	13,211	13,211

Notes: This table reports estimates of β from estimating equation 1 using four estimating samples. Panel A includes all test-takers whose household received BFP in October 2013. Panels A-C separately estimate equation 1 for three sub-samples of students grouped according to the size of the cash transfer: transfers in the top size tercile (Panel A), transfers in the middle size tercile (Panel B) and transfers in the bottom size tercile (Panel C). All estimating samples are restricted to final-year high school students who attended both exam days and who enrolled in a college in the year following the exam. The outcomes are indicator variables for remaining enrolled one and three years after enrollment (cols. 1-2), the share of credits completed one and four years after enrollment (cols. 3-4), and indicator variables for graduating four and five years after enrollment (cols. 5-6). Standard errors, clustered at the student level, shown in parentheses. ***, ** and * denote significance at the 10%, 5% and 1% levels, respectively.

Table 9: Testing college enrollment mechanisms

		Scholarship Eligibility		Received Scholarship	
	ENEM-based admission	Average score > 450	Essay score > 0	Full	Partial
	(1)	(2)	(3)	(4)	(5)
Panel A. All BFP test-takers					
BF before exam	-0.000	0.006**	0.002	-0.001	-0.000
	(0.001)	(0.003)	(0.001)	(0.003)	(0.003)
Mean after	0.063	0.512	0.961	0.083	0.069
N	119,571	140,475	140,475	31,519	31,519
Panel B. Top transfer size tercile					
BF before exam	-0.000	0.008*	0.004**	0.003	0.005
	(0.003)	(0.005)	(0.002)	(0.006)	(0.006)
Mean after	0.054	0.469	0.954	0.073	0.060
N	34,778	40,571	40,571	7,778	7,778
Panel C. Middle transfer size tercile					
BF before exam	-0.001	0.006	0.001	-0.005	-0.005
	(0.003)	(0.005)	(0.002)	(0.006)	(0.005)
Mean after	0.064	0.524	0.964	0.086	0.073
N	39,131	46,037	46,037	10,530	10,530
Panel D. Bottom transfer size tercile					
BF before exam	0.001	0.004	-0.000	-0.001	-0.000
	(0.002)	(0.004)	(0.002)	(0.005)	(0.005)
Mean after	0.069	0.534	0.965	0.085	0.071
N	45,662	53,867	53,867	13,211	13,211

Notes: This table reports estimates of β from estimating equation 1 using four estimating samples. Panel A includes all test-takers whose household received BFP in October 2013. Panels A-C separately estimate equation 1 for three sub-samples of students grouped according to the size of the cash transfer: transfers in the top size tercile (Panel A), transfers in the middle size tercile (Panel B) and transfers in the bottom size tercile (Panel C). All estimating samples are restricted to final-year high school students who attended both ENEM exam days. The outcome variables are shown in the column header: column 1 – a binary variable that equals one if the student enrolled in a college that used ENEM scores in the admission process; columns 2 and 3 – binary variables for the student scoring above 450 points and for scoring more than a zero on the essay, respectively; columns 4 and 5 – binary variables, conditional on enrollment, for the student receiving a partial or full government-funded scholarship to attend a private college. Standard errors, clustered at the student level, shown in parentheses. ***, ** and * denote significance at the 10%, 5% and 1% levels, respectively.

References

Anukriti, S., Kwon, S., and Prakash, N. (2022). Saving for dowry: Evidence from rural india. *Journal of Development Economics*, 154:102750.

Attanasio, O. P., Oppedisano, V., and Vera-Hernández, M. (2015). Should cash transfers be conditional? conditionality, preventive care, and health outcomes. *American Economic Journal: Applied Economics*, 7(2):35–52.

Augenblick, N., Jack, B. K., Kaur, S., Masiye, F., and Swanson, N. (2023). Retrieval failures and consumption smoothing: A field experiment on seasonal poverty.

Báez, J. E. and Camacho, A. (2011). Assessing the long-term effects of conditional cash transfers on human capital: Evidence from colombia. World Bank Policy Research Working Paper 5681, The World Bank. Retrieved February 3, 2022.

Baird, S., Ferreira, F. H., Özler, B., and Woolcock, M. (2014). Conditional, unconditional and everything in between: a systematic review of the effects of cash transfer programmes on schooling outcomes. *Journal of Development Effectiveness*, 6(1):1–43.

Baird, S., McIntosh, C., and Özler, B. (2011). Cash or Condition? Evidence from a Cash Transfer Experiment. *The Quarterly Journal of Economics*, 126(4):1709–1753.

Barrera-Osorio, F., Bertrand, M., Linden, L. L., and Perez-Calle, F. (2011). Improving the design of conditional transfer programs: Evidence from a randomized education experiment in colombia. *American Economic Journal: Applied Economics*, 3(2):167–95.

Behrman, J. R., Sengupta, P., and Todd, P. (2000). The impact of progresa on achievement test scores in the first year. Final report, International Food Policy Research Institute, Washington, D.C.

Benhassine, N., Devoto, F., Duflo, E., Dupas, P., and Pouliquen, V. (2015). Turning a shove into a nudge? a "labeled cash transfer" for education. *American Economic Journal: Economic Policy*, 7(3):86–125.

Benjamin, D. J., Brown, S. A., and Shapiro, J. M. (2013). Who is 'behavioral'? cognitive ability and anomalous preferences. *Journal of the European Economic Association*, 11(6):1231–1255.

Bensnes, S. S. (2016). You sneeze, you lose:: The impact of pollen exposure on cognitive performance during high-stakes high school exams. *Journal of health economics*, 49:1–13.

Bond, T. N., Carr, J. B., Packham, A., and Smith, J. (2022). Hungry for Success? SNAP Timing, High-Stakes Exam Performance, and College Attendance. *American Economic Journal: Economic Policy*, 14(4):51–79.

Brollo, F., Kaufmann, K., and La Ferrara, E. (2020a). The Political Economy of Program Enforcement: Evidence from Brazil. *Journal of the European Economic Association*, 18(2):750–791.

Brollo, F., Kaufmann, K., and La Ferrara, E. (2020b). The political economy of program enforcement: Evidence from brazil. *Journal of the European Economic Association*, 18(2):750–791.

Brown, C. L., Kaur, S., Kingdon, G., and Schofield, H. (2022). Cognitive endurance as human capital. Technical report, National Bureau of Economic Research.

Burks, S. V., Carpenter, J. P., Goette, L., and Rustichini, A. (2009). Cognitive skills affect economic preferences, strategic behavior, and job attachment. *Proceedings of the National Academy of Sciences*, 106(19):7745–7750.

Campbell, J. R. and Hercowitz, Z. (2019). Liquidity constraints of the middle class. *American Economic Journal: Economic Policy*, 11(3):130–155.

Carroll, C. D. (2001). A theory of the consumption function, with and without liquidity constraints. *Journal of Economic perspectives*, 15(3):23–45.

Carvalho, L. S., Meier, S., and Wang, S. W. (2016). Poverty and Economic Decision-Making: Evidence from Changes in Financial Resources at Payday. *American Economic Review*, 106(2):260–284.

Chetty, R., Friedman, J. N., Hilger, N., Saez, E., Schanzenbach, D. W., and Yagan, D. (2011). How Does Your Kindergarten Classroom Affect Your Earnings? Evidence from Project Star. *The Quarterly Journal of Economics*, 126(4):1593–1660.

Chetty, R., Friedman, J. N., and Rockoff, J. E. (2014). Measuring the Impacts of Teachers II: Teacher Value-Added and Student Outcomes in Adulthood. *American Economic Review*, 104(9):2633–2679.

Cunha, J. M. (2014). Testing paternalism: Cash versus in-kind transfers. *American Economic Journal: Applied Economics*, 6(2):195–230.

Cunha, J. M., De Giorgi, G., and Jayachandran, S. (2019). The price effects of cash versus in-kind transfers. *The Review of Economic Studies*, 86(1):240–281.

De Bruijn, E.-J. and Antonides, G. (2022). Poverty and economic decision making: A review of scarcity theory. *Theory and Decision*, 92(1):5–37.

Dean, E. B., Schilbach, F., and Schofield, H. (2019). *Poverty and Cognitive Function*. University of Chicago Press.

Dohmen, T., Falk, A., Huffman, D., and Sunde, U. (2010). Are risk aversion and impatience related to cognitive ability? *American Economic Review*, 100(3):1238–1260.

Duckworth, A. L., Quinn, P. D., Lynam, D. R., Loeber, R., and Stouthamer-Loeber, M. (2011). Role of test motivation in intelligence testing. *Proceedings of the National Academy of Sciences*, 108(19):7716–7720.

Duquennois, C. (2022). Fictional Money, Real Costs: Impacts of Financial Salience on Disadvantaged Students. *American Economic Review*, 112(3):798–826.

Ebenstein, A., Lavy, V., and Roth, S. (2016). The Long-Run Economic Consequences of High-Stakes Examinations: Evidence from Transitory Variation in Pollution. *American Economic Journal: Applied Economics*, 8(4):36–65.

Fe, E., Gill, D., and Prowse, V. (2022). Cognitive skills, strategic sophistication, and life outcomes. *Journal of Political Economy (forthcoming)*.

Fehr, D., Fink, G., and Jack, B. K. (2022). Poor and Rational: Decision-Making under Scarcity. *Journal of Political Economy*, 130(11):2862–2897.

Finn, B. (2015). Measuring motivation in low-stakes assessments. *ETS Research Report Series*, 2015(2):1–17.

Fiszbein, A. and Schady, N. R. (2009). *Conditional cash transfers: reducing present and future poverty*. World Bank Publications.

Garcia, S. and Hill, J. (2010). Impact of conditional cash transfers on children's school achievement: evidence from colombia. *Journal of Development Effectiveness*, 2(1):117–137.

García, S. and Saavedra, J. (2022). Conditional Cash Transfers for Education.

García, S. and Saavedra, J. E. (2017). Educational impacts and cost-effectiveness of conditional cash transfer programs in developing countries: A meta-analysis. *Review of Educational Research*, 87(5):921–965.

Glewwe, P. and Kassouf, A. L. (2012). The impact of the Bolsa Escola/Familia conditional cash transfer program on enrollment, dropout rates and grade promotion in Brazil. *Journal of Development Economics*, 97(2):505–517.

Gneezy, U., List, J. A., Livingston, J. A., Qin, X., Sadoff, S., and Xu, Y. (2019). Measuring success in education: The role of effort on the test itself. *American Economic Review: Insights*, 1(3):291–308.

Goldin, J., Homonoff, T., and Meckel, K. (2022). Issuance and incidence: Snap benefit cycles and grocery prices. *American Economic Journal: Economic Policy*, 14(1):152–178.

Hansen, K. T., Heckman, J. J., and Mullen, K. J. (2004). The effect of schooling and ability on achievement test scores. *Journal of Econometrics*, 121(1):39–98.

Hanushek, E. A. and Woessmann, L. (2008). The role of cognitive skills in economic development. *Journal of economic literature*, 46(3):607–68.

Hastings, J. and Washington, E. (2010). The first of the month effect: consumer behavior and store responses. *American economic Journal: economic policy*, 2(2):142–162.

Haushofer, J. and Salicath, D. (2023). The Psychology of Poverty: Where Do We Stand?

Heckman, J. J., Stixrud, J., and Urzua, S. (2006). The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior. *Journal of Labor Economics*, 24(3):411–482.

Jackson, C. K. and Mackevicius, C. L. (2023). What impacts can we expect from school spending policy? evidence from evaluations in the us. *American Economic Journal: Applied Economics*.

Kansikas, C., Mani, A., and Niehaus, P. (2023). Customized Cash Transfers: Financial Lives and Cash-flow Preferences in Rural Kenya.

Kaur, S., Mullainathan, S., Oh, S., and Schilbach, F. (2021). Do Financial Concerns Make Workers Less Productive?

Kuncel, N. R. and Hezlett, S. A. (2007). Standardized tests predict graduate students' success. *Science*, 315(5815):1080–1081.

Lichand, G. and Mani, A. (2020). Cognitive Droughts.

Machado, C. and Szerman, C. (2021). Centralized college admissions and student composition. *Economics of Education Review*, 85:102184.

Mani, A., Mullainathan, S., Shafir, E., and Zhao, J. (2013). Poverty Impedes Cognitive Function. *Science*, 341(6149):976–980.

Millán, T. M., Barham, T., Macours, K., Maluccio, J. A., and Stampini, M. (2019). Long-Term Impacts of Conditional Cash Transfers: Review of the Evidence. *The World Bank Research Observer*, 34(1):119–159.

Mullainathan, S. and Shafir, E. (2013). *Scarcity: Why having too little means so much.* Macmillan.

Park, R. J. (2020). Hot Temperature and High Stakes Performance. *Journal of Human Resources*.

Schilbach, F., Schofield, H., and Mullainathan, S. (2016). The Psychological Lives of the Poor. *American Economic Review*, 106(5):435–440.

Segal, C. (2012). Working When No One Is Watching: Motivation, Test Scores, and Economic Success. *Management Science*, 58(8):1438–1457.

Shapiro, J. M. (2005). Is there a daily discount rate? evidence from the food stamp nutrition cycle. *Journal of public Economics*, 89(2-3):303–325.

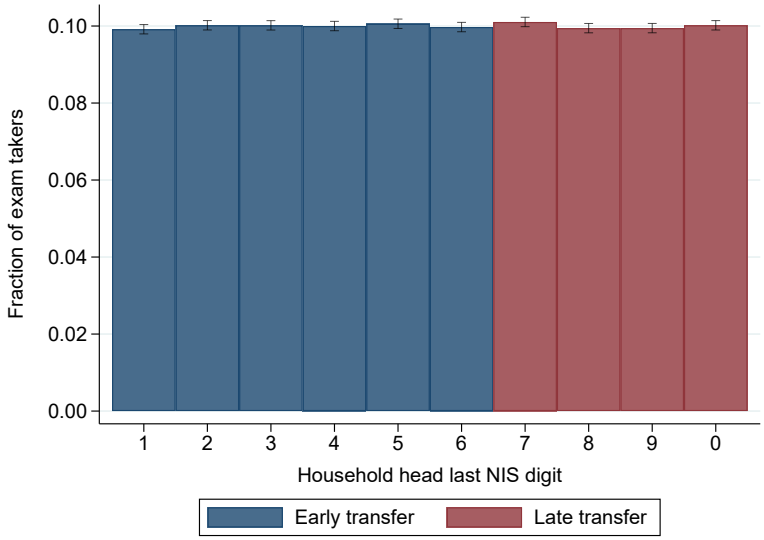
UNESCO (2012). International standard classification of education: Isced 2011. *Comparative Social Research*, 30.

Wise, S. L. and DeMars, C. E. (2005). Low examinee effort in low-stakes assessment: Problems and potential solutions. *Educational assessment*, 10(1):1–17.

Appendix

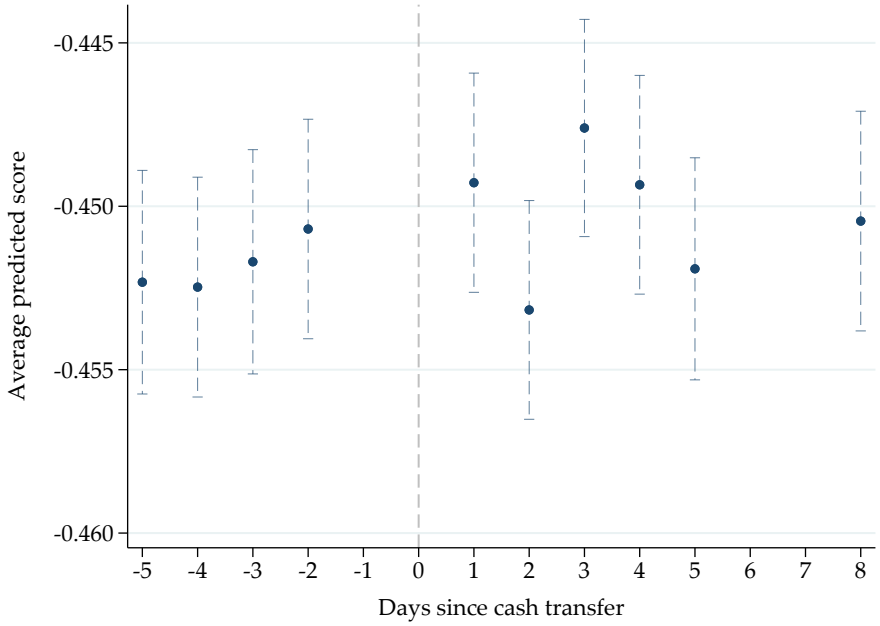
A Appendix Figures and Tables

Figure A1: Fraction of students with each NIS last digit in 2013



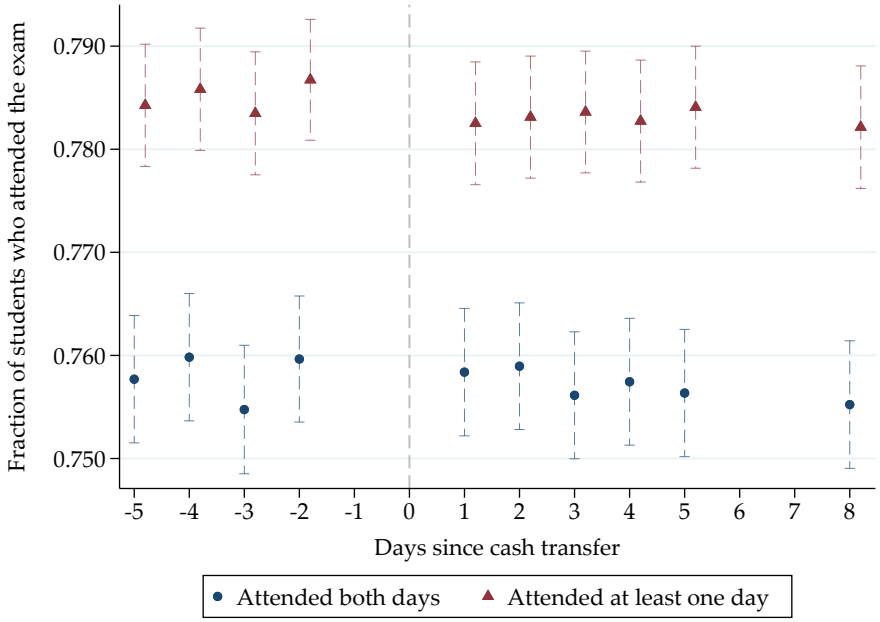
Notes: This figure illustrates the distribution of students, categorized by the last NIS digit of their household, based on data collected in 2013. The blue bars represent final NIS digits for households that received the cash transfer prior to the ENEM exam in 2013. Conversely, the red bars represent NIS ending digits for households that received the cash transfer after the 2013 ENEM exam.

Figure A2: Predicted test score using covariates by days since cash transfer



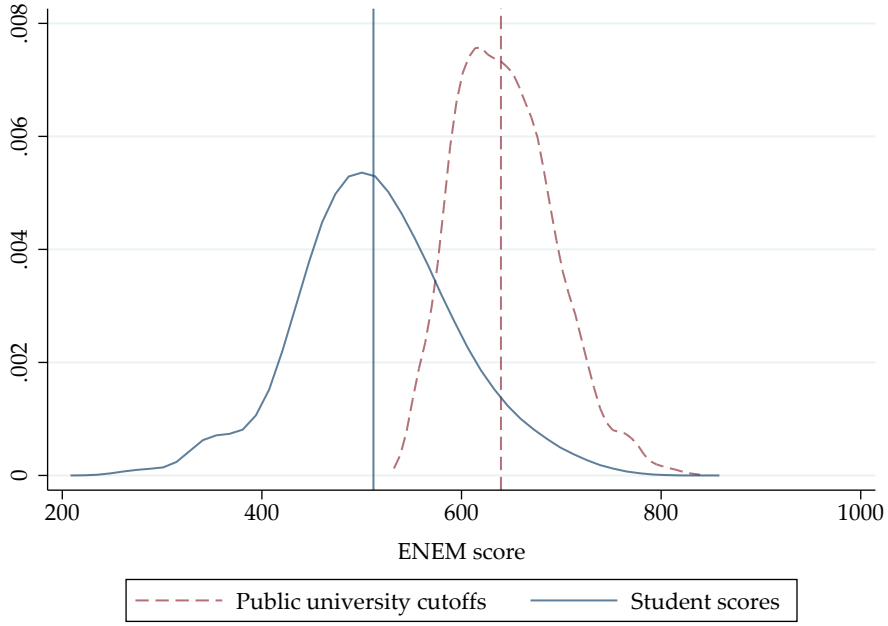
Notes: This figure plots the predicted average standardized ENEM score of BFP recipients and corresponding 95 percent confidence intervals (y-axis) against the BFP disbursement date relative to the exam date (x-axis). Positive x-axis values correspond to students in households that received the BFP transfer before the ENEM, while negative values correspond to those who received it after the ENEM. To construct the predicted score, we first regress the realized score on socioeconomic and demographic characteristics, including age, race, gender parental education and household income. The predicted scores are the fitted values from this regression. Test scores are standardized to be mean zero and standard deviation one among all test-takers (not just those who recieve BFP).

Figure A3: Fraction of students who showed up to take the ENEM by NIS digit



Notes: This figure plots the proportion of students registered for the ENEM exam who attended both exam days (blue circles) or at least one exam day (red triangles) against the BFP disbursement date relative to the exam date (x-axis). Positive x-axis values correspond to students in households that received the BFP transfer before the ENEM, while negative values correspond to those who received it after the ENEM.

Figure A4: Admission cutoff scores in public universities



Notes: This figure plots the distribution of admission cutoff scores across all public-university programs in 2017 (red dashed lines) and the distribution of ENEM scores in 2017 (solid blue line). The information on admission cutoffs comes from a publicly-available version of *SISU*, the centralized admission system the Ministry of Education uses to allocate students into public universities based on their ENEM scores. The vertical dashed and solid lines denote the median admission cutoff and ENEM score, respectively.

Table A1: Average student characteristics by last NIS digit

	Last NIS digit:									
	0	1	2	3	4	5	6	7	8	9
Panel A. Demographic characteristics and race										
Age	20.555	20.451	20.642	20.529	20.422	20.544	20.467	20.521	20.553	20.565
Male	0.346	0.349	0.342	0.352	0.349	0.348	0.347	0.349	0.351	0.349
White	0.277	0.282	0.278	0.276	0.275	0.269	0.276	0.272	0.278	0.277
Black/Brown	0.723	0.718	0.722	0.724	0.725	0.731	0.724	0.728	0.722	0.723
Panel B. SES and household characteristics										
Went to a private HS	0.019	0.018	0.020	0.018	0.018	0.019	0.018	0.020	0.019	0.017
Family size	4.620	4.593	4.596	4.604	4.606	4.601	4.609	4.594	4.589	4.595
Mom completed high school	0.204	0.196	0.202	0.206	0.206	0.202	0.200	0.199	0.201	0.203
Mom completed college	0.021	0.021	0.020	0.020	0.022	0.021	0.019	0.020	0.020	0.019
Family earns above 2x M.W.	0.071	0.068	0.069	0.069	0.070	0.069	0.068	0.067	0.069	0.070
Family earns above 5x M.W.	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.001
Panel C. Geographical location										
Lives in the North	0.124	0.123	0.116	0.122	0.117	0.117	0.118	0.118	0.119	0.122
Lives in the Northeast	0.481	0.482	0.492	0.483	0.488	0.494	0.478	0.490	0.484	0.484
Lives in the Southeast	0.267	0.265	0.263	0.268	0.268	0.260	0.274	0.261	0.268	0.265
Lives in the South	0.060	0.063	0.063	0.058	0.061	0.062	0.060	0.065	0.063	0.059
Lives in the Midwest	0.068	0.067	0.066	0.070	0.066	0.067	0.070	0.067	0.067	0.069
F-statistic	0.889	1.136	1.347	2.346	1.091	1.503	1.930	1.030	0.688	1.088
p-value F-statistic	0.576	0.317	0.164	0.002	0.358	0.094	0.016	0.419	0.799	0.362
Number of test-takers	18,485	18,544	18,576	18,668	18,670	18,623	18,438	18,756	18,308	18,391

Notes: This table compares the average characteristics of students according to the last digit of the NIS number associated with the BFP beneficiary in a student's household. The last NIS digit fully determines the date in which a student's family receives the cash transfer. Each column reports the average characteristic of students associated with the digit denoted in the column header. For each NIS digit d, the F-statistic and associated p-value are obtained from regressing an indicator variable that takes the value of one if the BFP beneficiary in student i's household has a last NIS digit d on the characteristics shown in panels A-C.

Table A2: The effect of Bolsa Familia on test scores controlling for student characteristics

	Dependent variable:					
	Average score	Social science	Natural science	Lang. arts	Math	Essay
	(1)	(2)	(3)	(4)	(5)	(6)
BF before exam	0.007**	0.006	0.005	0.012***	0.003	0.008
	(0.003)	(0.004)	(0.004)	(0.005)	(0.004)	(0.005)
Mean after	-0.471	-0.540	-0.433	-0.530	-0.457	-0.394
N	140,475	140,475	140,475	140,475	140,475	140,475

Notes: This table reports estimates of β from equation 1, controlling for students' socioeconomic and demographic characteristics, including age, gender, race, income and parental education. The sample is composed of final-year high school students who attended both exam days. The outcomes, displayed in the column headers, are the average standardized test score across all subjects (col. 1) and the standardized test score in each subject (cols. 2-6). Test scores are standardized to be mean zero and standard deviation one among all test-takers (not just those who recieve BFP). See Appendix B.2 for variable definitions. Standard errors, clustered at the student level, shown in parentheses. ***, ** and * denote significance at the 10%, 5% and 1% levels, respectively.

Table A3: Effect of receiving BFP across essay score components

		Components of the essay score:				
	Overall	Formal Portuguese	Thesis argumentation	Use of information	Linguistic resources	Intervention proposal
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. All BFP test-takers						
BF before exam	0.010*	0.013**	0.007	0.007	0.011**	0.005
	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)
Mean after	-0.394	-0.397	-0.331	-0.352	-0.367	-0.245
N	140,475	140,475	140,475	140,475	140,475	140,475
Panel B. Bottom transfer size tercile						
BF before exam	0.024**	0.026**	0.027***	0.019*	0.026**	0.009
	(0.010)	(0.011)	(0.010)	(0.010)	(0.010)	(0.009)
Mean after	-0.468	-0.474	-0.402	-0.422	-0.436	-0.279
N	40,571	40,571	40,571	40,571	40,571	40,571
Panel C. Middle transfer size tercile						
BF before exam	0.006	0.006	0.005	0.007	0.011	-0.003
	(0.009)	(0.010)	(0.009)	(0.009)	(0.009)	(0.008)
Mean after	-0.375	-0.374	-0.317	-0.335	-0.350	-0.231
N	46,037	46,037	46,037	46,037	46,037	46,037
Panel D. Top transfer size tercile						
BF before exam	0.002	0.008	-0.006	-0.003	-0.001	0.008
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.008)
Mean after	-0.356	-0.359	-0.290	-0.314	-0.329	-0.231
N	53,867	53,867	53,867	53,867	53,867	53,867

Notes: This table displays estimates of β from equation 1 using four estimating samples. Panel A includes all test-takers whose household received BFP in October 2023. Panels A-C separately estimate equation 1 for three sub-samples of students grouped according to the size of the cash transfer: transfers in the top size tercile (Panel A), transfers in the middle size tercile (Panel B) and transfers in the bottom size tercile (Panel C). All estimating samples are restricted to final-year high school students who attended both exam days. The outcomes, displayed in the column headers, are the standardized scores in the different components of the overall essay score: mastery of formal written Portuguese (col. 2); ability to develop a consistent argumentative thesis (col. 3); effective use of information and facts to support the argument (col. 4); effective use of linguistic resources, such as conjunctions, that guarantee cohesion (col. 5); ability to develop an intervention proposal that addresses the social problem considered in the essay.

Table A4: Placebo test: NIS digit and test scores using non-BFP Cadastro Unico sample

	Dependent variable:					
	Average score	Social science	Natural science	Lang. arts	Math	Essay
	(1)	(2)	(3)	(4)	(5)	(6)
BF before exam	0.0054	0.0035	0.0037	0.0050	0.0073	0.0077
	(0.0042)	(0.0054)	(0.0051)	(0.0058)	(0.0053)	(0.0061)
Mean after	-0.323	-0.390	-0.295	-0.347	-0.302	-0.280
N	100,832	100,832	100,832	100,832	100,832	100,832

Notes: This table reports estimates of β from a placebo version of equation 1. Instead of using students in BFP-beneficiary households, we restrict the sample to students with a household member enrolled in the Registry of Social Programs (Cadastro Unico), but who was not a BFP beneficiary. Exploiting the fact that all Cadastro Unico enrollees are assigned a NIS, we construct a placebo treatment variable that equals one if the enrollee in student i's household had a NIS last digit that would have made it eligible for receiving BFP before the exam had they been enrolled in BFP. The outcomes, displayed in the column headers, are the average standardized test score across all subjects (col. 1) and the standardized test score in each subject (cols. 2-6). Test scores are standardized to be mean zero and standard deviation one among all test-takers (not just those who recieve BFP). See Appendix B.2 for variable definitions. Standard errors, clustered at the student level, shown in parentheses. ***, ** and * denote significance at the 10%, 5% and 1% levels, respectively.

Table A5: Effects on test scores by transfer tercile, controlling for student characteristics

	Dependent variable:					
	Average score	Social science	Natural science	Lang. arts	Math	Essay
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Top transfer size tercile						
BF before exam	0.016***	0.015*	0.007	0.021**	0.014*	0.021**
	(0.006)	(0.008)	(0.007)	(0.009)	(0.007)	(0.010)
Mean after	-0.541	-0.608	-0.483	-0.622	-0.524	-0.468
N	40,571	40,571	40,571	40,571	40,571	40,571
Panel B. Middle transfer size tercile						
BF before exam	-0.002	-0.007	-0.002	-0.001	-0.002	0.003
	(0.006)	(0.008)	(0.007)	(0.008)	(0.007)	(0.009)
Mean after	-0.450	-0.516	-0.420	-0.500	-0.439	-0.375
N	46,037	46,037	46,037	46,037	46,037	46,037
Panel C. Bottom transfer size tercile						
BF before exam	0.007	0.010	0.009	0.016**	0.000	0.002
	(0.005)	(0.007)	(0.007)	(0.008)	(0.007)	(0.008)
Mean after	-0.436	-0.508	-0.407	-0.487	-0.422	-0.356
N	53,867	53,867	53,867	53,867	53,867	53,867

Notes: This table reports estimates of β from estimating equation 1 controlling for students' socioeconomic and demographic characteristics, separately for three sub-samples grouped according to the size of the cash transfer: transfers in the top size tercile (Panel A), transfers in the middle size tercile (Panel B) and transfers in the bottom size tercile (Panel C). All sub-samples are restricted to final-year high school students who attended both exam days. The outcomes, displayed in the column headers, are the average standardized test score across all subjects (col. 1) and the standardized test score in each subject (cols. 2-6). See Appendix B.2 for variable definitions. Test scores are standardized to be mean zero and standard deviation one among all test-takers (not just those who recieve BFP). Standard errors, clustered at the student level, shown in parentheses. ***, ** and * denote significance at the 10%, 5% and 1% levels, respectively.

Table A6: Heterogeneous effects on the overall score by student characteristics

Heterogeneity variable equal to:	0	1	P-value of difference
Panel A. Student is male			
BF before exam	0.008	0.008	0.995
	(0.004)	(0.006)	
Mean after exam	-0.510	-0.399	
N	91,059	49,416	
Panel B. Student is white			
BF before exam	0.007	0.011	0.575
	(0.004)	(0.007)	
Mean after exam	-0.506	-0.374	
N	99,879	38,070	
Panel C. Mother has college degree			
BF before exam	0.008	0.053	0.077
	(0.004)	(0.026)	
Mean after exam	-0.462	-0.365	
N	129,425	2,863	
Panel D. Household income $<$ min. wage			
BF before exam	0.006	0.010	0.594
	(0.006)	(0.004)	
Mean after exam	-0.330	-0.551	
N	50,756	89,719	

Notes: Each panel in this table reports estimates of β from estimating equation 1 separately for students who have a value of zero (col. 1) or a value of one (col. 2) for the heterogeneity variable denoted in the panel title. Column 3 reports the p-value from the test that the coefficients in column 1 and column 2 are equal. All sub-samples are restricted to final-year high school students who attended both exam days. The dependent variable in all regressions is the average standardized test score across all subjects, standardized to be mean zero and standard deviation one among all test-takers (not just those who recieve BFP). Standard errors, clustered at the student level, shown in parentheses. ***, ** and * denote significance at the 10%, 5% and 1% levels, respectively.

Table A7: Effect of BFP on ENEM-score-based measures of college and degree quality

	Average ENEM score in enrolled...		
	College	Degree	Program
	(1)	(2)	(3)
Panel A. All BFP test-takers			
BF before exam	0.063	-0.205	-0.244
	(0.480)	(0.276)	(0.523)
Mean after	519.981	524.978	510.984
N	31,392	42,131	30,060
Panel B. Top transfer size tercile			
BF before exam	-0.792	-0.550	-1.230
	(0.976)	(0.538)	(1.077)
Mean after	520.977	524.520	509.917
N	7,748	10,569	7,371
Panel C. Middle transfer size tercile			
BF before exam	-0.514	-0.416	-0.889
	(0.819)	(0.478)	(0.886)
Mean after	519.818	524.799	510.765
N	10,478	14,008	10,071
Panel D. Bottom transfer size tercile			
BF before exam	1.011	0.174	0.856
	(0.747)	(0.435)	(0.811)
Mean after	519.537	525.394	511.777
N	13,166	17,554	12,618

Notes: This table reports estimates of β from estimating equation 1 using four estimating samples. Panel A includes all test-takers whose household received BFP in October 2023. Panels A-C separately estimate equation 1 for three sub-samples of students grouped according to the size of the cash transfer: transfers in the top size tercile (Panel A), transfers in the middle size tercile (Panel B) and transfers in the bottom size tercile (Panel C). All estimating samples are restricted to final-year high school students who attended both exam days and who enrolled in a college in the year following the exam. The outcomes are the average ENEM score among graduates of the college (col. 1), degree (col. 2) and program (col. 3) the student is enrolled in. See Appendix B.2 for variable definitions. Standard errors, clustered at the student level, shown in parentheses. ***, ** and * denote significance at the 10%, 5% and 1% levels, respectively.

Table A8: The effect of Bolsa Familia on test score range bins

	Probability of scoring between:			
	400-500	500-600	600-700	700-800
	(1)	(2)	(3)	(4)
Panel A. All BFP test-takers				
BF before exam	-0.001	0.004*	0.000	-0.000
	(0.003)	(0.002)	(0.001)	(0.000)
Mean after	0.589	0.210	0.018	0.001
N	140,475	140,475	140,475	140,475
Panel B. Top transfer size tercile				
BF before exam	0.002	0.008**	0.000	0.000
	(0.005)	(0.004)	(0.001)	(0.000)
Mean after	0.594	0.179	0.014	0.000
N	40,571	40,571	40,571	40,571
Panel C. Middle transfer size tercile				
BF before exam	0.002	-0.001	0.001	-0.000
	(0.005)	(0.004)	(0.001)	(0.000)
Mean after	0.589	0.219	0.018	0.000
N	46,037	46,037	46,037	46,037
Panel D. Bottom transfer size tercile				
BF before exam	-0.006	0.006	-0.000	-0.000
	(0.004)	(0.004)	(0.001)	(0.000)
Mean after	0.585	0.224	0.021	0.001
N	53,867	53,867	53,867	53,867

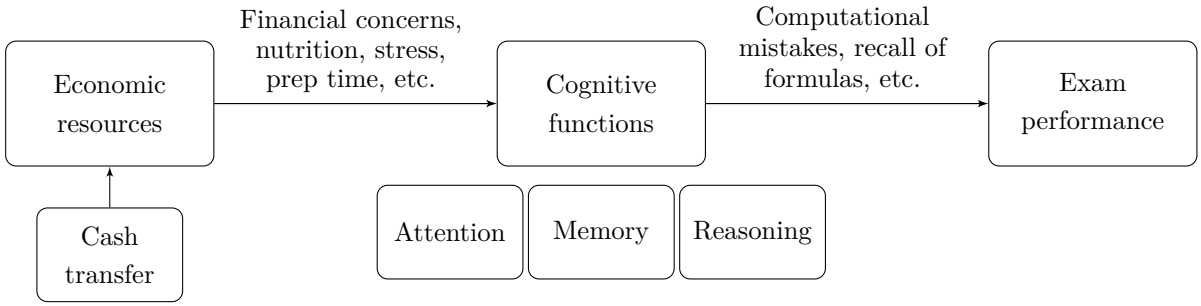
Notes: This table displays estimates of β from equation

B Conceptual Framework

B.1 Conceptual framework

Our framework has two building blocks rooted in the relationship between economic resources, cognitive functions, and exam performance. Appendix Figure B1 illustrates the framework.

Figure B1: Conceptual framework linking monetary transfers to exam performance



The first building block is the link between economic resources and cognitive functions. Scarcity of economic resources can negatively impact cognitive functions through several channels, including improper nutrition, heightened stress, insufficient time spent on exam preparation, or intrusive thoughts related to financial concerns. The cash transfer we study can be understood as a positive shock to economic resources, which could improve exam performance through any of these channels.

The second building block is the link between cognitive functions and exam performance. Cognitive functions such as attention, memory, and reasoning are essential for performance on mentally-demanding tasks like standardized tests. Impaired cognitive functions can negatively impact exam performance in a multitude of ways. For example, with impaired attention, individuals are more likely to ignore important aspects of a question; with impaired memory, students are more likely to forget necessary formulas; and with impaired reasoning, students are more likely to make computational errors.

B.2 Definition of Key Variables

Test score. The Brazilian Testing Agency grades the ENEM exam based on the three-parameter item response theory (IRT). According to IRT, the probability that an individual

i with ability θ_i correctly answers question j is:

$$\Pr(C_{ij} = 1|\theta_i) = p_j(\theta_i) = c_j + \frac{1 - c_j}{1 + e^{-a_j(\theta_i - b_i)}}, \tag{B1}$$

where a_j, b_j, and c_j are three question-level parameters that represent, respectively, a question's discrimination, difficulty, and pseudo-guess.[23] The test score is the estimate of θ_i generated by the testing agency. ENEM scores are normalized to have a mean of 500 and a standard deviation of 100.

College enrollment. We define college enrollment as an indicator for appearing in the higher-education census one year after taking the ENEM. The rest of the college outcomes are defined conditional on college enrollment.

College quality. We construct an earnings-based index of college quality. To do this, we group all college-educated workers in the RAIS (not just the workers in our sample) based on the university they attended and compute the average earnings of the graduates from each university.

College degree quality. We create an index of college degree (or major) quality using the average earnings of the graduates of each college degree. To allow for international comparisons, we classify majors based on the International Standard Classification of Education (UNESCO, 2012).

First-year persistence. We define first-year persistence as an indicator that equals one if a student remains enrolled in college at the end of their freshmen year and zero otherwise. We also create measures for persistence in further years.

Degree progress. We calculate the ratio between the number of credits completed at the end of each academic year and the total number of credits required to graduate.

Likelihood of graduating. We define an indicator for graduating one to six years after enrolling in college. Most students who ever graduate do so within the first six years. As robustness, we define a measure of on-time graduation based on expected degree length. The higher-education census contains information on how long a student in good standing should take to graduate from each program. We use this information to define an indicator for graduating within the expected number of years.

College financial assistance. We define indicator variables that equal one for students

[23] A question's discrimination refers to its ability to discriminate between low- and high-ability individuals; the difficulty represents the value of θ at which $p_j(\theta_i)$ has the maximum slope, and the pseudo-guess parameter indicates the likelihood that a student with an infinitely negative ability has to correctly respond to the question.

who received different forms of financial assistance when enrolling in college in the year following the ENEM exam: (i) full or partial *ProUni* scholarships, which fund college-related expenses for low-income students attending private colleges; (ii) university-funded scholarships; (iii) government-funded student loans; (iv) university-funded student loans.