Success Spills over
How Awards Affect Winners' Peers in Brazil *

Diana Moreira
UC Davis, BREAD and NBER

Fernanda Estevan
Sao Paulo School of Economics - FGV

March 16, 2026

Abstract

How does recognition of an individual affect the pursuit of opportunities among their peers? Using a regression discontinuity design and data on 7.5 million students, we identify the impact of a symbolic award within the Brazilian Math Olympiad. Witnessing a classmate's recognition generates sizable positive spillovers: it increases peers' future participation by 4.5% and the likelihood of top-decile scores by 13%. The award leads to more future winners, suggesting the signal activated latent potential rather than merely inflating expectations. These gains do not discourage lower-achieving students or trigger resource reallocation. Effects are driven by proximity and amplified by gender congruence.

*dsmoreira@ucdavis.edu, fernanda.estevan@fgv.br. We gratefully acknowledge funding from the São Paulo Research Foundation (grant #2019/25033-5), CNPq, LEAP-Harvard, UC Davis Small Grant in Aid of Research and Agency Fund. We are indebted to the Instituto de Matemática Pura e Aplicada (IMPA) and OBMEP for providing the data and institutional support throughout the project. We also thank INEP for their collaboration and assistance. In particular, we are especially grateful to Maruska Pereira de Almeida, Marcela Laureano, Marco César Araújo Pereira, Eduardo São Paulo, and Francisco Soares (INEP); Daniel Lins de Albuquerque, Claudio Landim, Jorge Vitório Pereira, Luiz Lúcio Renovato, Deborah Sadetsky, Erika Sholl, and Guilherme Silva (IMPA/OBMEP). This research benefited greatly from discussions with Lawrence Katz, Edward Glaeser, Gautam Rao, Raj Chetty, and Asim Khwaja, Claudio Ferraz, and Vitor Possebom. We thank Roberta Costa and Nathalia Sales for their collaboration on multiple aspects of this research and for their exceptional coordination and oversight during data collection and empirical analysis. We also benefited from excellent research assistance provided by Loreta Guerra, Guilherme Lambais, Matheus Loureiro, and João Carlos Saran.All remaining errors are our own.

We think that recognizing ordinary people who performed extraordinary acts of kindness and service is the best way anyone can think of to promote those values and to make everyone who watches think, "I could be that person too. I could do those kinds of things too"

– Ron Rand, *President of the Congressional Medal of Honor Foundation*

1 Introduction

Talented individuals whose abilities are atypical within their social group often fail to pursue opportunities commensurate with their potential.[1] A prominent explanation for this underperformance is that peers set social norms that penalize standing out, leading students to purposefully mid-direct their efforts to signal a specific social type (Bursztyn and Jensen, 2015). However, the social environment may do more than just impose costs on behavior; it may also serve as a vital source of information for self-discovery.

At its core, the decision to invest in human capital hinges on an individual's perception of the returns to that investment. These perceptions are rarely formed in a vacuum; they are constructed from subjective assessments of which goals are attainable and the perceived desirability of those outcomes. While recent literature has shown these perceptions to be highly malleable, the underlying process of their formation remains poorly understood (Jensen, 2010; Riley, 2024). The social environment is widely believed to be the primary crucible for these perceptions, yet establishing a causal link remains an empirical challenge. Isolating the influence of the social group requires a meaningful shock to one's peers that is strictly uncorrelated with direct shocks to the individual.

In this paper, we address this challenge by studying a shock that is both highly policy-relevant and ubiquitous: the public recognition of high performance. From academic honors and school vouchers (Angrist and Lavy, 2009) to performance-based pay in the labor market (Lemieux et al., 2009), institutional awards are a standard tool for signaling excellence. As a policy instrument, recognition is intended not only to reward the honoree but also to motivate others by signaling that a particular trajectory is both valued and achievable. However, such visibility may generate unintended spillovers. It may inadvertently dampen motivation among those further down the ability distribution (Robinson et al., 2021) or reallocate institutional resources toward a narrow subset of "winners." By examining these spillovers, we provide new evidence on how institutional signals of

[1] This gap between latent ability and realized ambition is well-documented; for instance, high-achievers from disadvantaged backgrounds frequently forgo applying to selective universities despite guaranteed financial support (Hoxby and Avery, 2013). Similarly, Avilova and Goldin (2018) find that women, who are traditionally underrepresented in economics, are highly sensitive to introductory grades, persisting in the major only upon receiving an 'A', whereas men remain largely undeterred by lower marks.

success shape the aspirations and investments of the wider social group.

In this paper, we ask: How does the recognition of an individual's achievement influence the broader group of peers who witness it? Our context is the Brazilian Math Olympiad (OBMEP), a nationwide competition reaching 85% of public schools. We focus on the "Honorable Mention," a purely symbolic, non-monetary award granted to the top 4% of participants. This setting provides a sharp informational shock: since preliminary selection occurs at the school level, the national award signals that a student is not merely a local high-performer, but among the best in the country. Because the organizers do not disclose the rankings of non-recipients, we can recover the combined impact of the informational and recognition values of these awards.

Our setting is uniquely suited for studying peer spillovers. We observe individual performance and a clearly defined social group, classmates, directly exposed to the recognition. We exploit an ex-post cutoff score to causally identify the award's impact using a Regression Discontinuity (RD) design. This design effectively compares classrooms, in which a student scored just above the cutoff (and received the award) with those in which a student scored just below (and did not). The identifying assumption is that determinants of subsequent classroom performance, such as prior achievement or unobserved norms, evolve smoothly around the cutoff, an assumption we support empirically. Our design ensures that treatment and control classrooms have equal ex-ante probabilities of being treated, exploiting only random factors that drives award exposure.[2]

We merge administrative data from the Math Olympiad with the Brazilian School Census, covering 7.5 million students across 260,000 classrooms between 2009 and 2016. This linkage allows us to identify classmates at the time of the award and track their academic trajectories regardless of subsequent school assignments. We focus on outcomes relevant for individuals at the top of the ability distribution, such as future Olympiad participation and performance, and at the bottom, such as school progression and dropout rates.

We find that receiving an Honorable Mention generates sizable positive spillovers. The award increases classmates' probability of taking the second-phase exam by about 4.5% in the following year and raises their likelihood of scoring in the 90$^{\text{th}}$ percentile, where most awards are concentrated, by 13% relative to the control mean. Notably, these effects translate into a higher probability of classmates winning awards themselves in subsequent years. This suggests that the response is not driven by a superficial inflation of expectations, but rather by a rational updating of perceived returns: the award was indeed attainable for a subset of students who had previously opted out of the competition.

[2]This is unlike Difference-in-Differences designs that typically exploit non random exposure to treatment (Borusyak and Hull, 2023).

Conditional on participation, exposed classmates also experience gains of 18.5% in average Math Olympiad scores relative to the control mean. Importantly, we find no evidence of discouragement among lower-achieving students, indicating that these improvements do not come at the expense of those at the lower end of the ability distribution.

The spillover effects on classmates are smaller in magnitude, roughly one-sixth of the effect estimated for the award recipient, and less persistent than the direct impact on the winner. Yet because each awardee has roughly 30 classmates, the aggregate peer effect remains economically meaningful. The smaller and shorter-lived spillovers suggest that their underlying mechanisms operate through a more limited set of channels and that are more prone to salience than those channels that influence the recipient's response.

We next examine the mechanisms underlying our results. The award may operate by shifting subjective determinants of educational investment, including beliefs about ability, perceptions of what is attainable, and aspirations, a set of channels we refer to as the "high-performance mindset." It may also increase awareness of the Math Olympiad as an opportunity. Finally, the presence of an awardee may prompt schools to reallocate resources toward her classroom, increasing inputs for classmates at the expense of others.

Our evidence is most consistent with a "high-performance mindset" mechanism rather than purely informational or resource-based channels. First, proximity matters: effects are concentrated among classmates and not grademates, defined as students in the same school and grade but in different classrooms. This pattern also makes within-school resource reallocation an unlikely explanation, as it would predict negative spillovers on grademates. Second, impacts are stronger among students who had previously participated in the Math Olympiad, indicating that ability proximity is central and that a purely informational channel is insufficient, since these students were already aware of the competition. Finally, gender congruence between awardees and classmates seems to amplify the effect, pointing to peer identification as an important mechanism. Although we cannot fully rule out teacher responses, the joint evidence on ability proximity and gender congruence supports the interpretation that at least part of the effect operates through direct student-to-student interactions.

Our paper contributes to several strands of the literature. First, we add to the growing body of research documenting the role of subjective factors, such as aspirations and perceived returns, in shaping the demand for education (Jensen, 2010; Attanasio and Kaufmann, 2017; Nguyen, 2008; Riley, 2024). While the theoretical foundations of these channels emphasize the social group's role in anchoring individual aspirations (Ray, 2006; Genicot and Ray, 2017), empirical work has largely focused on direct information or exposure shocks to the individual. For example, Jensen (2010) demonstrates that correcting misperceptions of returns increases investment, and Riley (2024) shows that exposure to a role-model-based narrative improves performance among high achievers. However, these studies typically abstract from the social environment's contribution to the formation of these beliefs. We contribute by demonstrating, in a natural setting, how a shock to one's social group directly influences an individual's pursuit of success.

Consequently, we bridge the literature on subjective beliefs with the extensive research on peer effects in education (Sacerdote, 2001; Austen-Smith and Fryer, 2005; Lyle, 2007; Carrell et al., 2009; Fryer and Torelli, 2010; Gagete-Miranda, 2025). While the majority of these studies rely on variation in peer composition, we examine a recognition shock that alters the salience of ability within a stable peer group. In doing so, we highlight how policies targeting individual students can generate broader, multiplicative effects through peer dynamics, transforming individual awards into collective catalysts for human capital investment.

Second, our paper relates to the literature on contests, tournaments, and non-monetary rewards. A large body of work shows that recognition affects recipients' performance across a range of settings.[3] Our paper shifts the focus from award recipients to the broader impact on their peers. In doing so, we build upon the work of Sequeira et al. (2016) and Megalokonomou et al. (2025), who examine how recognition for high achievers influences peer outcomes in India and Greece, respectively.[4] While our findings align with the positive spillovers documented by Megalokonomou et al. (2025), Sequeira et al. (2016) find more limited effects, likely because their sampled peers lacked the requisite proximity, in terms of both classroom environment and ability, to the award winner. They complement our findings by documenting consequences for very relevant outcomes, such as the pursuit of STEM degrees and subjective perceptions of the returns to education. We further extend this literature by investigating underlying mechanisms. Our results provide direct evidence against a "resource displacement" or "program awareness" story, allowing us to link our findings more tightly to the literature on role models.

Our primary contribution, however, stems from the unique advantages of our empirical setting, which significantly bolster both the internal and external validity of our findings. First, our study operates at a significantly larger scale, encompassing 155,000 awards across 39,000 schools. This represents a substantial increase in power and scope

[3]This includes education (Diamond and Persson, 2016; Levitt et al., 2016), the workplace (Neckermann et al., 2014; Bradler et al., 2016; Kosfeld and Neckermann, 2011), and online platforms (Gallus, 2017). More recently, Science Olympiads have been examined as settings in which recognition is highly salient and public, with Agarwal and Gaule (2020) and Agarwal et al. (2025) documenting persistent effects on the educational and career trajectories of International Science Olympiad medalists.

[4]Relatedly, Bursztyn and Jensen (2015) use leaderboards in U.S. high schools to document how social signaling and peer visibility can distort human capital investments.

compared to the 635 awards in Megalokonomou et al. (2025) or the 300 in Sequeira et al. (2016). This scale allows us to examine low-selectivity environments since the competition includes nearly every public school in the country.

Second, we address potential identification concerns inherent in Megalokonomou et al. (2025), as they utilize a Difference-in-Differences strategy, which may be sensitive to non-random exposure to the shock (Borusyak and Hull, 2023). Specifically, treatment and control classrooms have different ex-ante probabilities of receiving an award, as the control classrooms does not have an student with a similar ability level as the winner. Hence, the estimates may conflate the treatment effect with baseline characteristics that correlate with award propensity; our design explicitly bypasses these selection issues.[5]

The remainder of the paper proceeds as follows. Section 2 describes the Math Olympiad and its institutional context in Brazil. Section 3 presents the data, Section 4 outlines the empirical strategy, and Sections 5 and 6 report the main results and robustness checks. Section 7 examines alternative mechanisms, and Section 8 concludes.

2 Institutional context

Brazil's compulsory education system, covering grades 1–12, comprises both public and private schools. The vast majority of students attend public institutions, 84% in 2016, while the remaining enroll in private schools, which primarily serve students from higher socioeconomic backgrounds.

The Brazilian Math Olympiad for Public Schools (OBMEP) is a large-scale annual mathematics competition that, until 2016, the period covered in our analysis, exclusively targeted students from public schools.[6] It is organized by the *Institute for Pure and Applied Mathematics (IMPA)*, an academic institution affiliated with Brazil's Ministries of Science and Technology and Education.

All public schools serving grades 6–12 are eligible to participate in the Math Olympiad. Students compete in one of three levels based on their grade: Level 1 (6^{th}-7^{th}), Level 2 (8^{th}-9^{th}), and Level 3 (10^{th}-12^{th}). Public schools register for free through the Math Olympiad official website, specifying the number of participants per level.

Participation in the Math Olympiad is extensive, with approximately 18 million students competing in its first stage each year. The competition reached around 85% of nearly 70,000 eligible public schools and 99.6% of Brazilian municipalities in 2016. It is

[5]While Sequeira et al. (2016) also employ a Regression Discontinuity (RD) design, data limitations at the time precluded the use of modern standard practices, such as optimal bandwidth selection or flexible controls for the running variable. They also find no effect on peer's perceived returns and do not measure subsequent peers performance or behavioral change.

[6]From 2017 onward, private schools could participate in OBMEP by paying a registration fee.

widely promoted both through the media and directly within public schools.

The competition comprises two phases. The first phase consists of a 20-question multiple-choice exam administered by schools and lasting 2.5 hours. The Math Olympiad organizers provide schools with exam materials and grading instructions. Each school selects a regular school day to administer the exam to its students. School teachers grade the exams and forward a list of approximately the top 5% of their students to the Math Olympiad organizers.[7] Scores from this phase serve solely to identify students who advance to the second phase; approximately 800,000 students qualify annually. Awards and medals are determined exclusively by performance in the second phase.

The second phase is conducted jointly by the Math Olympiad organizers and regional coordinators.[8] It comprises 6 open-ended questions and is administered over a 3-hour period. The second-phase exam emphasizes conceptual understanding of core mathematical topics, rather than rote mastery of the standard school curriculum.

Second-phase exams are graded at regional centers and then sent to the national office, which establishes the final ranking based on second-phase scores. The top 2,300 students receive gold, silver, or bronze medals, and approximately 30,000 additional students receive Honorable Mentions. Since 2012, at least 200 Honorable Mentions per state have been reserved for students from non-selective schools, defined as schools that do not use admission exams, in each of Brazil's 27 states. Remaining Honorable Mentions may be allocated to students from either selective or non-selective schools, irrespective of state.[9]

We would expect the Honorable Mention award to generate potential motivational effects. The names and rankings of award winners are publicly announced on the Math Olympiad website, providing information unavailable to non-winners, who do not receive details about their scores or rankings. Hence, winning the award conveys explicit information to students that they rank within the top 4% of second-phase Math Olympiad participants.[10] Since second-phase participants represent roughly the top 5% of students from each public school nationwide, the Honorable Mention award provides unique and reliable feedback about students' national relative standing, information that is typically unavailable until students participate in national exams near the end of high school.[11] In

[7] The Math Olympiad organizers do not obtain information on the first-phase participants who fail to qualify for the second phase.

[8] Regional coordinators, typically mathematics professors appointed by the Math Olympiad, oversee exam implementation, initial grading, and the geographic clustering of schools for second-phase testing.

[9] Medal allocation also establishes state-level quotas for silver and bronze medals.

[10] Although students may try to infer their performance from published solutions, such inferences are difficult due to year-to-year variation in exam difficulty, reflected in fluctuating cutoffs (10–30 on a 1–120 scale). Moreover, only names and rankings of past winners are disclosed, not score distributions.

[11] Other science competitions typically target higher-achieving students, making their awards less relevant for students near the Honorable Mention cutoff. For example, the Brazilian Olympiad of Physics in

addition, regional coordinators organize ceremonies to celebrate winners' achievements. Although such events are informal and vary by region, anecdotal evidence suggests additional celebrations are frequently arranged by schools or local authorities.

Two features make the Honorable Mention award particularly suitable for our analysis. First, its large number of recipients generates high density around the cutoff, about ten times that at the bronze medal threshold, facilitating precise identification of peer effects and offering a clearer contrast, since the counterfactual is receiving no award. Second, unlike medals, Honorable Mentions do not include scholarships, training, or mentorship, allowing us to isolate the effect of public recognition from resource-based benefits. At the same time, the presence of prestigious medals enhances the signaling value of the Honorable Mention as a nationally recognized achievement.

Several characteristics of the educational context further support interpreting our results. Teachers and classmates are likely aware of a student's award status, either by checking the Math Olympiad website or through direct communication within the school. Honorable Mention certificates are distributed to schools and subsequently presented to students in their classrooms, directly engaging peers and school staff in recognizing awardees. Classrooms typically consist of around 30 students, who attend all subjects together for at least one academic year; it is common for classes to remain stable over multiple years. Indeed, our data indicate that roughly half of the peers remain in the same classroom as the award winner in the subsequent year.

3 Data

Our main dataset consists of administrative records from the Brazilian Math Olympiad, provided by IMPA. Our data cover the period from 2009 to 2016 and include information exclusively for second-phase participants of the Math Olympiad. The dataset provides participant-level information, including first- and second-phase scores, gender, date of birth, school grade, and the school's national identification number.

We merge this dataset with administrative data from the Brazilian School Census of K-12 education, publicly available for the period 2008-2017.[12] The School Census encompasses yearly student-level enrollment information for the entire population of Brazilian public and private schools. We conduct the merge using individual characteristics (gender, date of birth, school grade) and the school's national identification number, allow-

Public Schools awards about 3,500 students annually, compared to roughly 33,000 in the Math Olympiad (see http://www.sbfisica.org.br/obfep/).

[12]We use a version of the Brazilian School Census microdata that was publicly available at the time of data collection but is no longer accessible in its original form, following changes by the National Institute for Educational Studies and Research (INEP) that restricted public access to individual-level data.

ing us to match 73.56% of the Math Olympiad participants uniquely. The School Census also provides unique identifiers at the classroom level, enabling the identification of classmates and grademates of Math Olympiad participants. Moreover, the School Census contains a unique student identifier allowing longitudinal tracking of both Math Olympiad participants and their peers.

Using the Math Olympiad dataset, we compute participants' score margins relative to the award cutoffs. Because raw scores range from 0 to 120 and are not directly comparable across years, we standardize second-phase test scores within each level and year to have a mean of zero and a standard deviation of one. We define the Honorable Mention cutoff ex post as the lowest standardized score that received the award, allowing the cutoff to vary by cohort year, state, and competition level.[13] Accordingly, throughout the analysis, score margins are expressed in standard deviation units.[14]

Throughout the paper, we designate the year the student takes the Math Olympiad and obtains recognition as t. We measure most outcomes in the following year, $t + 1$, but also investigate them two years after, $t + 2$, to verify the persistence of impacts.

The main outcomes we examine relate to students' participation and performance on the second-phase exam of the Math Olympiad. To mitigate potential selection bias in our outcome measures, our participation indicator equals 1 for all students who took the exam and 0 for those who did not, including those who did not qualify. The same approach applies to our main performance outcomes, defined as indicators for exceeding the 50th, 70th, and 90th percentiles. The only exception is the second-phase score, which is observed only for exam takers and for which we present bounding exercises. Using School Census data, we construct individual-level measures of school dropout, grade attainment, and school or classroom switching, as well as classroom composition by students' and teachers' characteristics.

To construct a unified measure of school quality across all grades, we combine data from two national standardized assessments: *Prova Brasil*, administered at the primary and lower-secondary levels, and the *Exame Nacional do Ensino Médio* (ENEM), administered at the end of high school. For students enrolled in 6th through 9th grades, we rank schools based on their average *Prova Brasil* 9th-grade scores from the year preceding the award.[15] Schools are grouped into quartiles based on their national rank, which we use as

[13] As discussed in Section 2, minimum state quotas for Honorable Mentions were introduced in 2012, implying that cutoffs may differ across states.

[14] The only exception is the density test reported in Section 4, which relies on raw scores.

[15] Since *Prova Brasil* is administered biennially, we use scores from either the award year or the preceding year, selecting whichever is closest to the reference year. To maximize the number of observations with non-missing school quality measures, we apply four non-overlapping correction steps, each used only if the previous one fails due to lack of available data: (i) for students in 6th to 9th grades, if the school's

our measure of school quality. For upper-secondary students (10^{th} to 12^{th} grades), we follow the same approach using ENEM scores, the only nationally standardized assessment at that level.

3.1 Sample Restrictions

Our analysis focuses on students enrolled in grades 6-11 from 2009 to 2016 who qualified for the second round of the Math Olympiad, initially comprising 6,203,951 individuals.[16] After merging with the School Census, we identify 4,563,518 qualified students at time t. However, due to high attrition, only 2,359,895 of these students actually wrote the second-phase exam.

Ideally, we would observe at most one award recipient per classroom, allowing for a clean comparison with classrooms without winners. In practice, however, multiple students in the same classroom may receive awards. To approximate this ideal setting, we define treatment status based on the highest-scoring student in each classroom. Accordingly, "participants" are the top scorers, while their classmates include both lower-scoring participants and non-participants. Under this definition, our sample comprises 1,587,953 highest-scoring participants and 44,599,959 classmates.[17]

keeping only classrooms where there is only one 1st highest (i.e. eliminating students that was the highest score tied with a classmate) leads to the exclusion of 110,297 participants and their 1,533,810 classmates. We further exclude participants with atypical grade progression in the School Census, specifically those who advanced more than one grade or were enrolled in a lower grade compared to the previous year, and their classmates. This restriction removes an additional 10,462 highest-scoring participants and 596,871 of their classmates.

Due to the discrete nature of the scoring system, numerous students obtain scores exactly at the award cutoff. Math Olympiad organizers implement ex post tie-breaking rules based on question difficulty, which differs from the scoring methods used elsewhere in the distribution. Thus, we exclude 16,449 students who score exactly at the cutoff,

average 9^{th}-grade *Prova Brasil* score is unavailable in year t, we use the score from year $t-1$, and, if still unavailable, from year $t-2$; (ii) if none of these are available, we use the school's average *Prova Brasil* score for the 5^{th} grade; (iii) for students in upper-secondary education, if ENEM scores are missing, we use the school's average 9^{th}-grade *Prova Brasil* score; and (iv) for students with unclassified grade levels (e.g., adult education), we use the school's average ENEM score. If none of these corrections apply, the school quality measure is left missing.

[16] We exclude 12th graders, the final year of high school, due to the lack of subsequent outcome data.

[17] As a reference there is many more highest-scoring participants than 2nd or 3rd highest scoring. For instance, considering all second-phase participants who score within our minimum bandwidth window the number ranked 1^{st}, 2^{nd}, and 3^{rd} highest in their classrooms numbered 264,869, 51,190, and 11,993, respectively.

representing an additional 1% of the initial participant sample.

The resulting final sample comprises 1,450,745 Math Olympiad highest-scoring participants and their 41,968,785 classmates in grades 6-11. Within our defined minimum bandwidth, described in detail in Section 4, we observe 258,428 participants near the cutoff, along with 7,641,941 classmates.

3.2 Summary Statistics

This subsection provides summary statistics comparing participants in the minimum bandwidth (RD sample) with their classmates and classrooms in the RD and full samples. Although student-level characteristics and performance averages are not directly relevant for internal validity, they inform external validity and contextual interpretation of our results.[18]

Participant and Classmate Characteristics. Table 1, Panels B and C, compare Math Olympiad participants within the RD sample to their classmates. As anticipated, participants display markedly higher educational outcomes than their classmates. For instance, participants are 25 times more likely to score above the 90th percentile on the Math Olympiad exam in the subsequent year. Additionally, participants tend to be disproportionately white and male.

RD Sample vs. Full Sample Classroom Characteristics. Table 1, columns (1) and (2), contrasts classrooms in the RD sample with the full dataset. Schools represented in the RD sample tend to rank higher on quality measures, although a considerable proportion remains distributed across all quartiles. For example, almost 10% of RD-sample schools are in the lowest quartile as opposed to 20.6% in the full sample. Schools in the RD sample are, on average, larger and have more prior awards.

4 Empirical strategy

While our main analysis examines the impact of receiving an Honorable Mention on classmates, we also present estimates for the participants. Throughout the paper, we define a *participant* as a student who took the Math Olympiad and whose score was closest to the award cutoff. As explained in subsection 3.1, our sample construction ensures that there is at most one participant defining the treatment per classroom by selecting the highest-scoring participant in each classroom. Other students in the participant's classroom at time t, regardless of whether they participated in the Math Olympiad, are categorized as *classmates*.

To estimate the impact of receiving an Honorable Mention award on classmates' and

[18] Internal validity relies on smooth covariate variation around the threshold, which we test in Section 4.

participants' outcomes, we implement a regression discontinuity (RD) design. Treatment assignment is determined by a participant's second-phase Math Olympiad score relative to the award cutoff, defined in Section 3. Because 98% of students scoring above the cutoff receive the award, we adopt a sharp RD framework. Henceforth, we use 'scoring above the cutoff' and 'receiving an Honorable Mention' interchangeably.

Thus, our identification strategy compares students enrolled in classrooms where a Math Olympiad participant narrowly received an Honorable Mention award to those in classrooms where a participant earned a similar score but narrowly missed the award. By focusing on classrooms where participants scored near the award threshold, our research design mitigates concerns about selection bias, ensuring that the treated and control groups are comparable in terms of ability (Lee and Lemieux, 2010; Cattaneo and Titiunik, 2022). Moreover, the comparison is restricted to students who were already in the same classroom at time t, prior to the announcement of award winners. This guarantees that classroom composition is predetermined and not influenced by the treatment, addressing concerns about the endogeneity of peer networks.

In our main specifications, we implement two bandwidth choices around the award threshold. The first consists of outcome-specific optimal bandwidths following Calonico et al. (2014, 2017). The second is the minimum optimal bandwidth across our main outcomes, i.e., second-phase Math Olympiad score, participation, and scoring above the 50$^{\text{th}}$, 70$^{\text{th}}$, and 90$^{\text{th}}$ percentiles, and corresponds to the bandwidth selected for scoring above the 70$^{\text{th}}$ percentile outcome. As robustness checks, we also test other bandwidth choices.

Within each bandwidth, we estimate an OLS regression using a flexible linear specification, separately for participants and classmates:

$$y_{iceskt} = \alpha + \beta \text{Above cutoff}_{clst} + \lambda \text{Score}_{clst} + \delta(\text{Above cutoff}_{clst} \times \text{Score}_{clst}) + \gamma_{lst} + \varphi \mathbf{X}_{ect} + \varepsilon_{iceskt}. \tag{1}$$

The outcome y_{iceskt} refers to individual i in classroom c, school e, state s, measured at time $k \in (t, t+2]$, after the award announcement in year t. The indicator Above cutoff$_{clst}$ equals one if the highest-scoring participant in classroom c scored above the award cutoff, defined at the exam level l, state s, and cohort year t. Score$_{clst}$ denotes that participant's score margin, normalized to zero at the cutoff and expressed in standard deviation units. All specifications absorb Math Olympiad level–state–cohort fixed effects γ_{lst}. In selected specifications, we further control for school and classroom-level covariates $\mathbf{X}_{ect}$.[19] The coefficient of interest, β, captures the causal effect of receiving the award on outcome

[19]Specifications with controls include indicators for school location (Central West and Southeast), school selectivity, and the share of classmates scoring above the 90$^{\text{th}}$ percentile in the Math Olympiad at t, the only covariates exhibiting small imbalances in Table 2.

y. When estimating effects on classmates, standard errors are clustered at the classroom level, corresponding to the level of treatment assignment.

4.1 Validity of Identification Assumption

In regression discontinuity designs, identification requires that agents cannot manipulate the running variable at the cutoff. In our setting, the institutional features of the award assignment substantially limit this possibility. As detailed in Section 3, exam scores are assigned by external graders, and the Honorable Mention cutoffs are defined ex post by year, level, and state. Because students do not know the cutoff at the time of the exam and have no control over grading, strategic sorting around the threshold is implausible.

We first the density of the distribution around the award cutoff. For this exercise, we define the running variable as the difference between the student's raw score and the ex post Honorable Mention cutoff. Figure 1 displays the distribution of this variable. Visually, the density is smooth around zero, with no discernible jump or excess mass at the cutoff. Although there is modest local variation in bar heights, including a slightly taller bin just below zero, similar fluctuations appear elsewhere in the distribution and do not suggest systematic bunching. Our setting is not well suited for standard test of density as the scores are discrete variables and our sample is very large with more than 7.5 million observations within the minimum bandwidth. The large sample size grants unusually high statistical power relative to typical RD applications, allowing the detection of extremely small deviations from smoothness.[20] We implement a randomization inference procedure using placebo cutoffs to understand how atypical are the discontinuities at the cutoff. For each binwidth, we compute the log difference in density on either side of the true cutoff and compare it to a reference distribution obtained by shifting the cutoff to other possible values, excluding the true cutoff. The empirical p-value equals the share of placebo statistics whose absolute value exceeds that observed at the true cutoff. Figure 2 presents results from placebo tests within a symmetric window of $\pm$ 11 score points around the true cutoff, corresponding to the minimum bandwidth used in the main analysis. Across binwidth choices, the placebo p-values are consistently above 0.10, indicating that the observed density difference at the actual threshold is not unusually large relative to nearby placebo thresholds.

We also examine whether predetermined characteristics and lagged outcomes evolve smoothly at the cutoff. Table 2 shows that students who narrowly received an Honorable Mention are statistically indistinguishable from those who narrowly missed it across

[20] Indeed, formal tests based on McCrary (2008) and Cattaneo et al. (2018) reject the null of continuity at conventional levels (Table B.1).

a broad set of pre-award variables. For most covariates, we fail to reject the continuity assumption, with p-values typically well above 0.10. Only four of the 31 characteristics display small discontinuities: indicators for schools located in the Central-West and Southeast regions, attendance at a selective school, and the share of classmates scoring above the 90$^{\text{th}}$ percentile in the Math Olympiad at time t. Given the number of hypothesis tests performed, some rejections are expected by chance. Moreover, the detected discontinuities are small in magnitude and do not follow a systematic pattern, arising across unrelated dimensions such as geography and school type. Still, we report results from a parsimonious specification with only fixed effects and an augmented specification that additionally controls for the few covariates with weak discontinuities at the cutoff.

5 Main results

In this section, we examine how the presence of an Honorable Mention awardee in the classroom, defined as a student scoring above the award cutoff, affects classmates' outcomes. We report estimates using two bandwidths: the optimal bandwidth for a given outcome and the minimum bandwidth across our main outcomes, i.e., participation in Math Olympiad second-phase test, Math Olympiad second-phase test scores, and scoring above the 50$^{\text{th}}$, 70$^{\text{th}}$, and 90$^{\text{th}}$ percentiles, to have a constant-across-outcomes sample. Although the effect on the award recipients themselves is the focus of a companion paper (Estevan et al., 2025), we also present here corresponding results for award recipients to contextualize the magnitude of these peer effects.

5.1 How does the recognition of high-achievers influence classmates behavior?

Participation in the Math Olympiad

We begin by examining how receiving an Honorable Mention award affects classmates' likelihood of participating in the second phase of the Math Olympiad exam in the subsequent year. Participating in the second phase requires students to attend a three-hour exam on a weekend, typically at a school other than their own. As shown in Section 3, a substantial share of students who qualify for this stage do not ultimately attend, suggesting that participation is a margin along which peer effects may plausibly operate.

Table 3 and Figure 3 show that having an award-winning classmate increases second-phase participation among peers by 0.08-0.1 percentage points, an increase of approximately 4.5% of the control mean (from 3.73% to 4.77%). While modest in magnitude, the effect is statistically significant and robust across the inclusion of controls (columns 2 and 4) and a minimum (columns 1 and 2) or optimal bandwidth (columns 3 and 4).

Importantly, the award appears particularly effective in motivating relatively high-achieving students. Specifically, it increases the proportion of classmates surpassing the 50^{th}, 70^{th}, and 90^{th} percentiles by up to 5.66%, 7.91%, and 13.76% of the control mean, respectively (Appendix Tables A.2-A.3, Table 4 and Appendix Figures A.1- A.2 and Figure 4). Given that Honorable Mention recipients typically score above the 90^{th} percentile, this pattern suggests that exposure to a successful peer primarily encourages participation among classmates with strong academic potential, who are capable of earning an award themselves but may not pursue the opportunity in the absence of a high-performing peer. Accordingly, Table A.1 shows that the award increases the probability that classmates receive any award in the subsequent year by 7.35% relative to the control-group mean. These findings suggest that the award may also improve classmates' overall academic performance, a hypothesis we examine in the next subsection.

To obtain a back-of-the-envelope estimate of the number of students who may be missing out on opportunities, we focus on the top 20% of second-round participants, whom we view as the group most plausibly at risk of failing to realize their potential to win an award. In our dataset, 2.3 million students reached the second round of the competition, implying that approximately 472,000 students fall within this top quintile. Combining this figure with our RDD estimate of the effect of having a classmate with an Honorable Mention on surpassing the 90th percentile ($\beta = 0.0003$), we estimate that roughly 142 students benefit from this peer influence.

Performance in the Math Olympiad

We now examine whether receiving an Honorable Mention affects classmates' performance on the second-phase Math Olympiad exam. Table A.4 reports estimates of the effect of a student's award on classmates' second-phase exam scores. The point estimates indicate gains of up to 0.0283 standard deviations, corresponding to an 18.5% increase relative to the control-group mean, and are statistically significant at the 10% and 5% levels.

These estimates, however, may be influenced by selection into the second phase, as test scores are observed only for students who participate (hence, the much smaller sample in this table relative to Table 3). If receiving an award encourages relatively lower-achieving classmates to take the exam, changes in the composition of test-takers could mechanically lower average scores, attenuating the estimated effects and potentially masking larger underlying performance gains.

Although this interpretation appears unlikely, given the evidence in Tables A.2 to 4 (Figures A.1 to 4) that the award increased participation primarily among high-achieving students, we further assess this concern by examining the composition of test-takers in

Table A.6. We consider the following characteristics: age, a female indicator, a non-white indicator, prior participation in the second phase, and an indicator for attending a school ranked below the national median on a standardized assessment. As before, we report estimates using the minimum bandwidth across our three main outcomes and, alternatively, the average of their optimal bandwidths.

Table A.6 shows no evidence that receiving the award altered the composition of classmates who took the exam in the subsequent year in terms of observable characteristics when using the average bandwidth. Under the minimum bandwidth, only prior second-phase participation is positive and statistically significant at the 5% level. To assess compositional changes more systematically, we construct a summary index following Kling et al. (2007).{footnoteThe direction each variable contributes to the index is determined by the correlation with second-phase exam performance in Table A.5. The results again indicate no evidence that the classmates were weaker in the aggregated outcome measure (Table A.6, columns 6 and 12).[21]

We also conduct a bounding exercise following Angrist et al. (2006) in Table A.7. The procedure calculates the difference in second-phase participation rates between treated and control students to determine how many additional treated classmates participated compared to the control group. The upper bound estimate assumes that the additional classmates induced by the award would have been the lowest-performing students and removes the lowest-scoring treated students from the sample by an amount equal to the excess participation. In contrast, the lower bound estimate uses the original, unmodified sample, including all participants. With this extreme assumption, the effect is now statistically significant at the 1% level, corresponding to an increase of 0.0321 standard deviations (21% increase relative to the control group mean).

5.2 Does awards to high-achieving students inadvertently discourage those at the lower end of the ability distribution?

While the award appears to motivate higher-achieving classmates, a potential concern is that it could simultaneously discourage relatively lower-performing students, particularly those unlikely to qualify for the second-phase Math Olympiad exam.

Because Math Olympiad outcomes are not observed for lower-achieving students, we instead examine school-related outcomes from the School Census that are more relevant for this group. Tables A.8 and A.9 show no statistically significant effects of the award on classmates' dropout or grade progression rates, providing no evidence that increased

[21] We report analogous results for participants in Tables B.2 and B.3, which likewise show no evidence that the award affected the composition of participants in the following year.

participation among high achievers adversely affects students at the lower end of the ability distribution.

5.3 How do the effects on classmates compare to the effects on award recipients?

To better assess the magnitude of classmate effects, we directly compare them to the impact of receiving the award on participants themselves. We find that effects on classmates are consistently smaller and less persistent than those for award recipients, suggesting that classmate effects operate through more limited and transitory mechanisms.

Tables 5 and 6 report estimates for participation in the second-phase Math Olympiad exam one and two years after the award for classmates and participants, respectively. Since the goal is to compare the same sample one year and two years after the award, we restricted the sample for grades for which we can observe the student at the school two years after the award. Hence, the sample is smaller than the ones presented in our main result. One year after the award, the effect on Honorable Mention recipients' participation is roughly six times larger than the corresponding classmate effect. Specifically, the classmate effect amounts to about 4.7% of the control-group mean (Table 5, column 1), whereas the participant effect corresponds to approximately 29% of the control-group mean (Table 6, column 1). Moreover, the effect persists for at least two years among award recipients (Table 6, column 2), while for classmates it is detectable only in the first subsequent year (Table 5, column 2).

A similar pattern emerges for other Math Olympiad outcomes, including scoring above the 50^{th} percentile (Tables A.10 and B.4), the 70^{th} percentile (Tables A.11 and B.5), the 90^{th} percentile (Tables A.12 and B.6).[22]. In all cases, classmate effects are smaller in magnitude and less persistent than the direct effects experienced by award recipients.

6 Robustness checks

Figures 5 to 9 present a series of robustness checks. We examine the sensitivity of the results to alternative specifications, including local linear regression, leave-one-out analysis (exclusion of one cohort-year at a time), and different bandwidth choices. In particular, we assess robustness to narrower bandwidths, ranging from 0.25 to 0.45 standard deviations, to determine whether the estimates are driven by observations near the cutoff.

Although some estimates lose statistical significance in the narrowest windows, the overall pattern of results remains stable across most specifications and outcomes. This

[22]The corresponding tables for the second-phase exam score are: Tables A.13 and B.7 however due to natural attrition in who shows up in each of the years this outcome does not help with the goal of keeping the sample of one and two years fixed

suggests that the findings are not sensitive to functional form assumptions, specific cohorts, or bandwidth selection. Taken together, these robustness checks support the credibility of the identification strategy and the stability of the estimated effects.[23]

7 Potential channels

Our results thus far show that exposure to a peer who receives an Honorable Mention significantly increases classmates' participation in the second phase of the subsequent Math Olympiad. This effect is concentrated among higher-achieving students, as reflected in a higher likelihood of scoring in the top percentiles. We now turn to the potential mechanisms underlying these effects.

For conciseness, we focus on two outcomes: (i) participation in the second phase of the Math Olympiad at $t+1$, and (ii) achieving a score above the 90$^{\text{th}}$ percentile at $t+1$. As discussed in Section 5, students who exceed this threshold are highly likely to receive an award.

While multiple mechanisms may be at play, many of which are difficult to test using administrative data, we provide suggestive evidence consistent with a motivational capital channel, whereby the award fosters a high-performance mindset among students (and possibly teachers). In this framework, the award may shift beliefs about students' abilities, perceptions of the returns to effort and education, and preferences. We also present evidence that does not support two alternative channels. First, we find no support for an information channel in which students become more aware of the Math Olympiad following a peer's success. Second, we find no evidence consistent with a resource or displacement channel, in which resources reallocated toward award recipients indirectly benefit their classmates.

We find that proximity to the awarded peer within the classroom, rather than merely attending the same school, is critical for the observed effects. While the award increases classmates' participation (Table 7) and the likelihood of scoring above the 90$^{\text{th}}$ percentile (Table A.14), it has no statistically significant impact on gradémates, defined as students in the same grade and school but in different classrooms. This pattern highlights the importance of direct classroom proximity and suggests that resource reallocation across classrooms is limited, as gradémates do not exhibit adverse outcomes. Although these results do not fully rule out an information channel, since awareness of the award may be less likely to spread beyond classroom boundaries, we provide additional evidence below that is inconsistent with a purely informational explanation.

[23] Figures B.5 to B.9 report analogous robustness checks for the effects of awards on participants and yield similarly consistent results.

Tables 8 and A.16 show that students who previously participated in the Math Olympiad exhibit larger responses to peer awards. The point estimates indicate that these classmates are substantially more responsive to the award than those without prior participation. This heterogeneity by past participation suggests that increased awareness alone, corresponding to the information channel, cannot fully account for the results, since prior participants were already aware of the competition. Moreover, because previous participants necessarily qualified for the second-phase exam, this evidence also points to the relevance of ability proximity in shaping peer effects.

The same tables further suggest that gender congruence between award recipients and classmates may amplify participation responses, whereas racial congruence does not.[24] In addition, the specific match between winner and classmate characteristics, such as sharing the same gender, appears to be more relevant for eliciting responses than the winner's minority status alone. Consistent with this interpretation, Tables A.18 and A.20 show no differential effects associated specifically with the winner being female, black, or brown.[25]

While we cannot entirely rule out the role of teacher behavior, the evidence on ability proximity and gender congruence suggests that at least part of the effect is transmitted directly through peer interactions among students. Consistent with this interpretation, Table A.24 shows that effects are stronger when classmates remain in the same classroom in year $t+1$, further indicating that spillovers depend on sustained direct contact between the award recipient and their peers.[26] Moreover, even if teacher behavior contributes to the observed effects, it is unlikely to operate through within-classroom reallocation of effort from lower-performing to higher-performing students, as we find no effect of the award on classmates' dropout rates (Table A.8).

Finally, while the components of the motivational capital channel, such as beliefs about students' abilities, perceptions of the returns to education, and preferences, are difficult to measure directly, we can assess some of their implications. For example, if the award leads students to update their beliefs about the returns to their current educational investments, one would expect them to remain in what they perceive to be a high-return educational environment. Consistent with this prediction, classmates are more likely to remain in the same school following the award (Appendix Table A.23), and the same

[24] The race measure is subject to greater measurement error and is therefore less reliable than the gender measure. Across years, the reported race of a given student changes for approximately 11% of students, while reported gender changes for only 0.6%. These discrepancies likely arise because demographic information is reported by school principals rather than by students themselves.

[25] We present similar results for the remaining outcomes in Tables A.15 to A.22.

[26] These coefficients should be interpreted with caution since we cannot rule out that the award directly affects the likelihood that classmates remain in the winner's classroom (Table A.25).

pattern holds for award recipients (Appendix Table B.8).

Overall, the evidence is consistent with the view that the award helps build motivational capital, enabling students who already possess the necessary skills and access to opportunities to actively pursue and seize them.

8 Conclusion

This paper exploits a natural experiment in Brazilian education policy to estimate peer spillovers from publicly recognizing a high-performing student. By combining administrative data from the Brazilian Math Olympiad with the national School Census, we track both award recipients and their classmates over time, regardless of changes in school or classroom assignment.

Our results reveal that recognition generates meaningful positive spillovers. Classmates of award recipients are 4.5% more likely to participate in the Math Olympiad the following year and 13% more likely to score above the 90$^{\text{th}}$ percentile. While smaller than the direct effects on recipients, these spillovers are substantial in the aggregate: each awardee typically shares a classroom with approximately 30 peers, so the total effect on the cohort considerably exceeds the direct effect on the individual. Crucially, we find no evidence that lower-achieving students are harmed, indicating that the gains do not come at the expense of others in the classroom.

The pattern of heterogeneous effects offers insight into the mechanism at work. The stronger spillovers observed under ability proximity and gender congruence, where the peer and the awardee share the same gender, are more consistent with a behavioral channel than with informational or resource-based explanations. This finding carries a cautionary implication: if the underrepresentation of certain groups in high-achievement settings reduces the salience of role models for those groups, recognition programs that perpetuate existing demographic imbalances may inadvertently reinforce them.

These results enrich the cost–benefit calculus of the Math Olympiad and similar academic competition programs. Prior evaluations of such programs have focused on effects for direct participants. Our findings show that the social returns include peer spillovers of meaningful magnitude, which standard program evaluations would miss. More broadly, they contribute to a growing literature on how peer exposure to high achievers shapes academic investment decisions, suggesting that the benefits of recognition-based policies, including academic awards and certain affirmative action interventions, can extend well beyond their immediate targets through social multiplier effects.

References

Agarwal, R. and Gaule, P. (2020). Invisible geniuses: Could the knowledge frontier advance faster? *American Economic Review: Insights*, 2(4):409–424.

Agarwal, R., Gaulé, P., and Jiang, Y. (2025). Finding Young Einsteins: Olympiads and STEM Talent Discovery. GTF Working Paper WP/25/01, Global Talent Fund.

Angrist, J., Bettinger, E., and Kremer, M. (2006). Long-term educational consequences of secondary school vouchers: Evidence from administrative records in Colombia. *American Economic Review*, 96(3):847–862.

Angrist, J. and Lavy, V. (2009). The effects of high stakes high school achievement awards: Evidence from a randomized trial. *American Economic Review*, 99(4):1384–1414.

Attanasio, O. P. and Kaufmann, K. M. (2017). Education choices and returns on the labor and marriage markets: Evidence from data on subjective expectations. *Journal of Economic Behavior & Organization*, 140:35–55.

Austen-Smith, D. and Fryer, R. G. (2005). An economic analysis of acting white. *The Quarterly Journal of Economics*, 120(2):551–583.

Avilova, T. and Goldin, C. (2018). What can uwe do for economics? *AEA Papers and Proceedings*, 108:186–190.

Borusyak, K. and Hull, P. (2023). Nonrandom exposure to exogenous shocks. *Econometrica*, 91(6):2155–2185.

Bradler, C., Dur, R., Neckermann, S., and Non, A. (2016). Employee Recognition and Performance: A Field Experiment. *Management Science*, 62(11):3085–3099.

Bursztyn, L. and Jensen, R. (2015). How Does Peer Pressure Affect Educational Investments? *The Quarterly Journal of Economics*, 130(3):1329–1367.

Calonico, S., Cattaneo, M. D., Farrell, M. H., and Titiunik, R. (2017). Rdrobust: Software for regression-discontinuity designs. *The Stata Journal*, 17(2):372–404.

Calonico, S., Cattaneo, M. D., and Titiunik, R. (2014). Robust Nonparametric Confidence Intervals for Regression-Discontinuity Designs. *Econometrica*, 82(6):2295–2326.

Carrell, S. E., Fullerton, R. L., and West, J. E. (2009). Does your cohort matter? measuring peer effects in college achievement. *Journal of Labor Economics*, 27(3):439–464.

Cattaneo, M. D., Jansson, M., and Ma, X. (2018). Manipulation testing based on density discontinuity. *The Stata Journal*, 18(1):234–261. st0522.

Cattaneo, M. D. and Titiunik, R. (2022). Regression Discontinuity Designs. *Annual Review of Economics*, 14:821–851.

Diamond, R. and Persson, P. (2016). The long-term consequences of teacher discretion in grading of high-stakes tests. Technical report, National Bureau of Economic Research.

Estevan, F., Moreira, D., and Saran, J. C. (2025). Math olympiad awards as stepping stones: Evidence from Brazil's national competition on university access and career outcomes. Unpublished manuscript.

Fryer, R. G. and Torelli, P. (2010). An empirical analysis of acting white. *Journal of Public Economics*, 94(5):380–396.

Gagete-Miranda, J. (2025). An Aspiring Friend Is a Friend Indeed: On the Mechanisms Behind Peer Influences on Human Capital Accumulation. Working paper.

Gallus, J. (2017). Fostering public good contributions with symbolic awards: A large scale natural field experiment at Wikipedia. *Management Science*, 63:3999–4015.

Genicot, G. and Ray, D. (2017). Aspirations and inequality. *Econometrica*, 85(2):489–519.

Hoxby, C. and Avery, C. (2013). The Missing "One-Offs": The Hidden Supply of High-Achieving, Low-Income Students. *Brookings Papers on Economic Activity*, pages 1–50.

Jensen, R. (2010). The (perceived) returns to education and the demand for schooling. *Quarterly Journal of Economics*, 125(2):515–548.

Kling, J. R., Liebman, J. B., and Katz, L. F. (2007). Experimental analysis of neighborhood effects. *Econometrica*, 75(1):83–119.

Kosfeld, M. and Neckermann, S. (2011). Getting more work for nothing? symbolic awards and worker performance. *American Economic Journal: Microeconomics*, 3(3):86–99.

Lee, D. S. and Lemieux, T. (2010). Regression discontinuity designs in economics. *Journal of Economic Literature*, 48(2):281–355.

Lemieux, T., MacLeod, W. B., and Parent, D. (2009). Performance pay and wage inequality. *The Quarterly Journal of Economics*, 124(1):1–49.

Levitt, S. D., List, J. A., Neckermann, S., and Sadoff, S. (2016). The behavioralist goes to school: Leveraging behavioral economics to improve educational performance. *American Economic Journal: Economic Policy*, 8(4):183–219.

Lyle, D. S. (2007). Estimating and interpreting peer and role model effects from randomly assigned social groups at West Point. *The Review of Economics and Statistics*, 89(2):289–299.

McCrary, J. (2008). Manipulation of the running variable in the regression discontinuity design: A density test. *Journal of Econometrics*, 142:698–714.

Megalokonomou, R., Vlassopoulos, M., and Zenou, Y. (2025). The impact of talented peers: Evidence from exposure to math award winners. CEPR Discussion Paper DP20351, Centre for Economic Policy Research (CEPR).

Neckermann, S., Cueni, R., and Frey, B. S. (2014). Awards at work. *Labour Economics*, 31:205–217.

Nguyen, T. (2008). Information, role models and perceived returns to education: Experimental evidence from Madagascar. Unpublished manuscript.

Ray, D. (2006). Aspirations, poverty, and economic change. *Understanding poverty*, pages 409–421.

Riley, E. (2024). Role models in movies: The impact of Queen of Katwe on students' educational attainment. *The Review of Economics and Statistics*, 106(2):334–351.

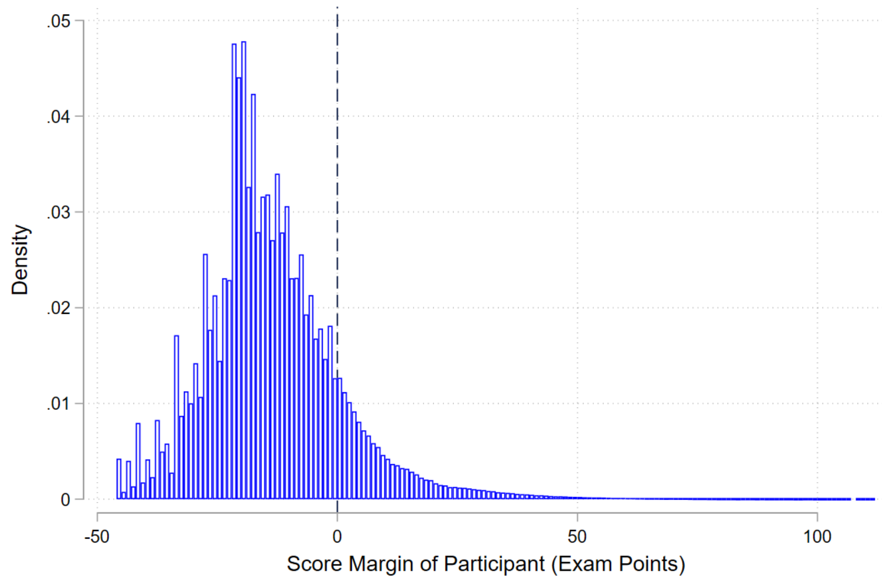
Robinson, C. D., Gallus, J., Lee, M. G., and Rogers, T. (2021). The demotivating effect (and unintended message) of awards. *Organizational Behavior and Human Decision Processes*, 163:51–64. Nudges and Choice Architecture in Organizations.

Sacerdote, B. (2001). Peer effects with random assignment: Results for Dartmouth roommates. *The Quarterly Journal of Economics*, 116(2):681–704.

Sequeira, S., Spinnewijn, J., and Xu, G. (2016). Rewarding schooling success and perceived returns to education: Evidence from India. *Journal of Economic Behavior & Organization*, 131:373–392.

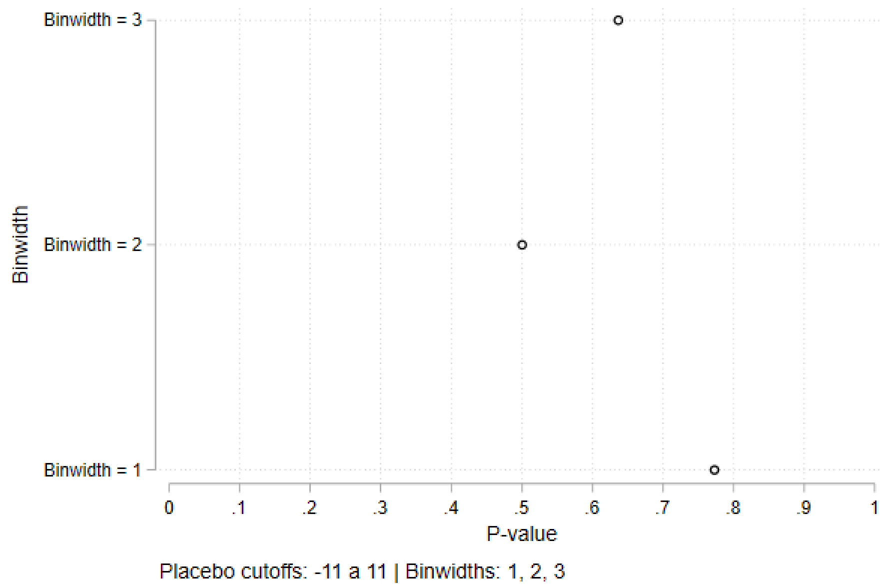
Figures and Tables

FIGURE 1: DENSITY AROUND CUTOFF



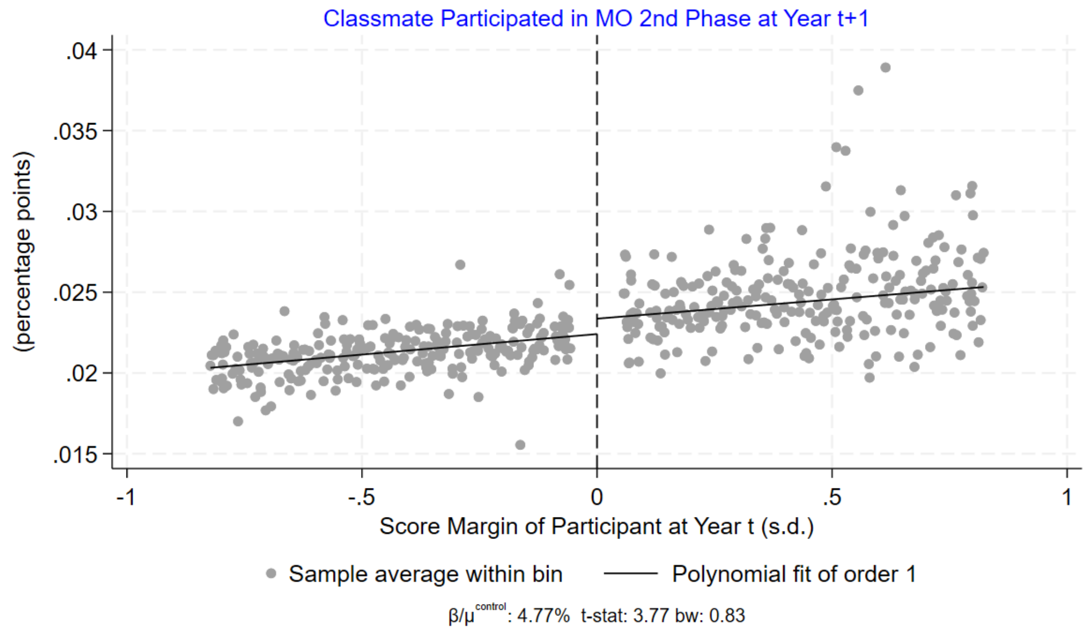
Source: 2[nd] Rd OBMEP Data, 2008-2017. Cutoff defined as the minimum Score in that particular Year and Level that achieved a Honorable Mention. Running Variable defined as the raw Exam Score of the student minus the student's defined raw Honorable Mention Cutoff. Data from all years available in dataset combined (2008-2017).

FIGURE 2: RANDOMIZATION INFERENCE PLACEBO CUTOFFS



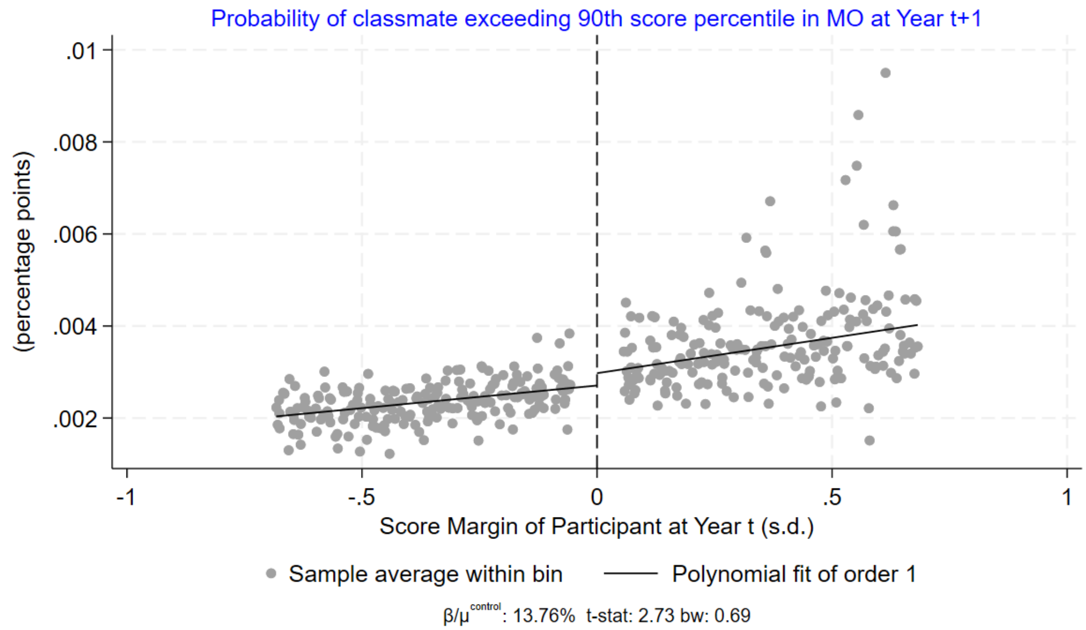
Notes: Source: 2nd Rd OBMEP data, 2008-2017. The running variable is the raw second-phase score minus the ex post Honorable Mention cutoff. The cutoff is defined as the minimum score among Honorable Mention recipients within the year, level, and state. The placebo distribution recomputes the same statistic at each integer pseudo-cutoff from -11 to 11, excluding 0. Pseudo-cutoffs with zero observations on either side are omitted. The empirical p-value is the share of placebo statistics whose absolute value is at least as large as the absolute statistic at the true cutoff. Each point reports the p-value for the binwidth shown on the y-axis.

FIGURE 3: REGRESSION DISCONTINUITY DESIGN: CLASSMATE SHOWN UP FOR MO 2ND PHASE AT YEAR T+1



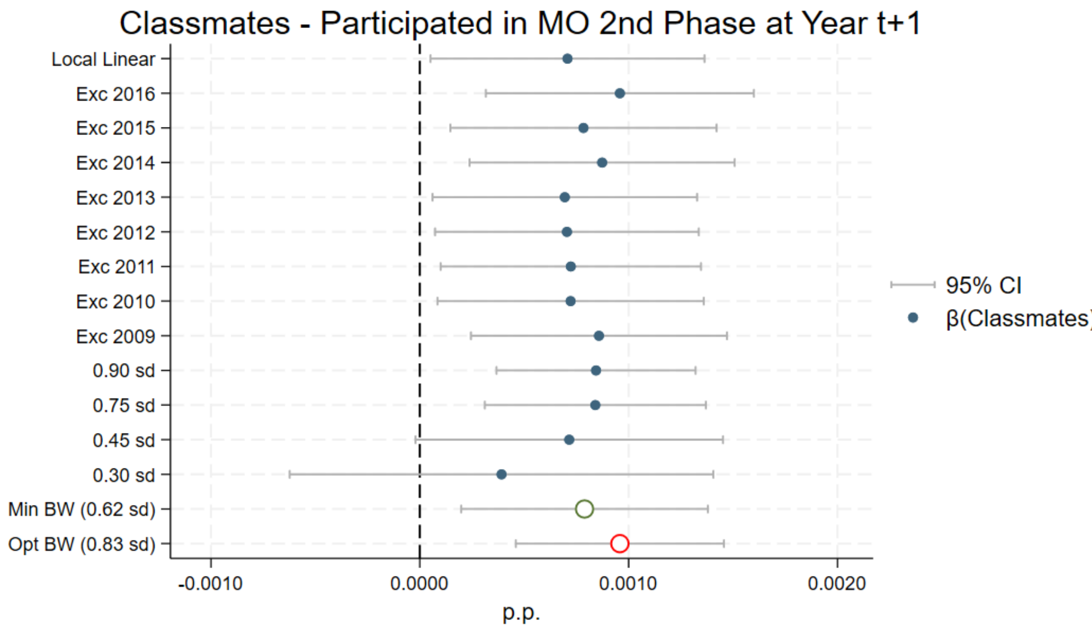
Source: 2nd Rd OBMEP Data, 2008-2017. This figure presents a regression-discontinuity (RD) plot of classmates' probability of participating in the second phase of the Math Olympiad (OBMEP) at year $t+1$. The running variable is the score margin of the highest-scoring participant in the classroom, defined as the standardized second-phase exam score minus the award cutoff (in standard deviations). The outcome variable equals one if the classmate participated in the second phase and zero otherwise. The solid lines are fitted values from local-linear regressions estimated separately on each side of the cutoff within the MSE-optimal bandwidth. Standard errors are clustered at the classroom level. The reported statistics are: $\beta/\mu^{control}$, the treatment-effect estimate as a share of the control-group mean; the t-statistic; and the MSE-optimal bandwidth in standard deviations.

FIGURE 4: REGRESSION DISCONTINUITY DESIGN: CLASSMATE SCORED ABOVE 90TH SCORE PERCENTILE AT YEAR T+1



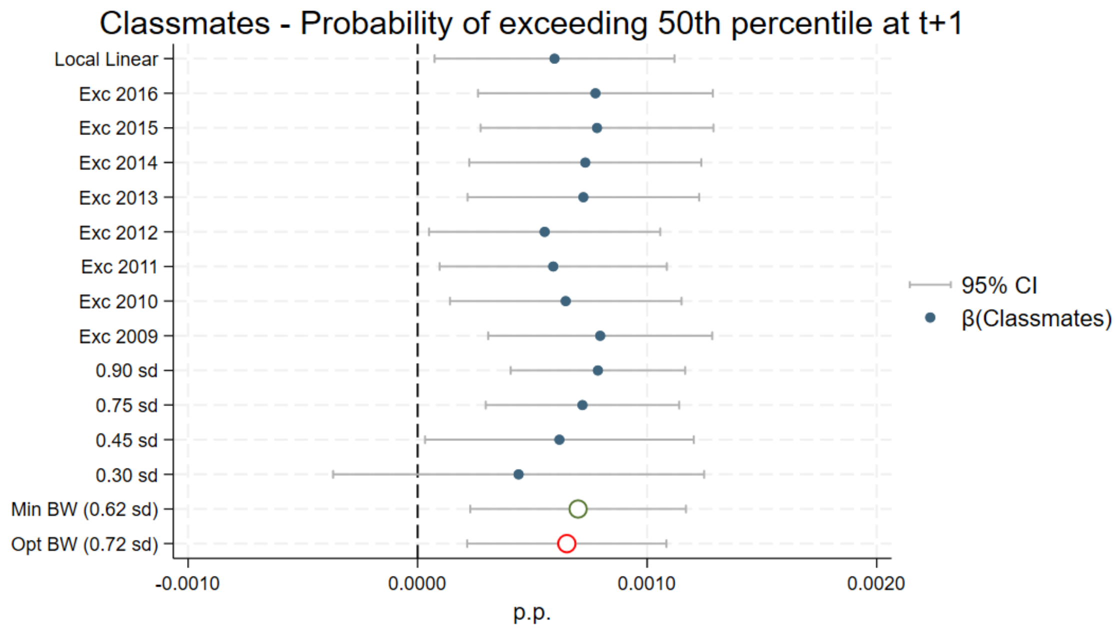
Source: 2nd Rd OBMEP Data, 2008-2017. This figure presents a regression-discontinuity (RD) plot of classmates' probability of exceeding the 90th percentile on the Math Olympiad (OBMEP) in year $t+1$. The running variable is the score margin of the highest-scoring participant in the classroom, defined as the standardized second-phase exam score minus the award cutoff (in standard deviations). The outcome variable equals one if the classmate's score exceeds the 90th percentile and zero otherwise. The solid lines are fitted values from local-linear regressions estimated separately on each side of the cutoff within the MSE-optimal bandwidth. Standard errors are clustered at the classroom level. The reported statistics are: $\beta/\mu^{control}$, the treatment-effect estimate as a share of the control-group mean; the t-statistic; and the MSE-optimal bandwidth in standard deviations.

FIGURE 5: CLASSMATE SHOWN UP FOR MO 2ND PHASE AT YEAR T+1



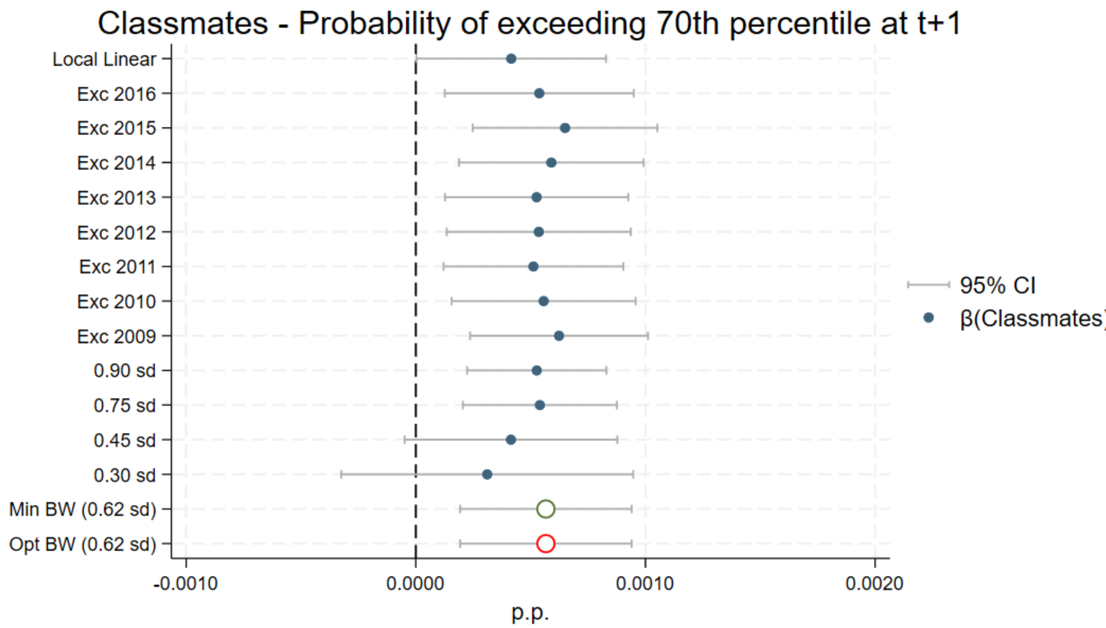
Notes: Source: 2nd Rd OBMEP data, 2008-2017. This figure reports robustness checks for the RD estimate of the effect of the classroom's highest-scoring participant scoring above the Honorable Mention cutoff in year t on classmates' probability of participating in the MO 2nd phase in year t+1; the outcome equals one if the classmate participated and zero otherwise. The treatment indicator equals 1 if the highest-scoring participant in the classroom scores above the award cutoff. The running variable is the score margin of the highest-scoring participant in the classroom, defined as the standardized second-phase exam score minus the award cutoff (in standard deviations). Each marker is the coefficient on the treatment indicator from a separate specification, and horizontal bars are 95% confidence intervals based on classroom-level clustered standard errors. The y-axis reports, in order: a local-linear rdrobust estimate with triangular kernel, the same covariates, and the minimum bandwidth; leave-one-year-out estimates excluding each year from 2009 to 2016 using the minimum bandwidth; fixed bandwidths of 0.90, 0.75, 0.45, and 0.30 standard deviations; the minimum bandwidth across classmate outcomes, and the MSE-optimal bandwidth for this outcome. The red hollow marker highlights the optimal-bandwidth estimate and the green hollow marker highlights the minimum-bandwidth estimate.

Figure 6: Classmate scored above 50th score percentile



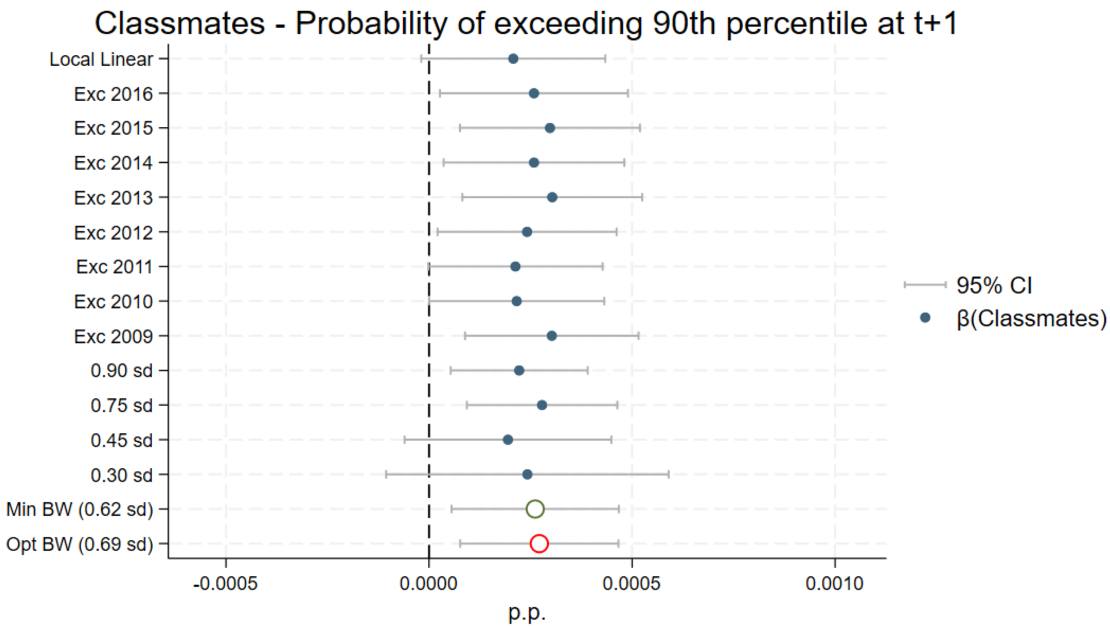
Notes: Source: 2[nd] Rd OBMEP data, 2008-2017. This figure reports robustness checks for the RD estimate of the effect of the classroom's highest-scoring participant scoring above the Honorable Mention cutoff in year t on classmates' probability of scoring above the median in the MO 2nd phase in year t+1; the outcome equals one if the classmate scored above the median and zero otherwise. The treatment indicator equals 1 if the highest-scoring participant in the classroom scores above the award cutoff. The running variable is the score margin of the highest-scoring participant in the classroom, defined as the standardized second-phase exam score minus the award cutoff (in standard deviations). Each marker is the coefficient on the treatment indicator from a separate specification, and horizontal bars are 95% confidence intervals based on classroom-level clustered standard errors. The y-axis reports, in order: a local-linear rdrobust estimate with triangular kernel, the same covariates, and the minimum bandwidth; leave-one-year-out estimates excluding each year from 2009 to 2016 using the minimum bandwidth; fixed bandwidths of 0.90, 0.75, 0.45, and 0.30 standard deviations; the minimum bandwidth across classmate outcomes, and the MSE-optimal bandwidth for this outcome. The red hollow marker highlights the optimal-bandwidth estimate and the green hollow marker highlights the minimum-bandwidth estimate.

FIGURE 7: CLASSMATE SCORED ABOVE 70TH SCORE PERCENTILE



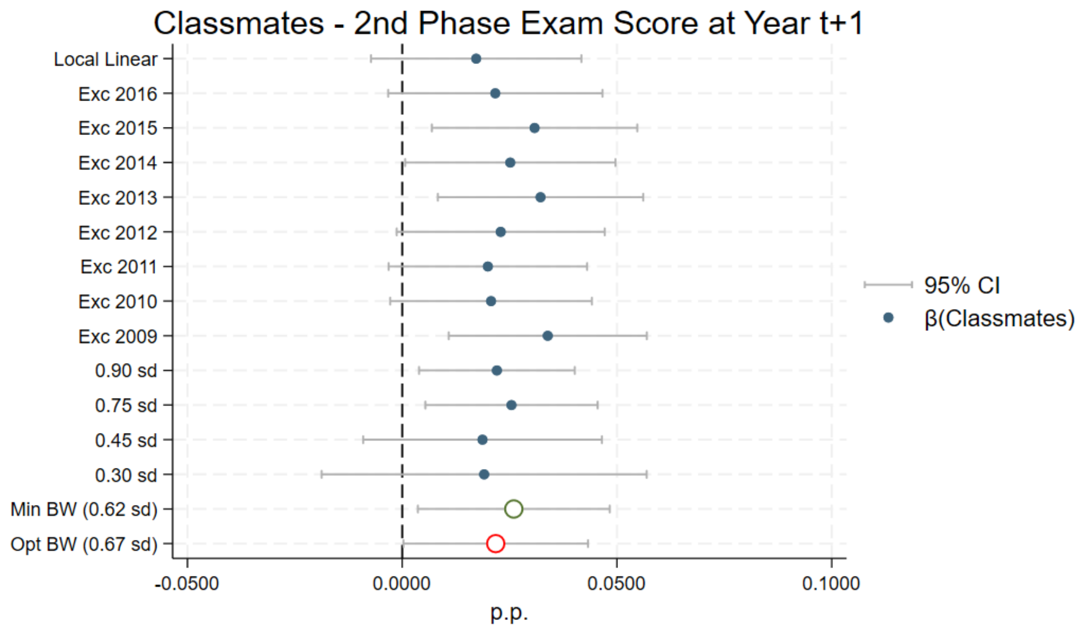
Notes: Source: 2nd Rd OBMEP data, 2008-2017. This figure reports robustness checks for the RD estimate of the effect of the classroom's highest-scoring participant scoring above the Honorable Mention cutoff in year t on classmates' probability of scoring above the 70th percentile in the MO 2nd phase in year t+1; the outcome equals one if the classmate scored above the 70th percentile and zero otherwise. The treatment indicator equals 1 if the highest-scoring participant in the classroom scores above the award cutoff. The running variable is the score margin of the highest-scoring participant in the classroom, defined as the standardized second-phase exam score minus the award cutoff (in standard deviations). Each marker is the coefficient on the treatment indicator from a separate specification, and horizontal bars are 95% confidence intervals based on classroom-level clustered standard errors. The y-axis reports, in order: a local-linear rdrobust estimate with triangular kernel, the same covariates, and the minimum bandwidth; leave-one-year-out estimates excluding each year from 2009 to 2016 using the minimum bandwidth; fixed bandwidths of 0.90, 0.75, 0.45, and 0.30 standard deviations; the minimum bandwidth across classmate outcomes, and the MSE-optimal bandwidth for this outcome. The red hollow marker highlights the optimal-bandwidth estimate and the green hollow marker highlights the minimum-bandwidth estimate.

FIGURE 8: CLASSMATE SCORED ABOVE 90TH SCORE PERCENTILE



Notes: Source: 2nd Rd OBMEP data, 2008-2017. This figure reports robustness checks for the RD estimate of the effect of the classroom's highest-scoring participant scoring above the Honorable Mention cutoff in year t on classmates' probability of scoring above the 90th percentile in the MO 2nd phase in year t+1; the outcome equals one if the classmate scored above the 90th percentile and zero otherwise. The treatment indicator equals 1 if the highest-scoring participant in the classroom scores above the award cutoff. The running variable is the score margin of the highest-scoring participant in the classroom, defined as the standardized second-phase exam score minus the award cutoff (in standard deviations). Each marker is the coefficient on the treatment indicator from a separate specification, and horizontal bars are 95% confidence intervals based on classroom-level clustered standard errors. The y-axis reports, in order: a local-linear rdrobust estimate with triangular kernel, the same covariates, and the minimum bandwidth; leave-one-year-out estimates excluding each year from 2009 to 2016 using the minimum bandwidth; fixed bandwidths of 0.90, 0.75, 0.45, and 0.30 standard deviations; the minimum bandwidth across classmate outcomes, and the MSE-optimal bandwidth for this outcome. The red hollow marker highlights the optimal-bandwidth estimate and the green hollow marker highlights the minimum-bandwidth estimate.

FIGURE 9: CLASSMATE'S 2ND PHASE EXAM SCORE



Notes: Source: 2nd Rd OBMEP data, 2008-2017. This figure reports robustness checks for the RD estimate of the effect of the classroom's highest-scoring participant scoring above the Honorable Mention cutoff in year t on classmates' standardized Exam Score in the MO 2nd phase in year t+1; the outcome is measured in standard-deviation units. The treatment indicator equals 1 if the highest-scoring participant in the classroom scores above the award cutoff. The running variable is the score margin of the highest-scoring participant in the classroom, defined as the standardized second-phase exam score minus the award cutoff (in standard deviations). Each marker is the coefficient on the treatment indicator from a separate specification, and horizontal bars are 95% confidence intervals based on classroom-level clustered standard errors. The y-axis reports, in order: a local-linear rdrobust estimate with triangular kernel, the same covariates, and the minimum bandwidth; leave-one-year-out estimates excluding each year from 2009 to 2016 using the minimum bandwidth; fixed bandwidths of 0.90, 0.75, 0.45, and 0.30 standard deviations; the minimum bandwidth across classmate outcomes, and the MSE-optimal bandwidth for this outcome. The red hollow marker highlights the optimal-bandwidth estimate and the green hollow marker highlights the minimum-bandwidth estimate.

TABLE 1: SUMMARY STATISTICS

	RD sample (1)	Full sample (2)
Panel A. School-level		
% of schools in the 1st quartile of test scores distribution	0.0980	0.2058
% of schools in the 2nd quartile of test scores distribution	0.2055	0.2537
% of schools in the 3rd quartile of test scores distribution	0.3058	0.2614
% of schools in the 4th quartile of test scores distribution	0.3648	0.2379
% of schools with missing test score data	0.0260	0.0413
School enrollment	718.52	688.55
	(447.9871)	(455.1125)
% of students taking ENEM	0.5788	0.5400
# of awards (last 2 years)	4.9826	3.4030
	(8.2392)	(8.7847)
# of classrooms	258,428	1,450,745
Panel B. Participant-level		
% female	0.4502	0.5002
% white	0.5952	0.4803
% participating in MO exam at t+1	0.1745	0.0986
% scoring above 50th percentile in MO at t+1	0.1608	0.0815
% scoring above 70th percentile in MO at t+1	0.1362	0.0668
% scoring above 90th percentile in MO at t+1	0.0680	0.0381
# of participants	258,428	1,450,745
Panel C. Classmate-level		
% female	0.5173	0.5125
% white	0.5119	0.4300
% participating in MO exam at t+1	0.0225	0.0197
% scoring above 50th percentile in MO at t+1	0.0136	0.0099
% scoring above 70th percentile in MO at t+1	0.0086	0.0059
% scoring above 90th percentile in MO at t+1	0.0027	0.0018
# of classmates	7,641,941	41,968,785

Notes: The table reports summary statistics (means with standard deviation in parentheses) for the RD sample, defined using the minimum bandwidth across the main outcomes, and for the full sample. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. Panel A reports school-level variables measured at the participants' classroom level, while Panels B and C report participant- and classmate-level variables, respectively. School test score distributions are constructed using Prova Brasil for grades 6–9 and ENEM for grades 10–12. Prova Brasil scores correspond to the sum of school-level average Math and Portuguese scores, using 9th-grade results when available and otherwise the closest available year or 5th-grade averages. ENEM scores correspond to the average school-level test score. ENEM participation is measured as the ratio of students who took the exam (from the ENEM dataset) to the number of students enrolled in the final grade of high school in the School Census. Prior and subsequent Math Olympiad participation and awards are identified using the School Census identifier. The indicators 'Female' and 'White' are constructed from School Census demographic data. 'Score above x^{th} percentile at $t+1$' is an indicator equal to one if the student's second-phase Math Olympiad score at $t+1$ exceeds the x^{th} percentile, and zero otherwise, including non-participants. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 2: Smoothness in Pre-Award Characteristics: all grades and fixed bandwidth of 0.6237

	β	t-stat	p-value	$\mu^{control}$	Sample size
Panel A. School level					
# of medals and honorable mentions (last 2 years)	0.0191	0.25	0.805	4.345	258,428
# of honorable mentions (last 2 years)	0.0225	0.35	0.726	3.900	258,428
Central West	-0.0031**	2.44	0.015	0.084	258,428
North	-0.0007	0.73	0.464	0.073	258,428
Northeast	-0.0017	1.02	0.307	0.209	258,428
South	-0.0005	0.24	0.814	0.172	258,428
Southeast	0.0060**	2.49	0.013	0.462	258,428
Municipal school	0.0014	0.37	0.710	0.321	258,428
Selective school	0.0030*	1.72	0.086	0.032	258,428
School in the 1st quartile of the test scores distribution	0.0028	1.16	0.246	0.112	258,428
School in the 2nd quartile of the test scores distribution	-0.0051	1.45	0.148	0.223	258,428
School in the 3rd quartile of the test scores distribution	0.0040	0.98	0.327	0.311	258,428
School in the 4th quartile of the test scores distribution	-0.0034	0.81	0.417	0.328	258,428
School with missing test score data	0.0016	1.15	0.250	0.027	258,428
School enrollment	1.2705	0.33	0.742	717.863	258,428
Rural school	0.0011	0.45	0.655	0.089	258,428
Panel B. Classmate level					
Grade attainment at t	0.0014	1.59	0.112	0.916	7,310,672
Participated in the MO exam at t	-0.0003	1.00	0.318	0.026	7,641,941
Scored above 50th percentile in MO at t	-0.0002	0.72	0.469	0.013	7,641,941
Scored above 70th percentile in MO at t	-0.0001	0.37	0.714	0.006	7,641,941
Scored above 90th percentile in MO at t	-0.0001**	2.29	0.022	0.000	7,641,941
Participated in the MO exam at t-1	-0.0002	0.80	0.425	0.021	7,641,941
Female	-0.0007	0.69	0.491	0.518	7,641,941
White	-0.0017	0.81	0.418	0.497	5,153,207
Panel C. Participant level					
Grade attainment at t	0.0014	1.18	0.239	0.977	250,045
Participated in the MO exam at t-1	0.0015	0.45	0.656	0.120	258,428
Scored above 50th percentile in MO at t-1	0.0030	0.93	0.353	0.105	258,428
Scored above 70th percentile in MO at t-1	0.0037	1.24	0.216	0.084	258,428
Scored above 90th percentile in MO at t-1	0.0025	1.08	0.279	0.039	258,428
Female	-0.0032	0.71	0.480	0.464	258,428
White	-0.0014	0.29	0.770	0.575	175,384

Notes: This table reports tests for smoothness in pre-award characteristics using the RD sample with the minimum bandwidth. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The first column reports the estimated β coefficients of the 'Above cutoff' variable on each outcome listed in the table, based on our main specification, which includes Math Olympiad level–state–cohort fixed effects. The second, third, fourth, and fifth columns report t-statistics, p-values, the mean of the control group, and sample size, respectively. Panel A reports school-level variables measured at the participants' classroom level. Panels B and C present outcomes at the participant and classmate levels, respectively School test score distributions are constructed using Prova Brasil for grades 6–9 and ENEM for grades 10–12. Prova Brasil scores correspond to the sum of school-level average Math and Portuguese scores, using 9^{th}-grade results when available and otherwise the closest available year or 5^{th}-grade averages. ENEM scores correspond to the average school-level test score. ENEM participation is measured as the ratio of students who took the exam (from the ENEM dataset) to the number of students enrolled in the final grade of high school in the School Census. Prior and subsequent Math Olympiad participation and awards are identified using the School Census identifier. The indicators 'Female' and 'White' are constructed from School Census demographic data. 'Score above x^{th} percentile at $t+1$' is an indicator equal to one if the student's second-phase Math Olympiad score at $t+1$ exceeds the x^{th} percentile, and zero otherwise, including non-participants. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

TABLE 3: IMPACT ON CLASSMATES OUTCOMES: PARTICIPATED IN MO 2ND PHASE AT YEAR $t+1$

	Min. bandwidth (h)		Opt. bandwidth (h)	
	(1)	(2)	(3)	(4)
Above cutoff	0.0008^{**}	0.0008^{***}	0.0010^{***}	0.0010^{***}
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Controls included	No	Yes	No	Yes
Control group mean	0.02143	0.02143	0.02096	0.02096
Bandwidth (h)	0.62366	0.62366	0.82688	0.82688
Classmates (obs.)	7,641,941	7,641,941	10,770,054	10,770,054

Notes: This table presents the impact of a participant's Honorable Mention award in year t on the participation of her classmates (as defined in t) in the second-phase Math Olympiad at $t+1$. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variable is a dummy equal to one if a student participated in the second-phase Olympiad exam at $t+1$. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. Columns (1) and (3) include Math Olympiad level–state–cohort fixed effects, while columns (2) and (4) additionally control for the variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90^{th} percentile at t). Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE 4: IMPACT ON CLASSMATES OUTCOMES: PROBABILITY OF EXCEEDING 90TH SCORE PERCENTILE IN MO AT YEAR $t+1$

	Min. bandwidth (h)		Opt. bandwidth (h)	
	(1)	(2)	(3)	(4)
Above cutoff	0.0003***	0.0003**	0.0003***	0.0003***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Controls included	No	Yes	No	Yes
Control group mean	0.00223	0.00223	0.00218	0.00218
Bandwidth (h)	0.62366	0.62366	0.68619	0.68619
Classmates (obs.)	7,641,941	7,641,941	8,499,762	8,499,762

Notes: This table presents the impact of a participant's Honorable Mention award in year t on her classmates' (as defined in t) probability of exceeding the 90th score percentile in the second-phase Math Olympiad at Year $t+1$. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variable is a dummy equal to one if a student exceeded the 90^{th} percentile of the score distribution in the Olympiad exam at $t+1$. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. Columns (1) and (3) include Math Olympiad level–state–cohort fixed effects, while columns (2) and (4) additionally control for the variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90^{th} percentile at t). Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE 5: IMPACT ON CLASSMATE OUTCOMES: PARTICIPATED IN MO 2ND PHASE AT YEAR $t+1$ OR $t+2$

	Min. bandwidth (h)		Opt. bandwidth (h)	
	t+1	t+2	t+1	t+2
Above cutoff	0.0010***	-0.0001	0.0011***	-0.0001
	(0.0003)	(0.0003)	(0.0004)	(0.0003)
Controls included	Yes	Yes	Yes	Yes
Control group mean	0.02129	0.01784	0.02130	0.01780
Bandwidth (h)	0.62366	0.62366	0.61265	0.61265
Classmates (obs.)	5,639,757	5,639,757	5,459,140	5,459,140

Notes: This table presents the impact of a participant's Honorable Mention award in year t on the participation of her classmates (as defined in t) in the second-phase Math Olympiad at $t+1$ and $t+2$. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variables are dummies equal to one if a student participated in the second-phase Olympiad exam at $t+1$ and $t+2$, respectively. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90^{th} percentile at t). Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE 6: IMPACT ON PARTICIPANT OUTCOMES: PARTICIPATED IN MO 2ND PHASE AT YEAR T+1 OR T+2

	Min. bandwidth (h)		Opt. bandwidth (h)	
	t+1	t+2	t+1	t+2
Above cutoff	0.0389***	0.0232***	0.0406***	0.0285***
	(0.0041)	(0.0037)	(0.0045)	(0.0040)
Controls included	Yes	Yes	Yes	Yes
Control group mean	0.13505	0.10372	0.13876	0.10625
Bandwidth (h)	0.62366	0.62366	0.54403	0.54403
Participants (obs.)	191,611	191,611	164,676	164,676

Notes: This table presents the impact of a participant's Honorable Mention award in year t on her participation in the second-phase Math Olympiad at $t+1$ and $t+2$. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variables are dummies equal to one if a student participated in the second-phase Olympiad exam at $t+1$ and $t+2$, respectively. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90th percentile at t). Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50th, 70th, and 90th percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70th percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE 7: HETEROGENEITY OF AWARD IMPACT ON PARTICIPATION IN MO'S 2ND PHASE AT YEAR $t+1$

	Min. bandwidth (h)			Opt. bandwidth (h)		
	Participant	Classmates	Grademates	Participant	Classmates	Grademates
	(1)	(2)	(3)	(4)	(5)	(6)
Above cutoff	0.0468***	0.0008**	0.0001	0.0478***	0.0008***	0.0002
	(0.0037)	(0.0003)	(0.0002)	(0.0040)	(0.0003)	(0.0002)
Control group mean	0.1422	0.0222	0.0244	0.1460	0.0220	0.0242
Bandwidth (h)	0.6237	0.6237	0.6237	0.5528	0.7710	0.7877
Observations	247,534	247,534	247,534	215,411	317,582	322,564

Notes: This table presents the impact of a participant's Honorable Mention award in year t on her participation in the second-phase Math Olympiad at $t+1$, as well as her classmates' and grademates' participation. The data include applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 between 2009 and 2016. All regressions are estimated at the classroom level. Columns (1) and (4) report outcomes for the participant. Columns (2) and (5) report outcomes for classmates, measured as classroom-level averages excluding the participant herself. Columns (3) and (6) report outcomes for grademates outside the participant's classroom, measured as classroom-level averages of each variable excluding the participant's classroom. Estimation at the classroom level is necessary to account for the fact that a given student may be a grademate of both barely winners and barely losers in different classrooms. We link Olympiad data to the corresponding year's Brazilian School Census using gender, school, grade, and birth date. The unique School Census identifier enables us to track students across years and merge additional Census information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variables are dummies equal to one if a student participated in the second-phase Olympiad exam at $t+1$. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90^{th} percentile at t). Results are presented for both minimum (columns (1)-(3)) and optimal (columns (4)-(6)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE 8: HETEROGENEITY OF AWARD IMPACT ON CLASSMATES' PARTICIPATION IN MO'S 2ND PHASE AT YEAR $t+1$ BY ABILITY PROXIMITY

	Min. bandwidth (h)		Opt. bandwidth (h)	
Panel A. Ability Proximity	(1)	(2)	(3)	(4)
Above cutoff	0.0008***	0.0005*	0.0010***	0.0008***
	(0.0003)	(0.0003)	(0.0003)	(0.0002)
Above cutoff × Participated before		0.0063***		0.0048**
		(0.0024)		(0.0020)
Linear Combination: β		0.0069		0.0056
Linear Combination: s.e.		0.0025		0.0021
Control group mean	0.0214	0.0214	0.0210	0.0210
Bandwidth (h)	0.6237	0.6237	0.8269	0.8269
Classmates (obs.)	7,641,941	7,641,941	10,770,054	10,770,054
Panel B. Social Similarity	(1)	(2)	(3)	(4)
Above cutoff	0.0003	0.0015**	0.0006*	0.0011**
	(0.0004)	(0.0006)	(0.0003)	(0.0005)
Above cutoff × Same gender	0.0011**		0.0006	
	(0.0005)		(0.0004)	
Above cutoff × Same race		-0.0007		-0.0003
		(0.0007)		(0.0006)
Linear Combination: β	0.0013	0.0008	0.0013	0.0008
Linear Combination: s.e.	0.0004	0.0005	0.0003	0.0004
Control group mean	0.0214	0.0227	0.0210	0.0222
Bandwidth (h)	0.6237	0.6237	0.8269	0.8269
Classmates (obs.)	7,641,941	4,294,456	10,770,054	5,962,111

Notes: This table presents heterogeneous effects of a participant's Honorable Mention award in year t on her classmates' participation in the second-phase Math Olympiad at $t+1$, considering their ability proximity (Panel A) and social similarity (Panel B). The data include applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 between 2009 and 2016. All regressions are estimated at the classroom level. We link Olympiad data to the corresponding year's Brazilian School Census using gender, school, grade, and birth date. The unique School Census identifier enables us to track students across years and merge additional Census information. The outcome variable is a dummy equal to one if a student participated in the second-phase Olympiad exam at $t+1$. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. The regression model in all columns follows Equation 1 in Section 4. In selected specifications, we augment the baseline model with interaction terms that allow the treatment effect to vary along specific dimensions of peer similarity. In Panel A, columns (2) and (4), we interact the treatment indicator with an indicator for whether the classmate had previously participated in the Math Olympiad, capturing differential effects by prior exposure. In Panel B, columns (1) and (3), we include an interaction between the treatment indicator and an indicator for gender match between the classmate and the award recipient. In Panel B, columns (2) and (4), we analogously interact the treatment indicator with an indicator for racial match. These interactions allow the estimated discontinuity to vary by prior participation and by demographic congruence with the awardee. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90th percentile at t). Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50th, 70th, and 90th percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70th percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

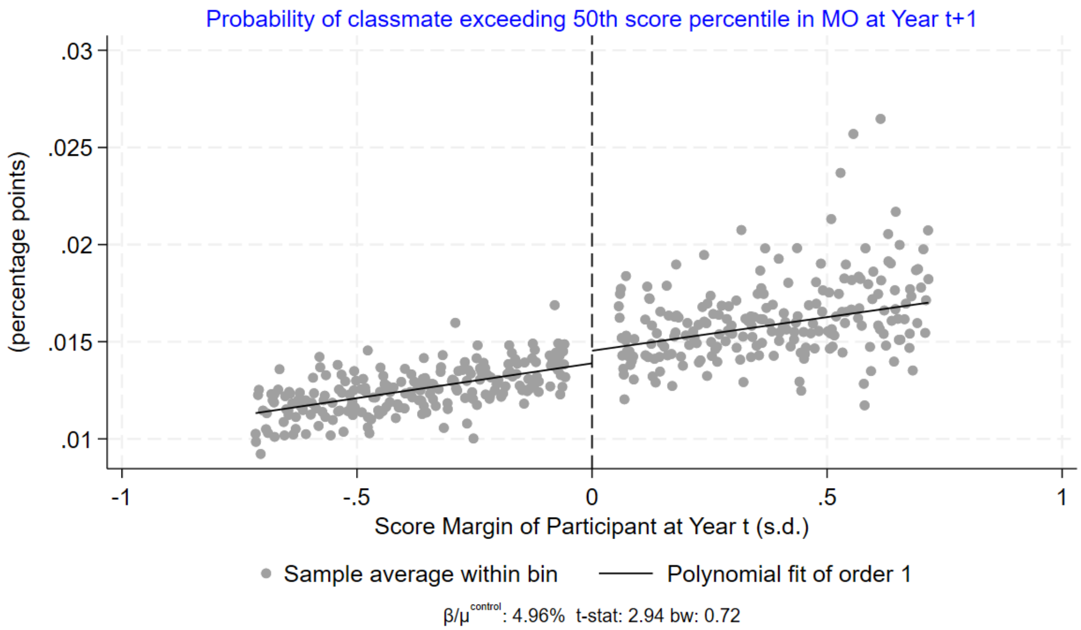
Online Appendix For

“Success Spills Over: How Awards Affect Winners’ Peers in Brazil”

Diana Moreira Fernanda Estevan

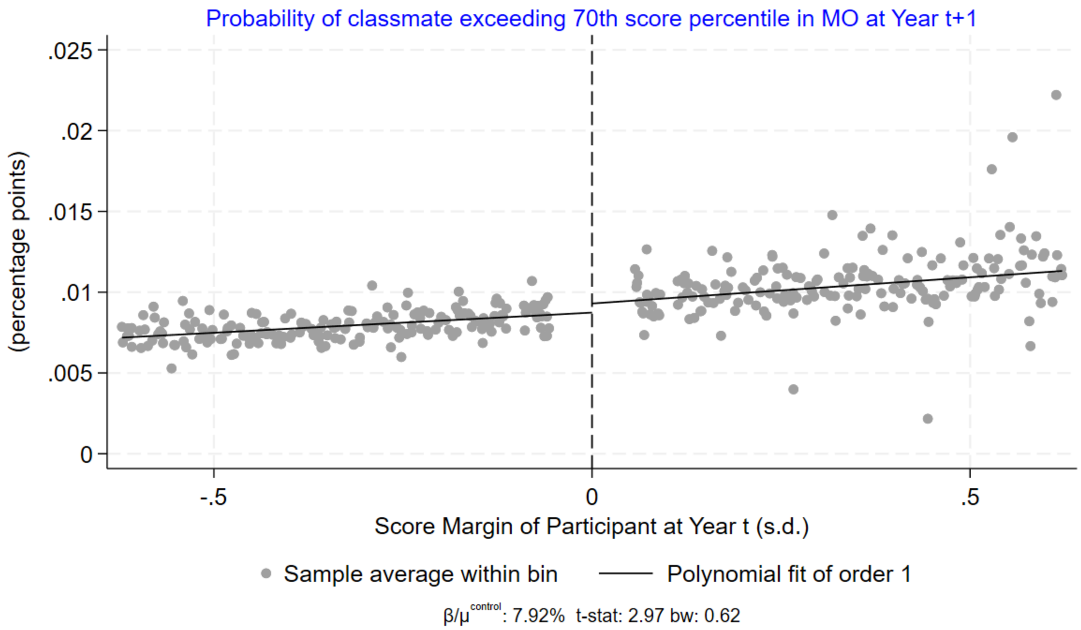
Appendix A – Classmates Figures and Tables

FIGURE A.1: REGRESSION DISCONTINUITY DESIGN: CLASSMATE SCORED ABOVE 50TH SCORE PERCENTILE AT YEAR T+1



Source: 2nd Rd OBMEP Data, 2008-2017. This figure presents a regression-discontinuity (RD) plot of classmates' probability of exceeding the 50th percentile on the Math Olympiad (OBMEP) in year $t+1$. The running variable is the score margin of the highest-scoring participant in the classroom, defined as the standardized second-phase exam score minus the award cutoff (in standard deviations). The outcome variable equals one if the classmate's score exceeds the 50th percentile and zero otherwise. The solid lines are fitted values from local-linear regressions estimated separately on each side of the cutoff within the MSE-optimal bandwidth. Standard errors are clustered at the classroom level. The reported statistics are: $\beta/\mu^{control}$, the treatment-effect estimate as a share of the control-group mean; the t-statistic; and the MSE-optimal bandwidth in standard deviations.

FIGURE A.2: REGRESSION DISCONTINUITY DESIGN: CLASSMATE SCORED ABOVE 70TH SCORE PERCENTILE AT YEAR T+1



Source: 2nd Rd OBMEP Data, 2008-2017. This figure presents a regression-discontinuity (RD) plot of classmates' probability of exceeding the 70th percentile on the Math Olympiad (OBMEP) in year $t+1$. The running variable is the score margin of the highest-scoring participant in the classroom, defined as the standardized second-phase exam score minus the award cutoff (in standard deviations). The outcome variable equals one if the classmate's score exceeds the 70th percentile and zero otherwise. The solid lines are fitted values from local-linear regressions estimated separately on each side of the cutoff within the MSE-optimal bandwidth. Standard errors are clustered at the classroom level. The reported statistics are: $\beta/\mu^{control}$, the treatment-effect estimate as a share of the control-group mean; the t-statistic; and the MSE-optimal bandwidth in standard deviations.

TABLE A.1: IMPACT ON CLASSMATES OUTCOMES: AWARDED WITH ANY PRIZE (MEDAL OR HM) AT YEAR $t+1$

	Min. bandwidth (h)		Opt. bandwidth (h)	
	(1)	(2)	(3)	(4)
Above cutoff	0.0002*	0.0002*	0.0002*	0.0002*
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Controls included	No	Yes	No	Yes
Control group mean	0.00272	0.00272	0.00268	0.00268
Bandwidth (h)	0.62366	0.62366	0.65041	0.65041
Classmates (obs.)	7,641,941	7,641,941	8,020,388	8,020,388

Notes: This table presents the impact of a participant's Honorable Mention award in year t on her classmates' (as defined in t) probability of winning any prize (medal or Honorable Mention) in the second-phase Math Olympiad at $t+1$. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variable is a dummy equal to one if a student won any prize in the second-phase Olympiad exam at $t+1$. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. Columns (1) and (3) include grade and Math Olympiad cohort-year fixed effects, while columns (2) and (4) additionally control for the Central West region, which is a variable that exhibits some imbalance in Table 2. Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE A.2: IMPACT ON CLASSMATES OUTCOMES: PROBABILITY OF EXCEEDING 50TH SCORE PERCENTILE IN MO AT YEAR $t+1$

	Min. bandwidth (h)		Opt. bandwidth (h)	
	(1)	(2)	(3)	(4)
Above cutoff	0.0007***	0.0007***	0.0006***	0.0006***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Controls included	No	Yes	No	Yes
Control group mean	0.01235	0.01235	0.01209	0.01209
Bandwidth (h)	0.62366	0.62366	0.71634	0.71634
Classmates (obs.)	7,641,941	7,641,941	8,919,706	8,919,706

Notes: This table presents the impact of a participant's Honorable Mention award in year t on her classmates' (as defined in t) probability of exceeding the 50th score percentile in the second-phase Math Olympiad at Year $t+1$. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variable is a dummy equal to one if a student exceeded the 50^{th} percentile of the score distribution in the Olympiad exam at $t+1$. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. Columns (1) and (3) include Math Olympiad level–state–cohort fixed effects, while columns (2) and (4) additionally control for the variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90^{th} percentile at t). Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE A.3: IMPACT ON CLASSMATES OUTCOMES: PROBABILITY OF EXCEEDING 70TH SCORE PERCENTILE IN MO AT YEAR $t + 1$

	Min. bandwidth (h)		Opt. bandwidth (h)	
	(1)	(2)	(3)	(4)
Above cutoff	0.0006^{***}	0.0006^{***}	0.0006^{***}	0.0006^{***}
	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Controls included	No	Yes	No	Yes
Control group mean	0.00758	0.00758	0.00758	0.00758
Bandwidth (h)	0.62366	0.62366	0.62366	0.62366
Classmates (obs.)	7,641,941	7,641,941	7,641,941	7,641,941

Notes: This table presents the impact of a participant's Honorable Mention award in year t on her classmates' (as defined in t) probability of exceeding the 70th score percentile in the second-phase Math Olympiad at Year $t + 1$. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variable is a dummy equal to one if a student exceeded the 70$^{\text{th}}$ percentile of the score distribution in the Olympiad exam at $t + 1$. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. Columns (1) and (3) include Math Olympiad level–state–cohort fixed effects, while columns (2) and (4) additionally control for the variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90$^{\text{th}}$ percentile at t). Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50$^{\text{th}}$, 70$^{\text{th}}$, and 90$^{\text{th}}$ percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70$^{\text{th}}$ percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE A.4: IMPACT ON CLASSMATES OUTCOMES: SCORE IN MO 2ND PHASE AT YEAR $t+1$

	Min. bandwidth (h)		Opt. bandwidth (h)	
	(1)	(2)	(3)	(4)
Above cutoff	0.0283**	0.0260**	0.0218*	0.0218**
	(0.0121)	(0.0114)	(0.0117)	(0.0110)
Controls included	No	Yes	No	Yes
Control group mean	0.15259	0.15259	0.14743	0.14743
Bandwidth (h)	0.62366	0.62366	0.67253	0.67253
Classmates (obs.)	171,880	171,880	184,756	184,756

Notes: This table presents the impact of a participant's Honorable Mention award in year t on the test score of her classmates (as defined in t) in the second-phase Math Olympiad at $t+1$. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variable is the test score in the second phase of the Olympiad exam at $t+1$. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. Columns (1) and (3) include Math Olympiad level–state–cohort fixed effects, while columns (2) and (4) additionally control for the variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90$^{\text{th}}$ percentile at t). Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50$^{\text{th}}$, 70$^{\text{th}}$, and 90$^{\text{th}}$ percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70$^{\text{th}}$ percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p<0.1$, ** $p<0.05$, *** $p<0.01$

Table A.5: Correlation with Exam Score residuals (Pairwise) - Classmates

	Exam Score	Age	Female	Non-White	2p before	School $\geq$ Median
Exam Score	1.000					
Age	-0.094***	1.000				
Female	-0.054***	-0.057***	1.000			
Non-White	-0.050***	0.036***	0.002***	1.000		
2p before	0.151***	-0.034***	-0.001	-0.012***	1.000	
School $\geq$ Median	0.141***	-0.069***	-0.001**	-0.052***	0.003***	1.000

Notes: This table reports pairwise correlations among variables after residualizing them on grade and year fixed effects. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The variables are those used to construct the summary index, computed following Kling et al. (2007). Correlations use pairwise deletion of missing values. Estimates are computed within the minimum bandwidth (0.5479) and restricted to the control group (untreated observations within the bandwidth). The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE A.6: IMPACT OF AWARD ON COMPOSITION OF CLASSMATES WHO PARTICIPATE IN MO EXAM AT $t+1$

	Min. BW						Avg. BW					
	Age	Female	Non-W	2p before	Sch $\geq$ M	S.M.	Age	Female	Non-W	2p before	Sch $\geq$ M	S.M.
Above cutoff	0.0072	-0.0006	0.0053	0.0081**	0.0008	0.0024	0.0040	-0.0001	0.0026	0.0060*	0.0041	0.0038
	(0.0125)	(0.0057)	(0.0055)	(0.0039)	(0.0067)	(0.0054)	(0.0116)	(0.0053)	(0.0051)	(0.0036)	(0.0062)	(0.0050)
Control group mean	13.6117	0.5188	0.3199	0.1267	0.6528	.	13.5942	0.5198	0.3214	0.1250	0.6470	.
Bandwidth (h)	0.6237	0.6237	0.6237	0.6237	0.6237	0.6237	0.7051	0.7051	0.7051	0.7051	0.7051	0.7051
Participants (obs.)	171,880	171,880	171,880	171,880	171,880	171,880	196,144	196,144	196,144	196,144	196,144	196,144

Notes: This table presents the impact of a participant's Honorable Mention award in year t on the composition of her classmates who participate in the second-phase Math Olympiad exam at year $t+1$. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier enables tracking students over time and merging with additional school information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variables are: the age of the individual; an indicator of the individual being female; 'Non-W' is an indicator of the individual being non-white; '2p before' is a dummy equal to one if the individual qualified for the Math Olympiad second phase at $t-1$ or $t-2$; 'Sch $\geq$ Med' is a dummy equal to one if the individual's school places above median in the school quality distribution; 'Summary' is the summary index computed following Kling et al. (2007). To construct the index, pairwise correlations among covariates were first estimated for the control group after residualizing on the fixed effects (Table A.5). Covariates whose residualized values are negatively correlated with the others were recoded (sign-reversed) so that all components point in a common direction before aggregation. Results are shown for the minimum and average bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The average bandwidth is the average between optimal bandwidths associated with the same three outcomes. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE A.7: IMPACT OF AWARD ASSIGNED AT YEAR T ON MO SCORE AT YEAR $t + 1$ (CLASSMATES)

	MO Score at Year t+1	
	Lower Bound	Upper Bound
Above cutoff	0.0260**	0.0321***
	(0.0114)	(0.0114)
Controls included	Yes	Yes
Students (obs.)	171,880	171,679
Classrooms (Clusters)	109,820	109,718
Dep. variable control mean	.15	.15

Notes: This table presents the upper and lower bound impact of a participant's Honorable Mention award in year t on the test score of her classmates (as defined in t) in the second-phase Math Olympiad at $t + 1$. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The lower bound corresponds to the results of our main specification, given by Equation 1 presented in Section 4. The upper bound adjusts the treatment sample accounting for the potential selection bias generated by the award impact on participation in the Math Olympiad. The correction is based on Angrist et al. (2006) and consists of including only the upper part of the distribution of scores, which assumes that the students who would not have participated in the absence of the classmate's award score at the bottom of the distribution. The outcome variable is the test score in the second phase of the Olympiad exam at $t + 1$. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. Both columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90th percentile at t). Results are presented for the minimum bandwidth. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50th, 70th, and 90th percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70th percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE A.8: IMPACT ON CLASSMATE OUTCOMES: DROPOUT IN $t+1$ OR $t+2$

	Min. bandwidth (h)		Opt. bandwidth (h)	
	t+1	t+2	t+1	t+2
Above cutoff	-0.0001	-0.0006	0.0003	-0.0000
	(0.0007)	(0.0010)	(0.0007)	(0.0009)
Controls included	Yes	Yes	Yes	Yes
Control group mean	0.06581	0.11325	0.06673	0.11475
Bandwidth (h)	0.62366	0.62366	0.64667	0.64667
Classmates (obs.)	5,639,757	5,639,757	5,950,879	5,950,879

Notes: This table presents the impact of a participant's Honorable Mention award in year t on her classmates' probability of dropping out of school at $t+1$ and $t+2$. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variables are dummies equal to one if a student dropped out of school at $t+1$ and $t+2$, respectively. We obtain the dropout data from the Census. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90th percentile at t). Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50th, 70th, and 90th percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70th percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE A.9: IMPACT ON CLASSMATE OUTCOMES: GRADE PROGRESSION FROM t TO $t+2$

	Min. bandwidth (h)		Opt. bandwidth (h)	
	t+1	t+2	t+1	t+2
Above cutoff	-0.0002	0.0012	-0.0000	0.0011
	(0.0014)	(0.0027)	(0.0015)	(0.0028)
Controls included	Yes	Yes	Yes	Yes
Control group mean	0.82067	1.58848	0.82181	1.58990
Bandwidth (h)	0.62366	0.62366	0.60767	0.60767
Classmates (obs.)	5,639,757	5,639,757	5,357,599	5,357,599

Notes: This table presents the impact of a participant's Honorable Mention award in year t on her classmates' grade progression from t to $t+2$. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variables are the number of grades the individual progressed from t to $t+1$ and t to $t+2$, respectively. We obtain the grade progression data from the Census. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90th percentile at t). Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50th, 70th, and 90th percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70th percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE A.10: IMPACT ON CLASSMATE OUTCOMES: PROBABILITY OF EXCEEDING 50TH SCORE PERCENTILE IN MO AT YEAR $t+1$ OR $t+2$

	Min. bandwidth (h)		Opt. bandwidth (h)	
	t+1	t+2	t+1	t+2
Above cutoff	0.0007**	0.0000	0.0005*	-0.0001
	(0.0003)	(0.0002)	(0.0003)	(0.0003)
Controls included	Yes	Yes	Yes	Yes
Control group mean	0.01210	0.01016	0.01220	0.01025
Bandwidth (h)	0.62366	0.62366	0.57675	0.57675
Classmates (obs.)	5,639,757	5,639,757	5,144,671	5,144,671

Notes: This table presents the impact of a participant's Honorable Mention award in year t on her classmates' probability of exceeding the 50th score percentile in the second-phase Math Olympiad at $t+1$ and $t+2$. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variables are dummies equal to one if a student exceeded the 50th score percentile in the second-phase Olympiad exam at $t+1$ and $t+2$, respectively. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90^{th} percentile at t). Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE A.11: IMPACT ON CLASSMATE OUTCOMES: PROBABILITY OF EXCEEDING 70TH SCORE PERCENTILE IN MO AT YEAR $t+1$ OR $t+2$

	Min. bandwidth (h)		Opt. bandwidth (h)	
	t+1	t+2	t+1	t+2
Above cutoff	0.0005**	0.0001	0.0005**	0.0001
	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Controls included	Yes	Yes	Yes	Yes
Control group mean	0.00751	0.00613	0.00759	0.00625
Bandwidth (h)	0.62366	0.62366	0.54663	0.54663
Classmates (obs.)	5,639,757	5,639,757	4,852,101	4,852,101

Notes: This table presents the impact of a participant's Honorable Mention award in year t on her classmates' probability of exceeding the 70th score percentile in the second-phase Math Olympiad at $t+1$ and $t+2$. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variables are dummies equal to one if a student exceeded the 70th score percentile in the second-phase Olympiad exam at $t+1$ and $t+2$, respectively. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90^{th} percentile at t). Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE A.12: IMPACT ON CLASSMATE OUTCOMES: PROBABILITY OF EXCEEDING 90TH SCORE PERCENTILE IN MO AT YEAR $t+1$ OR $t+2$

	Min. bandwidth (h)		Opt. bandwidth (h)	
	t+1	t+2	t+1	t+2
Above cutoff	0.0002**	-0.0001	0.0003**	-0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Controls included	Yes	Yes	Yes	Yes
Control group mean	0.00228	0.00171	0.00218	0.00163
Bandwidth (h)	0.62366	0.62366	0.73634	0.73634
Classmates (obs.)	5,639,757	5,639,757	6,874,806	6,874,806

Notes: This table presents the impact of a participant's Honorable Mention award in year t on her classmates' probability of exceeding the 90th score percentile in the second-phase Math Olympiad at $t+1$ and $t+2$. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variables are dummies equal to one if a student exceeded the 90th score percentile in the second-phase Olympiad exam at $t+1$ and $t+2$, respectively. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90th percentile at t). Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50th, 70th, and 90th percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70th percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE A.13: IMPACT ON CLASSMATE OUTCOMES: 2ND PHASE EXAM SCORE IN MO AT YEAR $t+1$ OR $t+2$

	Min. bandwidth (h)		Opt. bandwidth (h)	
	t+1	t+2	t+1	t+2
Above cutoff	0.0155	0.0194	0.0129	0.0175
	(0.0138)	(0.0138)	(0.0132)	(0.0133)
Controls included	Yes	Yes	Yes	Yes
Control group mean	0.15044	0.11201	0.14560	0.10856
Bandwidth (h)	0.62366	0.62366	0.66829	0.66829
Classmates (obs.)	125,206	105,583	134,482	112,775

Notes: This table presents the impact of a participant's Honorable Mention award in year t on her classmates' exam score in the second-phase Math Olympiad at $t+1$ and $t+2$. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variables are the exam score in the second-phase Olympiad exam at $t+1$ and $t+2$, respectively. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90th percentile at t). Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50th, 70th, and 90th percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70th percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE A.14: HETEROGENEITY OF AWARD IMPACT ON PROBABILITY OF EXCEEDING 90TH SCORE PERCENTILE IN MO AT YEAR $t+1$

	Min. bandwidth (h)			Opt. bandwidth (h)		
	Participant	Classmates	Grademates	Participant	Classmates	Grademates
	(1)	(2)	(3)	(4)	(5)	(6)
Above cutoff	0.0190***	0.0002**	0.0001*	0.0161***	0.0002*	0.0001
	(0.0026)	(0.0001)	(0.0001)	(0.0034)	(0.0001)	(0.0001)
Control group mean	0.0441	0.0022	0.0040	0.0523	0.0022	0.0040
Bandwidth (h)	0.6237	0.6237	0.6237	0.4211	0.6636	0.5899
Observations	247,534	247,534	247,534	151,494	264,647	228,406

Notes: This table presents the impact of a participant's Honorable Mention award in year t on her probability of exceeding the 90^{th} percentile in the second-phase Math Olympiad at $t+1$, as well as her classmates' and grademates' probabilities. The data include applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 between 2009 and 2016. All regressions are estimated at the classroom level. Columns (1) and (4) report outcomes for the participant. Columns (2) and (5) report outcomes for classmates, measured as classroom-level averages excluding the participant herself. Columns (3) and (6) report outcomes for grademates outside the participant's classroom, measured as classroom-level averages of each variable excluding the participant's classroom. Estimation at the classroom level is necessary to account for the fact that a given student may be a grademate of both barely winners and barely losers in different classrooms. We link Olympiad data to the corresponding year's Brazilian School Census using gender, school, grade, and birth date. The unique School Census identifier enables us to track students across years and merge additional Census information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variables are dummies equal to one if a student exceeded the 90^{th} percentile in the second-phase Olympiad exam at $t+1$. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90^{th} percentile at t). Results are presented for both minimum (columns (1)-(3)) and optimal (columns (4)-(6)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE A.15: HETEROGENEITY OF AWARD IMPACT ON CLASSMATES' PROBABILITY OF EXCEEDING 50TH SCORE PERCENTILE IN MO AT YEAR $t+1$ BY ABILITY PROXIMITY

	Min. bandwidth (h)		Opt. bandwidth (h)	
Panel A. Ability Proximity	(1)	(2)	(3)	(4)
Above cutoff	0.0007***	0.0004*	0.0006***	0.0004**
	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Above cutoff × Participated before		0.0066***		0.0053***
		(0.0022)		(0.0021)
Linear Combination: β		0.0071		0.0058
Linear Combination: s.e.		0.0022		0.0021
Control group mean	0.0124	0.0124	0.0121	0.0121
Bandwidth (h)	0.6237	0.6237	0.7163	0.7163
Classmates (obs.)	7,641,941	7,641,941	8,919,706	8,919,706
Panel B. Social Similarity	(1)	(2)	(3)	(4)
Above cutoff	0.0003	0.0008*	0.0004	0.0007
	(0.0003)	(0.0005)	(0.0003)	(0.0005)
Above cutoff × Same gender	0.0009**		0.0006	
	(0.0004)		(0.0004)	
Above cutoff × Same race		0.0003		0.0001
		(0.0006)		(0.0006)
Linear Combination: β	0.0011	0.0011	0.0009	0.0008
Linear Combination: s.e.	0.0003	0.0004	0.0003	0.0004
Control group mean	0.0124	0.0137	0.0121	0.0134
Bandwidth (h)	0.6237	0.6237	0.7163	0.7163
Classmates (obs.)	7,641,941	4,294,456	8,919,706	4,984,078

Notes: This table presents heterogeneous effects of a participant's Honorable Mention in year t on her classmates' probability of exceeding the 50th percentile in the second-phase Math Olympiad at $t+1$, considering their ability proximity (Panel A) and social similarity (Panel B). The data include applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 between 2009 and 2016. All regressions are estimated at the classroom level. We link Olympiad data to the corresponding year's Brazilian School Census using gender, school, grade, and birth date. The unique School Census identifier allows us to track students across years and to merge in additional Census information. The outcome variable is a dummy equal to one if a student exceeded the 50th percentile in the second-phase Olympiad exam at $t+1$. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. The regression model in all columns follows Equation 1 in Section 4. In selected specifications, we augment the baseline model with interaction terms that allow the treatment effect to vary along specific dimensions of peer similarity. In Panel A, columns (2) and (4), we interact the treatment indicator with an indicator for whether the classmate had previously participated in the Math Olympiad, capturing differential effects by prior exposure. In Panel B, columns (1) and (3), we include an interaction between the treatment indicator and an indicator for gender match between the classmate and the award recipient. In Panel B, columns (2) and (4), we analogously interact the treatment indicator with an indicator for racial match. These interactions allow the estimated discontinuity to vary by prior participation and by demographic congruence with the awardee. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90$^{\text{th}}$ percentile at t). Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50$^{\text{th}}$, 70$^{\text{th}}$, and 90$^{\text{th}}$ percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70$^{\text{th}}$ percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p<0.1$, ** $p<0.05$, *** $p<0.01$

TABLE A.16: HETEROGENEITY OF AWARD IMPACT ON CLASSMATES' PROBABILITY OF EXCEEDING 90TH SCORE PERCENTILE IN MO AT YEAR $t+1$ BY ABILITY PROXIMITY

	Min. bandwidth (h)		Opt. bandwidth (h)	
Panel A. Ability Proximity	(1)	(2)	(3)	(4)
Above cutoff	0.0003**	0.0002*	0.0003***	0.0002**
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Above cutoff × Participated before		0.0020		0.0023*
		(0.0013)		(0.0012)
Linear Combination: β		0.0022		0.0025
Linear Combination: s.e.		0.0013		0.0012
Control group mean	0.0022	0.0022	0.0022	0.0022
Bandwidth (h)	0.6237	0.6237	0.6862	0.6862
Classmates (obs.)	7,641,941	7,641,941	8,499,762	8,499,762
Panel B. Social Similarity	(1)	(2)	(3)	(4)
Above cutoff	0.0002*	0.0003	0.0003**	0.0004*
	(0.0001)	(0.0002)	(0.0001)	(0.0002)
Above cutoff × Same gender	0.0000		0.0000	
	(0.0002)		(0.0002)	
Above cutoff × Same race		-0.0001		-0.0002
		(0.0003)		(0.0003)
Linear Combination: β	0.0003	0.0002	0.0003	0.0002
Linear Combination: s.e.	0.0001	0.0002	0.0001	0.0002
Control group mean	0.0022	0.0025	0.0022	0.0025
Bandwidth (h)	0.6237	0.6237	0.6862	0.6862
Classmates (obs.)	7,641,941	4,294,456	8,499,762	4,755,534

Notes: This table presents heterogeneous effects of a participant's Honorable Mention award in year t on her classmates' probability of exceeding the 90^{th} percentile in the second-phase Math Olympiad at $t+1$, considering their ability proximity (Panel A) and social similarity (Panel B). The data include applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 between 2009 and 2016. All regressions are estimated at the classroom level. We link Olympiad data to the corresponding year's Brazilian School Census using gender, school, grade, and birth date. The unique School Census identifier enables us to track students across years and merge additional Census information. The outcome variable is a dummy equal to one if a student exceeded the 90^{th} percentile in the second-phase Olympiad exam at $t+1$. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. The regression model in all columns follows Equation 1 in Section 4. In selected specifications, we augment the baseline model with interaction terms that allow the treatment effect to vary along specific dimensions of peer similarity. In Panel A, columns (2) and (4), we interact the treatment indicator with an indicator for whether the classmate had previously participated in the Math Olympiad, capturing differential effects by prior exposure. In Panel B, columns (1) and (3), we include an interaction between the treatment indicator and an indicator for gender match between the classmate and the award recipient. In Panel B, columns (2) and (4), we analogously interact the treatment indicator with an indicator for racial match. These interactions allow the estimated discontinuity to vary by prior participation and by demographic congruence with the awardee. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90^{th} percentile at t). Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE A.17: HETEROGENEITY OF AWARD IMPACT ON CLASSMATES' 2ND PHASE EXAM SCORE IN MO AT YEAR $t+1$ BY ABILITY PROXIMITY

	Min. bandwidth (h)		Opt. bandwidth (h)	
Panel A. Ability Proximity	(1)	(2)	(3)	(4)
Above cutoff	0.0260**	0.0179	0.0218**	0.0153
	(0.0114)	(0.0119)	(0.0110)	(0.0114)
Above cutoff × Participated before		0.0408		0.0376
		(0.0322)		(0.0308)
Linear Combination: β		0.0587		0.0529
Linear Combination: s.e.		0.0308		0.0294
Control group mean	0.1526	0.1526	0.1474	0.1474
Bandwidth (h)	0.6237	0.6237	0.6725	0.6725
Classmates (obs.)	171,880	171,880	184,756	184,756
Panel B. Social Similarity	(1)	(2)	(3)	(4)
Above cutoff	0.0278*	0.0279	0.0240	0.0243
	(0.0156)	(0.0236)	(0.0150)	(0.0227)
Above cutoff × Same gender	-0.0040		-0.0048	
	(0.0203)		(0.0195)	
Above cutoff × Same race		0.0068		0.0063
		(0.0282)		(0.0272)
Linear Combination: β	0.0237	0.0347	0.0192	0.0306
Linear Combination: s.e.	0.0149	0.0175	0.0144	0.0168
Control group mean	0.1526	0.2004	0.1474	0.1967
Bandwidth (h)	0.6237	0.6237	0.6725	0.6725
Classmates (obs.)	171,880	102,431	184,756	109,639

Notes: This table presents heterogeneous effects of a participant's Honorable Mention in year t on her classmates' exam score in the second-phase Math Olympiad at $t+1$, considering their ability proximity (Panel A) and social similarity (Panel B). The data include applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 between 2009 and 2016. All regressions are estimated at the classroom level. We link Olympiad data to the corresponding year's Brazilian School Census using gender, school, grade, and birth date. The unique School Census identifier allows us to track students across years and to merge in additional Census information. The outcome variable is the student's exam score in the second-phase Olympiad exam at $t+1$. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. The regression model in all columns follows Equation 1 in Section 4. In selected specifications, we augment the baseline model with interaction terms that allow the treatment effect to vary along specific dimensions of peer similarity. In Panel A, columns (2) and (4), we interact the treatment indicator with an indicator for whether the classmate had previously participated in the Math Olympiad, capturing differential effects by prior exposure. In Panel B, columns (1) and (3), we include an interaction between the treatment indicator and an indicator for gender match between the classmate and the award recipient. In Panel B, columns (2) and (4), we analogously interact the treatment indicator with an indicator for racial match. These interactions allow the estimated discontinuity to vary by prior participation and by demographic congruence with the awardee. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90^{th} percentile at t). Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE A.18: HETEROGENEITY OF AWARD IMPACT ON CLASSMATES' PARTICIPATION IN MO'S 2ND PHASE AT YEAR $t+1$ BY WINNER CHARACTERISTICS

	Min. bandwidth (h)			Opt. bandwidth (h)		
	(1)	(2)	(3)	(4)	(5)	(6)
Above cutoff	0.0009**	0.0008**	0.0008*	0.0009***	0.0008***	0.0012***
	(0.0004)	(0.0004)	(0.0005)	(0.0003)	(0.0003)	(0.0004)
Above cutoff × Female Winner	-0.0003			0.0002		
	(0.0006)			(0.0005)		
Above cutoff × Black Winner		0.0013			0.0014	
		(0.0023)			(0.0019)	
Above cutoff × Black or Brown			-0.0001			-0.0010
			(0.0007)			(0.0006)
Linear Combination: β	0.0006	0.0020	0.0007	0.0011	0.0022	0.0003
Linear Combination: s.e.	0.0005	0.0023	0.0006	0.0004	0.0019	0.0005
Control group mean	0.0214	0.0221	0.0221	0.0210	0.0215	0.0215
Bandwidth (h)	0.6237	0.6237	0.6237	0.8269	0.8269	0.8269
Classmates (obs.)	7,641,941	5,254,369	5,254,369	10,770,054	7,321,917	7,321,917

Notes: This table presents heterogeneous effects of a participant's Honorable Mention award in year t on her classmates' participation in the second-phase Math Olympiad at $t+1$, considering the characteristics of the winners. The data include applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 between 2009 and 2016. All regressions are estimated at the classroom level. We link Olympiad data to the corresponding year's Brazilian School Census using gender, school, grade, and birth date. The unique School Census identifier enables us to track students across years and merge additional Census information. The outcome variable is a dummy equal to one if a student participated in the second-phase Olympiad exam at $t+1$. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. The regression model in all columns augments the baseline model presented in Equation 1 Section 4 with interaction terms that allow the treatment effect to vary along winners' demographics. In columns (1) and (4), we interact the treatment indicator with an indicator for whether the winner in the classroom is female. Columns (2) and (5) interact the treatment indicator with an indicator of whether the winner is black. Columns (3) and (6) interact the treatment indicator with an indicator of whether the winner is black or brown. These interactions allow the estimated discontinuity to vary by the winners' characteristics. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90th percentile at t). Results are presented for both minimum (columns (1)-(3)) and optimal (columns (4)-(6)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50th, 70th, and 90th percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70th percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.19: Heterogeneity of award impact on classmates' probability of exceeding 50th score percentile in MO at Year $t + 1$ by winner characteristics

	Min. bandwidth (h)			Opt. bandwidth (h)		
	(1)	(2)	(3)	(4)	(5)	(6)
Above cutoff	0.0008***	0.0008***	0.0008**	0.0007**	0.0007**	0.0009**
	(0.0003)	(0.0003)	(0.0004)	(0.0003)	(0.0003)	(0.0004)
Above cutoff × Female Winner	-0.0003			-0.0000		
	(0.0005)			(0.0004)		
Above cutoff × Black Winner		0.0011			0.0013	
		(0.0018)			(0.0017)	
Above cutoff × Black or Brown			-0.0001			-0.0004
			(0.0006)			(0.0005)
Linear Combination: β	0.0006	0.0019	0.0008	0.0006	0.0020	0.0005
Linear Combination: s.e.	0.0004	0.0018	0.0005	0.0003	0.0016	0.0004
Control group mean	0.0124	0.0131	0.0131	0.0121	0.0128	0.0128
Bandwidth (h)	0.6237	0.6237	0.6237	0.7163	0.7163	0.7163
Classmates (obs.)	7,641,941	5,254,369	5,254,369	8,919,706	6,107,285	6,107,285

Notes: This table presents heterogeneous effects of a participant's Honorable Mention in year t on her classmates' probability of exceeding the 50th percentile in the second-phase Math Olympiad at $t + 1$, considering the winner characteristics. The data include applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 between 2009 and 2016. All regressions are estimated at the classroom level. We link Olympiad data to the corresponding year's Brazilian School Census using gender, school, grade, and birth date. The unique School Census identifier allows us to track students across years and to merge in additional Census information. The outcome variable is a dummy equal to one if a student exceeded the 50th percentile in the second-phase Olympiad exam at $t + 1$. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. The regression model in all columns augments the baseline model presented in Equation 1 Section 4 with interaction terms that allow the treatment effect to vary along winners' demographics. In columns (1) and (4), we interact the treatment indicator with an indicator for whether the winner in the classroom is female. Columns (2) and (5) interact the treatment indicator with an indicator of whether the winner is black. Columns (3) and (6) interact the treatment indicator with an indicator of whether the winner is black or brown. These interactions allow the estimated discontinuity to vary by the winners' characteristics. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90th percentile at t). Results are presented for both minimum (columns (1)-(3)) and optimal (columns (4)-(6)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50th, 70th, and 90th percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70th percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.20: Heterogeneity of award impact on classmates' probability of exceeding 90th score percentile in MO at Year $t+1$ by winner characteristics

	Min. bandwidth (h)			Opt. bandwidth (h)		
	(1)	(2)	(3)	(4)	(5)	(6)
Above cutoff	0.0002*	0.0003**	0.0003	0.0002	0.0003**	0.0003
	(0.0001)	(0.0001)	(0.0002)	(0.0001)	(0.0001)	(0.0002)
Above cutoff × Female Winner	0.0001			0.0002		
	(0.0002)			(0.0002)		
Above cutoff × Black Winner		-0.0001			0.0000	
		(0.0008)			(0.0007)	
Above cutoff × Black or Brown			0.0000			-0.0000
			(0.0003)			(0.0002)
Linear Combination: β	0.0003	0.0002	0.0003	0.0004	0.0003	0.0003
Linear Combination: s.e.	0.0002	0.0008	0.0002	0.0002	0.0007	0.0002
Control group mean	0.0022	0.0024	0.0024	0.0022	0.0023	0.0023
Bandwidth (h)	0.6237	0.6237	0.6237	0.6862	0.6862	0.6862
Classmates (obs.)	7,641,941	5,254,369	5,254,369	8,499,762	5,823,843	5,823,843

Notes: This table presents heterogeneous effects of a participant's Honorable Mention award in year t on her classmates' probability of exceeding the 90^{th} percentile in the second-phase Math Olympiad at $t+1$, considering the characteristics of the winners. The data include applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 between 2009 and 2016. All regressions are estimated at the classroom level. We link Olympiad data to the corresponding year's Brazilian School Census using gender, school, grade, and birth date. The unique School Census identifier enables us to track students across years and merge additional Census information. The outcome variable is a dummy equal to one if a student exceeded the 90^{th} percentile in the second-phase Olympiad exam at $t+1$. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. The regression model in all columns augments the baseline model presented in Equation 1 Section 4 with interaction terms that allow the treatment effect to vary along winners' demographics. In columns (1) and (4), we interact the treatment indicator with an indicator for whether the winner in the classroom is female. Columns (2) and (5) interact the treatment indicator with an indicator of whether the winner is black. Columns (3) and (6) interact the treatment indicator with an indicator of whether the winner is black or brown. These interactions allow the estimated discontinuity to vary by the winners' characteristics. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90^{th} percentile at t). Results are presented for both minimum (columns (1)-(3)) and optimal (columns (4)-(6)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.21: Heterogeneity of award impact on classmates' 2nd phase exam score in MO at Year $t+1$ by winner characteristics

	Min. bandwidth (h)			Opt. bandwidth (h)		
	(1)	(2)	(3)	(4)	(5)	(6)
Above cutoff	0.0271*	0.0363***	0.0421**	0.0181	0.0308**	0.0400**
	(0.0153)	(0.0137)	(0.0179)	(0.0148)	(0.0132)	(0.0172)
Above cutoff × Female Winner	-0.0021			0.0083		
	(0.0229)			(0.0220)		
Above cutoff × Black Winner		0.0432			0.0759	
		(0.0943)			(0.0911)	
Above cutoff × Black or Brown			-0.0101			-0.0182
			(0.0271)			(0.0261)
Linear Combination: β	0.0250	0.0795	0.0319	0.0264	0.1067	0.0218
Linear Combination: s.e.	0.0170	0.0932	0.0203	0.0164	0.0901	0.0196
Control group mean	0.1526	0.1798	0.1798	0.1474	0.1757	0.1757
Bandwidth (h)	0.6237	0.6237	0.6237	0.6725	0.6725	0.6725
Classmates (obs.)	171,880	121,702	121,702	184,756	130,281	130,281

Notes: This table presents heterogeneous effects of a participant's Honorable Mention in year t on her classmates' exam score in the second-phase Math Olympiad at $t+1$, considering the winner characteristics. The data include applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 between 2009 and 2016. All regressions are estimated at the classroom level. We link Olympiad data to the corresponding year's Brazilian School Census using gender, school, grade, and birth date. The unique School Census identifier allows us to track students across years and to merge in additional Census information. The outcome variable is the students' exam score in the second-phase Olympiad exam at $t+1$. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. The regression model in all columns augments the baseline model presented in Equation 1 Section 4 with interaction terms that allow the treatment effect to vary along winners' demographics. In columns (1) and (4), we interact the treatment indicator with an indicator for whether the winner in the classroom is female. Columns (2) and (5) interact the treatment indicator with an indicator of whether the winner is black. Columns (3) and (6) interact the treatment indicator with an indicator of whether the winner is black or brown. These interactions allow the estimated discontinuity to vary by the winners' characteristics. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90^{th} percentile at t). Results are presented for both minimum (columns (1)-(3)) and optimal (columns (4)-(6)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The optimal

TABLE A.22: HETEROGENEITY OF AWARD IMPACT ON PROBABILITY OF EXCEEDING 50TH SCORE PERCENTILE IN MO AT YEAR $t+1$

	Min. bandwidth (h)			Opt. bandwidth (h)		
	Participant	Classmates	Gradematesates	Participant	Classmates	Gradematesates
	(1)	(2)	(3)	(4)	(5)	(6)
Above cutoff	0.0440***	0.0006**	0.0001	0.0454***	0.0006***	0.0000
	(0.0036)	(0.0002)	(0.0002)	(0.0038)	(0.0002)	(0.0002)
Control group mean	0.1274	0.0126	0.0153	0.1315	0.0124	0.0153
Bandwidth (h)	0.6237	0.6237	0.6237	0.5719	0.7233	0.5902
Observations	247,534	247,534	247,534	222,170	294,815	228,406

Notes: This table presents the impact of a participant's Honorable Mention in year t on her probability of exceeding the 50th percentile in the second-phase Math Olympiad at $t+1$, as well as her classmates' and gradematesates' probability. The data include applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 between 2009 and 2016. All regressions are estimated at the classroom level. Columns (1) and (4) report outcomes for the participant. Columns (2) and (5) report outcomes for classmates, measured as classroom-level averages excluding the participant herself. Columns (3) and (6) report outcomes for gradematesates outside the participant's classroom, measured as classroom-level averages of each variable excluding the participant's classroom. Estimation at the classroom level is necessary to account for the fact that a given student may be a gradematesate of both barely winners and barely losers in different classrooms. We link Olympiad data to the corresponding year's Brazilian School Census using gender, school, grade, and birth date. The unique School Census identifier allows us to track students across years and to merge in additional Census information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variables are dummies equal to one if a student exceeded the 50^{th} percentile in the second-phase Olympiad exam at $t+1$. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90^{th} percentile at t). Results are presented for both minimum (columns (1)-(3)) and optimal (columns (4)-(6)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE A.23: HETEROGENEITY OF AWARD IMPACT ON CLASSMATES' PROBABILITY OF TRANSFERRING SCHOOLS AT YEAR $t+1$

	Min. bandwidth (h)		Opt. bandwidth (h)	
	(1)	(2)	(3)	(4)
Above cutoff	-0.0057**	-0.0050**	-0.0056**	-0.0052**
	(0.0023)	(0.0023)	(0.0026)	(0.0026)
Controls included	No	Yes	No	Yes
Control group mean	0.22191	0.22191	0.22509	0.22509
Bandwidth (h)	0.62366	0.62366	0.52633	0.52633
Classmates (obs.)	7,113,860	7,113,860	5,869,636	5,869,636

Notes: This table presents the impact of a participant's Honorable Mention in year t on her classmates' (as defined in t) probability of transferring schools at $t+1$. The data include applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 between 2009 and 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variable is a dummy equal one if a student transferred schools at $t+1$. The main explanatory variable is an indicator for Honorable Mention award obtained by a participant in the classroom at t. Columns (1) and (3) include level-state-Math Olympiad cohort fixed effects, while columns (2) and (4) additionally control for variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90th percentile at t). Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50th, 70th, and 90th percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70th percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE A.24: CLASSMATES PARTICIPATION IN MO'S 2ND PHASE BY CLASSROOM ASSIGNMENT: OPTIMAL BANDWIDTH

	t+1 (1)	t+2 (2)	t+1 (3)	t+2 (4)
Above cutoff	0.0002	-0.0003	0.0009***	-0.0001
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Above cutoff × Same Class in t+1	0.0016***	0.0013**		
	(0.0006)	(0.0006)		
Above cutoff × Same Class in t+2			0.0003	0.0018**
			(0.0008)	(0.0008)
Linear Combination: β	0.0019	0.0010	0.0012	0.0016
Linear Combination: s.e.	0.0005	0.0005	0.0007	0.0007
Control group mean	0.0224	0.0185	0.0230	0.0198
Bandwidth (h)	0.8269	0.8269	0.8269	0.8269
Classmates (obs.)	7,285,159	7,285,159	6,816,922	6,816,922

Notes: This table presents the effects of a participant's Honorable Mention award in year t on her classmates' participation in the second-phase Math Olympiad at $t+1$ and $t+2$ by classroom assignment in $t+1$ and $t+2$. The data include applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 between 2009 and 2016. All regressions are estimated at the classroom level. We link Olympiad data to the corresponding year's Brazilian School Census using gender, school, grade, and birth date. The unique School Census identifier enables us to track students across years and merge additional Census information. The outcome variable in columns (1) and (3) is a dummy equal to one if a student participated in the second-phase Olympiad exam at $t+1$, while in columns (2) and (4) the outcome is participation in the second-phase at $t+2$. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by a participant in the classroom at t. The regression model in all columns augments the baseline model presented in Equation 1 Section 4 with interaction terms that allow the treatment effect to vary along peers' future classroom assignment. In columns (1) and (2), we interact the treatment indicator with an indicator for whether the classmate and the winner remained in the same classroom in $t+1$, and columns (3) and (4) present the same interaction, but considering classroom assignment in $t+2$. These interactions allow the estimated discontinuity to vary by peer proximity to a winner in the short-run. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, selective school, and percentage of classmates scoring at the 90$^{\text{th}}$ percentile at t). Results are presented for optimal bandwidths, which are obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

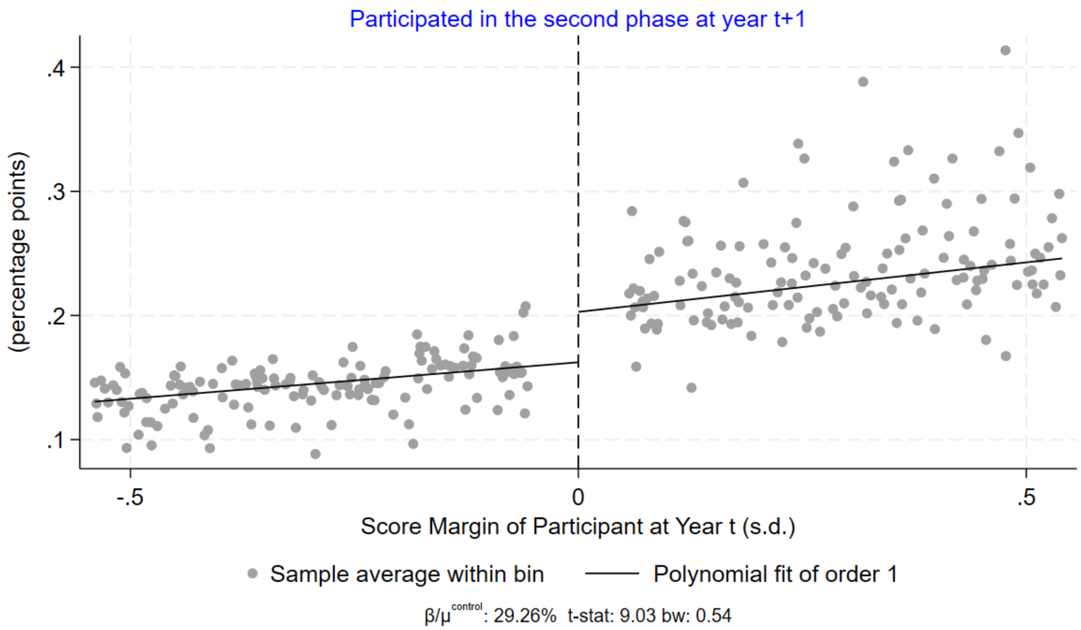
TABLE A.25: EFFECTS OF AWARD ON CLASSMATES' PROBABILITY OF STAYING IN THE SAME CLASSROOM AT YEAR $t+1$

	Min. bandwidth (h)		Opt. bandwidth (h)	
	(1)	(2)	(3)	(4)
Above cutoff	0.0056*	0.0047	0.0040	0.0034
	(0.0030)	(0.0030)	(0.0029)	(0.0029)
Controls included	No	Yes	No	Yes
Control group mean	0.46242	0.46242	0.46042	0.46042
Bandwidth (h)	0.62366	0.62366	0.67184	0.67184
Classmates (obs.)	6,912,463	6,912,463	7,471,426	7,471,426

Notes: This table presents the impact of a participant's Honorable Mention award in year t on her classmates' probability of staying in the same classroom as her at $t+1$. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variable is a dummy equal to one if a classmate stayed in the same classroom as the participant at year t. Columns (1) and (3) include level-state-Math Olympiad cohort fixed effects, while columns (2) and (4) additionally control for variables that exhibit some imbalance in Table 2. Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

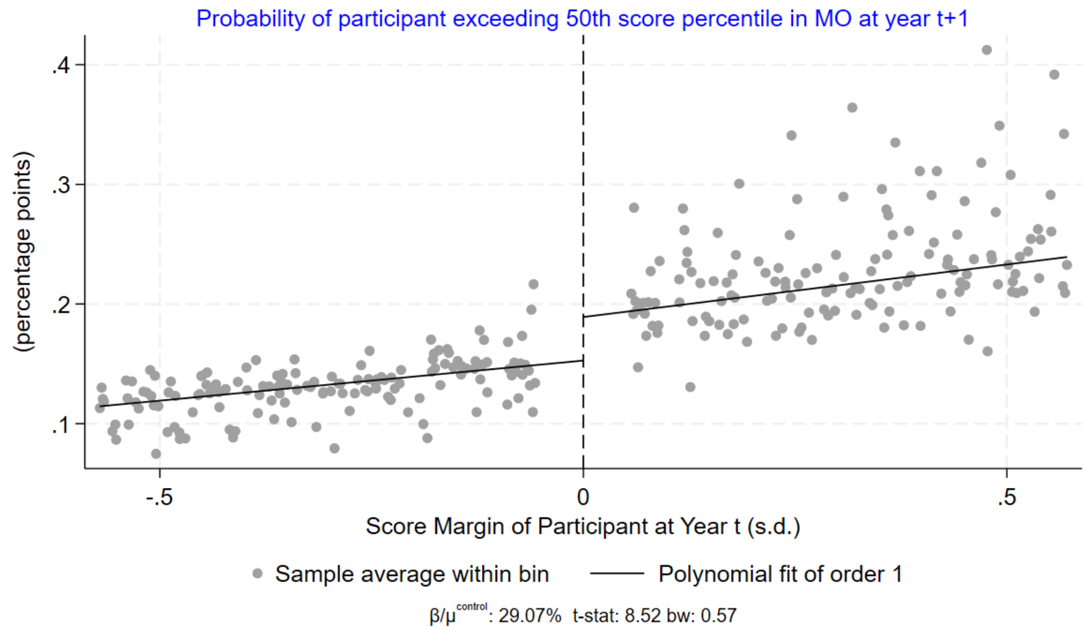
Appendix B – Participants Figures and Tables

Figure B.1: Regression Discontinuity Design: Participant shown up for MO 2nd phase at year t+1



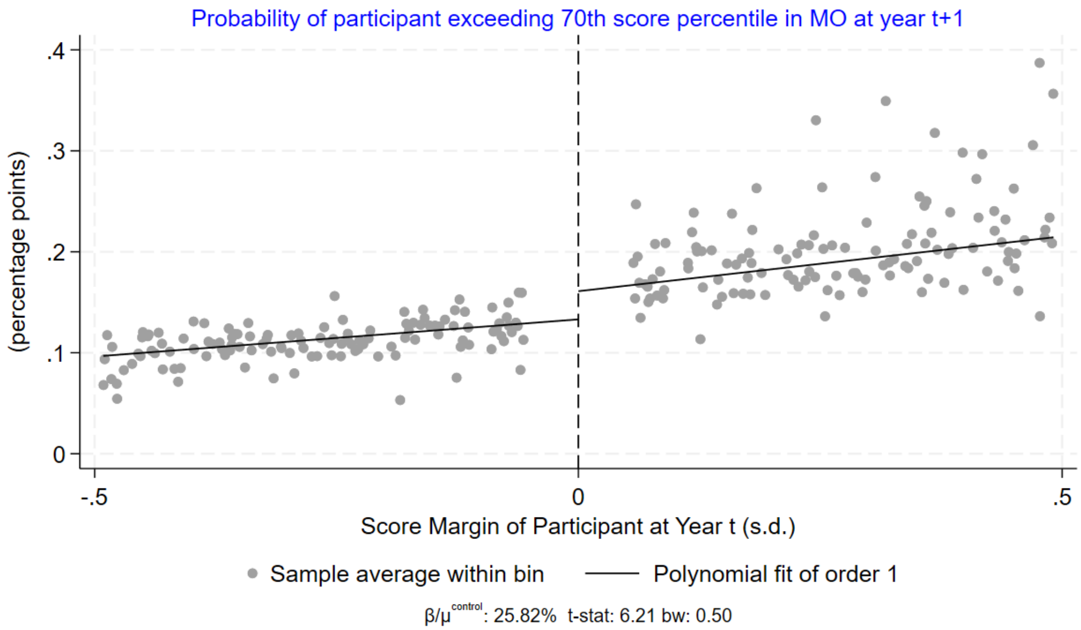
Source: 2nd Rd OBMEP Data, 2008-2017. This figure presents a regression-discontinuity (RD) plot of participants' probability of participating in the second phase of the Math Olympiad (OBMEP) at year $t+1$. The running variable is the score margin of the highest-scoring participant in the classroom, defined as the standardized first-phase exam score minus the award cutoff (in standard deviations). The outcome variable equals 1 if the participant participated in the second phase and 0 otherwise. The solid lines are fitted values from local-linear regressions estimated separately on each side of the cutoff within the MSE-optimal bandwidth. Standard errors are clustered at the classroom level. The reported statistics are: $\beta/\mu^{control}$, the treatment-effect estimate as a share of the control-group mean; the t-statistic; and the MSE-optimal bandwidth in standard deviations.

FIGURE B.2: REGRESSION DISCONTINUITY DESIGN: PARTICIPANT SCORED ABOVE 50TH SCORE PERCENTILE AT YEAR T+1



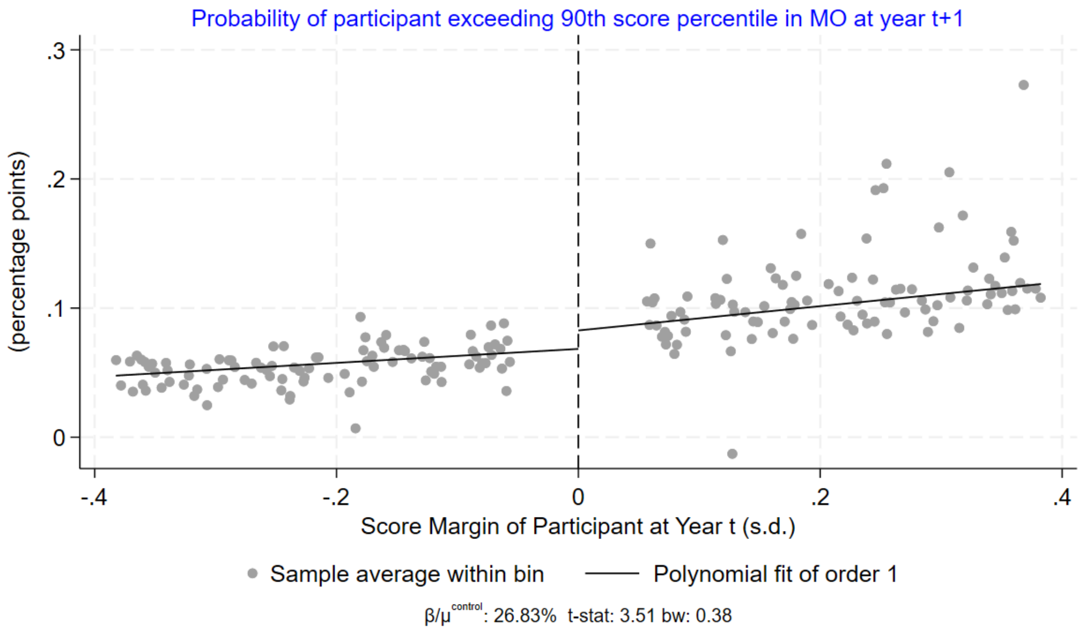
Source: 2nd Rd OBMEP Data, 2008-2017. This figure presents a regression-discontinuity (RD) plot of participants' probability of exceeding the 50th percentile on the Math Olympiad (OBMEP) in year $t+1$. The running variable is the score margin of the highest-scoring participant in the classroom, defined as the standardized first-phase exam score minus the award cutoff (in standard deviations). The outcome variable equals one if the participant's score exceeds the 50th percentile and zero otherwise. The solid lines are fitted values from local-linear regressions estimated separately on each side of the cutoff within the MSE-optimal bandwidth. Standard errors are clustered at the classroom level. The reported statistics are: $\beta/\mu^{control}$, the treatment-effect estimate as a share of the control-group mean; the t-statistic; and the MSE-optimal bandwidth in standard deviations.

FIGURE B.3: REGRESSION DISCONTINUITY DESIGN: PARTICIPANT SCORED ABOVE 70TH SCORE PERCENTILE AT YEAR T+1



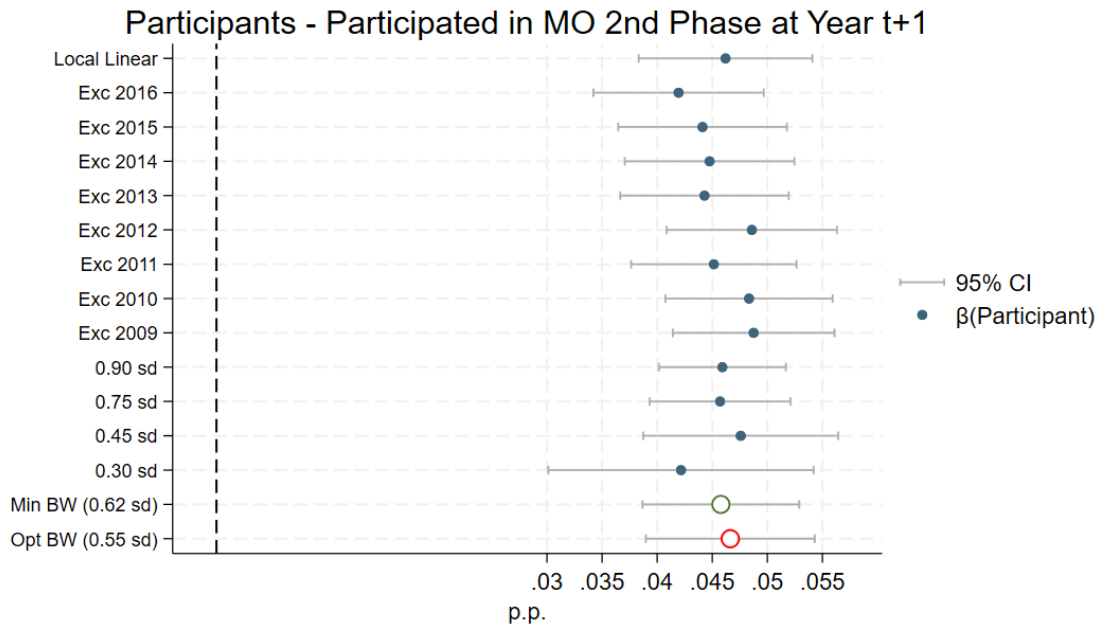
Source: 2nd Rd OBMEP Data, 2008-2017. This figure presents a regression-discontinuity (RD) plot of participants' probability of exceeding the 70th percentile on the Math Olympiad (OBMEP) in year $t+1$. The running variable is the score margin of the highest-scoring participant in the classroom, defined as the standardized first-phase exam score minus the award cutoff (in standard deviations). The outcome variable equals one if the participant's score exceeds the 70th percentile and zero otherwise. The solid lines are fitted values from local-linear regressions estimated separately on each side of the cutoff within the MSE-optimal bandwidth. Standard errors are clustered at the classroom level. The reported statistics are: $\beta/\mu^{control}$, the treatment-effect estimate as a share of the control-group mean; the t-statistic; and the MSE-optimal bandwidth in standard deviations.

FIGURE B.4: REGRESSION DISCONTINUITY DESIGN: PARTICIPANT SCORED ABOVE 90TH SCORE PERCENTILE AT YEAR T+1



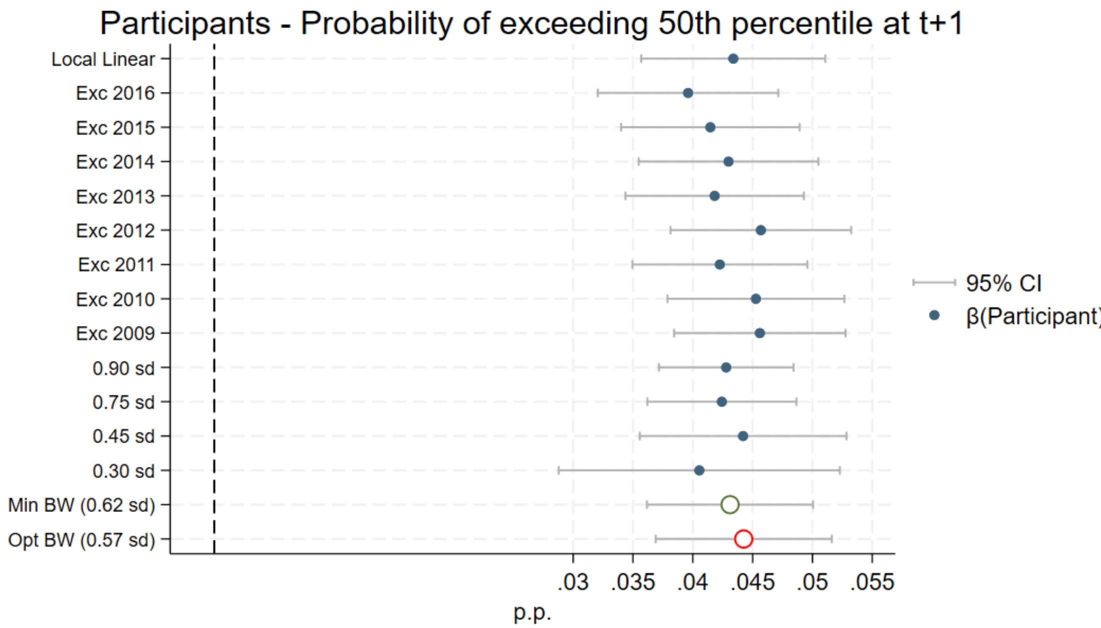
Source: 2nd Rd OBMEP Data, 2008-2017. This figure presents a regression-discontinuity (RD) plot of participants' probability of exceeding the 90th percentile on the Math Olympiad (OBMEP) in year $t+1$. The running variable is the score margin of the highest-scoring participant in the classroom, defined as the standardized first-phase exam score minus the award cutoff (in standard deviations). The outcome variable equals one if the participant's score exceeds the 90th percentile and zero otherwise. The solid lines are fitted values from local-linear regressions estimated separately on each side of the cutoff within the MSE-optimal bandwidth. Standard errors are clustered at the classroom level. The reported statistics are: $\beta/\mu^{control}$, the treatment-effect estimate as a share of the control-group mean; the t-statistic; and the MSE-optimal bandwidth in standard deviations.

FIGURE B.5: PARTICIPANT SHOWN UP FOR MO 2ND PHASE AT YEAR T+1



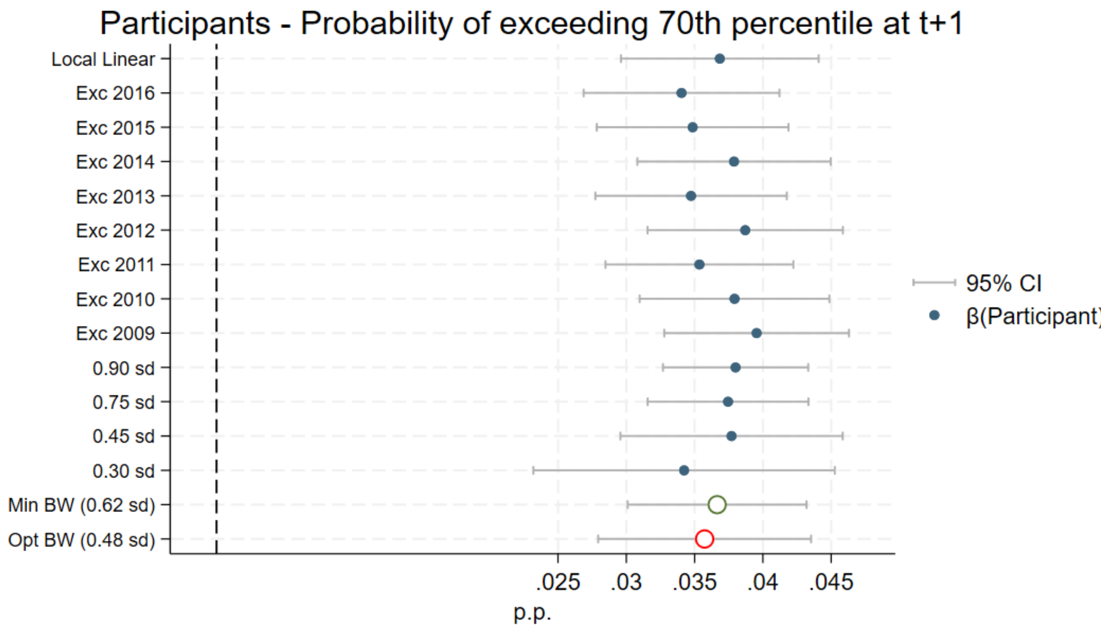
Notes: Source: 2nd Rd OBMEP data, 2008-2017. This figure reports robustness checks for the RD estimate of the effect of a participant scoring above the Honorable Mention cutoff in year t on that participant's probability of participating in the MO 2nd phase in year t+1; the outcome equals one if the participant participated and zero otherwise. The treatment indicator equals 1 when the participant scores above the award cutoff. The running variable is the participant's score margin, defined as the standardized first-phase exam score minus the award cutoff (in standard deviations). Each marker is the coefficient on the treatment indicator from a separate specification, and horizontal bars are 95% confidence intervals based on classroom-level clustered standard errors. The y-axis reports, in order: a local-linear rdrobust estimate with triangular kernel, the same covariates, and the minimum bandwidth; leave-one-year-out estimates excluding each year from 2009 to 2016 using the minimum bandwidth; fixed bandwidths of 0.90, 0.75, 0.45, and 0.30 standard deviations; the minimum bandwidth across classmate outcomes, and the MSE-optimal bandwidth for this outcome. The red hollow marker highlights the optimal-bandwidth estimate and the green hollow marker highlights the minimum-bandwidth estimate.

FIGURE B.6: PARTICIPANT SCORED ABOVE 50TH SCORE PERCENTILE



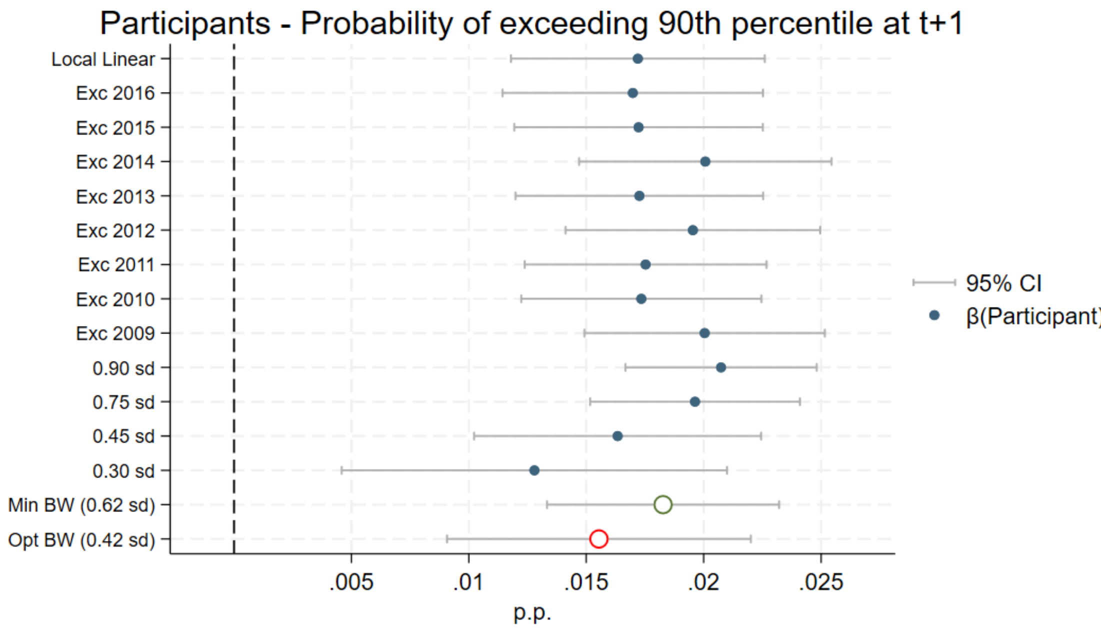
Notes: Source: 2[nd] Rd OBMEP data, 2008-2017. This figure reports robustness checks for the RD estimate of the effect of a participant scoring above the Honorable Mention cutoff in year t on that participant's probability of scoring above the median in the MO 2nd phase in year t+1; the outcome equals one if the participant scored above the median and zero otherwise. The treatment indicator equals 1 when the participant scores above the award cutoff. The running variable is the participant's score margin, defined as the standardized first-phase exam score minus the award cutoff (in standard deviations). Each marker is the coefficient on the treatment indicator from a separate specification, and horizontal bars are 95% confidence intervals based on classroom-level clustered standard errors. The y-axis reports, in order: a local-linear rdrobust estimate with triangular kernel, the same covariates, and the minimum bandwidth; leave-one-year-out estimates excluding each year from 2009 to 2016 using the minimum bandwidth; fixed bandwidths of 0.90, 0.75, 0.45, and 0.30 standard deviations; the minimum bandwidth across classmate outcomes, and the MSE-optimal bandwidth for this outcome. The red hollow marker highlights the optimal-bandwidth estimate and the green hollow marker highlights the minimum-bandwidth estimate.

FIGURE B.7: PARTICIPANT SCORED ABOVE 70TH SCORE PERCENTILE



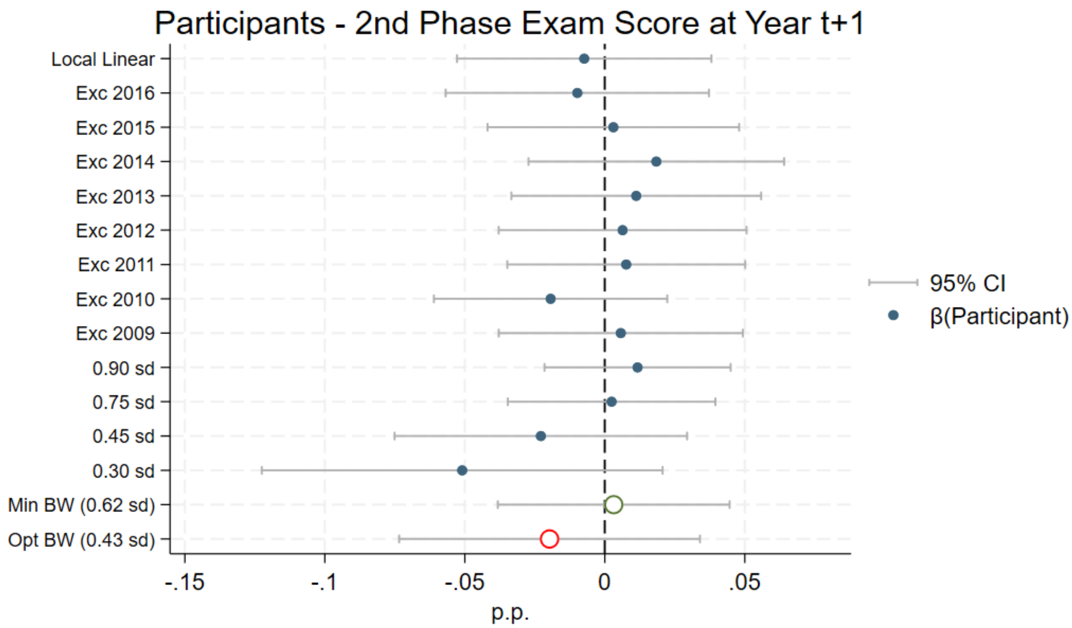
Notes: Source: 2[nd] Rd OBMEP data, 2008-2017. This figure reports robustness checks for the RD estimate of the effect of a participant scoring above the Honorable Mention cutoff in year t on that participant's probability of scoring above the 70th percentile in the MO 2nd phase in year t+1; the outcome equals one when the participant scores above 70th percentile and zero otherwise. The treatment indicator equals 1 when the participant scores above the award cutoff. The running variable is the participant's score margin, defined as the standardized first-phase exam score minus the award cutoff (in standard deviations). Each marker is the coefficient on the treatment indicator from a separate specification, and horizontal bars are 95% confidence intervals based on classroom-level clustered standard errors. The y-axis reports, in order: a local-linear rdrobust estimate with triangular kernel, the same covariates, and the minimum bandwidth; leave-one-year-out estimates excluding each year from 2009 to 2016 using the minimum bandwidth; fixed bandwidths of 0.90, 0.75, 0.45, and 0.30 standard deviations; the minimum bandwidth across classmate outcomes, and the MSE-optimal bandwidth for this outcome. The red hollow marker highlights the optimal-bandwidth estimate and the green hollow marker highlights the minimum-bandwidth estimate.

FIGURE B.8: PARTICIPANT SCORED ABOVE 90TH SCORE PERCENTILE



Notes: Source: 2[nd] Rd OBMEP data, 2008-2017. This figure reports robustness checks for the RD estimate of the effect of a participant scoring above the Honorable Mention cutoff in year t on that participant's probability of scoring above the 90th percentile in the MO 2nd phase in year t+1; the outcome equals one if the participant scored above the 90th percentile and zero otherwise. The treatment indicator equals 1 when the participant scores above the award cutoff. The running variable is the participant's score margin, defined as the standardized first-phase exam score minus the award cutoff (in standard deviations). Each marker is the coefficient on the treatment indicator from a separate specification, and horizontal bars are 95% confidence intervals based on classroom-level clustered standard errors. The y-axis reports, in order: a local-linear rdrobust estimate with triangular kernel, the same covariates, and the minimum bandwidth; leave-one-year-out estimates excluding each year from 2009 to 2016 using the minimum bandwidth; fixed bandwidths of 0.90, 0.75, 0.45, and 0.30 standard deviations; the minimum bandwidth across classmate outcomes, and the MSE-optimal bandwidth for this outcome. The red hollow marker highlights the optimal-bandwidth estimate and the green hollow marker highlights the minimum-bandwidth estimate.

FIGURE B.9: PARTICIPANT'S 2ND PHASE EXAM SCORE



Notes: Source: 2[nd] Rd OBMEP data, 2008-2017. This figure reports robustness checks for the RD estimate of the effect of a participant scoring above the Honorable Mention cutoff in year t on that participant's standardized Exam Score in the MO 2nd phase in year t+1; the outcome is measured in standard-deviation units. The treatment indicator equals 1 when the participant scores above the award cutoff. The running variable is the participant's score margin, defined as the standardized first-phase exam score minus the award cutoff (in standard deviations). Each marker is the coefficient on the treatment indicator from a separate specification, and horizontal bars are 95% confidence intervals based on classroom-level clustered standard errors. The y-axis reports, in order: a local-linear rdrobust estimate with triangular kernel, the same covariates, and the minimum bandwidth; leave-one-year-out estimates excluding each year from 2009 to 2016 using the minimum bandwidth; fixed bandwidths of 0.90, 0.75, 0.45, and 0.30 standard deviations; the minimum bandwidth across classmate outcomes, and the MSE-optimal bandwidth for this outcome. The red hollow marker highlights the optimal-bandwidth estimate and the green hollow marker highlights the minimum-bandwidth estimate.

TABLE B.1: RUNNING-VARIABLE DENSITY TESTS - PARTICIPANTS

Test	Statistic	p-value
Cattaneo et al. (2018)	67.935	0.000
McCrary (2008)	12.885	0.000

Notes: This table reports two density-discontinuity tests near the cutoff ($c = 0$) for the pooled sample, including observations at the cutoff. The null hypothesis for both tests is that the density is continuous around the cutoff. The first test follows Cattaneo et al. (2018) with the rddensity package, while the second is based on McCrary (2008) using the DCdensity command. The data include applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 between 2009 and 2017. The running variable is composed of the Exam Score minus the Honorable Mention prize cutoff. Cutoffs vary by year, competition level, and state, and are matched to each applicant accordingly.

Table B.2: Correlation with Exam Score residuals (Pairwise) - Participants

	Exam Score	Age	Female	Non-White	School ≥ Median
Exam Score	1.000				
Age	-0.007**	1.000			
Female	-0.024***	-0.054***	1.000		
Non-White	-0.015***	0.031***	-0.004	1.000	
School ≥ Median	0.042***	-0.037***	0.006*	-0.054***	1.000

Notes: This table reports pairwise correlations among variables after residualizing them on grade and year fixed effects. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The variables are those used to construct the summary index, computed following Kling et al. (2007). Correlations use pairwise deletion of missing values. Estimates are computed within the minimum bandwidth (0.5479) and restricted to the control group (untreated observations within the bandwidth). The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package.

TABLE B.3: IMPACT OF AWARD ON COMPOSITION OF WINNERS WHO PARTICIPATE IN MO EXAM AT $t+1$

	Min. BW					Avg. BW				
	Age	Female	Non-W	Sch $\geq$ M	S.M.	Age	Female	Non White	Sch $\geq$ M	S.M.
Above cutoff	-0.0158	-0.0117	-0.0044	-0.0039	0.0084	-0.0109	-0.0136	-0.0064	0.0002	0.0119
	(0.0179)	(0.0103)	(0.0088)	(0.0090)	(0.0090)	(0.0169)	(0.0095)	(0.0082)	(0.0084)	(0.0084)
Control group mean	13.3887	0.4409	0.2836	0.6448	.	13.3634	0.4428	0.2833	0.6402	.
Bandwidth (h)	0.6237	0.6237	0.6237	0.6237	0.6237	0.7051	0.7051	0.7051	0.7051	0.7051
Participants (obs.)	45,084	45,084	45,084	45,084	45,084	50,756	50,756	50,756	50,756	50,756

Notes: This table presents the impact of a participant's Honorable Mention award in year t on the composition of winners who participate in the second-phase Math Olympiad exam at year $t+1$. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variables are: the age of the individual; an indicator of the individual being female; 'Non-W' is an indicator of the individual being non-white; '2p before' is a dummy equal to one if the individual qualified for the Math Olympiad second phase at $t-1$ or $t-2$; 'Sch $\geq$ Med' is a dummy equal to one if the individual's school places above median in the school quality distribution; 'Summary' is the summary index computed following Kling et al. (2007). To construct the index, pairwise correlations among covariates were first estimated for the control group after residualizing on the fixed effects (Table B.2). Covariates whose residualized values are negatively correlated with the others were recoded (sign-reversed) so that all components point in a common direction before aggregation. Results are shown for the minimum and average bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The average bandwidth is the average between optimal bandwidths associated with the same three outcomes. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p<0.1$, ** $p<0.05$, *** $p<0.01$

TABLE B.4: IMPACT ON PARTICIPANT OUTCOMES: PROBABILITY OF EXCEEDING 50TH SCORE PERCENTILE IN MO AT YEAR $t + 1$ OR $t + 2$

	Min. bandwidth (h)		Opt. bandwidth (h)	
	t+1	t+2	t+1	t+2
Above cutoff	0.0358***	0.0229***	0.0365***	0.0252***
	(0.0040)	(0.0037)	(0.0043)	(0.0039)
Controls included	Yes	Yes	Yes	Yes
Control group mean	0.12132	0.09409	0.12558	0.09709
Bandwidth (h)	0.62366	0.62366	0.57209	0.57209
Participants (obs.)	191,611	191,611	172,491	172,491

Notes: This table presents the impact of a participant's Honorable Mention award in year t on her probability of exceeding the 50th score percentile in the second-phase Math Olympiad at $t + 1$ and $t + 2$. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variables are dummies equal to one if a student exceeded the 50th score percentile in the second-phase Olympiad exam at $t + 1$ and $t + 2$, respectively. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by the participant at t. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, and selective school). Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE B.5: IMPACT ON PARTICIPANT OUTCOMES: PROBABILITY OF EXCEEDING 70TH SCORE PERCENTILE IN MO AT YEAR $t+1$ OR $t+2$

	Min. bandwidth (h)		Opt. bandwidth (h)	
	t+1	t+2	t+1	t+2
Above cutoff	0.0296***	0.0197***	0.0277***	0.0231***
	(0.0038)	(0.0034)	(0.0045)	(0.0040)
Controls included	Yes	Yes	Yes	Yes
Control group mean	0.09959	0.07608	0.10728	0.08220
Bandwidth (h)	0.62366	0.62366	0.49948	0.49948
Participants (obs.)	191,611	191,611	143,956	143,956

Notes: This table presents the impact of a participant's Honorable Mention award in year t on her probability of exceeding the 70th score percentile in the second-phase Math Olympiad at $t+1$ and $t+2$. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variables are dummies equal to one if a student exceeded the 70th score percentile in the second-phase Olympiad exam at $t+1$ and $t+2$, respectively. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by the participant at t. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, and selective school). Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE B.6: IMPACT ON PARTICIPANT OUTCOMES: PROBABILITY OF EXCEEDING 90TH SCORE PERCENTILE IN MO AT YEAR $t+1$ OR $t+2$

	Min. bandwidth (h)		Opt. bandwidth (h)	
	t+1	t+2	t+1	t+2
Above cutoff	0.0147***	0.0099***	0.0143***	0.0120***
	(0.0029)	(0.0025)	(0.0041)	(0.0035)
Controls included	Yes	Yes	Yes	Yes
Control group mean	0.04510	0.03082	0.05330	0.03786
Bandwidth (h)	0.62366	0.62366	0.38286	0.38286
Participants (obs.)	191,611	191,611	107,313	107,313

Notes: This table presents the impact of a participant's Honorable Mention award in year t on her probability of exceeding the 90th score percentile in the second-phase Math Olympiad at $t+1$ and $t+2$. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variables are dummies equal to one if a student exceeded the 90th score percentile in the second-phase Olympiad exam at $t+1$ and $t+2$, respectively. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by the participant at t. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, and selective school). Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE B.7: IMPACT ON PARTICIPANT OUTCOMES: 2ND PHASE EXAM SCORE IN MO AT YEAR $t+1$ OR $t+2$

	Min. bandwidth (h)		Opt. bandwidth (h)	
	t+1	t+2	t+1	t+2
Above cutoff	-0.0238	0.0144	-0.0353	0.0145
	(0.0265)	(0.0267)	(0.0373)	(0.0383)
Controls included	Yes	Yes	Yes	Yes
Control group mean	1.02797	0.95512	1.11603	1.05081
Bandwidth (h)	0.62366	0.62366	0.38428	0.38428
Participants (obs.)	32,346	25,062	19,050	14,743

Notes: This table presents the impact of a participant's Honorable Mention award in year t on her exam score in the second-phase Math Olympiad at $t+1$ and $t+2$. The data cover applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 from 2009 to 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variables is the exam score in the second-phase Olympiad exam at $t+1$ and $t+2$, respectively. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by the participant at t. All columns control for Math Olympiad level–state–cohort fixed effects and variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, and selective school). Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

TABLE B.8: HETEROGENEITY OF AWARD IMPACT ON PARTICIPANTS' PROBABILITY OF TRANSFERRING SCHOOLS AT YEAR $t+1$

	Min. bandwidth (h)		Opt. bandwidth (h)	
	(1)	(2)	(3)	(4)
Above cutoff	-0.0080**	-0.0072**	-0.0078**	-0.0074*
	(0.0035)	(0.0035)	(0.0039)	(0.0039)
Controls included	No	Yes	No	Yes
Control group mean	0.21738	0.21738	0.22129	0.22129
Bandwidth (h)	0.62366	0.62366	0.53982	0.53982
Participants (obs.)	250,346	250,346	212,630	212,630

Notes: This table presents the impact of a participant's Honorable Mention in year t on her probability of transferring schools at $t+1$. The data include applicants to the second phase of the Brazilian Math Olympiad in grades 6-11 between 2009 and 2016. We link Math Olympiad records to the School Census using date of birth, school code, grade, and gender. The School Census identifier allows students to be followed over time and merged with additional school information. The regression model in all columns is given by Equation 1 presented in Section 4. The outcome variable is a dummy equal one if a student transferred schools at $t+1$. The main explanatory variable, 'Above cutoff', is an indicator for an Honorable Mention award obtained by the participant at t. Columns (1) and (3) include grade-state-Math Olympiad cohort fixed effects, while columns (2) and (4) additionally control for variables that exhibit some imbalance in Table 2 (Central West region, Southeast region, and selective school). Results are presented for both minimum (columns (1)-(2)) and optimal (columns (3)-(4)) bandwidths. The minimum bandwidth is defined as the smallest optimal bandwidth across our main outcomes, namely second-phase Math Olympiad scores, participation, and indicators for scoring above the 50^{th}, 70^{th}, and 90^{th} percentiles. It corresponds to the optimal bandwidth associated with scoring above the 70^{th} percentile. The optimal bandwidth is obtained using the command rdbwselect from the rdrobust package. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$