Gagandeep Sachdeva

PhD Candidate, UCSC Economics

gsachdev@ucsc.edu
+1 (831)-295-3570
Personal Website

Research Statement

My research examines inequities in education, and the factors that can influence these inequities. Across multiple projects, I investigate how teachers influence student outcomes and either bridge or perpetuate disparities between different groups of students, and how institutional factors such as affirmative action policies influence teacher quality. Specifically, in my dissertation, I explore three core research questions:

1. How do teachers differentially impact cognitive and non-cognitive skill development across student gender groups, particularly in the context of reading skills, where girls traditionally outperform boys?
2. How does faculty representation by gender affect both educational outcomes and students' broader perceptions of who belongs in educational (specifically STEM) spaces?
3. How does an aggressive and binding affirmative action policy in faculty hiring influence the quality of instruction provided by teachers, in a setting where a large-scale affirmative action program for students contributes a pool of candidates who are potentially equally productive?

I explore these questions across a variety of contexts, from elementary school classrooms in North Carolina to engineering colleges in India, employing several methodological approaches that allow for causal inference. By examining a comprehensive set of outcomes—including cognitive measures (test scores), non-cognitive indicators (grades, attendance, and suspensions), faculty productivity metrics (research output, administrative service), and psychosocial factors (confidence, anxiety, and stereotypical beliefs)—my work provides a multidimensional understanding of educational outcomes and faculty effectiveness that extends beyond conventional achievement metrics.

Job Market Paper

Persistent gender gaps in academic achievement remain a critical concern for educators and policymakers. While substantial research has examined mathematics achievement, where boys typically outperform girls, less attention has been paid to reading achievement, where boys consistently lag behind girls, with gaps that manifest in elementary school, and persist through higher education. These disparities are particularly concerning given the growing evidence that reading proficiency is a crucial determinant of educational attainment and future labor market outcomes. Reading skills play a significant role explaining college enrollment, suggesting that gender gaps in reading achievement may be a key driver of broader educational attainment disparities between males and females.

Teachers can have lasting impacts across multiple dimensions of student development, through both cognitive outcomes measured by test scores and non-cognitive outcomes captured by teacher-assigned grades, absences, and classroom behaviors. While teachers' impacts on non-cognitive measures is an important and growing area of research, their gender-differentiated impacts on non-cognitive skills remains under-explored. Given that boys systematically lag behind girls in non-cognitive skills, in addition to lagging behind in cognitive reading skills, understanding how

teachers can differentially impact male and female students' reading skills in both dimensions could provide crucial insights for addressing these persistent gender gaps.

In my job market paper, I investigate the gender-differentiated impacts of teachers on students' reading skills in both cognitive and non-cognitive dimensions, using a teacher value-added approach with administrative data from the state of North Carolina. My analysis yields three key descriptive findings:

First, between grades 3 and 8, girls on average outperform boys in cognitive reading skills (i.e., standardized tests) by around 0.12 to 0.14 standard deviations.

Second, I document substantial disparities between boys and girls using a novel predictive metric of in-class performance called *anticipated grades*.[1] Boys consistently lag behind girls in anticipated grades (conditional on test scores) across both mathematics and reading assessments, and these gaps persist through elementary and middle school. For reading anticipated grades specifically, the gender gap conditional on test scores grows from 0.1 standard deviation units in 3rd grade to 0.33 standard deviations in 8th grade.

Third, using gender-differentiated value-added measures of teacher effectiveness, I find that teachers with higher overall value-added typically have higher values of boy-specific effectiveness relative to their girl-specific effectiveness in their anticipated grade value-added, for both math and reading. This pattern does not emerge in test scores, suggesting a unique relationship between teacher effectiveness and non-cognitive outcomes that varies by student gender.

To investigate the gender-differentiated impacts of teachers, I adapt the approach of Chetty et al. (2014) to allow for heterogeneous effects of the same teacher on boys and girls. My findings reveal that the impacts of having an effective 4th grade teacher on both reading test scores and anticipated grades persist through middle school for both boys and girls. Importantly, I find contemporaneous positive impacts on boys' reading grades when they are assigned to effective 4th grade teachers, with no negative impact on girls—suggesting that effective teachers can simultaneously reduce gender gaps while improving outcomes overall. Preliminary analysis indicates these results are partly (though not entirely) driven by effective teachers' success in improving under-performing students, who tend to be boys in the context of reading skills. In ongoing work, I am exploring the gender-differentiated impacts of teachers on other non-cognitive measures such as absences, suspensions, and grade repetition, adapting the framework of Jackson (2018).

These findings deepen our understanding of how teachers influence reading outcomes for boys and girls in distinct ways. By examining both cognitive measures like test scores and non-cognitive measures like anticipated grades, this research identifies a potential mechanism that could help bridge persistent gender gaps in reading achievement. The results suggest that identifying and scaling the practices of effective teachers could be a promising pathway for addressing educational disparities while improving outcomes for all students.

[1] Course grades are "anticipated" by teachers, because grades are typically not finalized at the time when standardized tests are being conducted and data is being collected by the state. However, these measures serve as useful proxies of the final grade a student receives.

Other Dissertation Chapters

My second chapter examines an aggressive affirmative action in Indian higher education, analyzing the productivity of faculty hired under a quota-based policy. In India, public universities are constitutionally mandated to reserve approximately 50 percent of faculty positions for candidates from disadvantaged caste and social class groups (in addition to reserving 50% of seats for students from disadvantaged castes and classes). Using data from a nationally representative sample of 50 engineering and technology colleges in India (including some with random assignment of students to classrooms), we find that "reservation category" faculty (those hired through affirmative action) have lower levels of education, lower professorial ranks, and fewer years of experience in academia than "general category" faculty not hired through reservations. Despite these differences in formal qualifications, our central finding is that reservation category faculty deliver instruction of equal quality across a comprehensive range of outcome measures. We evaluate multiple dimensions of instructional effectiveness including students' performance in course grades, follow-on course performance, standardized test scores, dropout rates, attendance, graduate school plans, and graduation rates, and find no differences between students assigned to reservation category and general category faculty. In fact, for immediate course grades, students taught by reservation category faculty perform slightly better than those taught by general category faculty. Compellingly, this pattern holds for general category students as well, demonstrating that the benefits of faculty diversity extend to all students, even in contexts where there might be potential discrimination or resentment against faculty hiring quotas. Importantly, we evaluate these productivity differences between different groups of faculty in a setting where a large-scale affirmative action program for students contributes a pool of candidates who are potentially equally productive, but may not have had the requisite minimum qualifications required to apply for such jobs had it not been for affirmative action in student admissions. These findings have significant implications for debates over affirmative action programs worldwide, as they provide rigorous evidence that faculty diversity can be achieved without compromising educational quality—even in highly technical fields like engineering across multiple universities in the world's most populous country.

My third chapter investigates gender disparities in STEM education in India and examines the role of female faculty representation in addressing these disparities. Leveraging random assignment of students to instructors across multiple engineering colleges, we study how faculty gender composition affects both academic and non-cognitive outcomes. Our findings reveal that being assigned to a higher share of female faculty improves female students' academic achievement and reduces their STEM-related anxiety. These effects are most pronounced for female students with lower prior achievement and confidence levels. Additionally, exposure to female faculty shifts male students' beliefs about gender and STEM ability away from traditional stereotypes. These results highlight the broader role of representation in fostering inclusive and equitable learning environments, complementing my job market paper's examination of teacher effectiveness and gender gaps in primary and secondary education.

Future Research Agenda

Building on my dissertation work, my future research will continue exploring educational equity through three complementary projects that expand both the contexts and mechanisms I study. First, in a co-authored project, we will examine how residential and school segregation along caste lines in India affects educational inequality by linking administrative education data with census data to analyze how the concentration of underrepresented groups correlates with school resources and student outcomes. Second, I will investigate how school-wide factors beyond direct teacher-student interactions shape educational environments, by studying the spillover effects of high school football team success on academic and behavioral outcomes for non-athlete students in Texas. Third, I will explore how confirmation bias in belief updating mechanisms contributes to persistence of gender-biased beliefs in STEM contexts, by conducting experimental research that tests whether the source of corrective information about gender disparities affects how individuals update their beliefs. Together, these projects extend my research on educational equity by examining structural factors, institutional climate, and cognitive biases that influence outcomes across diverse educational settings.