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Teacher discrimination in occupational expectations and grading

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Abstract

This paper studies the extent of teacher's discrimination in occupational expectations and analyses whether discrimination in occupational expectations would further perpetuate discrimination in grading on the basis of student's caste and socio-economic status. The paper adopts an experimental approach and draws on data generated from 122 teachers from 19 schools in Delhi, India. Student's caste and socio-economic status were randomly assigned to a set of essays written by students such that the assigned characteristics were not related to essay quality. The results show that teachers' expect students belonging to low caste and low socio-economic status will be less likely to realize their occupational ambitions relative to students belonging to high caste and high socio-economic status. Consistent with this bias in expectations there is also a bias in grading which shows that low expectations of a teacher perpetuates discrimination in grades awarded. Essays assigned low caste and low socio-economic status characteristics are graded 3.64 points lower relative to essays assigned to high caste and high socio-economic status. Given the ultra-competitive nature of schooling in India and the importance of grades in determining access to higher education in India, a 3.64 point disadvantage is substantial. The estimates also show that there is a trade-off between caste and socio-economic status. Belonging to a high socio-economic status lowers the extent of discrimination faced by low caste students.

Keywords

Teacher discrimination, grading, occupational expectations, caste, socioeconomic status, Delhi, India.

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Acronyms

SES	Socio-economic Status
CBSE	Central Board of secondary education
B.E.D	Bachelor of education degree
M.E.D	Masters of education degree

Teacher discrimination in occupational expectations and grading

1 Introduction

Marks assigned by teachers to students tend to motivate and incentivize students. Even basic in-class tests are important for students and in the long-term are likely to have a bearing on their career choices. The marks received by students and particularly the fairness of marking may have a long-lasting impact on students in terms of their self-confidence, effort and motivation to pursue higher education. Lavy (2008) points out that, marks given to students by teachers not only determines students' class ranking and admission to universities but also act as a reward that boosts student's self-esteem or a punishment that might lower their self-esteem.

With regard to teacher influence on test scores, existing research suggests that teachers hold preconceived stereotypes, implicit biases that affect teacher's expectations based on student's ethnicity, socio-economic status, caste, sex and physical attractiveness which may influence the grades that they award. Psychological research shows that teachers may look hard for errors while marking essays or tests of minority students in order that the results conform to their expectations that is an expectation confirmation bias (Sprietsma, 2012). Experimental studies in the economics literature, for example, Hanna and Linden's (2012) study on India shows that teacher's assigned lower marks to low caste students relative to high caste students. Similarly, Sprietsma (2012) shows evidence of low marks assigned to essays with Turkish names relative to essays with German names. Tenenbaum and Ruck (2007) find that teachers hold lower expectations from minority African-American students relative to their Caucasian peers. Consistent with these findings, Casteel (1998) and Ferguson (2003) show that teacher's hold lower expectations from minority students and give less praise and feedback relative to Caucasian peers. Such teacher-driven biases in expectations are a matter of concern because they might perpetuate discrimination in grading which may lower student's self-esteem and class performance by impacting student's self-perception.

Due to the potential importance of grades received in school on the occupational paths and self-esteem of students, whether such grades are influenced by teacher's expectations about students from certain backgrounds, interpersonal bias, pre-conceived stereotypes and implicit biases remains a matter of concern and provides the motivation for this research paper.

This paper builds on the existing literature and focuses on whether teachers discriminate in terms of occupational expectations and whether discrimination in expectations further perpetuate discrimination in grades awarded on the basis of student's caste and socio-economic status in Delhi, India. The paper is set in the Indian capital, which has witnessed a major economic convergence between high caste and low caste in the current era of rapid economic development in India. In the current context it is possible that discrimination no longer runs only along caste lines but along "caste and class" lines. Recognizing this possibility and the blurring of lines between caste and class this paper examines teacher discrimination along caste and class lines by examining the effect of both these attributes on whether students have the ability to achieve their occupational ambitions and on grades awarded.

Methodologically, the paper uses an experimental approach to identify class and caste based discrimination and draws on data generated from 122 teachers from 8 private and 11 government schools in Delhi, India. To this purpose, 10 students aged 13-14.5 years were invited to write essays on the topic "My future career ambition". Student's caste and socio-economic status were then randomly assigned to essays such that as-signed characteristics were not related to essay quality/actual characteristics. Since, each of the 122 teachers graded 10 essays, the experiment generates 1,220 observations for analysis. Consistent with the existing literature, I

hypothesize that teachers expect students from low caste and low socio-economic status will be less likely to achieve their occupational ambitions and this discrimination in occupational expectations might perpetuate discrimination in grades awarded. I also hypothesize that there is a trade-off between caste and class and that high socio-economic status will mitigate the effects of low caste.

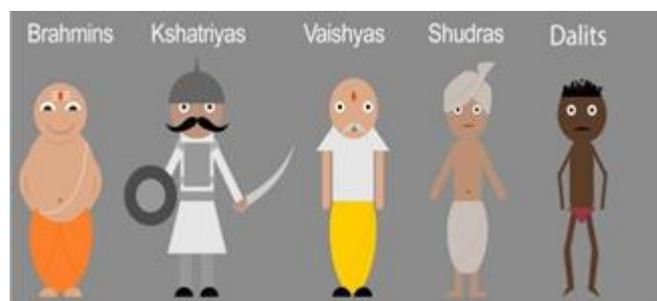
The novelty of the paper is twofold. First, the paper provides experimental evidence of teacher discrimination in occupational expectations. Second, it aims to analyse whether discrimination in occupational expectations further perpetuate discrimination in grading on the basis of the individual and the combined effects of student caste and socio-economic status in Indian capital, Delhi.

The remainder of the paper is structured as follows. Chapter 2, provides a background on caste based discrimination in India and economic convergence between caste and class. Chapter 3 provides a literature review. Chapter 4 presents the research methodology and the hypothesis. Chapter 5 presents the data and descriptive analyses. Chapter 6 discusses the results, chapter 7 provides a discussion and chapter 8 concludes.

2 Background: The Indian caste system and economic convergence between caste and class

This chapter provides a brief background on the Indian caste system. Given the large literature on this topic and the complexity of the system the presentation is limited to a discussion of issues that are pertinent to the paper and in particular argues that caste and class boundaries are blurred.

Caste also called “jati”, refers to a group of people who have a specific social ranking, a common origin and are linked to traditional occupations. The caste system comprises of four distinct groups also known as “varnas” arranged in hierarchical order. These groups are Brahmins, Kshatriyas, Vaishyas and Shudras. The Brahmins are the highest caste in the hierarchy and are traditionally engaged in occupations such as priests or teachers. Kshatriyas were rulers and warriors, Vaishyas were traders and Shudras were the working class. A fifth group, out-of-caste and considered untouchable are the Dalits (oppressed). This fifth group was relegated to occupations such as cleaning organic waste, burial or burning of dead bodies and other menial tasks (Deliege, 1999). They were not allowed to worship in temples, enter schools and were forced to stay in the outskirts of villages and faced oppression and discrimination (Deliege, 1999).



Source: Caracol (2018, 3 February). The caste system in India. Travels In India. Retrieved from: <http://india-with.me/caste-system-india>

In Hindu society, the oppression of Dalits /or Shudras was justified on the basis of “spiritual merit that individuals had accumulated in their past existence” (Galanter, 1984:11). This is consistent with the statement by Gupta(2000:19) who mentions, “Though there is no way by which those in caste society can distinguish unfailing natural markers of difference, yet they justify caste stratification on basis that different castes are built of different natural substances”. This kind of belief system persisted for decades and rationalized the exploitation of the lowest caste and those out-of-caste. The reason for these inequalities arising from the caste system has been attributed not to society but to the nature or divine (Hoff and Pandey, 2006).

The earliest expression of caste was first found in the Vedas, which are a set of four ancient Indian religious texts expected to have been compiled between 1500 and 1000 BC. The first of these Vedas, mentions a hymn about the first man “Purusa” who was sacrificed to give rise to four castes or varnas in India. A study by Deliege (2001:24) mentions that “Brahmin was his mouth, his two arms were made the ruler (Kshtriya or Thakur; King or warrior), his thighs were made the Vaishya and from his feet arose the Shudra (scheduled class/scheduled tribe/untouchable)”. The Dalits or untouchables were too low to be counted within this class structure. The Manu Smriti, a text that dates back to the third century AD reinforces this belief and mentions the exclusion of untouchables/dalits from schools, high caste villages, wells, temples, right to hold property or wealth. The text, further elaborates saying that dwellings of untouchables must be outside the village and donkeys must be their wealth (Ambedkar, 2014:49).



Source: <https://www.bbc.com/news/world-asia-india-35650616>

While the caste system was not completely rigid and there is a large literature which discusses its various features and the possibility of moving up the caste hierarchy, the essential idea of a caste hierarchy and notions of impurity and untouchability began to weaken only after India's independence from the British in 1947. The Indian constitution, adopted in 1950, abolished the caste system and a bill was passed that established reservation of seats for lower castes (now labelled scheduled castes and tribes) in universities and jobs in government. In part due to this policy of reservation as well as the increasing political and economic clout of the lower castes there has been a gradual convergence between high caste and low caste groups in the spheres of educational attainment, occupational choices, wages and consumption levels (Munshi, 2017:2). Symbolically, in 2017 the country elected a president from the country's lowest caste.

Despite the gradual blurring of caste and class since Indian independence, the existing literature tends to focus on caste based discrimination in education and other spheres (Hanna and Linden, 2012; Hoff and Pandey, 2006). However, a sole focus on caste may no longer be warranted as it is possible that discrimination not only runs along caste lines but along "caste and class lines". This study recognizes the blurring of lines between caste and class and examines teacher discrimination along caste and class lines by examining the effect of both these attributes on whether students have the ability to achieve their occupational ambitions and on grades awarded.

3 Literature review

Student's characteristics based on ethnicity, sex, caste and socio-economic status may influence grades that teacher's assign to students via teacher's pre-conceived stereo-types, implicit biases and expectations (Van Ewijk, 2011).

Stereotypes are described to be beliefs about certain groups of peoples and attitudes resulting from those stereotypes are evaluations of people of diverse characteristics (Ajzen, 2001). They are defined as cognitive strategies that might help teachers to evaluate students without an information overload of getting to know each student from scratch (Maccrae, Milne and Bodenhausen, 1994). Closely related and resulting from stereotypes, is a concept of implicit bias. It describes a situation when a person holds positive or negative attitudes towards other people or group of people, without having conscious knowledge of this bias (Kahneman and Egan, 2011). In field of education, teachers are more likely to rely on their system one (instinctive, automatic behaviour) when they have incomplete or unambiguous information. For instance, while grading, teachers may rely on system1 if they are unaware of marking criteria. System one response also arises in the presence of time constraints or when teachers are tired and have a lot going on in their minds (Staats and Contractor, 2014). The concept of expectations that arise due to stereotypes and implicit biases refers to the potential role teachers may play in creating inequalities among students (Jussim and Harber, 2005) and are known to affect student's achievement.

This chapter aims to review literature on these three concepts of teacher's stereo-types, implicit bias and expectations. The first section, reviews literature on teacher's stereotype bias followed by second section on teacher's implicit bias and third section will discuss literature on teacher's expectations. The Fourth section, will utilize these concepts of stereotypes, implicit bias and expectations to describe literature on teacher's discrimination in grading. This section also highlights gaps in the existing literature that has examined discrimination in grading and will explain how this research aims to fill these gaps and make a contribution.

3.1 Teacher's stereotype bias

Pre-conceived stereotypes towards a particular race, ethnicity, class and caste can influence teacher's decisions and may lead them to discriminate against minority students. For example, a question asked by a minority student in class may be interpreted as sign of lack of intelligence/ignorance in class whereas it might have been interpreted as sign of intelligence when asked by a majority student of higher caste/ class/ethnic majority. Rist (1970) elaborates on this and argues that such kind of teacher behaviour arises from teacher's preconceived stereotypes.

In his study Rist (1970) observed three divisions in class in a Kindergarten school in USA. The teacher was supposed to divide the class in groups of A, B and C based on student intelligence. However, Rist found out that teacher had divided the class on basis of student's socio-economic status. The students on table A, came from better off backgrounds, were neatly dressed relative to students on table B and table C. Students on table A were made to sit on the first seats, near the teacher. The teacher was warmer and gave more attention to students who sat on table A relative to students on table B and C. This kind of teacher behaviour in class positively impacted performance of table A students but adversely affected performance of table B and table C. Rist concluded that his study documented self-fulfilling prophecies based on teacher's stereotypes. However, the limitation of this study is that, it lacks to provide any empirical evidence because it is based on subjective views of the author based on a small sample size of 30 students which reduces its credibility.

Hoff and Pandey (2006) elaborates on teacher's stereotypes in detail and succeeded to offer an empirical evidence. The study is based on 321 high-caste and 321 low caste male students who volunteered to participate in a maze-solving experiment in a village in India. Before conducting the experiment personal details of students were asked including their caste. The experiment assessed performance (maze solving ability) under two conditions - one when the caste of the student was publicly announced and another where the caste of the student was not publicly announced and kept hidden. The study results show that there were no difference in performance when caste was kept hidden. Whereas, when caste was publicly announced performance of low caste students lowered by 1.83 points relative to high caste students. This study suggests that a threat is created among low caste students when their caste is announced publicly; which adversely affected low caste student's performance relative to high caste students. This is the threat of being judged, discrimination and fear that their low caste would lead to low reward. This concept is known as "stereotype threat" well explained by Steele (1997).

3.1.1 Stereotype threat

Steele (1997) describes that a stereotype threat is a social psychological threat, when one is doing something or is in a situation when a negative stereotype about one's group applies. This negative stereotype creates a threat in the air such that the person loses his self-esteem in fear of being judged by others. Negative stereotypes for women, students of low socio-economic status, low caste and African Americans have sharply been felt and has adversely hampered performance. Existing research shows that stereotype threat, adversely impacts women's performance at maths relative to men (Spencer et al., 1999), performance of white men at maths relative to Asian men (Aronson et al., 1999), social sensitivity of men relative to women (Leyens et al., 2000), Black student's verbal skills relative to white students (Steele and Aronson, 1995).

For example, in a study by Steele and Aronson(1995) both African American students and Caucasian students of Stanford University took the verbal test of the GRE (Graduate Record Exam). They were informed whether the test was diagnostic of intelligence or not. In the diagnostic condition the stereotype becomes salient. The study showed that performance of African American and Caucasian students was comparable in the absence of the diagnostic condition, whereas African American students scored 2.64 points (P -value <0.01) lower relative to Caucasian students in the presence of the diagnostic condition. The argument is that the diagnostic condition generates a stereotype threat among African American students and lowers their performance relative to Caucasian peers.

Similarly, there are other studies such as Schmader (2002) which studied how strength of gender identity moderates stereotype threats. The study had a sample of $N=33$ white men and $N=32$ white women. Participants were first requested to fill a collective self-esteem scale and then they participated in the stereotype threat study. The study found that women with higher levels of gender identification scored 0.59 points ($P<0.01$) lower marks in math tests relative to men. On the other hand, women with lower levels of gender identification, performed the same as men. This study provides strong evidence of how stereotype when attached to gender might adversely impact performance.

3.2 Teacher's implicit bias

Consistent with the above studies on stereotype bias, the concept of implicit bias also highlights the similar idea as how teacher's beliefs about certain group of students might unconsciously affect teacher's explicit actions/attitudes and may lead to discrimination against minority students.

For instance, many implicit associations link African-American students to behaviour of criminality, aggression and danger (Eberhardt et al., 2004). Tenenbaum and Ruck (2007) shows evidence that teachers hold low expectations arising from unconscious bias against minority students and rate African-American students to be disruptive and less attentive in class relative to Caucasian peers. Ferguson (2003) and Casteel (1998) also shows evidence of African-American students receiving less praise and less feed-back relative to Caucasian peers.

In a similar context, Dee (2005), elaborates more on implicit bias by describing how combinations of teacher-student demographics characteristics affect student's class-room performance. He describes that it is a two-way process. First, changes in teacher behaviour due to student characteristics and demographics. Second, changes in student behaviour due to teacher characteristics and demographics. This study introduces the idea of "active teacher effects" that teachers might have unintended bias in their prior expectations and interactions with students of different demographic cultures such that demographically similar teachers raise their expectations from demographically similar students and motivates them to perform well.

While study by Dee (2005) is very important in explaining teacher's implicit bias and active teacher effects, it lacks in providing credible empirical evidence to proof the active teacher effects and show empirically that a demographically similar teacher raises the motivation and performance of demographically similar students.

3.3 Teacher's expectation bias

Teacher's expectations that result from teacher's stereotypes and implicit biases might perpetuate discrimination in other spheres such as grading, affect student's intelligence and are known to have self-fulfilling prophecies. Psychological research shows that manipulating teacher's expectations towards a group of students, leads students to perform consistent with those expectations. This has been coined as "Pygmalion effect" by Rosenthal and Jacobson (1968).

Rosenthal and Jacobson (1968) conducted a non-verbal intelligence test among all children from kindergarten through the fifth grade in Jacobson's elementary school in USA. Teachers were unaware of the fact that this was an intelligence test. Teachers considered the test as "A test of inflicted acquisition" a test developed at Harvard University to identify children likely to show greater intellectual development (bloomers) in upcoming years in school. The authors then informed teachers about the students who were identified as "late bloomers". These late bloomers constituted about 20% of total students in school and were selected at random. The authors then analysed test results after one year and then again after 2 years.

The results showed that, after one year the late bloomers had higher points on IQ tests compared to the control students. Again after 2 years the results showed that late bloomers actually showed higher IQ gains relative to control students. Given that the only systematic difference between the bloomers and control was in teachers' minds about which student will bloom, the authors argued that, teacher expectations created a self-fulfilling prophecy. The study also showed that when control students gained higher IQ in later years and showed improvement, teachers' reactions towards them was hostile and less affectionate as these students showed unexpected intellectual growth. This study, thus showed how inaccurate high teacher expectations for certain students might give an undue advantage to those children and help them achieve much higher intellectual development than rest of the class.

This study by Rosenthal and Jacobson (1968) led to extreme reactions. There was enthusiastic support for the study as well as sharp criticism. The Pygmalion study hit an intellectual and political nerve. For instance reviews by Spitz (1999) supported the findings of the study and since its publication it has been widely cited by Jones (1986), Claire and Fiske (1998) and others for showing a) the self-fulfilling nature of teacher expectations; b) teacher expectations create erroneous social stereotypes; c) teacher expectations are a powerful force that

creates injustice and social inequality. Several other studies such as Weinstein and Mckown (1998) went on to state that, these self-fulfilling prophecies not only persisted in a classroom but also persisted in workplace, colleges and in government.

Despite this support, other studies argue that the results of the study are not as straight forward as they might seem. Results were criticized because, both categories of children, late bloomers and controls showed an increase in IQ regardless of the experimental condition. Late-bloomers showed a 12 point increase in IQ while the control group showed a 8 point increase in IQ. The increase in IQ was described to be dramatic, however, a 4-point difference is not so dramatic.

Several replications of the Pygmalion study were conducted to correct for the various methodological criticisms. These replications focused on whether teacher expectations had a self-fulfilling impact on student's achievement. The solution to the Pygmalion controversy was finally provided by the study of Rosenthal and Rubin (1978) that conducted a meta-analysis of 345 experiments on expectancy effects. The 345 experiments were divided into eight groups and Z scores were computed. These Z scores represented combined expectancy effect in all eight categories. The median from the combined eight Z scores was found to be 6.62 suggesting the presence of a self-fulfilling prophecy effects.

3.3.1 Golem effect

Related to the concept of Pygmalion effect, is called "Golem effect" Golem means fool or oaf; derived from Hebrew slang (Babad et al., 1982). Golem effect can be thought of as negative Pygmalion. It is a darker version of Pygmalion. It has been challenging and provocative to study Golem effects, due to ethical constraints and other operational challenges. The idea of this concept, is based on low expectation of a superior/teacher; that is evident from his/her behaviour would adversely impact a subordinate's performance. It is a matter of ethical concern to manipulate negative expectations about students among teachers. Even Babad et al. (1982) chose not to apply a treatment of lowered teacher expectations towards students. What researchers did, was to experimentally raise teacher expectations for some students, for whom teachers naturally possessed low or high expectations. Thus, researchers generally used, pre-existing biases of teachers to proxy for their negative expectations. These biases carry with them low expectations for minority students (Baron et al., 1985).

For example, Oz and Eden(1994) randomly made squad leaders of military believe that low scores on physical fitness does not indicate ineptitude, while in the control group no such instructions were given. The results of the analysis showed greater improvement among low-scoring military squad leaders relative to control group. The limitation of this study, is its extremely small sample size (n=17). Moreover, this study failed to demonstrate the idea of Golem effect in a complete sense. It did not show, how low expectations of a supervisor would adversely impact performance of the subordinate. Despite its limitations, this study has been important, because of its first attempt to identify Golem effect in military setting.

Feldman and Prohaska (1979) conducted experiment, where they sent confederates to schools acting as students (n=39). These confederates evinced negative or positive expectations for participants (n=40) acting as their teachers (whether they are effective or ineffective).The results showed significant difference in attitudes of students, non-verbal behaviour and performance according to expectation. In their other study Feldman and Theiss (1982) studied the joint effect of teacher expectation of students and student's expectations of teachers on performance and behaviour of both groups. The experiment led to similar and significant results as per hypothesis. This study, did not just provide an anecdotal evidence of Golem effect, but also provided a credible empirical estimate along with challenges of Golem research.

Another study by Vrugt (1990) examined if artificially induced negative expectations among therapists were conveyed to clients via non-verbal behaviour. The study randomly assigned (n=18) male psychotherapists who served as interviewers and (n=18) male psychology students serving as interviewees to treatment and control conditions. In the treatment condition, the interviewers were informed, that the interviews were undergoing a treatment for psychological problems. In the control, no such information was provided to interviewers about interviewees. The study showed significant results and confirmed that negative expectations of therapists did affect clients/interviewees negatively.

3.3.2 Are negative teacher expectations more harmful than positive teacher expectations?

Reviews such as Fiske and Taylor (1991) have argued that self-fulfilling prophecies are more likely to have negative effects than positive effects. Most meta-analysis and naturalistic studies that have assessed the relationship between teacher expectations and student achievement show much larger effects of 0.3 to 0.4 standard deviation for negative teacher expectations and effects nearly 0.2 standard deviations for positive teacher expectations. Therefore, teacher's expectations are a matter of concern, because negative teacher expectations can be more harmful than positive teacher expectations.

3.4 Discrimination in grading

Present study, utilizes concept of teacher's expectations arising from teacher's stereo-types and implicit biases and focuses on the question whether teachers discriminate in holding occupational expectations and whether lower expectations of a teacher perpetuates discrimination in grades awarded to students based on their caste and class in Indian capital, Delhi. Empirical evidence on teacher's discrimination in expectations and grading is scarce and limited to just three studies. These studies are Van Ewijk (2011), Sprietsma (2012) and Hanna and Linden (2012).

Study by Van Ewijk (2011) experimentally assess teacher's discrimination on basis of student ethnicity in Netherlands. It is based on the hypothesis that teachers may have preconceived stereotypes against Turkish students relative to native Dutch students and such bias in stereotypes might lead to a bias in grading. To this purpose, the study conducted an experiment based on requesting 113 teachers to grade 10 set of essays in a packet. Student names were randomly manipulated on the set of essays, such that teachers believed that some essays were written by ethnic minority, Turkish students and some essays were written by native Dutch students.

Because of randomization, the study applied simple OLS method taking test scores as a dependent variable and "ethnic minority name" as a dummy. The effects turn out, not to be significantly different from zero such that author concludes that teacher's do not discriminate in direct grading bias in Netherlands on basis of student's ethnicity. The author tries to explain that such result could be either because of potential failure of experimental manipulation or highly objective grading done by teachers irrespective of student ethnicity in schools.

This study is novel, because it is the foremost study conducted in Netherlands that assesses teacher's ethnic bias via an experiment. Published in Economics of education review and IDEAS/RePEc and cited by 57 scholars, this study has motivated the experiment of my study. However, potential limitation of this study is, that author has not developed any mechanism in the experiment to show that experimental names manipulation worked and that teacher's noticed student's ethnicity before grading the essay. Furthermore, the teacher's did not grade the essays in front of the author/researcher rather sent their evaluations online. In such a scenario, there could be a possibility that teachers sent grades without even reading essays properly and this might lead author to conclude that there is no discrimination in grading.

Later, motivated by study of Van Ewijk (2011) a similar study was conducted by Sprietsma (2012) to examine teacher's discrimination in grading on basis of students' ethnicity in Germany. This study based on sample size of 80 teachers and 800 observations randomly assigned German and Turkish names on set of 10 essays. This study applied the OLS method and found that essays bearing Turkish names were awarded 0.12 points lower test scores (out of 6) relative to essays bearing German names. Therefore, in contrast to study by Van Ewijk (2011) the study by Sprietsma (2012) found evidence of teacher's discrimination in grading.

In relevance to the Indian context, study by Hanna and Linden (2012) has assessed teacher's discrimination in grading on basis of student's caste. The study is based on a sample size of 120 teachers recruited from 67 government and 53 private schools. Methodologically, the authors adopts an experimental approach based on random assignment of child characteristics (age, gender and caste) to cover sheets of exams by ensuring that there was no relationship between actual and assigned characteristics. The results show, that teachers assign 0.03 to 0.08 standard deviations lower marks to low caste students relative to high caste students.

This study is novel, because it is the only study that has tried to assess discrimination in grading in India empirically. However, it suffers from some major limitations. First, the study does not mention anything about the state in which it has been conducted in India. Nor does the reader get an idea about the names and location of selected schools (city; rural/urban). India is a huge country where notions of caste differ in every state. For instance, teachers are more likely to discriminate against low caste in Uttar Pradesh relative to Delhi. Second, the study states that on average only 43 teachers checked the exams. If this is the case, then the information that 120 teachers were recruited and participated in the study is not clear. Third, the authors randomly put student's caste on cover sheets for teacher's to see and then grade. Doing this, could be a very artificial approach as teachers might get to know the actual intent of experiment. Fourth, discrimination on the basis of caste is less likely to occur when the socio-economic status of the student is high therefore the study fails to incorporate the fact that in current era of rapid economic development it could be possible that discrimination not only runs along caste lines but along "caste and class" lines.

Therefore, to fill such gaps in existing literature and recognizing the blurring of caste and class lines, this paper examines teacher's discrimination along caste and class lines by examining the effect of both these attributes on whether students have the ability to achieve their occupational ambitions and on grades awarded. Consistent with the existing literature, I hypothesize that teachers expect that students from low caste and low socio-economic status will be less likely to achieve their occupational ambitions and this bias in expectations might further perpetuate a bias in grading against students of low caste and low socio-economic status. I also hypothesize that there is a trade-off between caste and class and that high socio-economic status will mitigate the effects of low caste. Methodologically, this paper uses an experimental approach based on grading essays by teachers on which student's caste and socio-economic status was randomly manipulated. The next chapter, explains this experiment and hypothesis in detail.

4 Research methodology and hypothesis

This chapter outlines the research methodology used to test the research hypothesis. In general, it is difficult to uncover teacher's attitudes of discrimination especially in terms of expectations and grades awarded. Among others, the use of survey-based questions suffers from the possibility of social desirability bias as teachers are unlikely to confess to discrimination. Furthermore, research on discrimination becomes difficult because discriminatory attitudes may not be intentional, and may lie in the sub-conscious and may arise from pre-conceived stereotypes. It is possible to uncover such issues, at least to some extent, by conducting field experiments. Motivated by the study conducted by Hanna and Linden (2012) an experiment was designed and conducted in the Indian capital, Delhi as described below.

4.1 Experiment overview

The experiment took place in Delhi in three stages. The first stage of the experiment, involved essay writing by 10 students aged 13-14.5 years on the topic "My future career ambition". Students were given a guideline to write essays so that their essays were similar in structure. The essays were collected and caste and socio-economic status was randomly assigned to essays such that one essay out of 10 was kept as a blind essay on which no manipulation of caste and socio-economic status was done. In the third stage, a packet of 10 essays was graded by each of 122 teachers. After grading was done, packets were collected and payment was made to teachers to compensate for their precious time.

Table 1
Experiment overview

Location	Indian capital; Delhi
First stage	Essay writing by 10 students aged 13-14.5 years on the topic "My future career ambition"
Second stage	Randomization of student caste and socio-economic status on essays such that one essay out of 10 was kept as a blind essay.
Third stage	Grading session by 122 teachers from 8 private and 11 government schools.

Source: Data collected by author

4.1.1 Experiment details

First stage: Children's essay writing

In the month of July, I went door to door to invite 10 students in Delhi aged between 13-14.5 years to write an essay on the topic "My future career ambition". The essay writing took place under my invigilation in a hall at my home, on a Saturday when all the children were available. Some children wrote the entire essay in front of me while some others went back home and handed in the essay on the next day.

Children between the age group 13 to 14.5 years were chosen and the topic was not subject-specific, because I wanted essays which could be graded, such that every teacher who had a basic BEd (Bachelor of education) degree was eligible to check the essays. The essay title “My future career ambition” was selected for various reasons. First, it gave me an idea about the student’s career ambitions. Second, the topic of the essay invited students to write about their occupational ambitions, parental occupations and background. This is important as providing information on their caste and class would seem natural rather than forced.

I gave a guideline to students to write the essay (see **appendix**). In the first paragraph, I asked students to introduce their interest and motivation related to career ambition and occupational paths. In the second paragraph, I asked students to write about their parental occupation/background and how it motivated their career ambition. In the third paragraph, I asked students to write, what they had done to achieve their career ambition (extracurricular activities, study interests, reading). In the fourth paragraph, I asked students to write about struggles that they may have faced to achieve their career ambitions. In the fifth paragraph, I asked students to mention how their goal if achieved would contribute to society. All essays were written in English.

Second stage: Randomizing caste and socio-economic status on essays

The aim of this paper is to assess whether teachers discriminate in holding occupational expectations and whether these expectations perpetuate discrimination in grades awarded based on student’s caste and socio-economic status.



a) Getting 1,220 photocopies to be checked by 122 teachers

To identify this, student’s caste and socio-economic status was randomly assigned to the essays such that one essay out of 10 was kept as a blind essay on which caste and socio-economic status was not assigned. Randomization is expected to ensure that caste and socio-economic status assigned on the essays is not related to essay quality or actual student’s characteristics. It must be noted, that only student’s caste and socio-economic status was adjusted in the essay. Everything else, including the spellings and structure remained in exactly the same as written by the students.

To ensure that teachers noticed the assigned caste and socio-economic status on the essays before grading it, I asked teachers to respond to three multiple choice questions before grading

and after having read the essay.¹ Teachers were told, that this served as a check that they had read the essay carefully. In the first question, teachers had to mention student's ambition. In the second question teachers had to mention student's caste and in the third question, teachers had to mention student's socio-economic status. This ensured that teachers had read the essay carefully and did notice student's caste and socio-economic status before grading.



b) Making packets after randomization of student's caste and SES on essays.

Teachers were asked to mark the essay out of 100 and also rate the essay out of 5 for the question “whether the student will be able to achieve his/her career ambition”. A score of 0/5 indicates that teachers have low expectations in terms of student's achieving his/her ambition and score of 5/5 means that teachers have the highest possible expectations in terms of student's achievement of his/her career ambition.

Third stage: Grading session by teachers

I obtained a list of all private and government schools in Delhi affiliated to the CBSE (Central Board of Secondary Education) and sent an email to all the schools which had provided their email address; requesting them to allow me to conduct research at their school.² In the email, I had explained the brief idea of my research making sure that actual intent of experiment was not revealed. I visited those schools first which had accepted my email/request and allowed me to conduct research at their school. Later, I visited other schools based on principal's recommendation.



c) At Deep Public School with Economics teacher.

¹ The study by Hanna and Linden (2012) also utilizes a similar approach to ensure that teacher's notice student's caste prior to mark the essay. In this study; teachers had to enter the information of assigned student's caste, age and gender on a separate sheet prior grading the exams.

² All schools in Delhi must be affiliated to CBSE (Central board of secondary education). CBSE is a national level board of education in India for public and private schools managed by Union government of India.

Finally, the schools which accepted the brief idea of research and allowed me to access teachers, became a part of my study.

In total, 122 teachers from 8 private and 11 government schools participated in my research. Each teacher was requested to grade a packet containing 10 essays on the basis of content, style and language thus generating 1,220 observations for analysis.

Teachers were also requested to fill the three multiple choice questions based on the essay, after reading but prior to grading. This was done to ensure that teacher's notice student's caste and socio-economic status before grading the essay. After grading, teachers were requested to fill a survey form which obtained information on a list of teacher characteristics. The questionnaire included questions on teacher's gender, age, education status, years of teaching experience, school type, location of school and total time taken to grade the essays (see appendix for details).



d) Government Co-ed senior Secondary school making payment by cheque

Subsequently they were paid for their efforts. Payments ranged between Rs. 200 to 400 Rs (2.39 euro-4.79 euro).³

4.2 Hypothesis

Based on the literature and the experiment, this paper aims to test the following hypotheses. Literature such as Sprietsma (2012) suggests that discrimination in teacher's expectations might perpetuate discrimination in grading. Therefore, I first set and test hypothesis to examine teacher's discrimination in occupational expectations and then I set and test hypothesis to examine teacher's discrimination in grading.

4.2.1 *Teacher's discrimination in occupational expectations*

H1: Teachers hold lower occupational expectations from essays assigned to low caste relative to high caste and this bias in expectations might further perpetuate a bias in grading.

This hypothesis aims to examine teacher's discrimination in occupational expectations in terms of students' career ambition for essays assigned to low caste relative to high caste and further analyses whether such discrimination perpetuates a bias in grading or not. This also applies to the following two hypotheses.

³ For schools chosen in the beginning of the field experiment, I paid an amount of 400Rs for checking a packet of 10 essays. However, I later realized that teachers were willing to participate in research even if I paid them 200Rs to check a packet of 10 essays. Teacher's willingness to participate in this study depended on their interest and time availability and not on money so much.

H2: Teachers hold lower occupational expectations from essays assigned to low socio-economic status relative to high socio-economic students.

This hypothesis aims to examine teacher's occupational expectations in terms of students' achievement of their career ambition for essays assigned to low socio-economic status relative to high socio-economic status.

H3: Teacher's hold lowest occupational expectations from essays assigned to low caste and low socio-economic status and that high socio-economic status would mitigate the effect of low caste.

This hypothesis aims to examine extent of teacher's discrimination in occupational expectations for low caste and low socio-economic status category relative to high caste and high socio-economic status and further examine the role of high socio-economic status in mitigating bias faced by low caste.

4.2.2 Teacher's discrimination in grading

H4: Teachers give lower grades to essays assigned low caste relative to high caste.

This hypothesis aims to examine teacher's discrimination in grading, against low caste students relative to high caste students.

H5: Teachers give lower grades to essays assigned low socio-economic status relative to high socio-economic status.

This hypothesis aims to examine teacher's discrimination in grading, against low socio-economic status category relative to high socio-economic status category.

H6: Teacher's give the lowest grades to essays that are assigned low caste and low socio-economic status relative to essays assigned high caste and high socio-economic status

This hypothesis aims to examine teacher's discrimination in grading, against students' essays assigned to low caste and low socio-economic status relative to high caste and high SES (socio-economic status) and examines whether high socio-economic status mitigates the effect of low caste.

4.3 Empirical specification

Since caste and class are randomly assigned to each of the essays, it is reasonable to expect that after controlling for the tendency of a particular teacher/grader to grade high or low (grader fixed effect), any remaining differences in grades across caste and class may be attributed to grader discrimination. To identify caste and class effects, I apply a simple OLS (ordinary least square method) to test each of the six hypotheses.

Hypothesis 1: Average effect of assigned caste on teacher's occupational expectations

The aim of hypothesis 1 is to test whether teachers hold lower occupational expectations against students' essays belonging to low caste relative to high caste. I utilize the following empirical specification¹ to test this hypothesis.

$$Q_{ij} = \beta_{castej} + \tau_{graderfixedeffecti} + \epsilon_{ij} \quad (1)$$

In this equation Q_{ij} represents the teacher's occupational expectations assigned by teacher i to essay j . The variable $castej$ is a dummy which takes value 0 for an essay assigned to low caste and 1 for an essay assigned a high caste. The $graderfixedeffect_i$ controls for teacher-specific grading approach (strict/lenient). The idiosyncratic error term is ϵ_{ij} . Since assignment of caste on an essay is randomly determined there is no reason to expect that it is related to essay quality or with the idiosyncratic error term. Thus, the β should provide an unbiased estimate of assigned caste on the occupational expectations assigned by teachers. Standard errors are clustered at the teacher level. This applies to the entire following hypothesis.

Hypothesis 2: Average effect of assigned socio-economic status on teacher's occupational expectations

The aim of hypothesis 2 is to test whether teachers hold lower occupational expectations against students' essays belonging to low socioeconomic status relative to high socioeconomic status. I utilize the following empirical specification 2 to test this hypothesis.

$$Q_{ij} = \beta SES_j + \tau graderfixedeffect_i + \epsilon_{ij} \quad (2)$$

In this equation Q_{ij} represents teacher's occupational expectations assigned by teacher i to essay j . The SES_j is a dummy variable, which takes value 0 for an essay assigned to low socioeconomic status (SES) and 1 for an essay assigned as a high SES (socioeconomic status). The ϵ_{ij} represents the idiosyncratic error term. The $graderfixedeffect_i$, in equation will control for teacher-specific grading approach (strict/lenient). The idiosyncratic error term is ϵ_{ij} . Since assignment of socioeconomic status on an essay is randomly determined there is no reason to expect that it is related to essay quality or with the idiosyncratic error term. Thus, the β should provide an unbiased estimate of assigned socioeconomic status on the occupational expectations assigned by teachers.

Hypothesis 3: Average effect of assigned caste and socio-economic status on teacher's occupational expectations

The aim of hypothesis 3 is to test whether teachers hold lower occupational expectations against students' essays belonging to low caste and low socioeconomic status relative to high caste and high socioeconomic status. I utilize the following empirical specification 3 to test this hypothesis.

$$Q_{ij} = \beta_1 (lowcastelowSES_j) + \beta_2 (blindcasteblindSES_j) + \beta_3 (LowcasteHighSES_j) + \beta_4 (HighcastelowSES)_j + \tau graderfixedeffect_i + \epsilon_{ij} \quad (3)$$

In this equation Q_{ij} represents teacher's occupational expectations assigned by teacher i to essay j . The $lowcastelowSES_j$, $blindcasteblindSES_j$, $LowcasteHighSES_j$, $HighcastelowSES_j$ are dummy variables. The ϵ_{ij} represents the idiosyncratic error term. The $graderfixedeffect_i$, in equation will control for teacher-specific grading approach (strict/lenient). Since assignment of caste and socioeconomic status on an essay is randomly determined there is no reason to expect that it is related to essay quality or with the idiosyncratic error term. Thus, the β should provide an unbiased estimate of assigned caste and socioeconomic status on the occupational expectations assigned by teachers.

Hypothesis 4: Average effect of assigned caste on grades

The aim of hypothesis 4 is to test whether teachers assign lower marks to students' essays belonging to low caste relative to high caste. I utilize the following empirical specification 4 to test this hypothesis.

$$Y_{ij} = \beta \text{caste}_{j} + \tau \text{graderfixedeffect}_{i} + \epsilon_{ij} \quad (4)$$

In this equation Y_{ij} represents grades assigned by teacher i to essay j . The variable caste_{j} is a dummy which takes value 0 for an essay assigned to low caste and 1 for an essay assigned a high caste. The $\text{graderfixedeffect}_{i}$ controls for teacher-specific grading approach (strict/lenient). The idiosyncratic error term is ϵ_{ij} . Since assignment of caste on an essay is randomly determined there is no reason to expect that it is related to essay quality or with the idiosyncratic error term. Thus, the β should provide an unbiased estimate of assigned caste on the grade assigned by teachers.

Hypothesis 5: Average effect of assigned socio-economic status on grades

The aim of hypothesis 5 is to test whether teachers assign lower marks to students' essays belonging to low socioeconomic status relative to high socioeconomic status. I utilize the following empirical specification 5 to test this hypothesis.

$$Y_{ij} = \beta \text{SES}_{j} + \tau \text{graderfixedeffect}_{i} + \epsilon_{ij} \quad (5)$$

In this equation Y_{ij} represents grades assigned by teacher i to essay j . The SES_{j} is a dummy variable, which takes value 0 for an essay assigned to low socioeconomic status (SES) and 1 for an essay assigned as a high SES (socioeconomic status). The ϵ_{ij} represents the idiosyncratic error term. The $\text{graderfixedeffect}_{i}$, in equation will control for teacher-specific grading approach (strict/lenient). The idiosyncratic error term is ϵ_{ij} . Since assignment of socioeconomic status on an essay is randomly determined there is no reason to expect that it is related to essay quality or with the idiosyncratic error term. Thus, the β should provide an unbiased estimate of assigned socioeconomic status on the grades assigned by teachers.

Hypothesis 6: Average effect of assigned caste and socio-economic status on grades assigned

The aim of hypothesis 6 is to test whether teachers assign lowest marks to students' essays belonging to low caste and low socioeconomic status relative to high caste and high socioeconomic status. I utilize the following empirical specification 6 to test this hypothesis.

$$Y_{ij} = \beta_1 (\text{lowcastelowSES})_j + \beta_2 (\text{blindcasteblindSES})_j + \beta_3 (\text{LowcasteHighSES})_j + \beta_4 (\text{HighcastelowSES})_j + \tau \text{graderfixedeffect}_{i} + \epsilon_{ij} \quad (6)$$

In this equation Y_{ij} represents grades assigned by teacher i to essay j . The lowcastelowSES_j , $\text{blindcasteblindSES}_j$, LowcasteHighSES_j , HighcastelowSES_j are dummy variables. The ϵ_{ij} represents the idiosyncratic error term. The $\text{graderfixedeffect}_{i}$, in equation will control for teacher-specific grading approach (strict/lenient). Since assignment of caste and socioeconomic status on an essay is randomly determined there is no reason to expect that it is related to essay quality or with the idiosyncratic error term. Thus, the β should provide an unbiased estimate of assigned caste and socioeconomic status on the grades assigned by teachers.

5 Data and descriptive analysis

The first section of this chapter describes the data sample and data location. The second section describes teacher characteristics. The third section describes the actual and assigned characteristics. The fourth section presents initial results based on means and standard deviations. The fifth and sixth sections provide initial results on teacher's in-group bias (same caste) and out-group bias (different caste).

5.1 Data sample and data location

The research was conducted in Delhi. In recent years, it has witnessed convergence between caste and class in the current era of economic development. In the current context it is possible that discrimination no longer runs only along caste lines but along "caste and class" lines. Recognizing this possibility and the blurring of lines between caste and class, makes Delhi an unique location for conducting research to ex-amine teacher discrimination in occupational expectations and grading along caste and class lines.

The data consists of 1,220 observations for analysis generated from 122 teacher participants from 19 schools in New Delhi. The sample includes teachers from 8 private and 11 government schools who graded a set of 10 essays each on which caste and socio-economic status of students were randomly assigned.

I have provided the list of all schools, along with the location of the school, number of teachers chosen from each school in the appendix (Table A).

5.2 Descriptive analysis of teacher characteristics

Table 1 provides descriptive analysis for teacher characteristics. The idea of this table is to provide a glance of teaching profession in schools in Delhi. Column 1 of the table shows the total/overall for the respective categories mentioned in the rows. Column 2 describes the teacher characteristics by gender and column 3 describes the teacher characteristics by teacher's education level.

The sample represents a skewed gender balance, leaning towards females (95.08%) representing the feminization of the teaching profession in Delhi and in India. In terms of teacher's education, data display that 67.21% out of 122 teachers hold a Bachelor of education degree, 28.69% teachers hold a masters of education and very few teachers in teaching profession hold a graduate degree (4.1%). These figures are according to expectation and highlight the real context of teaching profession in Delhi.⁴ Out of the total of 122 teachers, sample consists of 74 private school teachers and 48 government school teachers. The reason behind less number of government school teachers in sample is lack of teaching staff in government schools relative to private schools.

The sample consists of majority number of permanent teachers 59% (72/122), with mean age between 30-35 years and hold on average 117 months (9.75 years) of teaching experience. A majority of 92/122 (75.4%) teachers teach in schools located in urban areas and 30 /122(24.5%) teachers teach in schools located in rural parts of Delhi.

⁴ Majority number of teachers in schools in Delhi are females and must hold a bachelor in education or a master's in education degree to be eligible to teach in schools. Teachers holding a graduate degree are least preferred in teaching profession.

Table 1
Descriptive analysis of teacher characteristics

	Total/mean	Female	B.E.D Bachelor in education	M.E.D Masters in education	Graduate
Number of teachers	122	95.08 %	67.21 %	28.69 %	4.10 %
Female teachers	116	1	67.24 %	30.17 %	2.59 %
Mean age	30-35	21.55 %	26.83 %	8.57 %	0 %
Private school	74	62.93 %	54.88 %	82.86 %	0 %
Government school	48	37.07 %	45.12 %	17.14 %	100%
Rural location	30	23.28 %	26.83 %	14.29 %	60 %
School in urban location	92	76.72 %	73.17 %	85.71 %	40%
Permanent teachers	72	56.9 %	53.66 %	71.43 %	60%
Mean months of teaching experience	117	118	111	139	51.4
Mean minutes checking essays	136.12	139	85.2	266.71	56
Mean marks	74.2	74.3	76.45	68.99	73.9
Mean teacher expectation	3.63 (72.6 %)	3.64 (72.8 %)	3.7 (74 %)	3.47 (69.4 %)	3.46 (69.2 %)
Total	122=122	116	82	35	5

Source: Data collected by author

The data, further highlights that private schools teachers are relatively more educated (82.86% teachers holding a M.E.D degree) relative to government school teachers (17% teachers hold a M.E.D degree) which explains majority number of toppers and higher boards exam results from private schools relative to government schools in the Indian capital.⁵

Average time in minutes, spent in checking 10 essays is 136.12 minutes (row 12). Females took relatively longer (139 minutes) to check the essays relative to males (80 minutes). Greater is the education of the teacher, longer is the time taken while grading and assign lower marks to students.⁶ For instance, highly educated M.E.D (Master in education) degree holding teachers took the maximum time (266.71 minutes) to grade essays and assigned on average, lowest marks (68.99%) to students. Whereas, B.E.D (Bachelor in education) degree holding teachers took lesser time(85.2 minutes) and assigned average higher (76.45%) marks to students.

On average, teachers' occupational expectations are 3.63/5 (row 14) equivalent to 72.6% (proportion) to get a clear idea. Data further reveals that, male teachers on average hold relatively low occupational expectations from students and assign relatively less marks in comparison to female teachers. For instance, female teachers hold higher occupational expectations (3.64/5) or 72.8% (proportion) from their students relative to male teachers (3.39/5 or 67.8%) and also mark students higher (74.33%) relative to males (72.33%).

⁵ Central board of secondary school education exam. This is a key exam in India that 10th and 12th class students have to appear for to gain admission to University.

⁶ Master's in education (M.E.D) is preferred over bachelors in education (B.E.D) and least preferred is a graduate degree in teaching profession.

5.3 Actual and assigned characteristics

Actual characteristics refer to the true characteristics of teachers and students and as-signed characteristics are the characteristics assigned by random manipulation. Table 2 shows that majority of teachers belong to high caste (59%) and only 8% belonging to the low caste. For the remainder, I was unable to get information.

Table 2
Descriptive analysis by actual and assigned characteristics

	Actual teacher's caste	Actual student's caste	Assigned student's caste	Actual student's SES	Assigned student's SES
Low caste / Low SES student	8.11 %	10 %	50 %	10 %	50 %
High caste / High SES	59.10 %	90 %	40 %	90 %	40 %
Unknown / blind	32.79%	0 %	10 %	0 %	10 %
Total	122 (100 %)	10 (100 %)	100%	10 (100 %)	122 (100 %)

Source: Data collected by author

Column 2 of table 2, provides information about actual student's caste. Of the 10 students who wrote the essays, 10% belong to low caste while the remainder belong to a high caste and in terms of socio-economic status it is a similar proportion with a majority of 90% students who wrote the essays belonging to a high socio-economic status.

The assigned student's caste to essays is shown by column 3. It show that 50% of essays were assigned a low caste, 40% essays were assigned high caste and 10% essays were kept as blind. The assigned student's socio-economic status, given by column 4 reveals that 50% essays were randomly assigned to low socio-economic status category, 40% essays were assigned to high socio-economic status and 10% essays were kept as blind category.

5.3.1 Randomization check

I test whether the assigned characteristics are correlated with actual characteristics or exam quality shown in table 3. I regress the actual characteristics (column 1-3) on the assigned characteristics (row 1-3). For each specification, I provide the p-value for all assigned characteristics.

The results demonstrate that random assignment procedure succeeded in assigning characteristics to the essays that are uncorrelated with actual characteristics or essay quality.⁷ Each of the coefficients of the assigned characteristics are found to be insignificant.

Therefore, I find no evidence that assigned characteristics are related with actual characteristics or exam quality. This clearly justifies the successful random assignment procedure.⁸

⁷ Hanna and Linden (2012) adopts a similar randomization check and adopts a similar conclusion when coefficients of assigned characteristics were found to be insignificant.

⁸ This was done to make sure, that teachers have read the essay properly before grading and have noticed student's caste and socioeconomic status; which was the intent of the experiment.

Table 3
Randomization check

	(1) Actual SES student	(2) Actual caste student	(3) Actual caste and SES student
Assigned SES student	0.2 (0.22)	–	–
Assigned caste student	–	-0.25 (0.21)	–
Assigned caste and SES			0.1428 (0.28)
P-value	0.407	0.292	0.626

Standard error statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5.3.2 Average effect of treatments on time taken to grade the essays

The average effect of treatments on time taken to grade the essays by teachers is shown below in table 4. The results show that, average effect of treatments on time taken to grade the essays is very small and insignificant.

Table 4
**OLS regression showing average effect of treatments
on time taken to grade essays**

	(1) Minutes marking
Low caste Low SES	-1.78e-14 (37.65)
Blind caste blind SES	-1.52e-14 (50.51)
High caste Low SES	-1.88e-14 (41.24)
Low caste High SES	-1.87e-14 (41.24)
_cons	136.1*** (29.16)
N	1220

Standard error in parentheses

$p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The average effect of individual treatments on marks is also insignificant and very small (not shown here). These results, show that priming teachers (asking teachers whether they noticed student's caste and socio-economic status after reading the es-say8) for student's caste and socio-economic status did not affect average time taken to grade essays.

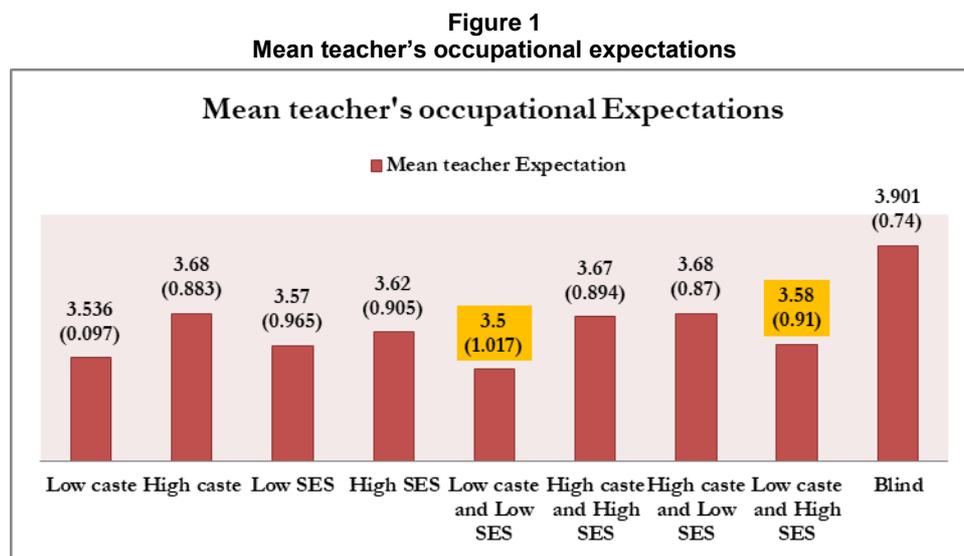
5.4 Initial results

Section 5.4.1 will present results on teacher's differences in occupational expectations followed by section 5.4.2 which will describe results on teacher's differences in grading based on student's caste and socio-economic status.

5.4.1 Differences in occupational expectations⁹

On the basis of the literature review, I hypothesize that teacher's may hold lower occupational expectations against students belonging to low caste and low socio-economic status and this discrimination in expectations might further perpetuate discrimination in grading. Figure 1 presents results for mean teacher's occupational expectations on basis of individual and combined effect of caste and socio-economic status (SES) with standard errors given in brackets.

On average, teacher's may hold, 0.14 points or 4% lower occupational expectations from student's essays assigned low caste relative to high caste, suggesting a small caste bias against low caste students in terms of their occupational ambitions.



Source: data collected by author; standard errors are given in brackets.

Similarly, teacher's expectations are also found to be biased against low socio-economic status category relative to high socio-economic status but the extent of discrimination is small(0.05 points or 1.4%).

Low caste along with low socio-economic status slightly increases the extent of discrimination, as teacher's bias in occupational expectations shoots up by 0.17points (4.9%) for low caste and low socio-economic status relative to high caste and high socio-economic status. However, high SES (socio-economic status) mitigates the effect of low caste as extent of bias falls by 0.074 points for low caste and high SES socio-economic status) category relative to low caste and low socio-economic status category.

The most striking result is, for the blind category for which teachers may hold 0.22 points (5.7%) higher occupational expectations relative to high caste and high socio-economic status (SES) students. This reveals, that for the actual essay (blind essay), teacher's occupational expectations are relatively higher as compared to essays with assigned characteristics.

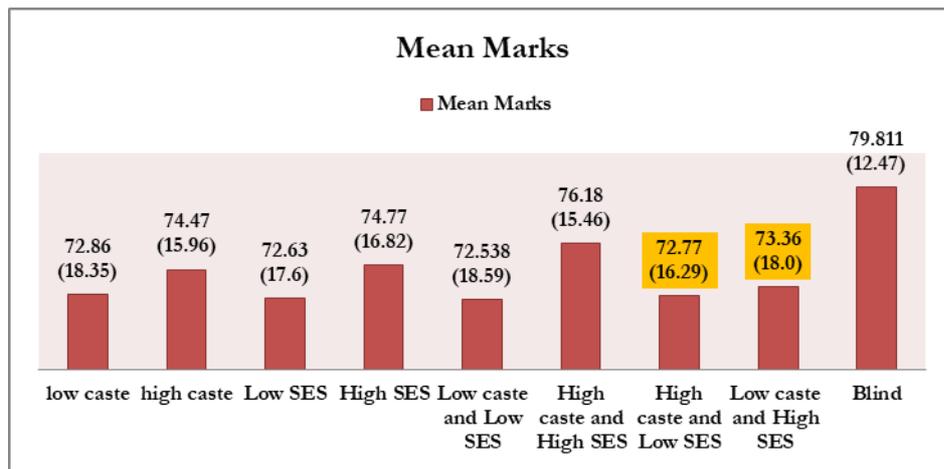
⁹ Occupational expectations are assigned out of 5. A score of 0/5 implies lowest teacher's occupational expectations and score of 5/5 depicts maximum teacher's occupational expectation in terms of student's achievement of his/her career ambition.

5.4.2 Differences in grades¹⁰

Following figure 2 below depicts the bias in teacher’s grading against low caste categories. Note that, standard errors are given in brackets below the “marks” in graph.

The graph depicts, that low caste category has been assigned mean marks (72.86) which is 2.2% lower relative to high caste. The extent of bias increases by 3.64 points or by 5% when the low caste category also has a lower socio-economic status relative to high caste and high socio-economic status. Given the ultra-high competition that student’s face to enter university this bias of 3.64 points or 5% against low caste and low socio-economic status students is substantial.

Figure 2
Mean marks for assigned caste and SES categories



Source: data collected by author; standard errors are given in brackets.

However, high socio-economic status lowers the extent of bias faced by low caste category as discrimination in grading falls by 0.82 points for low caste and high socio-economic status (SES) category relative to low caste and low SES(socio-economic status) category. Thus, belonging from high socio-economic status acts an advantage and reduces the extent of bias faced by low caste (base category: High caste and high SES).

The graph, further depicts that discrimination is more likely to run along class lines rather than caste as socio-economic status is relatively a stronger factor in determining extent of discrimination. Essays assigned to high caste but lower socio-economic status face 0.6 points greater discrimination (72.77) relative to essays assigned to low caste and high socio-economic status (73.36). The results points towards the higher importance of better socio-economic status to minimize the extent of bias faced by a low caste student.

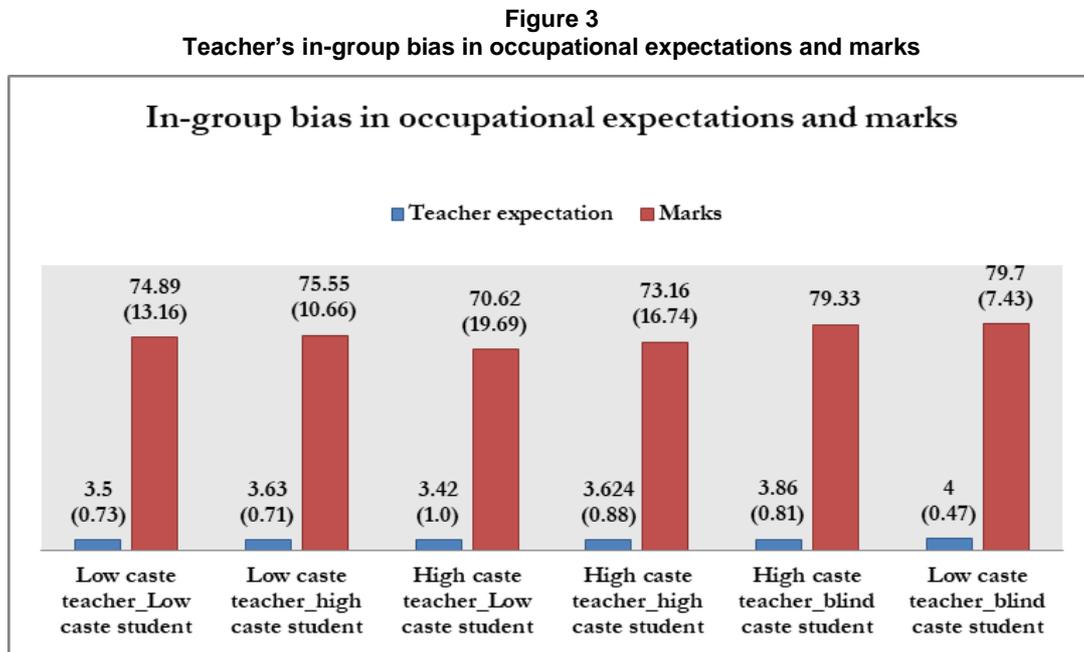
On the same note, the figure also suggests that essays assigned to low socio-economic category has been assigned 2.9% or 2.13 points lower marks relative to high socio-economic status; depicting teacher’s bias against lower socio-economic status students. In contrast, to these results, blind category receives the highest mean marks (79.81) which is 4.59% higher relative to high caste and high SES (socio-economic status) category. This reveals, that for the actual essay (blind essay), teacher’s assign marks that are relatively higher than the essay of assigned characteristics (essays with manipulation).

¹⁰ Grades are assigned out of 100. A score 0/100 refers to lowest grade and 100/100 refers to the maximum grade assigned to an essay.

5.5 In-group differences

5.5.1 Interaction of teacher's caste and student's caste

The following figure 3, depicts teacher's in-group bias in holding occupational expectations in terms of student's ambition and grades awarded on basis of interaction of teacher's caste and student's caste.



Source: Data collected by author; standard errors given in brackets.

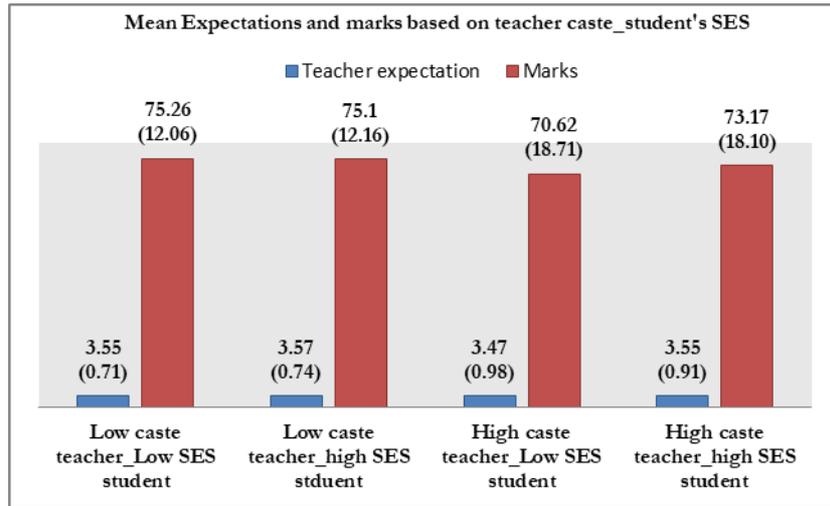
The figure demonstrates that high caste teachers may hold higher occupational expectations and also assign higher grades to their in-group category. For instance, high caste teachers assign 0.20¹¹ points (5.5%) higher occupational expectations and 2.54 points (3.47%) higher marks to high caste students relative to low caste students. In contrast, low caste teachers do not appear to be biased against high caste category as they hold 0.13 points (3.58%) higher occupational expectations and assign 0.66 points (0.8%) higher marks to high caste category relative to low caste. The graph, further reveals that both high caste teachers and low caste teachers hold highest occupational expectations from the blind category and also award maximum marks to the blind essay. It should be noted that credibility of these results based on significance will finally depend on OLS regressions shown in next chapter.

5.5.2 Interaction of teacher's caste and student's socio-economic status (SES)

The following figure 4, depicts, how teachers of high caste and low caste, award marks and hold expectations based on student's socio-economic status. The figure shows that both high caste teachers and low caste teachers may be biased against students from low socio-economic status in holding occupational expectations. Based on figure 4, high caste teachers hold 0.08 points (2.3%) lower occupational expectations from low socio-economic status category relative to high socio-economic status category. Similarly, low caste teachers also hold 0.02 points (0.56%) lower occupational expectations from low socio-economic status students relative to high socio-economic status students.

¹¹ 3.624-3.42=0.20

Figure 4
Expectations and marks awarded based on interaction
of teacher's caste and student's SES



Source: Data collected by author; standard errors given in brackets.

Consistent with these results, there is also a bias in grading as high caste teachers assign 2.55 points lower marks to low socio-economic status students relative to high socio-economic status students. Low caste teachers in contrast, are not shown to be biased against lower socio-economic status category while grading as they assign 0.16 points higher marks to low socio-economic status category relative to high socio-economic status category. This might depict low caste teachers' support and attitude of motivating lower socio-economic status category students to perform well. The credibility of these findings based on significance however will finally be given by OLS regression in next chapter.

6 Results

The paper focuses on the question whether teachers discriminate in terms of occupational expectations and whether discrimination in expectations further perpetuates discrimination in grades awarded on the basis of student's caste and socio-economic status in Delhi, India. The aim of this chapter is to test the hypotheses set out using the ordinary least square method. Since literature such as Sprietsma (2012) suggests that discrimination in teacher's expectations might perpetuate a discrimination in grading, section 6.1 will first emphasize upon the link between teacher's expectations and student marks for different caste and socio-economic status categories. Section 6.2 will examine teacher's discrimination in occupational expectations and I then examine teacher's discrimination in grading in section 6.3. To examine the origin of these results in terms of who discriminates, Section 6.4 examines the link between teacher and student caste in order to examine in-group (same caste) and out-group (different caste) patterns.

6.1 How predictive are teacher's occupational expectations for student's marks?

This section will emphasize on the importance of teacher's occupational expectations in perpetuating discrimination in grading for different caste and socio-economic status categories. Existing literature such as Rosenthal and Jacobson (1968) and Sprietsma (2012) have emphasized, that teacher's expectations play an important role in determining student's achievement. However, these studies lack in providing an empirical evidence to show how important are teacher's expectations in perpetuating discrimination in grading against different caste and socio-economic categories.

Table 5
Correlation of teachers' occupational expectation and marks

Caste and SES	Correlation : Teacher expectation and marks
Low caste and Low SES	0.69*
High caste and High SES	0.64*
Low caste and High SES	0.73*
High caste and low SES	0.69*
Blind	0.64*

Source: Data collected by author, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5 provides a correlation between teacher's occupational expectations and student's marks assigned to essays based on different caste and socio-economic status categories. It is interesting to note that teacher's expectations are strongly correlated with student's marks and are significant at 10% level for all caste and socio-economic status categories. This implies that teacher's expectations play an important role in determining student's marks; especially for the low caste and low socio-economic status and low caste and high socio-economic status categories. This is validated by literature review, which points to the fact, that teacher's expectations are relatively more powerful in creating self-fulfilling prophecies in terms of marks assigned and overall achievement especially for the minority students.

Results further demonstrate, that discrimination in teacher's occupational expectations against low caste and low socio-economic status students might have a huge ad-verse effect on student's marks and henceforth their overall achievement in class. It is also quite interesting, that

correlation between teacher's expectations and marks is lowest (0.69) for the high caste and high socio-economic status category and blind category which shows that teacher's expectations may not be very strong in perpetuating discrimination in grading for high caste and blind category.

6.2 Individual and combined average effect of treatments on teacher's occupational expectations

6.2.1 Result for hypothesis 1: average effect of assigned caste on occupational expectations

Table 6 presents results for assessing average effect of assigned student's caste on teacher's occupational expectations in terms of student's ambitions / occupational paths. Based on the literature, I expect that teacher's may hold lower occupational expectations in terms of student's achievement of their occupational paths from low caste students relative to high caste students.

Table 6
Average effect of assigned caste on occupational expectations

Caste	(1) Teacher expectation
Caste low	-0.144** (0.050)
Caste blind	0.221** (0.067)
Constant	3.680*** (0.025)
Grader fixed effects	Yes
N	1219
R2	0.40

Standard errors in parentheses, clustered at teacher level,

*p < 0.05, **p < 0.01, ***p < 0.001

The results show that, teacher's hold on average 0.14 points or 4% (OLS estimate/mean of estimate*100)¹² lower occupational expectations from essays assigned to low caste category relative to high caste after controlling for grader fixed effect. The coefficient is negative and significant at 5% level (P-value-0.05) with standard errors clustered at teacher level.

This bias of 0.14 points in teacher's expectations is small but is a matter of concern because lower teacher's expectations as explained by Golem effect are detrimental for student's achievement and self-esteem (Babad et al., 1982)

However, for the blind essay on which student's caste was not revealed was assigned 0.22 points (5.6%) higher occupational expectations relative to high caste after controlling for grader fixed effect. The coefficient holds a positive sign and significant at 5% level. This result, confirms discrimination in teacher's occupational expectations against low caste category because the actual essay (blind essay) has been assigned, mean highest teacher's expectations relative to essay of assigned caste.

¹² 0.144/3.536*100=4%

6.2.2 Result for hypothesis 2: average effect of assigned socio-economic status on occupational expectations

Table 7 depicts OLS regression for testing hypothesis 2, given by empirical specification 2. It presents, results for average effect of student's socio-economic status on teacher's occupational expectations in terms of student's achievement of their occupational ambitions.

Results show that on average teachers hold 1.47% (0.0528/3.57) lower occupational expectations for students' essays assigned low socio-economic status relative to high socio-economic status after controlling for grader fixed effects. This result is not significant and is small in magnitude. However, the negative coefficient suggests that there may be a bias in teacher's expectations against students belonging to lower socio-economic status.

Table 7
Average effect of assigned SES on occupational expectations

SES	(1) Teacher expectation
SES low	-0.0529 (0.044)
SES blind	0.272*** (0.078)
Constant	3.630*** (0.025)
Grader fixed effects	Yes
N	1219
R2	0.40

Standard errors in parentheses,
*p < 0.05, **p < 0.01, ***p < 0.001

6.2.3 Result hypothesis 3: average effect of combination of assigned caste and socio-economic status on teacher's occupational expectations

Table 8, shows OLS regression result for average effect of combination of assigned caste and socio-economic status on teacher's occupational expectations after controlling for grader fixed effects. Based on literature and hypothesis 3, I expect that teachers may hold lower occupational expectations for low caste and low socio-economic status category and that being from high socio-economic status will mitigate the effect of low caste.

The results show that teachers hold on average 0.172 points or 4.9% lower occupational expectations for essays assigned to low caste and low socio-economic status relative to high caste and high socio-economic status after controlling for grader fixed effects. This result is significant at 10% level and reveals teacher's discrimination in occupational expectations against low caste and low socio-economic status category.

However, high socio-economic status mitigates the effect of low caste as extent of bias falls by 0.074 points for low caste and high socio-economic status category relative to low caste and low socio-economic status category. In other words, high socio-economic status mitigates the extent of discrimination for low caste as; teacher's occupational expectations fall only by 2.65%¹³ for low caste and high socio-economic status category relative to high caste and high socio-economic status category. This result shows importance of high socio-economic status in lowering the extent of bias that low caste students might face.

¹³ 0.0975/3.58 (OLS/Mean)

Table 8
Average effect of assigned caste and SES
on teacher's expectations

	(1) Teacher expectation
Low caste and low SES	-0.172* (0.067)
High caste and low SES	0.00410 (0.06)
Low caste and high SES	-0.0975 (0.075)
Blind caste and blind SES	0.223** (0.079)
_cons	3.630*** (0.025)
Grader fixed effect	Yes
<i>N</i>	1219
<i>R</i> ²	0.41

Standard errors in parentheses, clustered at teacher level
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

However, for the essay assigned to the blind category teachers assigned on average 0.22 points or 5.7% higher occupational expectations relative to high caste and high socio-economic status category with significance at 5% level.

6.3 Individual and combined average effect of treatments on student's marks

6.3.1 Hypothesis 4: average effect of assigned student's caste on marks

Table 9 shows OLS regression result of an average effect of assigned student's caste on marks relative to high caste after controlling for grader fixed effects. Based on previous result, of teacher's discrimination in occupational expectations based on caste, I expect that this bias in expectations might perpetuate discrimination in teacher's grading.

Table 9
Average effect of assigned caste on student's marks

	(1) Marks student
Low caste	-1.612* (0.814)
Blind	5.332*** (1.042)
_cons	74.48*** (0.422)
Grader fixed effect	Yes
<i>N</i>	1220
<i>R</i> ²	0.581

Standard errors in parentheses, clustered at teacher level
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

As expected, results demonstrate teacher's discrimination in grading as essays assigned to low caste are graded 1.6 points or 2.2%(OLS/mean) lower relative to essays as-signed high caste. This coefficient is negative and significant at 10% level.

Given the huge competition to enter university, a bias of 2.21% against low caste students is substantial and is matter of concern because discrimination is associated with depression, low self-esteem, high drop-out rates and high suicide rates among minority students (Hoff and Pandey, 2006).

The blind essay has been assigned 5.3 points (6.68%) higher marks relative to high caste category. The coefficient is positive and significant at 1% level with standard errors clustered at teacher level. This result shows that teachers discriminate in grading when the assigned caste category is revealed on essays or tests relative to when it is not revealed (actual essay).

6.3.2 Result for hypothesis 5: average effect of assigned socio-economic status on marks

Table 10 depicts OLS regression results for marks awarded on basis of assigned socio-economic status on essays after controlling for grader fixed effects. Previous results on teacher's discrimination in occupational expectations based on student's socio-economic status, lead me to expect that this bias in expectations might perpetuate a discrimination in teacher's grading.

The results demonstrate teacher's bias against low socio-economic category as marks assigned for essays assigned to low socio-economic status are on average 2.13 points (2.94%) lower relative to essays assigned to high socio-economic status after controlling for grader fixed effects. The coefficient is negative and significant at 5% level with standard errors clustered at teacher level.

Table 10
Average effect of assigned SES on students marks

	(1) Marks student
Low SES	-2.136** (0.640)
Blind	5.041*** (1.214)
_cons	74.77*** (0.383)
Grader fixed effect	Yes
N	1220
R ₂	0.583

Standard errors in parentheses, clustered at teacher level
*p < 0.05, **p < 0.01, ***p < 0.001

Given the high cut-off merit for admissions to reputed universities and limited budget to afford good quality education makes discrimination of 2.13 points a matter of concern for lower socio-economic status students.

However, the blind essay on which student's socio-economic status was not assigned, received marks, 5 points (6.31%) higher relative to essay assigned high socio-economic status. This result is significant at 1% the level.

6.3.3 Result for hypothesis 6, average effect of combination of assigned caste and socio-economic status on student's marks

Table 11 depicts an OLS regression result of average effect of combination of assigned caste and socio-economic status on student's marks after controlling for grader fixed effects. The results, show that teachers assign 3.642 points or 5.02% lower marks to essays assigned low caste and low socio-economic status relative to high caste and high socio-economic status. The coefficient has a negative sign and shows significance of 1% level. This bias of 3.6 points is substantial and shown to be maximum against low caste and low socio-economic status category.

However, high socio-economic status lowers the extent of discrimination faced by low caste as grading bias reduces by 0.82 points for low caste and high socio-economic status category relative to low caste and low socio-economic status category, significant at 5% level.

Table 11
Average effect of assigned caste and SES on marks

	(1) Teacher expectation
Low caste and low SES	-3.642*** (0.911)
High caste and low SES	-3.402*** (0.832)
Low caste and high SES	-2.820** (1.06)
Blind caste and blind SES	3.631** (1.12)
_cons	76.18*** (0.522)
Grader fixed effect	Yes
N	1220
R ₂	0.585

Standard error given in parentheses, clustered at teacher level
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Socio-economic status is shown to be relatively stronger factor in determining extent of discrimination in grading as essays assigned to high caste but lower socio-economic status face 0.60 points greater discrimination

(-3.402) relatively to essays assigned to low caste and high socio-economic status (-2.80).

The blind essay however is awarded on average 3.63 points (4.59%) higher mean score relative to essay assigned high caste and high socio-economic status. This reveals, that for the actual essay (blind essay), average marks are relatively higher than the essay of assigned characteristics (essays with manipulation).

6.4 In-group bias

Finally, this section will explore teachers' in-group (same caste) and out-group (different caste) bias on basis of interaction of teacher's characteristics and student's characteristics and aims to identify origins of teacher's discrimination in terms of who discriminates.

6.4.1 Average effect of interaction of teacher's caste and assigned student's caste on occupational expectations

The following table 12, presents results for average effect of interaction of teacher's caste and assigned student's caste on teacher's occupational expectations after controlling for grader fixed effects and student's socio-economic status.¹⁴ Each row in the table represents an individual OLS regression.

The results demonstrate that high caste teachers hold higher occupational expectations from their in-group category and biased against low caste category. For instance, high caste teachers assign 0.53%(OLS estimate/mean of estimate*100) or 0.019 points higher occupational expectations to high caste students and assign 5.6% or 0.19 points lower occupational expectations to low caste students.

Table 12
Average effect of interaction of teacher's caste and assigned student's caste on occupational expectations

	Separate OLS regressions Teacher expectation	OLS Constant
High caste teacher_ High caste student	0.0194** (0.066)	3.41*** (0.02)
High caste teacher_ Low caste student	-0.193** (0.069)	3.59*** (0.031)
Low caste teacher_ High caste student	0.137 (0.102)	3.49*** (0.015)
Low caste teacher_ Low caste student	-0.128 (0.122)	3.50*** (0.01)
Grader fixed effects	Yes	Yes
Student's SES	Yes	Yes
<i>N</i>	899	899

Standard error in parentheses
*p < 0.05, **p < 0.01, *** p < 0.001

The magnitude of coefficients is small but significant at 5% level (P value < 0.005). The low caste teachers however, are not shown to favour or discriminate in holding occupational expectations on basis of student's caste as the coefficients show an insignificant result.

¹⁴ Row 1 shows an OLS regression of (High caste teacher _high caste student an interaction of teacher's high caste and student's high caste) on occupational expectations. Similarly, row 2 presents an OLS regression of High caste teacher_ low caste student on occupational expectations. Row 3 presents an OLS regression of Low caste teacher_ high caste student on occupational expectations. Row 4 presents OLS regression of Low caste teacher _low caste student on occupational expectations. Similarly row 5 and row 6 presents OLS regression of Low caste teacher_ caste blind and High caste teacher_ caste blind on expectations respectively.

6.4.2 Average effect of interaction of teacher's caste and assigned student's caste on marks assigned

The following, table 13 presents results for average effect of interaction of teacher's caste and assigned student's caste on marks assigned¹⁵ after controlling for grader fixed effects and student's socio-economic status. Each row in the table, represents an individual OLS regression for the same.

Results show, that high caste teachers assign 2.36 points or 3.22% (OLS estimate/mean of estimate*100) higher marks when the assigned characteristics belong to high caste; indicating in-group bias/favour for the same caste. The coefficient is positive and significant at 5% level (P-value < 0.05). In contrast, high caste teachers are shown to be biased against low caste students as they assign 2.41 points or 3.41% lower marks when the assigned characteristics is low caste. The coefficient is negative and significant at 5% level demonstrating discrimination of high caste teachers against low caste students. However, for the low caste teachers the results are insignificant which depicts that low caste teachers may not discriminate or hold in-group bias on basis of student's caste while grading.

Table 13
Average effect of interaction of teacher's caste and assigned student caste on marks

	Separate OLS regressions Marks student	OLS Constant
High caste teacher_ High caste student	2.36** (1.04)	70.72*** (0.54)
High caste teacher_ Low caste student	-2.41** (1.09)	72.95*** (0.51)
Low caste teacher_ High caste student	1.46 (2.15)	71.62*** (0.24)
Low caste teacher_ Low caste student	0.102 (2.15)	71.62*** (0.24)
Grader fixed effects	Yes	Yes
Student's SES	Yes	Yes
<i>N</i>	900	900

Standard error in parentheses
*p < 0.05, **p < 0.01, *** p < 0.001

¹⁵ Row 1 shows an OLS regression of (High caste teacher _high caste student an interaction of teacher's high caste and student's high caste) on marks. Similarly, row 2 presents an OLS regression of High caste teacher_ low caste student on marks. Row 3 presents an OLS regression of Low caste teacher_ high caste student on marks. Row 4 presents OLS regression of Low caste teacher _low caste student on marks. Similarly row 5 and row 6 presents OLS regression of Low caste teacher_ caste blind and High caste teacher_ caste blind on marks respectively.

Analysis (section 6.4.1 and 6.4.2)

Overall, the results from section 6.4.1 and 6.4.2 suggests that the discrimination against low caste students arises from high caste teachers and not from the low caste teachers. High caste teachers are shown to favour their in-group category that is high caste category and are shown to discriminate against low caste category in holding occupational expectations and grading.

6.4.3 Average effect of interaction of teacher's caste and student's socio-economic status on occupational expectations

The following table 14, presents results for average effect of interaction of teacher's caste and assigned student's socio-economic status on occupational expectations¹⁶ after controlling for grader fixed effects and student's caste. Each row in the table, represents an individual OLS regression for the same.

Table 14
Average effect of interaction of teacher's caste and assigned student SES on expectations

	Separate OLS regressions Teacher expectation	OLS Constant
High caste teacher_ High SES student	0.074 (0.058)	3.46*** (0.02)
High caste teacher_ Low SES student	-0.058 (0.05)	3.52*** (0.03)
Low caste teacher_ Low SES student	-0.019 (0.065)	3.49*** (0.016)
Low caste teacher_ High SES student	-0.019 (0.063)	3.49*** (0.016)
Grader fixed effects	Yes	Yes
Student's SES	Yes	Yes
<i>N</i>	899	899

Standard error in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Results, show that both high caste teachers and low caste teachers may discriminate against students from low socio-economic status as high caste teachers hold 1.67%(OLS estimate/mean of estimate*100) or 0.05 points and low caste teachers hold 0.53% or 0.019 points lower occupational expectations from low socio-economic status students respectively. The coefficients holds a negative sign but are not significant. The high caste teachers may favour high socio-economic status students as they hold 2.08% higher occupational expectations from them but the coefficient is small in magnitude and insignificant.

¹⁶ Row 1 shows an OLS regression of (High caste teacher _high SES student an interaction of teacher's high caste and student's high SES) on occupational expectations. Similarly, row 2 presents an OLS regression of High caste teacher_ low SES student on occupational expectations. Row 3 presents an OLS regression of Low caste teacher_ low SES student on occupational expectations. Row 4 presents OLS regression of Low caste teacher _high SES student on occupational expectations. All OLS regressions control for grader fixed effects.

These insignificant results thus, depict that teachers may not discriminate or favour students on basis of socio-economic status in holding occupational expectations. This further suggests, that student's caste may still be a dominant factor that may lead to teacher's discrimination in expectations in the current era of economic development and high socio-economic status only acts to mitigate the discrimination faced by low caste category.

6.4.4 Average effect of interaction of teacher's caste and student's socio-economic status on marks awarded

The following table 15, presents results for average effect of interaction of teacher's caste and assigned student's socio-economic status on marks after controlling for grader fixed effects and student's caste. Each row in the table, represents an individual OLS regression for the same.

Table 15
Average effect of interaction of teacher's caste and assigned student's SES on marks

	Separate OLS regressions Teacher expectation	OLS Constant
High caste teacher_ High SES student	2.379** (0.89)	70.71*** (0.414)
High caste teacher_ Low SES student	-2.42** (0.90)	72.95*** (0.54)
Low caste teacher_ Low SES student	0.839 (1.28)	71.63*** (0.244)
Low caste teacher_ High SES student	0.715 (1.092)	71.65*** (0.244)
Grader fixed effect	Yes	Yes
Caste	Yes	Yes
<i>N</i>	900	900

Standard error in parentheses
*p < 0.05, **p < 0.01, *** p < 0.001

Results demonstrate that high caste teachers favour high socio-economic status students while grading and discriminate against low socio-economic status students. For instance, high caste teachers assign 2.37 points or 3.25% (OLS estimate/mean of estimate*100) higher marks when the assigned characteristics belong to high socio-economic status and assign 2.42 points or 3.42% lower marks when the assigned characteristics belongs to low socio-economic status. The coefficients are significant at 5% level. However, for the low caste teachers the coefficient on marks assigned is insignificant which depicts that low caste teachers may not hold a bias for or against different socio-economic status category students in awarding marks.

Analysis (section 6.4.3 and 6.4.4)

Therefore, overall(section 6.4.3 and 6.4.4) results suggests that teachers may not discriminate on basis of student's socio-economic status in holding occupational expectations but while grading, high caste teachers favour high socio-economic status students and discriminate against low socio-economic status students. Hence, teacher's discrimination is more likely to run only along lines of caste in holding occupational expectations; but discrimination does run along class lines when teachers grade essays/work of low socio-economic status and high socio-economic status students. These results are a matter of concern because marks awarded not only determine student's rank and admissions to universities but also affects their motivation to pursue higher education.

7 Discussion

The present chapter will discuss the results of the study. The first section compares the current findings of the study with previous studies. The second section explores various implications associated with the present results. The third section will outline opportunities for improvement and fourth section highlights avenues for further research.

7.1 Comparison with existing studies

Analogous to Hanna and Linden (2012) and Sprietsma (2012) the present results find that teacher's discriminate in grading. On the contrary, the results on discrimination in grading oppose to the study by Van Ewijk (2011) who finds no evidence of discrimination in grading in Netherlands based on student's ethnicity. Since, the context of my study is closely related to study by Hanna and Linden (2012) I will compare present results with this study in detail.

Similar to the study by Hanna and Linden (2012), present study utilizes an experimental approach to assess teacher's discrimination in grading. While present study finds evidence that teacher's assign 1.61 points or 2.21% (OLS estimate/mean of estimate*100) lower grades to essays assigned to low caste students relative to high caste students; Hanna and Linden (2012) finds relatively lower extent of discrimination of 0.08 standard deviations for essays assigned to low caste relative to high caste. Hanna and Linden (2012) also examines whether teachers hold an in-group bias but finds no credible evidence for it. Contrary to Hanna and Linden (2012), the present results show evidence of teacher's in-group bias as high caste teachers assign 2.36 points or 3.22% higher marks to high caste students and assign 2.41 points or 3.41% lower marks when the assigned characteristics is low caste.

The present study eliminates the gap in Hanna and Linden's (2012) study by recognising that in current era of economic development, discrimination not only runs along caste lines but along "caste and class" lines and emphasizes upon role of teacher's expectations in perpetuating discrimination in grading. To this purpose, the paper utilized an experimental approach to identify class and caste based discrimination and drew on data generated from 122 teachers from 8 private and 11 government schools in Delhi, India. Ten students aged 13-14.5 years were invited to write essays on the topic "My future career ambition". Student's caste and socio-economic status was then randomly assigned on set of essays such that assigned characteristics were not related with essay quality/actual characteristics. A total of 122 teachers graded a pack-et of 10 essays which generated 1,220 observations for analysis.

The results, show that indeed caste and class boundaries are blurred and discrimination not only runs along caste lines but along "caste and class" lines in the Indian capital. For instance, teachers' hold on average 0.17 points or (4.91%) lower occupational expectations for essays assigned to low caste and low socio-economic status relative to high caste and high socio-economic status. However, high socio-economic status mitigates the effect of low caste as extent of bias in expectations falls by 0.074 points for low caste and high socio-economic status category relative to low caste and low socio-economic status category.

Consistent with this discrimination in expectations there is also discrimination in grading which shows that lower expectations of a teacher further perpetuates discrimination in grading. Essays assigned low caste and low socio-economic status characteristics are assigned 5.02% or 3.64 points lower marks relative to essays assigned to high caste and high socio-economic status. Given the ultra-competitive nature of schooling in India and the importance of grades in determining access to higher education, a 3.64 points disadvantage is substantial. There is also trade-off between caste and socio-economic status. Belonging to high socio-economic status

lowers the extent of discrimination faced by low caste students as grading bias falls by 0.8 points for low caste and high socio-economic status(-2.8) category relative to bias faced by low caste and low socio-economic status(-3.64) category.

The results, further depict that discrimination in grading is more likely to run along class lines rather than caste as socio-economic status is relatively a stronger factor in determining extent of discrimination. Essays assigned to high caste but lower socio-economic status face 0.60 points greater discrimination (-3.402) relatively to essays assigned to low caste and high socio-economic status (-2.80).

Above all, the blind essay is awarded on average maximum of 0.22 points or 5.7% higher occupational expectations and 3.6 points or 4.59% higher mean marks relative to essay assigned to high caste and high socio-economic status. This reveals, that for the actual essay (blind essay), average marks are relatively higher than the essay of assigned characteristics (essays with manipulation). This depicts, that assigning student's characteristics on essays/tests is likely to perpetuate teacher's discrimination or their favour for caste and class categories relative to when student's characteristics are kept blind (hidden).

Unlike Sprietsma (2012) and Van Ewijk (2011) the present study has also attempted to explain the origin of these results and to identify which kind of teachers discriminate. The results, suggests that the discrimination against low caste students arises from majority number of high caste teachers in the sample and not from the low caste teachers. For instance, high caste teachers are shown to discriminate against essays assigned to low caste and low socio-economic status as they assign 2.41 points or 3.41% lower marks to low caste category and 2.42 points or 3.42% lower marks to low socio-economic status category respectively.

7.2 Implications of results

The findings of this study has following implications. First, the data provides evidence to the Delhi government that teacher's in the Indian capital hold lower expectations against students of low caste and low socio-economic status and these lower expectations of teacher's further perpetuate discrimination in grading. Therefore, government should design campaigns, teacher training programs and various implicit association tests in schools to raise awareness about pre-conceived stereotypes and implicit biases that lead to discrimination in teacher's expectations and perpetuate discrimination in grading.

Second, to minimise teacher's discrimination in grading the Delhi government must formulate a policy of standardized objective grading across schools. In response to this policy, schools must offer free programs to make teachers aware of the testing instruments and grading criteria as unawareness about grading instruments and criteria may lead teachers to rely on student characteristics and thus perpetuate discrimination in grading.

Analogous to Hoff and Pandey's (2006) the third, implication directs towards a policy of not revealing student's characteristics (caste and socio-economic status) on essays/ tests/classroom setting as revealing student's characteristics might perpetuate teacher's discrimination for or against caste and socio-economic status categories.

Fourth, to minimise discrimination faced by low caste and low socio-economic status students in schools, the present study directs towards policy to uplift the low caste and low socio-economic status students in terms of their socio-economic status such that their vulnerability to discrimination can be minimised.

7.3 Opportunities for improvement

Given the nature of experiment, the present study like Hanna and Linden (2012) could not incorporate for essay fixed effects. Though analogous to Hanna and Linden (2012); assigned characteristics were randomly assigned on essays such that they are not related with essay

quality/actual characteristics (shown in table 3: randomization check). Therefore, present study guides the future research to design an experiment where there should be an inter-variation within essays such that the research can control for essay fixed effects.

7.4 Avenues for further research

The present study distinguishes three avenues for future research. The first avenue could investigate a comparative analysis of teacher's discrimination in occupational expectations and grading in Delhi and Uttar Pradesh in India. The second avenue, can examine teacher's discrimination in occupational expectations and grading on basis of student's religion. The third avenue, could examine teacher's discrimination on basis of student's caste when the principal/head of the school belongs to low caste relative to the case when the principal/head belongs to high caste.

8 Conclusion

Education has the power to transform lives of students who belong to minority class and caste. However; they may not be able to reap advantage of education if teachers discriminate in occupational expectations and grading. Discrimination in occupational expectations is a matter of concern because low expectations of a teacher can further perpetuate discrimination in grading. Motivated by the long-term effects of teacher's discrimination on student's development and the importance of grades in determining access to higher education, this paper built upon on the existing literature and focused on the question whether teachers discriminate in terms of occupational expectations and analysed whether low expectations of a teacher perpetuates discrimination in grades awarded on the basis of student's caste and socio-economic status in Delhi, India. The paper utilised an experimental approach based on grading essays by teachers on which student's caste and socio-economic status was randomly manipulated.

The results, show that indeed caste and class boundaries are blurred in current era of economic development in Indian capital as discrimination not only runs along caste lines but along "caste and class" lines. Teachers hold lower occupational expectations for essays assigned to low caste and low socio-economic status relative to high caste and high socio-economic status. However, high socio-economic status mitigates the effect of low caste. Consistent with this bias in expectations there is also a bias in grading which shows that lower expectations of a teacher further perpetuates a discrimination in grading against low caste and low socio-economic status students. Essays assigned low caste and low socio-economic status characteristics are assigned 3.64 points lower marks relative to essays assigned to high caste and high socio-economic status. Given the ultra-competitive nature of schooling in India and the importance of grades in determining access to higher education, a 3.6 point disadvantage is substantial. There is also a trade-off between caste and socio-economic status. Belonging to high socio-economic status lowers the extent of discrimination faced by low caste students as marking bias falls by 0.8 points for low caste and high socio-economic status students. The paper explains the origin of these results and finds that the discrimination against low caste students arises from majority number of high caste teachers in the sample and not from the low caste teachers.

Since discrimination is associated with feelings of inferiority complex among students, low self-esteem, adversely affects admissions to universities, their career choices and overall development (Hoff and Pandey, 2006), there is an urgent need for proper training mechanisms, education and awareness about how teacher's stereotypes and implicit bias might bias teacher's expectations against minority students. Discrimination in grading can be minimised by reducing a bias in teacher's expectations and by formulating a policy of standardized objective grading.

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Appendices

Annex (A) List of schools

Following table1 depicts the name of 19 schools. There are 17 schools in my sample located in urban area and 3 schools located in rural area. I have tried to diversify the sample. Teachers have been selected from different schools, located in different parts of Delhi.

Table A
List of schools, nature, location and number of teachers participated

Name of the School	Type: Private / Government	Location: Rural / Urban	Region in Delhi	Number of teachers; participated
Muni International School	Private	Urban	Uttam Nagar	12
Rose Valley public school	Private	Urban	Najafgarh	10
GD Lancer Public School	Private	Urban	Uttam Nagar	10
Deep Public School	Private	Urban	Vasant Kunj	13
Ramjas School	Private	Urban	Rk Puram Sector 4	25
Vasant Valley School	Private	Urban	Vasant Kunj	1
Indo American Montessori pre-school	Private	Urban	Karol Bagh	1
KSM Public school	Private	Urban	Ghitorni	1
SDMC School	Government	Urban	Shubhash	9
Shubhash Nagar SDMC school	Government	Rural	Nagar Surehera	12
Surehera SDMC school	Government	Rural	Kharkhari	8
Kharkhari SDMC school	Government	Urban	Tagore garden	1
SDMC Co-ed Primary school Modi Mill	Government	Urban	Modi Mill, Okhala	4
NDMC school Devaram Park	Government		Devaram Park	1
Lax Alliance Foundation school	Government/NGO	Urban		1
NGO				
Government Co-ed Secondary school Rajpur	Government	Rural	Rajpur	10
Bridge school NGO	Government/NGO	Urban		1
Hunor school NGO	Government/NGO	Urban	Kishangarh	1
Government girls Senior Secondary school	Government	Urban	Srinivaspuri	1
Total	8 private, 11 government	16 urban, 3 rural		122

Source: Data collected by author

Annex (B) The original guideline given to students

I guided students what to write in each paragraph as given below.

Topic: My future career ambition; Age: 13-14.5 years

First paragraph: In this paragraph, introduce your interest and motivation related to career ambition.

- Second paragraph: Write about your parental occupation/background and how it has motivated your career ambition.
- Third paragraph: What you do to achieve your career ambition (extra-curricular activities, study interests, reading etc)
- Fourth paragraph: Struggles that you face to achieve your career ambition.
- Fifth paragraph: How your goal will contribute to society.

Follow the above points to write an essay. Write as much as you can.

Annex (C) Questions asked in the form (Teacher characteristics)

One of the crucial part of the experiment was to gain information on teacher characteristics. The questionnaire included questions on teacher's gender, age, education status, years of teaching experience, school type, location of school and total time taken for grading the essays.

Q1: Gender: a) Male b) Female

Q2: Age: a) 20-25 b) 25-30 c) 30-35 d) 35-40
 e) 40-45 f) 45-50 g) 50 or above

Q3: Education: a) B.E.D b) M.E.D /Masters c) PHD

Q4: Employment status:
a) part time b) Ad-hoc c) permanent d) retired

Q5: Years of teaching experience:
a) 5 years b) 10 years c) 15 years d) 20 years or more

Q6: Teach in which school:
a) private b) government c) Kendriya Vidyalaya

Q7: Location of School: a) Rural b) Urban

Q8: Total time for grading all essays:

Annex (D) Pictures From the field work

I had an amazing experience during the field work. Though it was challenging because I had no research assistant, so I had to travel and contact all schools myself. But given the nature of my research, school principals helped me to connect with other schools. So I got to know school principals, teachers and of course had amazing time with school children.

While some schools rejected my request, saying that their teachers are busy etc.; other principals welcomed me. They were interested in the university and my supervisors and of course because, I was also paying to the teachers.

Deep Public School, Vasant Kunj also invited me to come to their school and give a small talk to students about importance and relevant careers in economics; which was really great.

From this experience, I learnt a lot and travelled to parts of Delhi, I never went before and understood that not everyone is gonna refuse you if you set out for particular goal/work no matter how challenging it is.

Picture A: Economics workshop at Deep Public school



Source: Published in Hindustan Times

Picture B: In the staff room at SDMC Co-ed Primary school Modi Mill, New Delhi



Note: This picture was taken by another teacher in the staff room on request.

Picture C: Making payment to the teachers after essays were checked at Muni International school, New Delhi



Note: This picture was taken by a teacher in staff room.

Picture D: With Kids at a Co-ed Government Senior Secondary school- Rajgarh



Note: Picture taken by author

Picture E: at SDMC CO-ED primary school Modi Mill



Note: Picture taken by author

Picture: F With Kids at Ramjas RK Puram Secto r4



Note: Picture taken by author

Picture: G With Kids at school on Independence day



Note: Picture taken by author

Picture H: With deputy principal Rose Valley Public school



Note: Picture taken by another teacher in staff room

Picture J: At senior secondary government school Rajgarh



Note: Picture taken by the class teacher at school