Making Up People—The Behavioral Effects of Caste

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Abstract—It is typically assumed that being hard-working or clever is a trait of the person, in the sense that it's always there. However, in an experiment in which high-caste and low-caste boys solve mazes under incentives, cues to identity influence the expression of these traits. Increasing the salience and publicness of caste produces about a 25% decline in performance through each of two effects: An effect on preferences regarding effort provision reduces *high*-caste performance, and an effect on the capacity to learn reduces *low*-caste performance. Situational cues alter behavior by altering the framework of meanings that surround an identity.

Key words: framing effect, situational cue, caste, identity, stigma, stereotype threat

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I. Introduction

A number of models in economics give different answers to the question of how identity—an individual's sense of the social categories to which he belongs—might affect preferences and behavior. We present an experiment that allows us to discriminate among some of these models. We show that situational cues can alter preferences regarding the provision of effort, the ability to learn new skills, and the response to competitive environments. Our findings suggest that identity can have a first-order effect on human capital formation and development.

How identity affects behavior is a central question in many disciplines. In his essay "Making Up People," the philosopher Hacking (1986) argues that defining new slots in which to fit and enumerate people, *e.g.* the *perverted*, the *suicidal*, and the *heterosexual* or *homosexual* person, changes individuals' self-concepts and world-views and thus their behavior. Historians have documented that societies all over the world have systematically invented identities and used symbols, etiquette, rituals, dress codes, and segregation to impress the notion that individuals in different groups represented significantly different categories and were subject to different constraints. For example, in *Growing up Jim Crow: How Black and White Southern Children Learned Race***,** Ritterhouse (2006, p. 4) writes that the unwritten rules that governed interactions across race lines were used "not only as a form of social control but also as a script for the performative creation of…'race' itself." In *Power in the Blood*, Sabean (1984, p. 59) shows how elites in early modern Germany used the Catholic sacraments to impress on individuals a caste-like hierarchy:

> "It was through the sacrament that various state officials attempted to mediate their conceptions of the person, guilt, conscience, and justice…" "The ordeal demanded more than just external compliance, and the question remains to what degree peasants were able to resist such massive inroads into their consciousness."

Through what channels does identity affect behavior? A standard view in the social sciences that derives from Max Weber is that if culture matters, it does so by imparting values that are consistent across situations, and the values explain action. An alternative view drawing on recent work in cognitive psychology is that culture is fragmented and provides frames, understandings, and world-views that need not be consistent with one another. The sociologists Swidler (1986, 2001) and DiMaggio (1997) argue that culture (as a system of meanings) shapes behavior through frames that are *situationally* evoked and that determine which actions seem possible and desirable *in that situation*, given a person's values. Background settings or contexts can alter motives and behavior by evoking a particular self-concept or world-view and altering the framework of meanings that surround an identity.

In this paper, we report on our experiment in rural India that tests this hypothesis by manipulating the salience and publicness of caste identity. Under the caste system, which still more or less prevails in rural India, preeminence is assigned to birth rather than competition (Béteille, 2011, I[1979], p. 11). As Béteille (2011, Book II [1980], p. 98) writes,

> "For centuries it was believed that a man's social capacities were known from the caste or the lineage into which he was born, and that no further test was necessary to determine what these capacities were."

Individuals in castes at the bottom of the caste hierarchy, who are today called Dalits, were subject to the practice of untouchability. There are three dimensions of untouchability: exclusion from public spaces and public water sources, humiliation, and exploitation by the high castes (e.g. Desphande, 2011, p. 9). Although untouchability is illegal under the Constitution of India, Bros and Couttenier (2011) demonstrate the systematic use of violence across Indian districts to enforce untouchability rules. How does this play out in schools? Two surveys give some indication:

> "One common example of social prejudice in the classroom is the disparaging attitude of upper caste teachers towards Dalit children. This can take various forms, such as telling Dalit children that they are 'stupid,' making them feel inferior, using them for menial chores, and giving them liberal physical punishment." (PROBE, 1999, p. 51)

> "In one out of four primary schools in rural India, Dalit children are forced by their teachers or by convention to sit apart from non-Dalits. As many as 40 percent of schools practice untouchability while serving mid-day meals, making Dalit children sit in a separate row while eating" (Shah et al., 2006, p.168, based on a 2001-02 national survey)

In our experiment, junior high school boys drawn from either the top of the caste hierarchy (the "General Castes") or bottom (the Dalits) solve mazes under incentives under one of three conditions.[1] In the first condition, caste identity, which is not visible from physical markings, is not made public in a session of three high-caste and three low-caste boys; we call this condition "Caste Not Revealed." In the second condition, caste identity is made public in a session consisting of three high-caste and three low-caste boys; we call this condition "Revealed Mixed." The last condition is the same as the second except that a session consists of *only* high-caste boys or *only* low-caste boys; we call this condition "Revealed Segregated."

Revealed Segregated is a stronger prime to the caste system than Revealed Mixed because participants would likely have been aware that the composition of their session reflected deliberate segregation by caste status. This is so because participants were brought to the experiment site in groups with an equal number of high-caste and low-caste boys. Moreover, given their share in the population of enrolled schoolchildren, the probability that segregation of high- and low-caste students could result from a random draw of the local population of students is very small (less than $(0.2)^6 = 0.00006$). As discussed above, enforced segregation of low-caste from high caste individuals is a recognizable expression of high-caste dominance.

[1] Hoff and Pandey (2006) summarize the results from treatments that use only piece rate incentives (N =336), but do not discuss the treatments that use both piece rate and tournament incentives (N=246).

We have three main findings. First, *high*-caste participants solve 26% fewer mazes in Revealed Segregated than in Caste Not Revealed, controlling for individual characteristics. Under the piece rate incentive scheme, the output and payoff to a participant are completely independent of the output of the other participants. A participant's output thus depends only on his ability and his preferences over the provision of effort. There is no plausible reason why the *ability* of the high-caste participants should be impaired in the Revealed Segregated condition. On the contrary, Smith *et al.* (2008) find that priming individuals with the concept or the experience of power *increases* their performance on cognitive tasks. Shih *et al.* (2008) find that the effect on cognitive performance of activating a positively stereotyped aspect of one's identity is ambiguous since having to meet a high standard can cause anxiety. But we are able to show that the activation of high-caste identity in Revealed Segregated does not decrease self-confidence. Given this, the decline in high-caste output that we find in Revealed Segregated must reflect a change in *preferences* regarding the provision of effort.

Our preferred interpretation is that the Revealed Segregated condition evokes a mental frame in which high-caste participants feel less need to achieve. Recalling the quotations from Béteille, the high-caste individuals' preeminence is assigned by birth and "no further test was necessary to determine what these capacities were." A recent literature in economics shows that human preferences are not uniquely determined, but instead are subject to influences from transitory emotional states (Loewenstein, Nagin, and Paternoster 1997), anchors (Ariely, Loewenstein, and Prelec, 2003), and framing effects (Benjamin, Choi, and Strickland 2010; LeBoeuf, Shafir, and Bayuk 2010; a survey is Fehr and Hoff 2011).

Our second result is that *low*-caste boys solve mazes just as well as high-caste boys only in Caste Not Revealed. Making caste public reduces mean low-caste performance relative to

mean high-caste performance. There is a significant caste gap of 20% under piece rate incentives in Revealed Mixed, controlling for individual characteristics. The caste gap is robust to controls for proxies for class (parents' education, mother's employment outside the home, and father a day laborer). We infer that in other possible worlds, the low castes could have been an equal or dominant group; there are no intrinsic differences in ability between high and low castes; a social identity has affected behavior. This result extends to a new category, the untouchables, and to a new situation, performing a task under incentives, a large body of work in social psychology that finds that situations that cue negative identities lead individuals to experience a "stereotype threat" that disrupts performance. We discuss this in the next section.

Our third finding is that making caste identity public eliminates the positive output response by both high- and low-caste participants to tournament. When caste is not made public, high-caste participants solve 25% more mazes under tournament compared to piece rate incentives. The comparable figure for the low caste is 28%. In contrast, when caste is made public, performance does not improve under tournament incentives. Indeed, in the segregated sessions, the low-caste participants solve 38% *fewer* mazes under tournament incentives than under piece rate incentives, controlling for individual characteristics. The perverse response of the low caste to competitive environments lends support to our interpretation that the Revealed Segregated condition evokes a world-view in which preeminence is assigned to birth not competition, and in which achievement by a low-caste individual is a punishable offence. This world-view is captured in fables that children learn (*e.g*. Jadhav 2005).

II. Five Theories about Identity and Preferences/Behavior

To help organize the discussion of our experimental results, in this section we outline five theories about how a sense of identity with others might affect preferences and behavior.

Theory 1: Identity has no effect on preferences. In the textbook model in economics, an individual has fixed preferences in which a sense of identity with others has no influence. This theory is one of the fundamental differences between the standard model of economics and the conception of the individual that has increasingly been found useful in other social sciences, in which socially defined variables, such as conformity, affect preferences.

Theory 2: Identity is an element of fixed preferences. The theory that an individual has, at any moment in time, a well-defined set of preferences and that they are always salient is maintained in recent work that substantially broadens the notion of preferences by incorporating one's sense of group membership. In Akerlof and Kranton (2000), a social category constitutes part of an individual's identity. Associated with the category are a set of norms or ideals for how someone in that category should behave. The individual likes conforming to the ideals of that category and dislikes actions by others that deviate from the ideals. A related idea in Ray (2006) is that a person's membership in a particular group shapes his aspirations.

Theory 3: Identity is an element of fixed preferences, but it is chosen. An individual chooses his social identities, *i.e*. he can define himself and his relationships to others at a categorical level (see e.g. Akerlof and Kranton 2002, Loury and Fang 2005, and Munshi and Rosenzweig 2006). For example, a descendant of Irish immigrants to the US can define himself as Irish-American or not. The individual's choice problem makes sense only under the assumption that an individual has a meta-utility function. However, just as in the two models above, an individual has well-defined preferences that provide all the information that is relevant for describing his choices.

Theory 4: In contexts in which it is salient, identity is a framing device that orients action. An individual has an extended utility function that expresses itself automatically in one

way or another if stimulated appropriately (Salant and Rubinstein 2008). Cues to identity may influence the accessibility of memories; shape the perception, interpretation and, hence, the meaning of facts; and trigger a rule-of-thumb to guide behavior. As shown in Benjamin *et al.* (2010) and LeBeouf *et al*. (2010), filling out a simple background questionnaire can render certain identities salient and induce the subjects to more closely align their behavior with the values and commitments associated with that identity. Priming their Asian identities makes Asian-Americans more cooperative, less individualistic, and more patient; priming a "family-oriented" identity triggers values related to family obligations. These results support the hypothesis that people have multiple identities, and that making one identity more salient than others evokes different norms and values. We can make an analogy to DNA. DNA are the instructions for making an individual, but poorly understood features of the environment determine which genes express themselves.

Where the idea of an extended utility function becomes interesting is that it leads to the observation of inconsistent choices. Of course, if we knew all the stimuli to the individual, then the theory of rationality (*i.e.* consistency) would be trivial. Since we do not observe all stimuli, and our understanding of the ways that individuals process information is limited, it becomes a useful construct to posit multiple preferences, one for each self-construal or world-view.

Useful for what purpose? It may be useful for understanding long-run social change, which entails changes in the set of possible identities, the salience of particular identities, and the possible ways of understanding a situation. In the process of economic development, the stimuli to which an individual is exposed can change in a way that leads to the expression of one set of preferences rather than another, not under the control of the individual. That is, preferences depend on context.

Theory 5: "Stereotype susceptibility." Finally, another body of evidence relates to the nature of human productivity, rather than preferences. A growing body of research finds that individuals' productivity in a given situation depends on their sense of themselves in that situation. Undergraduate students who were randomly placed in *low-power* roles, or primed with the concept or experience of low power, performed worse on executive function tasks than students in a high-power prime or a no-prime condition (Smith *et al.* 2008). In dozens of experiments, priming a negatively or positively stereotyped aspect of an individual's identity shifts performance in the direction of the stereotype: African-Americans do worse on academic tests if before the test they are asked to check a box for their race (Steele and Aronson 1995); student athletes at a selective college do worse on academic tests if their identity as an athlete is made salient (Dee 2009); Asian-American women, if the *Asian* aspect of identity is made salient, do *better* on math tests than women in the no-prime condition, but if their *gender* is made salient, do *worse* than women in the no-prime condition (Shih, Pittinsky, and Ambady 1999). Children in both lower elementary grades and middle school grades (but not those in upper elementary grades) showed shifts in performance consistent with the patterns of "stereotype threat" and "stereotype boost" (Ambady *et al.* 2001 and Afridi, Li, and Ren 2010).

However, the subtlety of stereotype activation can also play a role in creating performance boosts. This is an issue we will have to address in interpreting our findings since we used a strong prime to caste. Shih *et al.* (2002) varied the subtlety of cues to identity and found in one study that blatant activation of Asian identity had no effect on Asians' performance on a math test, and in another study case significantly impaired performance, perhaps by creating anxiety about conforming to an ideal of very high performance.

Mediating factors in stereotype threat include the ability to concentrate and physiological

reactions, of which "choking" under pressure is an extreme example (Schmader, Johns, and Forbes 2008). In conditions of stereotype threat, Krendl *et al*. (2008) find that women taking a math test did not recruit the neural regions associated with mathematical learning, but instead showed heightened activation in a neural region associated with social and emotional processing.

III. Participants and Design

288 high-caste (hereafter H) and 294 low-caste junior high-school boys (hereafter L) who lived in the district of Hardoi in the state of Uttar Pradesh participated in the study. In the 19th century, this region was characterized by feudal rule. Its legacy today is greater high-caste dominance compared to areas of the state that did not have such rule (Pandey 2008).

Participants in groups of six solved mazes. These six boys were generally drawn from different villages, but since this was not always the case, we will control for the number of other participants that a participant knew. Each participant, just before entering the car that brought him to the experiment site, was asked privately his name, village name, father's name, grandfather's name, and caste. On arriving at the site, we privately verified with each participant his name and caste before randomly assigning him to a treatment and sending him to a large classroom, where participants were entertained for up to an hour while waiting for all the cars bringing participants from other villages to arrive. The focus of the experiment was on the effect on behavior of *making identity public and salient in a six-person session*. Three conditions varied the publicness and salience of caste in a six-person session:

> *Caste Not Revealed* (the control condition). A session was composed of 3 H and 3 L. No personal information about the participants was revealed.
>
> *Revealed Mixed* (*i.e*. caste revealed in a mixed-caste session). The composition of a session was the same as in the preceding condition, but now the experimenter began a session by saying that she would like to confirm some information with each participant, who should nod if it is correct. Then the experimenter turned to each participant and stated his name, village name, father's name, grandfather's name, and caste.

Revealed Segregated (*i.e.* caste revealed in a segregated session). This was the same as the preceding condition except that a session was composed of either 6 H or 6 L.

The priming mechanism reflects a way in which caste identity is actually made salient in classroom settings. This increases the external validity of our results. Although an individual's caste is widely known and people are frequently called by their caste names, the public announcement of caste in village schools is a standard practice. Following the common usage in this area and also the way that caste is recorded in school enrollment books, we used the traditional name for each caste (Thakur, Chamar, etc.).[2]

We next describe the incentive schemes. Participants were given a packet of 15 mazes to solve in each of two 15-minute rounds.[3] Some participants had piece rate incentives in both rounds (the "P/P treatments"); others had piece rate incentives in round 1, and tournament incentives in round 2 (the "P/T treatments"). Under the piece rate scheme, a participant earned one rupee per maze solved. Under the tournament scheme, he earned six rupees per maze solved if he solved the most mazes in his session; otherwise he earned nothing. In case of a tie, both winners received the prize. The tournament provided very high-powered incentives: a winner could (and some did) earn 15 x 6 rupees, equivalent to almost two days' unskilled adult wages.

Figure 1 gives the organization of the experiment. Experimental conditions were identical in the first round of treatments (1) and (4), (2) and (5), and (3) and (6), and so we will pool them when reporting first-round results.

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[2] In the 1998-99 Indian National Family Health Survey, households had to self-name their caste in one of the questions. Most low-caste respondents gave their actual caste name (*e.g.* Chamar), but a few used the more generic and politically correct names, Dalit, *harijan*, or Scheduled Caste (Marriott, 2003).

[3] The mazes are Xerox copies from http://games.yahoo.com/games/maze.html, level 3. Gneezy, Niederle, and Rustichini (2003) showed that individuals don't just solve mazes for fun, they respond to incentives.

Figure 1. **Experiment Design**

	P/P			P/T		
	(1)	(2)	(3)	(4)	(5)	(6)
	Caste Not Revealed	**Revealed Mixed**	**Revealed Segregated**	**Caste Not Revealed**	**Revealed Mixed**	**Revealed Segregated**
Number of participants	156	120	60	60	120	66
Number of sessions	26	20	10	10	20	11
Composition of session	HLHLHL	HLHLHL	HHHHHH or LLLLLL	HLHLHL	HLHLHL	HHHHHH or LLLLLL
Round 1	Piece rate incentive					
Round 2	Piece rate incentive			Tournament incentive		

Note. P/P means that the piece rate incentive applies in both rounds of maze-solving. P/T means that the piece rate incentive applies in round 1 and the tournament incentive applies in round 2.

Recruitment. We conducted the experiment in January and March 2003 and in March 2005. In January 2003, on days that schools were open, we went to public schools near the site of the experiment and chose high- and low-caste children for each day after pooling the enrollment data for all nearby public schools. A letter from the District Magistrate instructed the teachers to cooperate with our team. On days that schools were closed, we visited homes in nearby villages each evening to ask parents' permission to pick up their children the next day to drive them to the junior high school that served as the site of the experiment. In only rare instances did parents refuse to let their children participate. In March 2003 and March 2005, to choose the subjects, every day our team went to six randomly selected villages within a 20-kilometer radius of the experiment site. From each village, we drew an equal number of high-caste and low-caste children. At most ten participants came from a single village, nearly always an equal number of H and L. On each day, we recruited participants from a new set of villages.

Implementation. On arrival at the experiment site, participants waited in silence in a large common room while a research assistant entertained them. When we were ready to begin the sessions, the participants were directed in groups of six to a new set of classrooms, where they remained for the rest of the experiment. We next describe what took place during an experimental session, which lasted about 70 minutes.

Under the Revealed Mixed and Revealed Segregated conditions, the experimenter began a session by making public the identity of the participants, as described above (p. 9). After that, all sessions proceeded in the same way. The experimenter—always a high-caste young woman—told the participants that they would "take part in two games of solving puzzles." She gave participants the show-up fee of 10 rupees and described how to solve a maze in this way:

> "…there is one child. The child has to go to the ball. The solution is a path that takes the child to the ball. The black lines are walls. The child cannot cross a wall."

Participants were given five minutes to practice with an additional maze. The experimenter explained that for each maze they solved, participants would receive an additional one rupee. She checked to make sure each child understood the incentive scheme. She explained that the earnings of each participant would be revealed in private. Then she told the participants that they would have 15 minutes to solve a packet of mazes, and the first round of maze-solving began. After that round, and without giving feedback on performance, she said that there would be one more round of solving mazes, explained the incentive scheme (piece rate or tournament), and checked that each child understood it. After the second round, participants gave information about their background privately in a post-play survey. Mazes were graded blind. Participants received their earnings in sealed envelopes and were taken home.

Predictions. Under the piece rate scheme, the output and payoff to an individual are independent of the output of the other individuals. Individual output thus depends only on

preferences regarding effort provision and the productivity of effort. In contrast, under tournament incentives, revealing the caste identity of the other participants might affect beliefs about the individual's chances of winning the tournament. Since we cannot separately measure beliefs and preferences, here we make predictions only about performance under the piece rate scheme. Later we will discuss beliefs relevant to the tournament scheme.

The predictions of the theories discussed in Section II are fairly clear—see Figure 2. Since preferences are fixed and always salient under the first three theories, the prediction under these theories are that increasing the salience of caste would have no effect on behavior.

Figure 2. **Predicted Effects of Increasing the Salience of Caste under Piece Rate Incentives**

Theory	Predicted effect of increasing caste salience on the performance of:	
	High caste	Low caste
Effect on preferences		
Theories 1-3 Individuals have well-defined preferences that are always salient.	*None*	*None*
Theory 4 Increasing an individual's awareness of an aspect of his identity may cue a world-view and self-concept. Individuals have multiple sets of preferences, one for each world view and self-concept.	*Ambiguous*— Cueing an identity whose norm is to be superior increases utility from achieve-ment, which increases effort; but evoking a world-view in which life chances depend less on effort than on caste decreases effort.	*Declines*— Making a low-caste person more aware of his caste reinforces a world-view in which it is a norm violation for a low-caste person to excel.
Effect on ability: Stereotype susceptibility	*Ambiguous*	*Declines*

In contrast, the prediction under theory 4—namely, that identity has framing effects that orient action—would be that increasing the salience of caste reinforces for a *low*-caste individual the world-view in which Dalits are accepted only so long as they stay in "their place," which would reduce the utility from high achievement. For a *high*-caste individual, the predictions under theory 4 are ambiguous. On the one hand, the ideal of a high-caste person is to be

superior: making him more aware of caste should, if anything, enhance his desire to conform to this ideal. On the other hand, making caste more salient could activate a mental frame in which he has less need to achieve because, as indicated in the quotation from Béteille above, "a man's social capacities were known from the caste or the lineage into which he was born."

Finally, under the theory of "stereotype susceptibility," making caste more salient entails a negative productivity shock to L and, possibly, a positive productivity shock to H (Dee 2009).

IV. Descriptive Statistics

Here we describe the participants' characteristics and broadly summarize the results.[4] Table 1 shows that parents of H have much greater education than parents of L. For simplicity, the table groups together Revealed Mixed and Revealed Segregated as the "identity conditions." The table shows that 45% of all H compared to 12% of all L have a mother with at least six years of schooling. (These are weighted averages across conditions, calculated using Figure 1.) For only 5% of H, compared to 28% of L, both parents are illiterate. Only 8% of H have fathers who are day laborers, compared to 18% in the case of L. These differences highlight the need to examine whether the correlates of caste can explain the differences between H and L in our results. We can do that because the distribution of parents' characteristics for H shares a common support with that for L. For example, there are not only L who have mothers with no schooling; there are also H whose mothers have no schooling. We collected data on two other variables in the post-play survey: prior exposure to mazes, and number of participants known in a session.

[4] In each time period in which we conducted the experiment (January and March 2003 and March 2005), we held at least six sessions under P/P incentives in the control condition. As shown in Web Appendix Table A1, there were no significant differences in output by time period. Therefore we pool the data across the three time periods. We also found no experimenter effects on the number of mazes solved per round.

Table 1 shows that the randomization between the control and identity conditions was largely successful. However, in the identity conditions, participants have parents with a significantly higher level of education, and participants are significantly more likely to have had some exposure to mazes. These differences should, if anything, improve performance in the identity conditions compared to the control. We also find differences across conditions in the number of participants known in the session. We will control for these factors in the analysis.

Table 1**: Descriptive Statistics for Participants**

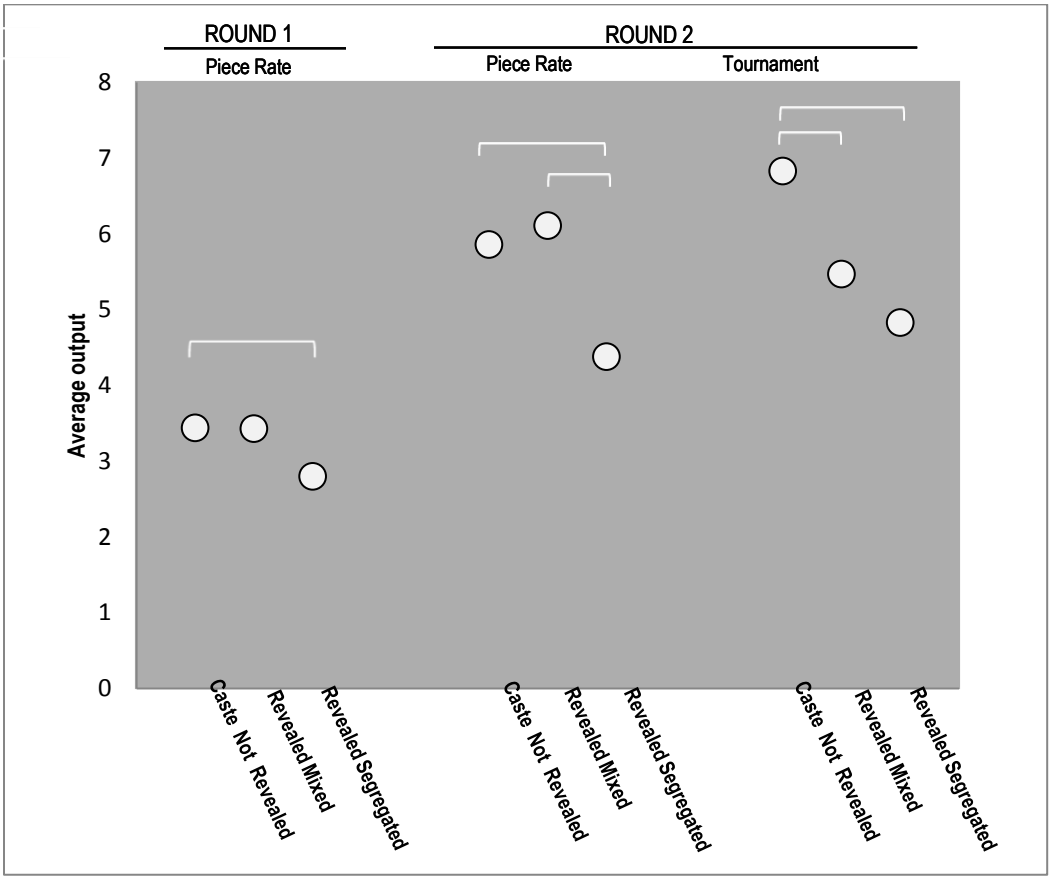
	High caste		Low caste	
	Caste Not Revealed	Identity conditions	Caste Not Revealed	Identity conditions
Mother's education				
None	32%	25%	75%	68%
Years ϵ (0,6)	26%	29%	17%	17%
At least 6 years	42%	46%	8%	15% *
Father's education				
None	6%	6%	26%	31%
Years ϵ (0,6)	7%	13% *	22%	19%
At least 6 years	86%	81%	52%	50%
Both parents illiterate	7%	4%	26%	29%
Mother works outside the home	4%	7%	7%	5%
Father is a day laborer	8%	9%	17%	19%
Previous exposure to mazes	8%	15% *	4%	16% *
Mean number of other participants known	0.55	1.14*	0.56	1.03*

Notes. Except for the last row, the tests of equality of means across experimental conditions for the high caste are based on logit regressions, one for each characteristic; and similarly for the low caste. For "average number of participants known," the test of equality of means is based on a *t*-test. * $p < 0.05$.

Figure 3 reports the average number of mazes solved by H under the three conditions that vary caste salience. Block 1 is round 1, block 2 is round 2-piece rate, and block 3 is round 2-

tournament. It is easy to see that H output is *lowest* when caste is *most* salient, *i.e.* in Revealed Segregated. Under the Mann-Whitney *U*-test, the differences between Caste Not Revealed and Revealed Segregated are significant at $p < .05$ in all blocks. In block 2, average output is higher in Revealed Mixed than in the control, but the difference is not significant.

Figure 3. **Average Output of High-Caste Participants**

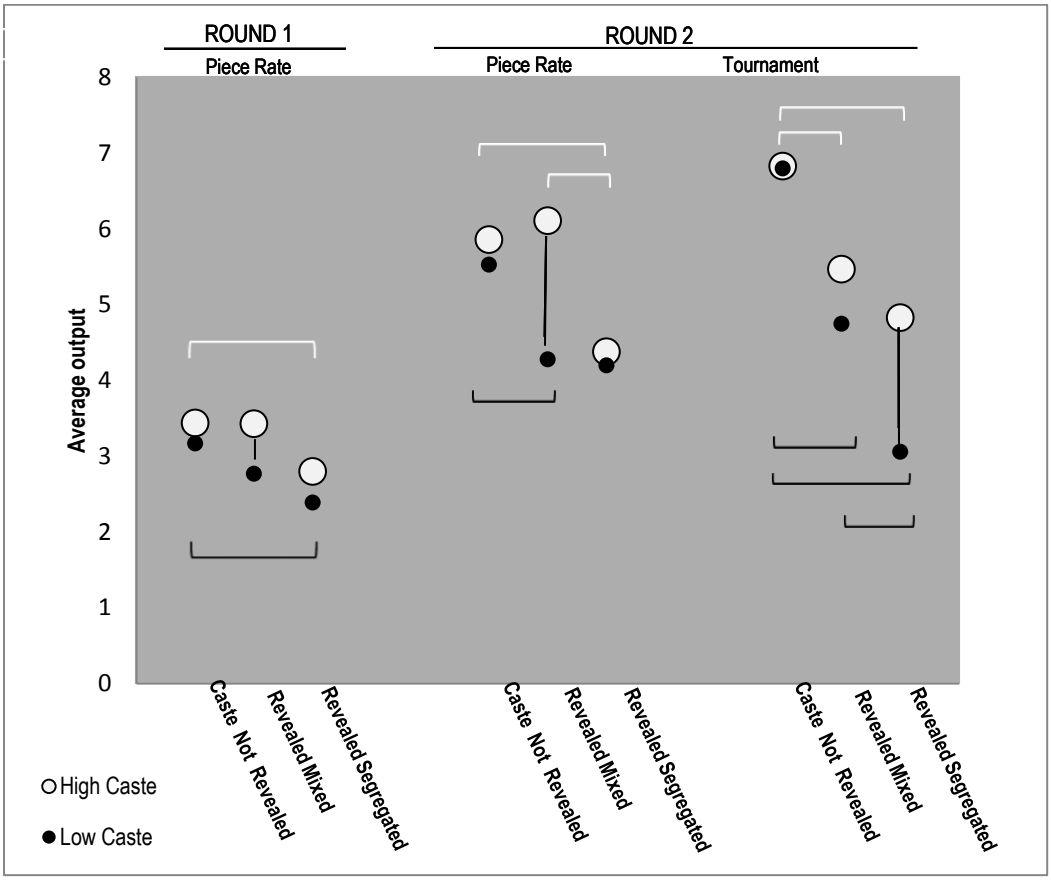


Note. Brackets indicate differences between treatments with 95% confidence based on the Mann-Whitney *U*-test.

Figure 4 superimposes on Figure 3 the average L output by condition. In all three blocks, in Caste Not Revealed, average output of H is almost the same as that of L. That is, when caste identity is not made public, H and L do equally well on average in solving mazes and are equally

responsive to competitive environments. However, when caste is made public, the performance declines for L are steeper than those for H.

Figure 4. **Average Output of High-Caste and Low-Caste Participants**

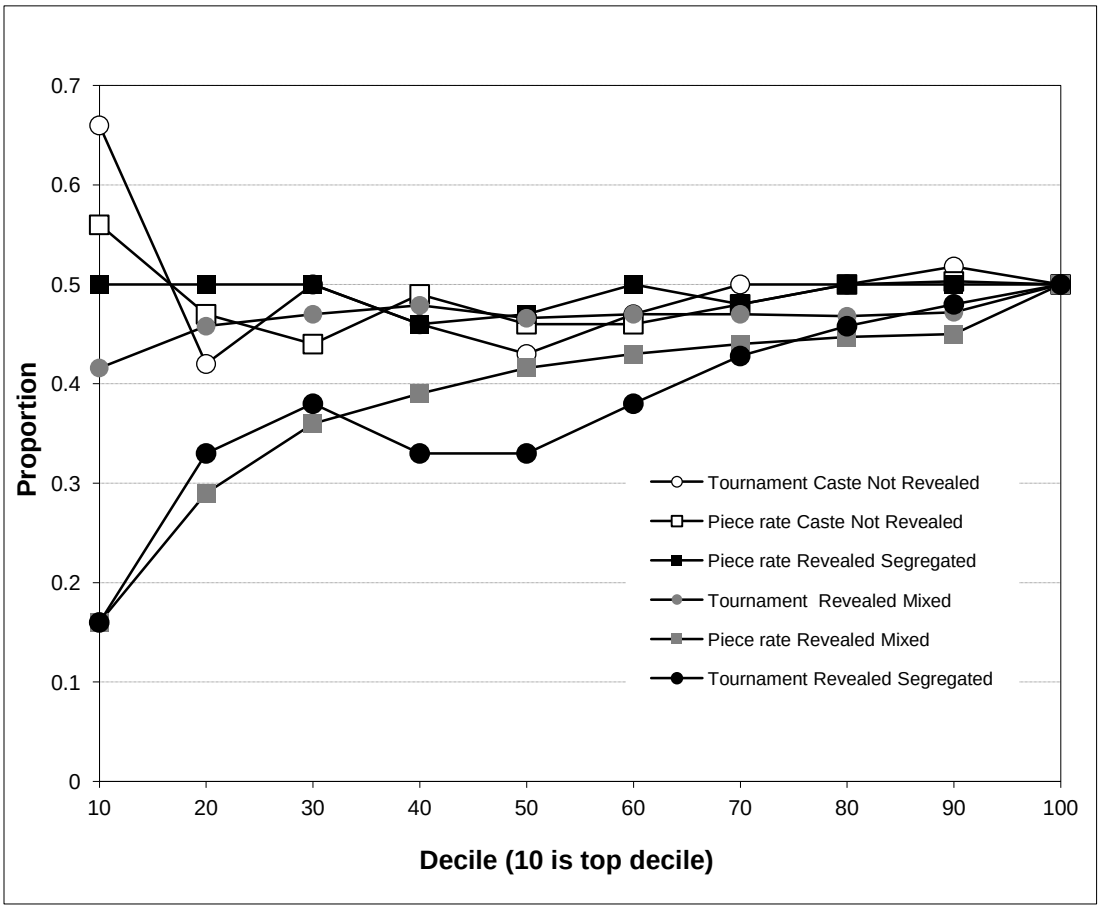


Note. Black brackets indicate differences between treatments for L. Vertical lines indicate significant caste gaps. Statistical significance is based on the Mann-Whitney test with 95% confidence.

Figure 5 shows how the identity conditions impair L relative to H performance at the very top of the ability distribution. The figure reports, for round 2, the ratio of L participants to all participants with output at or above each decile. (If H and L were equally represented throughout the achievement distribution and if varying caste salience had the same effect on both groups, all points in the figure would lie along the horizontal line at one-half; *i.e.* any cut of the

distribution would have a proportion of L participants equal to about one-half.) The figure shows that if the top 10 percent of participants was selected based on performance in the control condition, this would result in a *majority* L representation. If the selection was based on performance in Revealed Mixed, this would result in a *minority* L representation. And if the selection was based on performance in Revealed Segregated under piece rate incentives, it would result in an *equal* representation of H and L.

Figure 5. **Proportion of the Low Caste above each Performance Decile in Round 2 (Cumulative)**



Note. There is, in general, more than one subject whose performance ranks him at the border between two deciles. In those cases, we calculated the proportion of L among participants whose performance was exactly the decile performance, and allocated L in this proportion to both sides of the boundary.

V. Measuring Treatment Effects

A. Number of Mazes Solved—Full Sample

We find patterns of results similar to those in Figure 4 in regressions that control for individual and family characteristics. We pool all observations and allow for interactions among caste, cues to caste identity, and incentives. Table 2, columns (1)-(4), report OLS estimates, with robust standard errors clustered at the individual level, for the following specification:

$$\text{Mazes solved in a round} = \alpha + \omega\cdot(\text{round is 2}) + \beta\cdot(\text{subject is H}) + \gamma\cdot(\text{session cues identity}) \quad (1)$$
$$+ \delta\cdot(\text{subject is H*session cues identity}) + \tau\cdot(\text{Tournament}) + \lambda\cdot(\text{Tournament*subject is H}) +$$
$$\xi\cdot(\text{Tournament*session cues identity}) + \theta\cdot(\text{Tournament*subject is H * session cues identity}) + \mu\cdot Z + \text{error}$$

where Z is a vector of individual and family characteristics. α measures predicted output in the omitted case: an L in Caste Not Revealed in round 1. The next eight coefficients (from ω to θ) measure round, caste, treatment effects, and the two-way and three-way interactions.[5]

Two results from the table are immediate. First, the estimated coefficients on H show that the caste gap is very small and always insignificant in Caste Not Revealed. Second, the coefficients on tournament show that in Caste Not Revealed, tournament incentives significantly increase output. The coefficients on T*H are always insignificant, which means that the response of H to tournament incentives is statistically indistinguishable from that of L.

[5] For example, γ is a vector that measures the difference for L between an identity condition (Revealed Mixed or Revealed Segregated) and the control, under piece rate incentives. Using a subscript *s* for Revealed Segregated, $\alpha + \omega + \gamma_s$ is the predicted output of L in round 2 of Revealed Segregated under piece rate incentives. The predicted output of H in Revealed Segregated under tournament incentives is $\alpha + \omega + \beta + \gamma_s + \delta_s + \tau + \lambda + \xi_s + \theta_s$.

Specification (1) uses only treatment and caste indicators. Specification (2) adds controls for individual characteristics: grade in school, previous exposure to mazes, and number of other participants known in a session. Specification (3) adds controls for family characteristics.

Between specifications (1) and (2), the only change in the set of significant treatment effects is that the output decline by L in Revealed Mixed under piece rate incentives is no longer significant. To further consider the treatment effects, we use Table 3, columns (1)-(2), which can be derived from specification (2). It is easy to see in the top panel, which considers performance under piece rate incentives, that the effect of Revealed Mixed is not significant for either L or H, but jointly these effects produce a significant caste gap. We also see that Revealed Segregated depresses the performance of each caste group by 0.93 mazes, which is significant.

The bottom panel of Table 3 reports treatment effects under the tournament incentive. Each of the identity conditions reduces output for H and L, but much more severely for L. For example, for H, Revealed Segregated decreases output by 2.25 mazes or 34%; the comparable figures for L are a decrease in output by 3.97 mazes, or 60%.

Figure 6 graphs predicted output in round 2 (again, figures are based on specification (2) in Table 2). The dotted lines show the result, discussed above, that in Caste Not Revealed, output under the tournament scheme is significantly greater than under piece rate incentives. For H and L alike, the increase is 1.3 mazes (p-value = 0.01); in percentage terms, the boost in output is 25% for H and 28% for L. In contrast, as shown by the solid lines, when caste is made public, there is no positive response by H or L to tournament incentives. In fact, in Revealed Segregated, the tournament scheme perversely reduces L output. The decline is 1.6 mazes (p-value < 0.01), which is equivalent to a 38% decline from the predicted level under piece rate incentives.

Table 2: **OLS Estimates of the Determinants of Output per Round and Output Change between Rounds**

Dependent variable →	Output per round				Output change between rounds
	Without individual and family characteristics (1)	With individual characteristics (2)	With individual and family characteristics (3)	Excluding participants who solved zero mazes (4)	With individual characteristics (5)
High caste (H)	0.29	0.16	0.35	0.56	0.25
	(0.35)	(0.36)	(0.39)	(0.34)	(0.42)
Round 2	2.14***	2.17***	2.27***	2.33***	
	(0.15)	(0.16)	(0.16)	(0.16)	
Revealed Mixed	-0.70**	-0.58	-0.51	-0.07	-0.54
	(0.34)	(0.37)	(0.38)	(0.35)	(0.39)
Revealed Segregated	-0.97***	-0.93**	-0.74	-0.70*	-0.86**
	(0.37)	(0.40)	(0.46)	(0.40)	(0.43)
Tournament (T)	1.40**	1.45**	1.44**	1.28*	1.06*
	(0.65)	(0.66)	(0.66)	(0.66)	(0.55)
Revealed Mixed * H	0.75	0.73	0.65	-0.12	0.64
	(0.48)	(0.50)	(0.53)	(0.47)	(0.60)
Revealed Segregated * H	0.02	-0.01	-0.16	-0.52	-0.64
	(0.54)	(0.58)	(0.65)	(0.56)	(0.64)
T*H	-0.26	-0.12	-0.14	-0.04	-0.44
	(0.89)	(0.90)	(0.96)	(0.86)	(0.77)
Revealed Mixed * T	-1.35*	-1.59**	-2.02***	-1.48*	-1.02
	(0.76)	(0.78)	(0.78)	(0.77)	(0.69)
Revealed Segregated * T	-2.77***	-3.05***	-3.02***	-2.82***	-1.38*
	(0.76)	(0.77)	(0.82)	(0.77)	(0.76)
Revealed Mixed * T * H	-0.07	0.02	0.67	-0.16	-0.26
	(1.08)	(1.11)	(1.20)	(1.08)	(1.00)
Revealed Segregated*T * H	1.73	1.73	1.91	1.92*	2.56**
	(1.14)	(1.21)	(1.33)	(1.16)	(1.05)
Grade in school		0.43**	0.51**	0.45**	0.34
		(0.21)	(0.23)	(0.21)	(0.21)
Previous exposure to mazes		0.37	0.51	0.35	-0.19
		(0.30)	(0.33)	(0.29)	(0.36)
Number of participants known		0.06	0.10	0.01	0.02
		(0.09)	(0.09)	(0.08)	(0.09)
Mother's education $\in(0,6)$			0.28		
			(0.30)		
Mother's education ≥ 6			0.44		
			(0.33)		
Father's education $\in(0,6)$			-0.64*		
			(0.39)		
Father's education ≥ 6			-0.91***		
			(0.34)		
Mother employed outside home			0.05		
			(0.53)		
Father not a day laborer			0.55		
			(0.35)		
Constant	3.26***	2.97***	2.76***	2.98***	2.16***
	(0.24)	(0.28)	(0.50)	(0.28)	(0.32)
R^2	0.189	0.197	0.221	0.223	0.080
N	1164	1076	928	1008	538

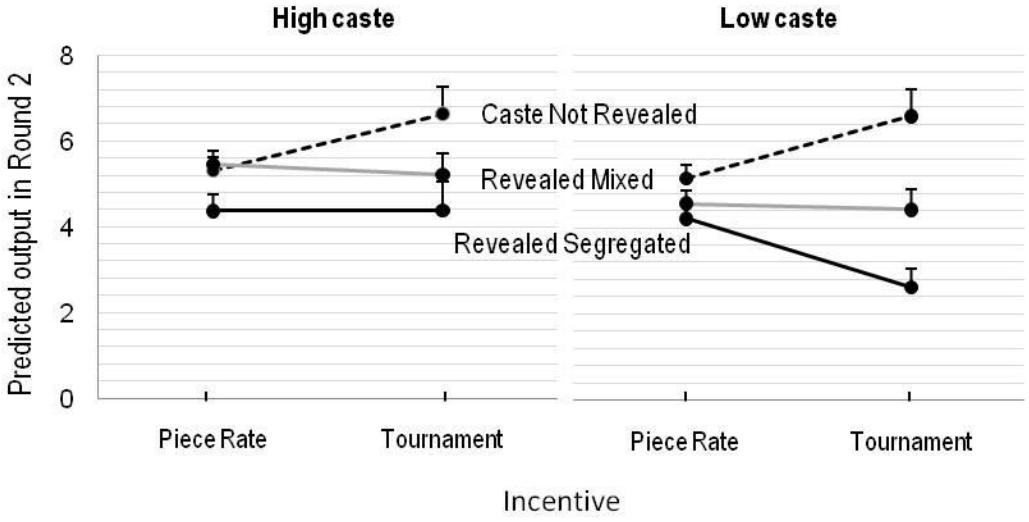
Notes. Standard errors in parentheses are robust to heteroskedasticity, and observations are clustered at the level of the individual. The omitted case is L in Caste Not Revealed under piece rate incentives. Column (4) excludes participants who have zero output in both rounds. Round 2 = 1 for round 2 and zero for round 1. Grade in school = 1 if the participant is in grade 7, 0 if he is in grade 6. Previous exposure to mazes = 1 if some time before the experiment, the participant had seen mazes; 0 otherwise. Number of other participants known is the number of others in the experimental session known to a given participant. *** $p<0.01$, ** $p<0.05$, *** $p<0.10$.

Table 3: **Treatment Effects of Making Caste Identity Public under Piece Rate and Tournament Incentives**

	Output per round, full sample			Output per round, excluding participants who solved zero mazes			Output change between rounds, full sample		
	H	L	Caste gap significant	H	L	Caste gap significant	H	L	Caste gap significant
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Under piece rate incentives, the effect of moving from Caste Not Revealed to:									
Revealed Mixed	0.16	-0.58	**	-0.19	-0.07		-0.22	-0.72**	
	(0.36)	(0.37)		(0.34)	(0.35)		(0.38)	(0.33)	
Revealed Segregated	-0.93**	-0.93**		-1.23***	-0.70*		-1.20***	-1.22***	
	(0.42)	(0.40)		(0.41)	(0.40)		(0.41)	(0.35)	
Under tournament incentives, the effect of moving from Caste Not Revealed to:									
Revealed Mixed	-1.42*	-2.17***		-1.82**	-1.54**		-1.16**	-1.55***	
	(0.79)	(0.77)		(0.75)	(0.77)		(0.57)	(0.56)	
Revealed Segregated	-2.25**	-3.97***	*	-2.13**	-3.52***	**	-0.42	-2.33***	***
	(0.92)	(0.75)		(0.86)	(0.75)		(0.61)	(0.58)	

Notes. All treatment effects reported here can be derived from the regressions in Table 2: Effects in columns (1)-(3) can be obtained from regression (2); those in columns (4)-(6) can be obtained from regression (4); those in columns (7)-(9) can be obtained from regression (5). However, it is easier to estimate these effects and obtain their standard errors by running a separate regression with different benchmark cases. For example, to obtain the effect on H of moving from Caste Not Revealed to Revealed Mixed under tournament incentives, a convenient benchmark is H, tournament incentives, and Caste Not Revealed. Cluster-robust standard errors are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Figure 6. **Predicted Output in Round 2: Piece Rate and Tournament Incentives**



Note. Error bars are based on standard errors. Predicted values control for the participant's grade in school, prior exposure to mazes, and number of other participants known in the session. See Figure A1 for the values..

Up to now, we have reported results controlling only for individual characteristics (specification (2) of Table 2). We next check whether the treatment effects are robust to controls for class. This is important because it could be that the channel through which social identity influences behavior is *class*, not *caste*. Class can also give rise to stereotype threat (Clare and Croizet 1998). Our proxies for class are the level of the parents' education, whether the mother is employed outside the home, and whether the father is employed as a day laborer. Because stigma is associated with daily wage-labor, we did not ask the participants in the post-play survey, "Is your father a day laborer?" Instead we asked about the father's occupation and formed a binary variable for daily wage labor based on the response. Specification (3) of Table 2 reports the regression results. We find that the caste gap in Revealed Mixed under piece rate incentives remains significant: it is 0.35 + 0.65=1.0; *p*-value = 0.01. Thus, the two gaps between actual mean output of H and Lin Revealed

Mixed, illustrated in Figure 4 (blocks 1 and 2, p. 17 above), are robust to controls for both individual characteristics and household characteristics.

The only proxy for class that is individually significant is father's education, and its effect is not in the expected direction. The additional contribution of all parental variables over and above caste and treatment effects is insignificant by an *F*-test: $F(6,486)= 1.58$, *p*-value=0.11. We thus cannot reject the hypothesis that parental variables have no effect on performance. It might be, however, that parental variables matter for L but not H because having educated parents alleviates low-caste stigma. Therefore in unreported regressions, we rerun specification (3) separately for H and L participants. We still find that parental variables have little explanatory power and are insignificant by an *F*-test. We also checked for the effect of having both parents illiterate. We find that this is not significant (result not shown). In these and all other regressions that we have run, we find no evidence that class is the channel through which caste influences behavior. However, since we do not have measures of income and wealth, the concern that unobserved class variables may matter, remains.

B. Between-Round Change in the Number of Mazes Solved

As an additional check on our results, we consider the treatment effects on the *change in output between rounds*: see Table 3, the last three columns. We find that for both H and L, the impairment of performance in Revealed Segregated compared to the control remains significant under the piece rate scheme (p-value < 0.01). Thus, whether our dependent variable is the output level or the between-round change in output, we obtain a *counter*-stereotype susceptibility result for H and a *pro*-stereotype susceptibility result for L.

To investigate whether the counter-stereotype susceptibility result comes from a shift in preferences that lead to reduced effort, or a decline in the ability to perform when identity is blatantly primed (as in Shih et al. 2002, discussed in Section II), we will in the remainder of this section decompose performance into two stages:

> *Stage 1*. The participant learns what it means to solve a maze. The outcome is binary—success or failure. We measure failure by zero output by a participant over the 30 minutes of maze-solving.
>
> *Stage 2*. The participant applies and improves his skills. The outcome is the number of mazes solved conditional on success in learning how to solve a maze.

C. Success or Failure in Learning How to Solve a Maze

Table 4 shows that failure for H occurs more often in the control than in the identity conditions, whereas the reverse is true for L. To fit a logit model, it is necessary to collapse the two identity conditions and also the two incentive conditions.[6] We estimate:

$$\text{Failure} = \alpha + \beta\cdot(\text{subject is H}) + \gamma\cdot(\text{session cues identity}) + \delta\cdot(\text{subject is H} * \text{session cues identity}) + \mu\cdot Z + \text{error}, \quad (2)$$

where the benchmark case is L in Caste Not Revealed. We use the logit results, reported in Supporting Table A2, to predict the probability of failure. Figure 7 reports the results, controlling for individual characteristics. The figure shows that revealing caste *reduces* failure among H from 8% to 2%, and *increases* the failure among L from 1% to 11%. These changes are statistically significant and robust to the addition of controls for household characteristics. These changes are also consistent with the predictions of stereotype susceptibility: when the participants are made more aware of caste, H are less likely, and L are more likely, to fail to learn how to solve a maze. These results suggest that the identity conditions do not depress the

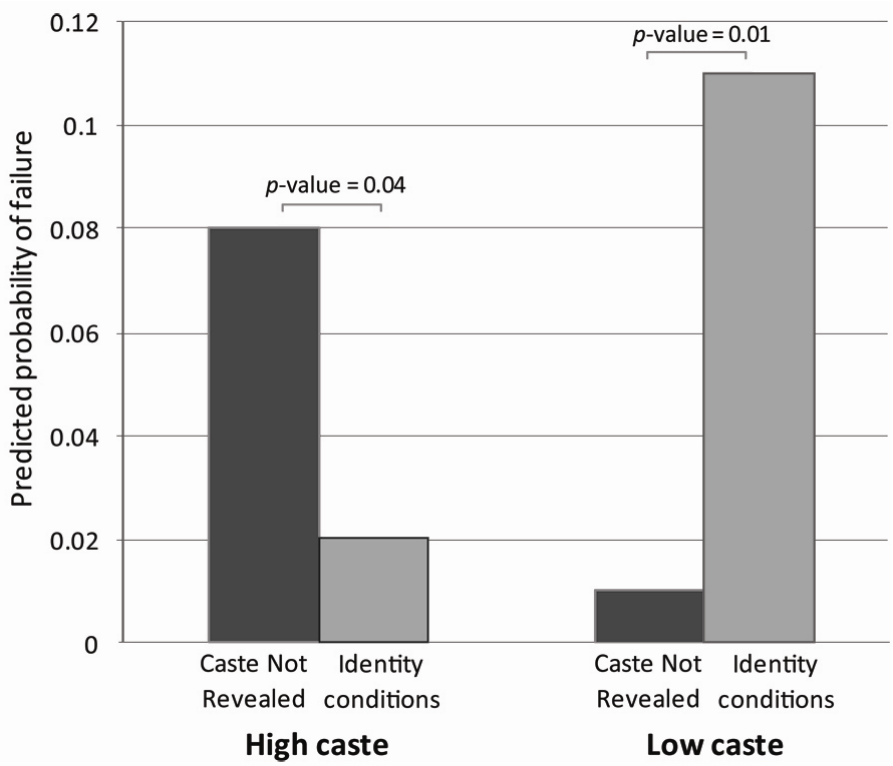
[6] Otherwise the estimates are unbounded, since some cells in Table 4 are empty.

ability of H to perform a cognitive task. They suggest instead that the decline we find in H output in Revealed Segregated reflects a change in preferences over the provision of effort.

Table 4**. Proportion of Participants with Zero Output**

Treatment	Participants with zero output /Total participants of the respective caste in the treatment			Proportion	
	High caste	Low caste		High caste	Low caste
P/P- Caste Not Revealed	7/78	2/78		0.09	0.03
P/P-Revealed Mixed	1/60	9/60		0.02	0.15
P/P- Revealed Segregated	1/30	2/30		0.03	0.07
P/T -Caste Not Revealed	2/30	0/30		0.07	0
P/T- Revealed Mixed	0/60	6/60		0	0.10
P/T -Revealed Segregated	3/30	4/36		0.10	0.11

Figure 7. **Predicted Probability of Failure**



Note. Based on the logit regression in Supporting Table A2, column (1). The control variables are grade in school, prevision exposure to mazes, and number of other participants known. The predicted probabilities are estimated at the means of the control variables.

D. Number of Mazes Solved by the Subsample Excluding Non-Learners

An advantage of decomposing performance into stages is that we can consider treatment effects on performance ability *conditional on knowing how to solve a maze*. We report the effects in Table 3, columns (4)-(5). Are the qualitative results for the full sample robust on the subsample?

We find that our treatment effects on H are *stronger* on the subsample than on the full sample. The reason is that in the subsample, we are not capturing the stage 1 effects, in which we saw that making caste public increases the probability that H will learn how to solve a maze. Under piece rate incentives, in the *full sample* the treatment effect of Revealed Segregated is -0.93 ($p < 0.05$), compared to -1.23 ($p < 0.01$) in the *subsample*. We view this latter figure (-1.23) as our best estimate of the "entitlement effect*"* for H of the Revealed Segregated condition. It is the effect on output of moving from the control condition to Revealed Segregated conditional on knowing how to solve a maze. The decline of 1.23 mazes per round represents a 26% decrease in output by H relative to average output in the two rounds in the piece rate-control condition (calculated from Table 2, column 4). The entitlement effect on H is about the same size as that of stereotype threat on L (= -23%). Each of these situational effects is the same order of magnitude –but of opposite sign—as the effect of switching from piece rate incentives to winner-take-all tournament incentives in the control condition (+25% for H and +28% for L).

We call the effect on H an "entitlement effect" because our interpretation is that Revealed Segregated reinforces a world-view in which, to repeat Béteille, "a man's social capacities were known from the caste or the lineage into which he was born" and this status entitled him to the power to exploit the low castes. The induced complacency reduces the need to achieve.

Consider next an alternative interpretation.[7] The caste order is always contested. Thus it could be that in Revealed Mixed unlike Revealed Segregated, H feel the need to affirm and

[7] Emphasized by a referee and also by Rohini Somanathan in a personal communication.

demonstrate their superiority, even if only to themselves. That is possible, but in that case one might expect H output to be significantly higher in Revealed Mixed than in the control condition, since Revealed Mixed cues the presence of the low-caste reference group. We do not find this. Ultimately this alternative interpretation comes down to largely the same thing as our preferred one, namely, that *situations that reinforce the complacency of the high caste in their superior status induce them to value less the rewards from individual productive effort*.

Finally, consider the treatment effects for L in the subsample compared to the full sample (see Table 3, columns (5) and (2)). We find that making caste public impairs output *less* in the subsample than in the full sample. This is because in the subsample, we are not capturing the effect on stage 1, in which we saw that revealing caste identity increases the probability of failure to learn how solve a maze. In the subsample, under piece rate incentives, the treatment effect of Revealed Segregated is no longer significant with 95% confidence. This suggests that *under piece rate incentives, the identity conditions hurt L primarily by hurting their ability to learn a new task (*maze-solving). In contrast, under tournament incentives, the treatment effects of the identity conditions that we found in the *full sample* remain large and significant in the *subsample.* This means the for L, the identity conditions impair both the ability to learn and, conditional on knowing how to solve a maze, the response to tournament incentives

VI. Further Evidence of the Meanings that Cues to Caste Evoke

We have argued that the decline in H performance under piece rate incentives in Revealed Segregated results from a framing effect on preferences that makes H more complacent, and that it does not result from a decline in H self-confidence. In this section, we discuss evidence from other experiments, treatments, and observational studies about the meanings that Revealed Segregated evokes.

A test of self-confidence. In an earlier experiment (Hoff and Pandey 2005, summarized in Hoff and Pandey 2006), we used exactly the same conditions as in the present experiment to manipulate the salience of caste. However, our dependent variable was a measure of self-confidence. In a six-person session, H and L were taught how to solve a puzzle based on the game *Rush-Hour Traffic Jam*. At the end of the session, participants had to make a choice between a riskless payoff and a lottery. The lottery yielded a high payoff if the individual solved a new puzzle successfully, and zero otherwise. In choosing the lottery, a participant was thus betting on his own success. The outcome measured self-confidence. The results showed no caste gap in the proportion that accepted the lottery in either Caste Not Revealed or Revealed Mixed. In contrast, in Revealed Segregated, there was a large and significant caste gap in the proportion that accepted the lottery when the puzzle was difficult and the judge had some discretion in evaluating a player's success. The caste gap occurred because of a large and significant *decline* in the acceptance rate by the low caste, and a small *increase* in the acceptance rate by the high caste, compared to Caste Not Revealed. These results lend support to the hypothesis that Revealed Segregated evokes a frame in which a low-caste individual feels that "I can't (or don't dare to) excel," while a high-caste individual suffers no loss in self-confidence.

Tournament results. Recall from Figure 6 (p. 23) that making caste public eliminated the positive output response to tournament incentives. This finding is consistent with our interpretation that when caste is more salient, H feel less need to achieve and L do not wish to excel. However, there is another possible explanation of the tournament results. If we make the plausible assumption that H believe that high-caste boys are more able than low-caste boys to solve mazes, then Revealed Segregated, in which a high-caste participant has five H competitors, would provide lower expected returns to effort than the control because it would decrease the probability of winning the tournament.

Still another possible explanation of the underperformance of H in Revealed Segregated (both under piece rate and tournament incentives) might be that H do not wish to differentiate themselves from others in their community. This explanation does not seem germane because an individual's community is his specific endogamous caste, not the set of all specific castes at the high end of the caste hierarchy; and sessions are composed of H individuals from several specific castes—Thakur (36%), Brahmin (32%) Kshatriya 29%, and others (less than 1%). Thus, in Revealed Segregated, H would not be among boys of only their own specific caste. Earlier experiments uncover solidarity within the same specific caste (Hoff, Kshetremade, and Fehr, 2011), and spite between men of different specific castes (Fehr, Kshetremade, and Hoff 2008).

Observational studies. If our interpretation is correct that when the boundaries between high and low castes are sharp, the *high*-caste boys think "I don't need to excel," then the prediction would be that an *erosion* of caste boundaries would elicit *greater* efforts by high-caste individuals to achieve. This is what Kochar (2004) finds in her study of the effect of an Indian government policy to construct schools in low-caste hamlets. The policy led, as intended, to an increase in low-caste enrollment. The increased school enrollment of *low*-caste children in turn had an unintended effect: it increased the enrollment rate of the *upper* castes. The surprising result was that aid targeted to Dalits did not narrow the gap in years of schooling between the Dalits and the rest of society,[8] but spurred the high-caste to increase its own schooling, which maintained the relative superiority of the high caste in years of education.

Consider next the evidence for the low caste. If our interpretation is correct that when caste hierarchy is salient, the *low*-caste boys think "I can't (or don't dare to) excel," then the prediction would be that factors that increase caste salience would discourage enrollment in school by the low caste. This is what Jacoby and Mansuri (2011) find in their analysis of social

[8] We thank Anjini Kochar for bringing her work to our attention.

barriers to education attainment in rural Pakistan based on a survey of over 3000 households and over 1000 elementary schools. In line with earlier work, they define a caste-status group as *dominant* in a settlement if it owns the majority of land, and argue that high-caste dominance in a settlement determines the ability of high castes to enforce exclusionary norms against low-caste individuals. They find that *low*-caste children are deterred from enrolling in school in *high*-caste dominant settlements; in fact, the greater barriers to school enrollment faced by low-caste children for whom the closest available school is in a high-caste-dominant hamlet can account for the entire enrollment gap favoring high-caste over low-caste children in the areas of rural Pakistan that they studied. The following responses from low-caste women to the question, "Do children receive the same treatment from teachers," illustrate the kinds of exclusionary norms imposed on low-caste individuals:

> "They let the daughters of [high castes] use the latrines, but tell our daughters to use the fields because you stink." "The teachers make the daughters of Zamindar Zaats [high castes] sit inside the rooms, under the fans. Our poor children are outside, under the sun and dust" (Jacoby and Mansuri, p. 7).

These two observational studies —the only studies of which we are aware that examine the effect of changes in caste salience on achievement—lend support to our interpretation of the meanings that situational cues to caste boundaries evoke.

VII. Conclusion

In our study, being hard-working or clever is not a trait of the person, in the sense that it is always there. Instead situational cues to caste influence the expression of these traits. An implicit act of segregating by caste status a group of experimental subjects reduces average performance of both high- and low-caste participants by about 25%. Cues to caste also produce significant caste gaps in performance, with the high caste learning more and working more

productively than the low caste. The influence of identity comes from the "outside in" rather than the "inside out" (Swidler 2001, p. 111; see also Ridgeway 2011).

We have argued that it is a useful construct to posit multiple preferences, one for each self-concept or world-view. It is useful for understanding long-run social change, which entails changes in the set of possible identities, the salience of particular identities, and the possible ways of understanding a situation. This perspective opens up a new set of policy options for enhancing human capital formation and productivity and perhaps, more generally, social welfare. Finally, this perspective suggests the importance of understanding how the set of possible identities evolves. Economists in recent years have taken up that question (see *e.g.* Greif and Laitin 2004, Fang and Loury 2005, Munshi and Rosenzweig 2006, and Hoff and Stiglitz 2010).

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