# Belief Formation in the Returns to Schooling

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## 1. Introduction

This study investigates how poor households in rural and urban Rajasthan form beliefs about the value of additional years of schooling. Previous studies have documented that poor populations in developing nations hold downwardly biased beliefs of the returns to schooling; they do not think schooling is as valuable as it actually is.[1] Further, it has been shown that providing correct beliefs about average wages for adults with high levels of schooling can significantly and substantially increase schooling attainment. This project aims to understand how such interventions can be made more effective by understanding the source of the original bias.

Using a survey with 402 households in the Ajmer district of Rajasthan, India, we are able to gain some preliminary insights into the complicated process of subjective belief formation about the returns to schooling. In our sample, under our survey protocol, respondents show quite accurate beliefs of the relation between schooling attainment and wages (wages conditional on finding work) in the general population. However, they greatly underestimate the probability of working, especially for the highly educated. Though further work needs to be done, this provides an interesting explanation for downwardly biased beliefs of the returns to schooling – a failure to recognize (or incorporate) the increase in the probability of working. We also provide suggestive evidence that (i) our population overestimates the relation between schooling and happiness (which

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[1] Jensen, Robert. "The (Perceived) Returns to Education and the Demand for Schooling." *Quarterly Journal of Economics*, May 2010.

we estimate to be significantly positive for both own education and spouse's education), and (ii) people use different categories of data (e.g. types of jobs, people they know, types of skills) when formulating beliefs of for different levels of schooling.

## 2. Survey Design

Our investigation relied on the use of a door-to-door survey performed during the winter of 2011-2012 in rural and urban Ajmer. The survey, in its totality, covered 402 households from both rural and urban areas of Ajmer district. Out of these 402 households, 181 were male respondents and the rest 221 were female respondents. Wage information for all the members (a total of 2,428 individuals) was collected from these households.

### 2.1 Questions

The survey consisted of three sections. The questions were not incentivized.

The first section regarded questions about happiness. Numerous articles in the subjective well-being literature suggest responses to happiness questions can be contextually influenced. We do two things to limit the noise of these responses. First, we ask the happiness questions first. We do not want the subject thinking about how they dropped out of school at the age of 12 when they are responding to how happy they currently are. Second, following the advice of Kahneman and Krueger (2006), we ask 'On average, how happy were you last week?' Such wording seems to be more robust to context or framing effects. After asking for their own happiness, we ask about their spouse. Then we ask for their beliefs of how happy an average adult male living in Rajasthan is given a certain level of schooling attainment. As with all the questions that follow, we ask for zero, five, eight, ten and twelve years of schooling.[2]

The second section is the thrust of the survey. This section asked about beliefs of wages for varying levels of schooling attainment for an average male living in Rajasthan. The survey proceeded one schooling level at a time, starting with zero years of schooling. In each subsection, we would first ask about their beliefs of the probability of finding work – "Out of 100 people who have completed [X] years of schooling, how many do you think would be working as of today?" Next we would ask for their beliefs of wages – "What is the average wage of a man who was completed class [X]?" Often they would think out loud as they contemplated the average wage. In this case, our surveyor would note what they would be thinking about – type of jobs, people they knew, own experience, information from the media, skills this person would have, computer skills, or other – and in what order the respondent mentioned this category. If they did not organically think out loud, after they gave their response, our surveyor would ask why they said this and take the same notes. Next, they were asked what kinds of jobs such an educated person would have, if they knew anyone with this level of schooling, what that person did, and how much they made. This section concluded with two questions to understand if subjects understood selection into schooling and neighborhoods. They were also asked "If a man whose capabilities limit him only to five years of education, was made to study {10, 12} years instead, what would his wage be?", as well as "What do you think is the average wage of a man with {0, 5, 8, 10, 12} years of schooling who grew up in a village and lives in a city?"

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[2] Throughout the text, we refer to the lowest schooling category as zero years of schooling. However, the expectations questions asked about a man who is *illiterate* rather than one who has zero years of schooling. We did this to match more closely with the coding for the National Sample Survey. However, our data on actual wages relies on zero years of schooling rather than illiteracy.

The third section was about the household: how many years of schooling did the household members have, what were their occupations, what were their wages, where did they grow up, who made household financial decisions, who made household education decisions, how many children did they have, in what grades, and how old.

## 2.2 Selection

For the rural survey, four villages were surveyed in Bhinay block of Ajmer district, and a total of 202 households were covered in these villages. The selection criterion for the villages was straightforward. A comprehensive list of all the villages (at a radius of around 25 km from the Bhinay block centre) was created and from these, all villages with more than 100 households were shortlisted.[3] Four villages were then randomly selected for the survey.

For the urban survey, six slum areas were surveyed from in and around Ajmer city, and a total of 200 households were covered. From a list of all the slums in the city, four slum areas were randomly chosen, along with an additional list of buffer slums. During the survey we could not cover our targeted 200 households in the four slums visited because there were not adequate eligible households. Hence, we surveyed additional two slums from the village buffer lists increasing the number of slums covered to six.

The household selection criteria for both the urban and rural survey was to interview parents (ideally equal number of male and female per day) who have children between the ages of 6 to 14 years and hence are involved in making education related decisions in the households.

The survey was conducted with one parent in every household. A survey team of five surveyors and one supervisor, was hired and trained on the content and administration of the beliefs questionnaire tools used. Each survey was conducted individually by the surveyors and on an average took 30 to 40 minutes each.

# 3. Expected and Actual Wages

In this section we look at the wage data. We compare respondent beliefs of wages for given levels of schooling to estimates from our survey (which oversamples poor areas) and the NSS for Rajasthan, which should be more representative. We also compare the predicted and actual implied relation between schooling attainment and wages to determine whether respondents underestimate the slope of this relationship.

Though our results are preliminary, generally we come to two conclusions. First, if we consider beliefs of wages conditional on working, they are quite accurate for all levels of schooling. Second, if we look at subject beliefs of wages not conditional on finding work (multiplying wage predictions by predictions of likelihood of finding work), respondents underestimate how much someone with high levels of schooling, ten or twelve years, would earn. As we will discuss in later sections, this is driven by subjects underestimating the probability of finding work, especially at higher levels of schooling.

## 3.1 Wages Conditional on Finding Work

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[3] Bhinay block was selected because it is the site of an adult literacy evaluation where the survey team was working. We utilized reports from the literacy project which provided a mapping and population count of every village in the block. Villages with over 100 households were selected for the beliefs project because these larger villages were not in the sample for the literacy evaluation.

In this subsection, we will look at wages, both predictions and survey estimates, conditional on finding work for various levels of schooling.

*Average beliefs of wages at each schooling level are very accurate; as a result, beliefs of the correlation between wages and schooling attainment is estimated to be quite accurate.*

Figure 1 depicts average wages, be they predictions or estimates, across various levels of schooling attainment from both our survey data as well as data from the National Sample Survey (NSS) collected in Rajasthan. [4]As Figure 1 illustrates, despite the previous evidence of downwardly biased beliefs of the returns to schooling in the developing world, our respondents, on average, hold remarkably accurate beliefs. The accuracy is notable on at least two fronts.

First, the differences of beliefs and actual wages at each level of schooling are remarkably small -- the average belief is always within 14% of either the average wage from our survey data or the NSS data. Previous studies have typically found that predicted wages for low levels of schooling exceed actual and that predicted wages for high levels of schooling fall far short of actual wages. We cannot support either claim.

Second, the inferred beliefs of the relation between schooling attainment and wages also appear to be quite accurate. This follows directly since we found no strong overestimation of wages for lowly-educated workers or strong underestimation of wages for highly-educated workers. Unlike previous work, we find that respondents' predictions, on average, do *not* have a flatter slope than actual wages in the relation between schooling and wages.

**Figure 1:**
**Expected and Actual Wages**
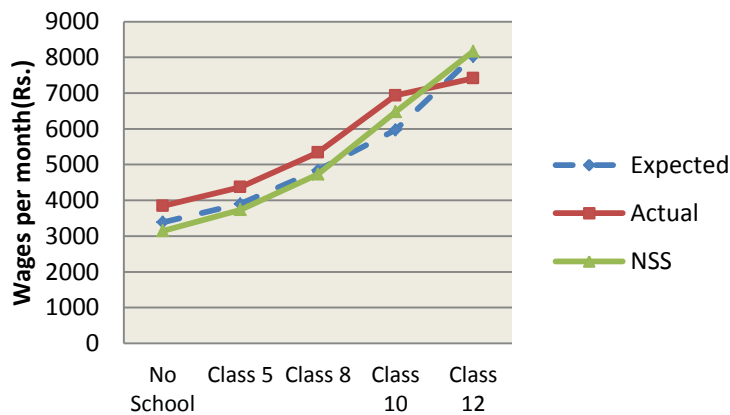


The seemingly accurate beliefs held by survey respondents appear to be true both for respondents in urban or rural Ajmer, though the picture becomes less clear.

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[4] Although our wage question was not phrased conditional on working, our field team reported that this question was interpreted as conditional by respondents. We therefore compare it to actual data on wages conditional on working.

**Figure 2:**
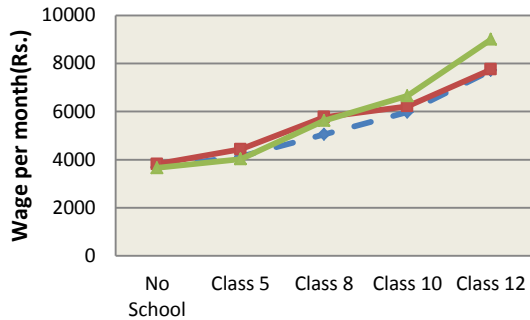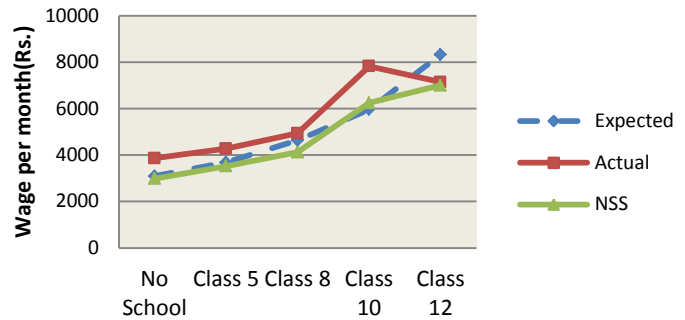**Expected and Actual Wages,**
**Urban Ajmer**



**Figure 3:**
**Expected and Actual Wages,**
**Rural Ajmer**



In the conclusion, we discuss potential reasons why we do not find a downward bias in subjects' belief of the relation between schooling and wages.

## 3.2 Expected Wages, Not Conditional on Finding Work

In this subsection, we analyze wages, both predicted and estimated from surveys, that are *not* conditional on finding work. These are expected wages; they are the daily wage times the probability of finding work on a given day. Since this requires multiplying estimates, we regard the results with reasoned caution.

Figure 4 shows average wages for a given level of schooling. The two solid lines are estimated actual wages from our survey and the NSS survey; they are the product of average daily wages and the likelihood of working on a given day. The dotted line indicates our respondents' beliefs of expected wages; they are the product of estimated monthly wages multiplied by the likelihood of finding work on a given day.

**Figure 4**
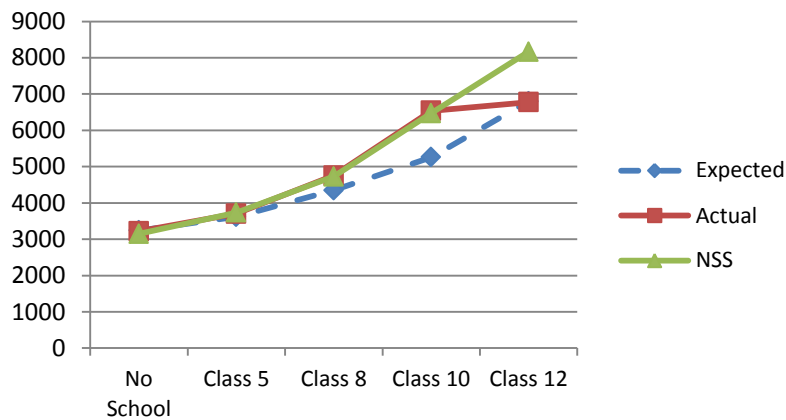


The conclusion is not clear. Comparing the expectations to the NSS estimates, it appears our respondents correctly estimate wages for low levels of education but underestimate wages for high levels of schooling, by around 18% for 10 and 12 years of schooling. The downward bias is perhaps more interesting because they only seem to underestimate high levels of schooling, thus underestimating the slope of the function above.

A similar pattern appears comparing the predictions with the estimated wages from our survey data with the exception of 12 years of schooling. It is worth noting that our data only include 58

data points for people with 12 years of schooling, and we oversample poor areas in urban Ajmer. The NSS data are likely better estimates for wages in this cell.

# 4. Sources of Beliefs

Our survey contains a number of measures to examine the sources of the beliefs of earnings conditional on different levels of schooling. First, the enumerators wrote down what examples the respondent gave as she was giving her answer to the average earnings questions, and prompted when examples were not given. Second, enumerators asked specifically two sets of questions about the types of jobs that a person would do with that level of education and about people they knew who had each level of education.

## 4.1 Sources of information

We first examine which types of information respondents used in answering the earnings questions.

*Respondents reported forming their wage beliefs primarily based on knowledge of the type of job one can do with the skills at each level of schooling. Specific skills were also important in forming beliefs for higher education levels.*

Figure 5 gives the frequencies for each type of answer for each level of education. Across all categories the most common source of belief was a specific type of job that a person could perform with that level of education. The frequency of this response was declining in the level of education, however. At higher levels of education, respondents more frequently mention general skills that a person with that level of education has.[5] However, even at the highest education level, more than 80% of respondents mentioned a job category first.

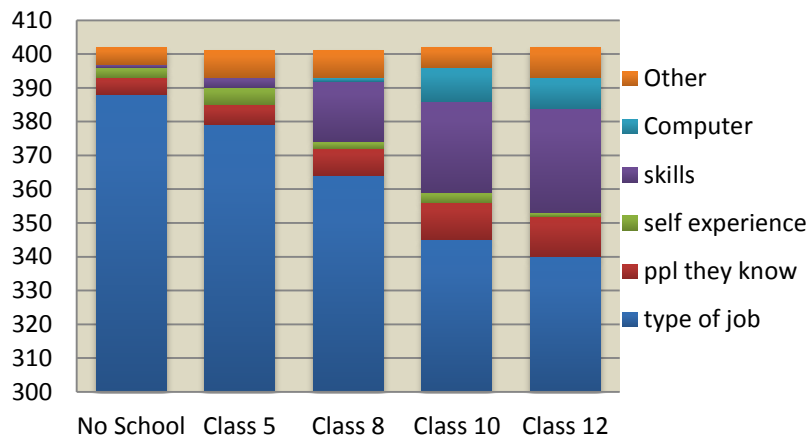**Figure 5: First ranked beliefs for wage expectations**

Figure 6 shows the frequency of the second source of beliefs if one was mentioned. Since respondents were not required to give a second set of beliefs, we only have data in about half of

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[5] Examples of skills given include reading and writing, the ability to do basic calculations and math, the ability to and an increased ability to search for a job, and ability to obtain a driver's license.

cases.[6] Response rates were increasing in level of education, with the most common answer among the higher education levels being the skills that one obtains with more education. It is also interesting to note that self-experience and people the respondent knows contribute more strongly to beliefs at lower education levels.

**Figure 6: Second ranked beliefs for wage expectations**
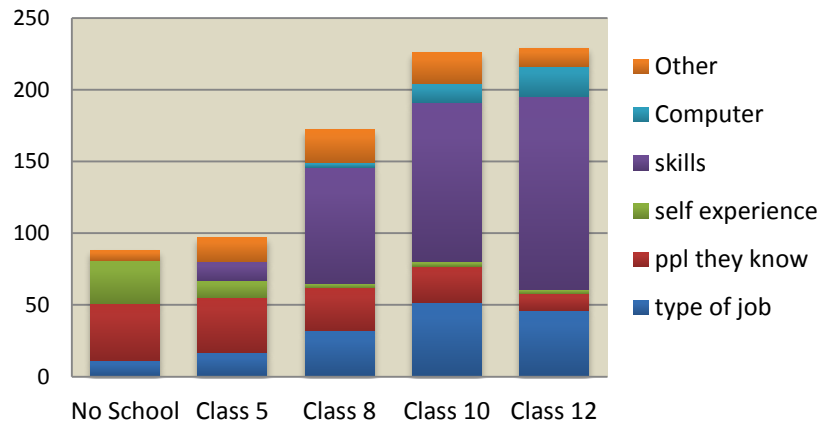


## 4.2 Type of Job

   This subsection reports on the type of jobs that respondents reported were associated with each level of schooling.

   *Job types reported to be associated with each schooling level match closely with our actual data, on average.*

   Figure 7 analyzes the types of jobs that respondents reported one could do at each education level. We classify these into 3 categories: manual, low skill and high skill. We compare the frequencies of the reported jobs with the actual jobs from our data. The frequencies of each job type correspond closely between expectations and actual jobs data. In future analyses we will compare the frequencies across urban and rural areas to examine whether the reports from urban (rural) respondents more closely match the actual data from urban (rural) residents.

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[6] About 12% of respondents mentioned a third source of beliefs, averaged across all education levels.

**Figure 7: Job belief comparison with actual jobs of the respondents**
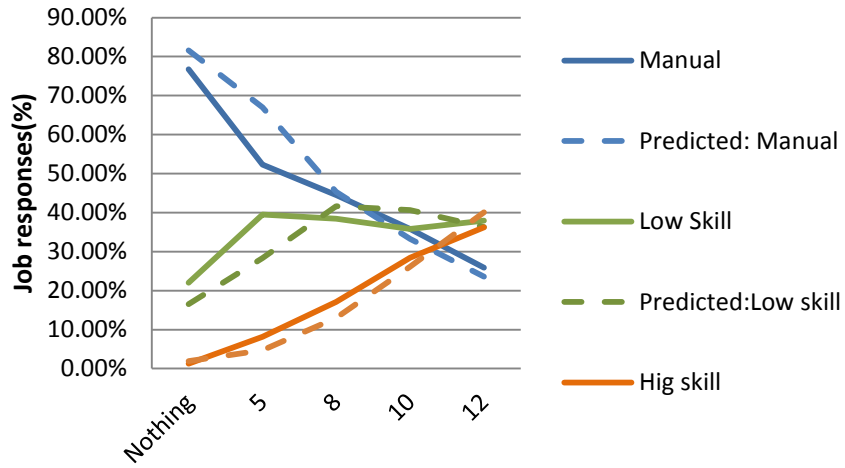


### 4.3 Wages of Acquaintances

Finally, we report the relationship between wages of acquaintances and actual wages in our data.

*Wages of acquaintances at each schooling level match closely with our actual data, on average.*

In Figure 8 we analyze the data on wages of people the respondents know and compare these data with our entire sample. The wages of the people they know are very close to the actual data. The differences across schooling levels (as represented by the slopes of the lines in the graph) are also similar. If anything, the slope in the actual data is less steep than the slope of the acquaintance data. As with the job types analysis above, in future work we intend to break this graph out by urban and rural residence to see whether expectations are closer to the actual data in the area of residence.

**Figure 8: Wage comparisons – Actual wages vs. Wages of people they know**
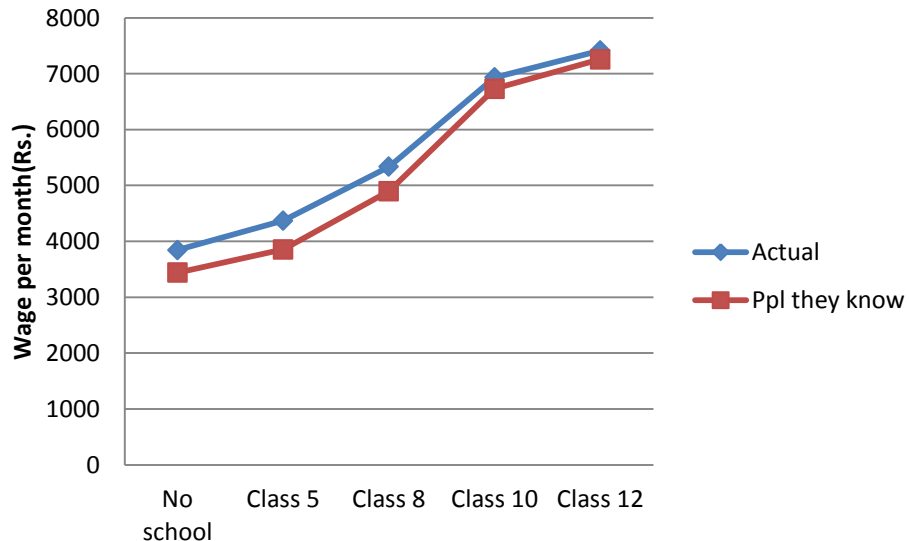
## 5. Employment Probabilities

In addition to measuring beliefs of average earnings by education level, our survey measured beliefs of employment probability. For each education level, we asked the respondents, "out of 100 people with X level of schooling, how many do you think were working as of today?"

We first compare the responses to this question, by education category, with our actual data from our sample of men. We stress that these comparisons are preliminary, as the employment beliefs question was worded as 100 *people* rather than *men*. Because the introduction of the survey stressed that we were thinking about men, and the earnings and happiness questions mentioned men specifically, we assume that this question reflects beliefs about men. However, we cannot rule out that some of the respondents reported averages for men and women rather than just men.

*In contrast with much of the wage expectations data, beliefs of the likelihood of working is substantially lower than our actual data.*

Figure 10 compares the average beliefs of employment probabilities with the actual probabilities from the men in our sample. The beliefs data underestimate employment probabilities for every level of education. In addition, the gap between beliefs and actual employment is increasing in the level of education. These results are particularly striking given the accuracy of the wage data. Because our wage beliefs were found to be much more accurate, we speculate that, in this context, downwardly-biased beliefs of the overall returns to education may be driven by biased beliefs about employment prospects rather than wages. This is an area that we intend to explore in future work.

**Figure 9: Mean actual employment vs. mean expected employment**
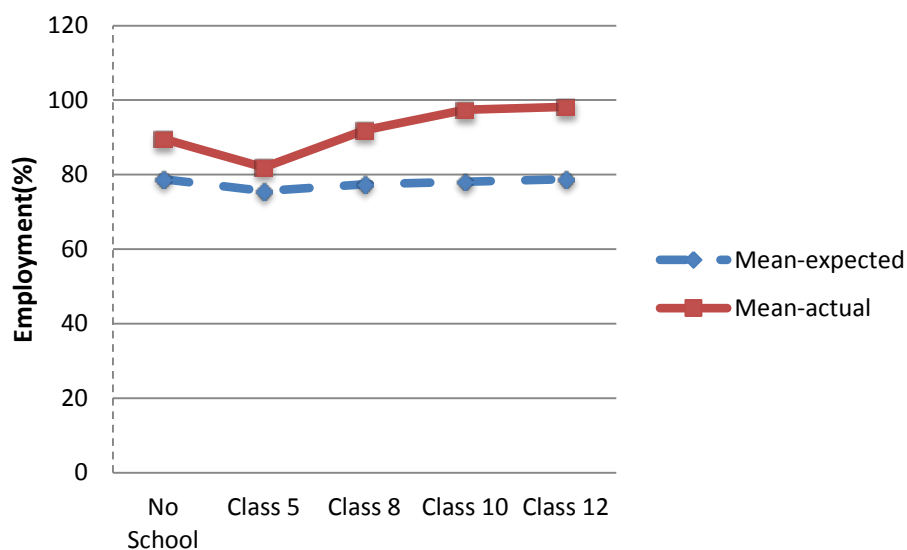


## 6. Happiness and Schooling

Financial returns are but one way to consider the value of schooling; in fact, money can be construed simply as an instrument for the real outcome of interest – happiness. As mentioned in

Section 1, we asked the happiness question first since reported happiness is often affected by previous questions; e.g. they might report a different happiness level after they have been primed to think about how much schooling they have.  Hence, we interpret the happiness data as fully independent responses.

*Respondents predict a strong correlation between happiness and level of schooling attainment.*

Over 80% of respondents reported beliefs that the average person with 0 years of schooling was "Sad" or "Very Sad" on average last week; whereas, over 85% believe someone with a secondary degree was either "Happy" or "Very Happy" last week.

**Figure 10:**
**Predicted Happiness for Schooling Attainment**
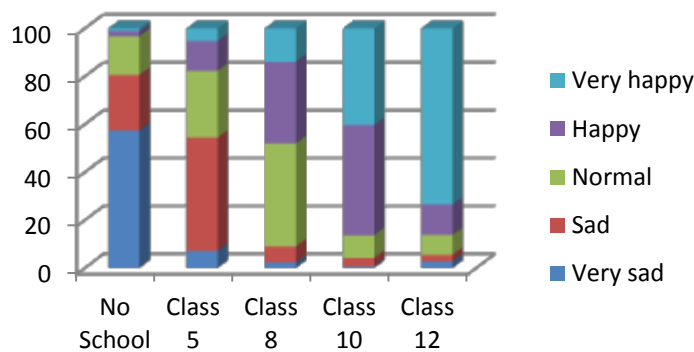


It should be noted that these beliefs were elicited within subject – each subject was asked for their beliefs for all levels of schooling attainment – and the order was not randomized.  Every respondent was asked to report their beliefs of happiness first for someone with no schooling, then someone with five years of schooling, and so on.  This is important for a hard-to-quantify outcome like happiness.  For example, suppose that the same respondent was asked for her beliefs of *either* someone with 5 years or 8 years of schooling, but not both.  She might say "average" for both.  However, if she were asked for her beliefs of *both* 5 and 8, she might want to report that she believes someone with 8 years would be happier on average, so she might report two different levels of happiness.  Hence, we interpret our results with these qualifiers.  The reported beliefs strongly suggest subjects believe there is a strong correlation between happiness and schooling attainment.  Unfortunately, we must interpret the magnitude of this correlation with caution.

*Happiness is correlated with both own schooling attainment and the schooling attainment of one's spouse.*

As can be seen in Figures 11 and 12, though the gradient is not as steep as that found for predicted happiness levels, there is a significant positive correlation between happiness and either own schooling attainment or spousal schooling attainment.  For own happiness, 48% of the unschooled respondents reported they were either "Sad" or "Very Sad" on average last week and only around 25% were either "Happy" or "Very Happy".  Meanwhile just over 50% of the respondents with a secondary degree reported they were either "Happy" or "Very Happy" last week and only around 27% reported being "Sad" or "Very Sad".

**Figure 11:**
**Happiness by Schooling**
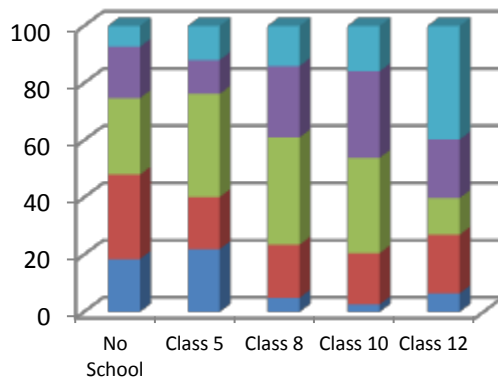
**Figure 12:**
**Happiness by Spouse's Schooling**
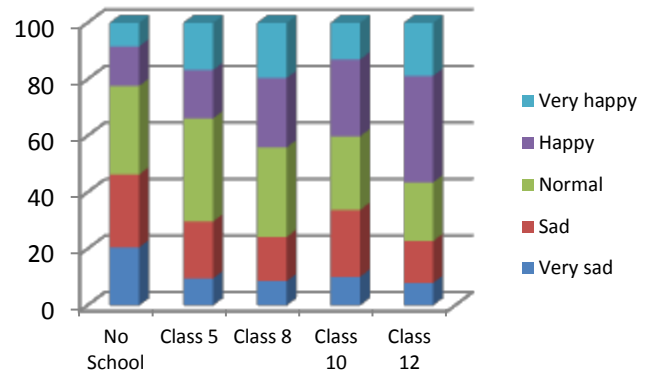
There is not always a clear relationship between income and happiness, so it is worthwhile to think about non-pecuniary returns to schooling. The data above show that the correlation, at least, is (and is believed to be) strictly positive and seemingly quite substantial.

## 7. Conclusion and Future Work

Our surveys have extended previous work on subjective beliefs of earnings at different levels of schooling by examining the sources of those beliefs and by examining additional outcomes important in the study of returns to schooling beyond wages. We find that beliefs of wages are surprisingly accurate, both relative to the areas where we surveyed and to the state of Rajasthan as a whole. In contrast, likelihood of employment is underestimated, and more so for higher education levels. Expectations of happiness levels are also more strongly increasing in schooling levels than our actual data.

We conclude by discussing on our plans for further analysis of these data and for further research. First, we intend to look more closely at the relationships between beliefs and actual data across urban and rural study areas. In particular, we would like to quantify the correlations of beliefs and actual wages of one's own area, compared with the correlation of beliefs and wages in the other area. This analysis will yield insights into whether beliefs are formed by experiences in one's own area relative to both rural and urban areas.

Second, although we find striking similarities between beliefs and actual wages, on average, we intend to explore the substantial heterogeneity in the data. For example, we intend to examine whether this heterogeneity is related to differences in sources of beliefs, expected types of jobs or wages of acquaintances at each schooling level. This analysis will yield insights into the sources of bias at the individual level, even though beliefs do not appear to be biased on average. We intend to confirm the sources of these biases and potential interventions for addressing them through subsequent field experiments.

In future research, we also intend to further explore potential biases in beliefs of employment probabilities. If our preliminary findings hold, then biases in beliefs of returns to schooling could, on average, be driven primarily by biases in beliefs of employment probabilities, on average. This suggests that information interventions that target likelihood of employment could be more effective than interventions that focus on wages. We intend to explore this hypothesis in future surveys and field experiments.

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