Leaving no one behind:

Behavioral response to social exclusion and economic inequalities

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Author

Pooja Balasubramanian

Born in District of Hottagally, Hunsur Road, Mysore, India

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First Supervisor: Prof. Marcela Ibañez Diaz, Ph.D.

Second Supervisor: Prof. Stephan Klasen, Ph.D.

Third Supervisor: Prof. Dr. Fredrick Carlsson.

Declaration for the admissions application

I confirm,

(1) that to date, I have not successfully completed a doctoral program or doctoral process, nor discontinued my studies in such a program. Otherwise, I have already indicated this in the application,

(2) that no intermediaries were paid for the purpose of informing me about doctoral study opportunities,

(3) that in connection with the doctoral studies process and its preparation, no funds or its non-monetary equivalency were paid and no unpaid services were solicited, contrary to the purpose of the examination procedures,

(4) that there is no basis on which to justify the retraction of a doctorate degree.

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Date, Signature

Dissertation – Overview

The dissertation is composed of four chaperters. In this section, I would like to mention the contributions by each of the coauthors and myself.

(1) Subjective returns to education: Rational expectations of disadvantaged groups in India
The field work for this study was possible from the funding provided by Professor Marcela Ibanez.

(2) Social comparison at the workplace:Evidence from a field experiment in Kolkata, India
(joint work with Ghida Karbala)
Ghida contributed to the research design and initial data analysis. Pooja conducted the field work and the initial literature review. Both the authors contributed equally in completing the final draft of the paper.

(3) Religious discrimination and Altruism: A field experiment with children in Mumbai, India
(joint work with Marcela Ibañez Diaz, and Daniel Celis)
The research design was developed jointly by Marcela, Daniel and Pooja. Pooja conducted the field work and the initial literature review, data cleaning and analysis. Daniel contributed to the data analysis. Marcela contributed to the literature review and the data analysis. All three authors contributed to completing the final draft of the paper.

(4) Development of Social Preferences in informal risk sharing: A field experiment with Colombian children
(joint work with Marcela Ibañez Diaz, and Daniel Celis)
Marcela developed the research design and contributed in writing the conceptual framework, literature review and analysis. Daniel conducted the entire field work, initial data cleaning and data analysis. Pooja contributed to the literature review and the data analysis in the project. All three authors contributed to completing the final draft of the paper.

Date, Signature

Acknowledgements

I would like to dedicate my thesis to my mother, father and sister. Thank you for supporting and standing by me not only during my PhD years but also through all of my experiences and decisions till date. Thank you to my father who is my most reliable alarm clock. I would like to make a special mention to my mother who recently completed her doctoral thesis, among other things she does. She also never fails to ask if I have eaten and what I plan on eating in the day. Thank you my (little) sister Poornima, for reading my thesis patiently until the very last day.

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My first year in Göttingen, I spent most of the time in my office (getting no where in my research) and eating falafel wraps. It was only from the second year I was introduced to a whole new world within this town. I moved to my shared flat NikoWG 53. Soon I realised my productivity was very positively correlated with taking the weekends off and spending it with my lovely flatmates. Apart from an exponential improvement in my German skills, the cycling tours, swimming in the lake, making real marmalede (not store bought), baking bread and cake are everlasting memories I will always cherish. It was truly moments like jogging with Nikki or rambling in Hindi-German with Helena, our occasional boardgame evenings that made Göttingen instantly feel like home. I would like to mention a special thank you to Franzi. I am extremely greatful for the sisterhood I experience with you and look forward to making our Bangkok train station conversations come true. Ofcourse on the top of the list of wonderful women in my life is Vidya. I am looking forward to us sharing a flat in Berlin and doing exciting research, among other things.

It would be imperative to mention Prof.Klasen who has motivated innumerable young

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Chapter 1

Introduction

Social inclusion has been widely discussed and conceptualised in policy debates since the 1970s. Over the years, in the form of multidimensional poverty measures (Alkire and Foster, 2011) and the capabilities approach (Sen, 1985a), research has focussed on discrimination based on identities such as race, gender, ethnicity, and other disadvantaged groups within countries. However, only until recently the term has regained a voice in the development discourse, when the United Nations in their Sustainable Development Goals (SDGs) committed to reducing not only material or income inequality, but also inequalities based on different social identities. It includes a rights-based approach enabling participation of all individuals in the society, ensuring equal access to resources, voice and self-respect. In a detailed report 'Leaving no one behind' (United Nations Department of Economic and Social Affairs, 2016) the UN highlighted three broad domains where exclusion can occur; namely denial of opportunities or pre-market exclusion, unequal access to resources such as wealth and income, and unequal participation in society (non-market interactions). This dissertation studies behavioral responses to economic inequalities faced by individuals from different social identity groups through the lens of the abovementioned domains.

One of the key questions put forth by researchers critically assessing the 'LNOB' agenda of the UN, is the need to conceptualise and provide necessary instruments to measure those left out. A popular framework discussed by both Klasen and Fleurbaey (2019) and Kabeer (2014) is to focus on the intersection of two distinct approaches to inequality. On one hand is the vertical approach wherein inequality is measured in the form of income, assets or including non monetary metrics such as capabilities at the household or individuals level. The second approach is the horizontal inequality that emphasises on social discrimination or group based disadvantages that individuals face based on their identities at birth such as gender, caste, ethnicity, race, age and forms of disability (Stewart, 2009). While each of these inequalities exist independently, Kabeer (2016) emphasises '*it is the intersection between these different forms of inequality that serves to define the most severe and often the most enduring form of social exclusion in socieites*'.

The thesis advances the discussion on consequences of the intersection between horizontal and vertical inequalities in the following ways: (a) The first study observes subjective earnings expectations for children across different identity groups such as lower caste, Muslims and females relative to the priviledged Hindu males. This analysis is an important descriptive study as differences in expected returns to education could explain early school dropouts and demand for human capital accumulation among different social identity groups in India. The study is categorized under the domain of denial of opportunities or pre-market exclusion. (b) The second study addresses how men and women respond to wage inequality - especially when the gender of the advantaged coworker is known. Using a field experiment, we observe the interaction of income and gender based inequality within the labor market. This paper falls in the domain of unequal access to resources or market exclusion. (c) The third and fourth paper focus on reducing inequalities within a relatively less researched domain of non-market interactions. The third paper addresses motivations that encourage altruistic behavior towards recipients who are economically deprived but belong to a different religious group in India. The fourth paper identifies the importance of solidarity norms that contribute to collective risk sharing, thereby lowering risks of individuals who are economically vulnerable in Colombia. Both the papers study

how norms of social preferences such as altruism and reciprocity are associated with age. Inorder to measure the impact of identity based exclusion and existing inequalities, each chapter uses a combination of economic experiments and surveys. The thesis follows a behavioral framework combining theories in pyschology (role of deliberative and automatic thinking (Tversky and Kahneman, 1974)), sociology (priming and social identity theories, (Tajfel and Turner, 1986; Tajfel and Turner, 2019)) and economics (Li et al., 2009; Lane, 2016; Falk and Knell, 2000; Bertrand et al., 2005).

Priming and making identities salient has also been used in previous studies. By using such methods, it is possible to reveal how individuals 'see' or 'think' or 'activate' their mental models as normalised by society or the context they live in (Latour and Douglas, 1988). However, in most cases, the findings show individuals from minority or disadvantaged group are discriminated against (a detailed review of these studies can be found in Field experiments in Discrimination (Bertrand and Duflo, 2017)). While these studies document how disadvantaged social identities could be the target of the limited information models that propel 'statistical discrimination' (driven consciously or unconsciously by prejudice - See (Aigner and Cain, 1977; Dickinson and Oaxaca, 2009)), very few studies show how negative stereotypes and prejudice become self fulfilling prophecies. In other words, they not only encourage the individuals who discriminate but also affect those discriminated. Social psychologists have argued in favor of the reverse causal channel, whereby the statistical based discrimination of cateogorizing certain groups as less productive, intern causes these groups to be less productive. They term this as self expectancy effects or the stereotype threat (Steele and Aronson, 1995). Few studies in economics have attempted to reveal the disadvantaged group's tendency to self affirm the negative stereotypes about their own group. The study by Hoff and Pandey (2006) stand out in the literature who show that priming and making caste identity salient, results in a strong and robust caste gap in performance. A replication study was conducted in China by Afridi et al. (2015), and performances of children between 7 to 12 years old was observed. The social identity made salient was the location of residence; namely urban and rural. This distinction was based on a four decade long differential treatment whereby the urban residents have always been favored in terms of housing, education, jobs and public benefits. The authors found a significant drop in own performance for the rural or low category children after making their hukou (housing category) identity salient. Apart from performances in real effort tasks, some studies also measure risk, time and social preferences of individuals when their social identity was made salient. These studies shed light on the sensitivity of social cues on individual's preferences (Benjamin et al., 2010; Li et al., 2009).

The dissertation attempts to observe such self fulfilling stereotypes in more realistic environments. A main contribution of the thesis is to understand how inequality traps can impede the progress on equality and inclusion within each of the domains of the UN's conceptual framework. It further suggests potential policy measures that can help break existing inequality traps. The first domain where exclusion can occur is through pre-market discrimination or denial of opportunities. We contribute to the literature by studying how subjective earnings expectations vary among excluded and marginalised identities. We find collective mobilisation of marginalised groups and their representation in the form of political leadership as important variables to promote demand

for higher education among the excluded groups. The second domain under consideration is unequal access to resources, specifically income and employment. We conducted a RCT among university students in India with the aim to study how inequality in wages affects productivity of workers. The paper particularly, focusses on how individuals respond to wage inequality when they know the gender of the advantaged coworker. One of the main contributions of the study is to highlight the assymmetric responses of males and females towards inequality depending on who is their reference group. We find women in our sample evaluate a male advantaged coworker as better performers and tend to justify the pay difference. The paper proposes need for more macro and meso policies that finance gender equality. Apart from gender sensitive policies such as affirmative action and skill training, there is a need to exogeneously invest in public infrastructure that lowers burden of care work, and free up time for women in reproductive labor activities.

Finally, in the third and fourth chapter we consider participation in non market interaction. The third chapter highlights the development of altruistic giving in children and observes if favoritism for own religious group lowers voluntary contributions towards members of the outgroup. Our contribution through this study is to highlight the presence of religious discrimination, if any, among children between 7 to 17 years. In our sample of children from the city of Mumbai, we do not observe religious identity based discrimination when norms of solidarity (altruism) are considered. Similarly, in the study in Bogota (Colombia), we focussed on motivations of altruism, reciprocity and deservingness. We found altruism and reciprocity to be strong motivations contributing to informal risk sharing with other members in civil society. In both chapters we propose the promotion of norms of solidarity among middle and high school students as important non-cognitive skills.

While assessing exclusion among different social identity groups, a common thread throughout the dissertation is its focus on children and young adults. Children across identities are considered one of the most vulnerable groups exposed to social exclusion (Klasen, 2001; UNICEF, 2014; Molinas Vega et al., 2011). A World Bank report on equality of opportunity (also known as the Human Opportunities Index) reveals disparity in education, health and the public life, particularly for children based on pre-existing characteristics such as gender, ethnicity, education of parents (Molinas Vega et al., 2011). Apart from external factors such as provision of education, health and other public services that can ensure equality of opportunity, there is a growing literature in economics that observes how internal preferences, primarily non-cognitive skills such as self control, time preferences, fairness and prosociality develops for children across different social identity groups (Fehr and Schmidt, 2006; Sutter et al., 2019; Harbaugh et al., 2007; Harbaugh and Krause, 2000). Heckman et al. (2018) was one of the first studies to show the benefits of developing non cognitive skills as crucial for life outcomes.

We contribute to this literature by studying the development of social preferences and norms of solidarity across a large age spectrum i.e 7 to 17 years. The study in Colombia builds a panel dataset following the same children over three years. Such a longitudinal study enables us to observe the development of risk sharing preferences that can contribute to reducing economic inequalities. Furthermore, we are able to identify important phases in the early childhood and adolescence wherein a certain non-cognitive skill either develops or depreciates. By considering

factors such as socio economic status, parental preferences and peer effects, the studies can provide a holistic understanding of how norms of risk sharing and solidarity develop in children. Given the importance of non cognitive skills in enriching life outcomes and contributing to enable equality of opportunity, identifying these internal social preferences in children is an important policy question.

In the next paragraphs I provide a roadmap summarizing the objectives, methodology, findings and contributions for each chapter.

1.1 Roadmap

The first chapter studies demand side factors that could impact decisions for schooling and gaining higher education for students across different social identity groups. We measure subjective monetary returns for different levels of education; namely high school, diploma and college. It has been shown in the literature that subjective expectations are important reference points used by individuals in their decision making (Attanasio and Kaufmann, 2009; McKenzie et al., 2013; Auspurg et al., 2017). By using primary data and innovative survey techniques such as calculating the probability distribution (Dominitz and Manski, 2006; Attanasio and Kaufmann, 2014), our contribution is to study the differential earnings expectations for a sample of students from different social identity groups. The survey took place over two consecutive years (2017 and 2018) in Mumbai (India) among children between 12 to 17 years of age. Using a balanced panel dataset, we are able to observe whether there is an aspirational gap, measured as monetary returns to education, among children from different minority, disadvantaged and privilidged identities. In addition, the paper using novel statistical technique known as the Distributional regression (Hohberg et al., 2017) as a complimentary method to mean estimations. The Distributional regression not only incorporates the arithmetic mean but also other moments of the distribution such as variance and skewness in the analysis. The findings show students from marginalized identity groups, especially girls and Muslims expect lower monetary returns from education and schooling compared to children belonging to privilidged social groups. However, disadvantaged caste groups who face systematic discrimination in the labor market and have low actual earnings, overestimate their expected earnings relative to the existing wage gap.

In the second chapter, we study gender based wage inequality at the workplace. The aim of the study was to experimentally test the paradox of the female contented worker (Dawson, 2017; Parks et al., 1995; Poggi, 2010). The paradox suggests that despite the persistence of gender wage inequality, women tend to report higher job satisfaction than men. In this paper, we observe workers response to wage inequality. Furthermore, we study how men and women vary in their response to wage inequality, when the gender identity of the advantaged coworker is made salient. Contributing to the question on why gender based discrimination in the labor market continues to persist, the study focusses on the behavioral responses (measured by effort and subjective satisfaction) of workers who face wage inequality when the gender identity of the advantaged coworker is salient. In order to test this phenomenon, we conducted a field experiment across three universities in Kolkata, India. The experiment is based on the theoretical framework of the wage effort hypothesis (Akerlof, 1984). We hired students as research assistants

for a data entry task. All students worked for two consecutive sessions in teams of two. The groups of students were further divided into four groups - Control group where all students recieved the same wage, T1(Unilateral wage cut) one of the coworkers experienced a wage cut. In T2(Wage cut- Known Ingroup identity) and T3(Wage cut- Known Outgroup identity), a coworker not only recieved the wage cut, but the gender identity of the advantageous worker was made salient. In the first session all the workers recieved the same wage. We introduced the wage cut for one of the coworkers in the second session. The experiment design allowed the use of a difference in difference regression method to analyse our results. We find that receiving unequal wages compared to a coworker whose gender identity is unknown impacts the productivity of the worker negatively. When identities of the coworkers are made salient, we find that there is a differential response to wage inequality by females and males respectively. Male workers reduce their effort supply under wage inequality irrespective of the gender of the coworker. However, female workers negatively respond to wage inequality only when paired with coworkers of the same gender. When female participants are paired with male coworkers, wage inequality does not result in changes in productivity. In our sample, no change in effort under wage inequality is driven by those females who expect their performance levels to be lower than their male coworkers and hence do not percieve the inequality as unfair. Our study contributes to the literature by (Hoff and Pandey, 2006) and (Afridi et al., 2015) who show how long term cultural inequalities and social norms can have behavioral consequences, particularly on the individuals facing these inequalities.

In the absence of formal institutions for social protection, social preferences play an important role in risk sharing and reducing economic inequalities (Dercon, 2002; Kinnan and Townsend, 2012; Angelucci et al., 2015). The third and fourth chapter provide evidence of the strong presence and development of social preferences such as altruism and reciprocity. In the third chapter, we implement a field experiment to study two main motivations for altruistic giving; namely pure altruism and warm glow (Andreoni, 1990; Ottoni-Wilhelm et al., 2017; Vesterlund, 2016) among children. Our study aims to understand how motivations of altruism can affect voluntary contributions (a) for different age groups (b) when the recipient is either from the same or different religious identity group as the donor. Through this study we contribute to the literature on motivations driving social preferences. Particularly, we are able to disentangle the relative importance of two motivations of giving - pure altruism and warm glow. In the domain of identity based discrimination, previous studies have found strong evidence of discrimination or ingroup bias(Chai et al., 2011; Chakravarty et al., 2016; Hoff and Pandey, 2006). We provide empirical evidence of ingroup bias (religious) among school age children in Mumbai, India. The field experiment was a between-within subject design based on a modified dictator game by Ottoni-Wilhelm et al. (2017). The within subject design wherein each participant made 6 donation decisions was used to disentangle pure altruism and warm glow. The between subject design tested two contextual factors affecting giving behavior; namely age and the religious identity of the potentital recipients. The survey and experiment was conducted across 8 public schools in Mumbai in 2018 keeping in mind Hindu and Muslim dominant localities. Our sample size was 1600 students from 7 to 17 years of age. Apart from disentangling the relative importance of the two motivations of voluntary giving, for the analysis we used a Cobb Douglas function

and specified a structural estimation to obtain the pure altruism and warm glow parameters (Cappellari and Jenkins, 2006; Ottoni-Wilhelm et al., 2017). The children in our sample show both pure altruistic and warm glow preferences and there is a shift in the relative degree of warm glow giving (or pure altruism) based on the contextual factors. We find pure altruism (warm glow) to be positively (negatively) correlated with age. However, warm glow forms the dominant motivation driving voluntary contributions. We do not observe an ingroup bias in altruistic giving based on the recipient's religious identity. In addition to the experiment, we conduct household surveys with both parents of the children to understand the influence of parental opinions on the child's preferences for fair and equitable distribution towards different identity groups. Apart from mapping the development of motivations for altruistic giving in children, our study is particularly important in the debate of voluntary contributions for public goods in areas with heterogeneous and salient identities. We find that despite living in diverse environments, children upto the age of 17 years do not lower the total voluntary contributions when the recipient is from a religious outgroup.

In the fourth chapter, we study intrinsic motivations for solidarity norms and risk sharing among school age children. The study focusses on identifying the development of different intrinsic motivations such as altruism, reputation, reciprocity and deservingness in sustaining informal risk sharing. Our novel experiment design allows to test all the above motivations, in addition to observing the importance of reducing informational asymmetry. Our research context is Bogota, Colombia. While there is evidence of risk sharing among adults, our contribution to the literature is to study the development of solidarity norms for risk sharing among children. Using a panel dataset, we trace the development of social norms in children over three years by implementing a solidarity game from Selten and Ockenfels (1998). The novelty of the study is that we are able to follow 500 children and observe how norms such as altruism, image concerns, reciprocity, deservingness change with cognitive development and contribute towards sustaining informal risk sharing and solidarity networks. The within-between experiment design is a modified version of the solidarity game by Selten and Ockenfels (1998). Students are randomnly selected into groups of three. One of the students experiences an economic shock and looses all their earnings. The other students in the group have to decide how much they would like to transfer to this student faced with the exogenous economic shock. The students make the transfer decisions over four rounds. The modifications in each round is able to test which social preference motivates the student's willingness to transfer. We find that there is a substantial degree of risk sharing measured as the proportion of children who transfer income to members of the group affected by an idiosyncratic negative income shock. Yet, the proportion of endowment transferred is relatively low. Altruism increases between the age of 9 and 11 years and remains stable thereafter. Another important norm contributing to informal risk sharing is reciprocity or conditional altruism whereby giving is positively correlated with previous transfers made by the beneficiary. Finally, we find that image concerns are important for the youngest cohort i.e 9 years old. However, it is not an important motivation to participate in informal risk sharing for older children. In both India and Colombia, we find altruism to be a strong motivation while making solidarity transfers. For the sample of children in Mumbai, we do not observe significant differences in altruistic giving when the identity of the recipient differs. Similarly, in Bogota,

children are contributing based on the neediness of others but do not differentiate based on the effort levels or the income earned by the participants who lost their earnings. However, past behavior of the beneficiaries are given importance.

Chapter 2

Subjective returns to education: Rational expectations of disadvantaged groups in India

Over the last 40 years, countries have shown an increasing trend in secondary and tertiary educational attainment owing to the demand for an educated workforce (Fasih et al., 2012; Desai and Kulkarni, 2008). However, at the same time, educational disparities between groups and social strata is increasing (Kabeer, 2014). Based on the World Inequality Database on Children, the Global Education Monitoring Report of the UNESCO has provided an overview of these inequalities. The report shows across different continents, children from lower income groups, rural areas and conflict-affected communities have low mean education and higher likelihood of being out of school. Similarly, the likelihood of completing higher and tertiary education is lowest for females and children from minority tribes and ethnicities(UNESCO, 2015). In this paper we investigate the drivers of persistent gaps in school enrollment and attainment of higher education across children of different social identities in India. Our hypothesis is that biases in perceptions on returns to education could explain early drop out of minority and traditionally discriminated groups. We focus on specific groups such as females, disadvantaged caste and minority religions in India. The earnings expectations is observed for three levels of education; completion of high school, technical education and college.

The study tests whether Muslims, females and lower caste groups expect lower returns to education compared to Hindu male and upper caste students(Kingdon, 2005; Kingdon and Unni, 2001; Duraisamy and Duraisamy, 2017; Madheswaran and Attewell, 2007). Despite its complexities and varied groups or 'Jatis', the caste system in India is classified into three broad categories for comparison; namely, General category (Upper caste or advantaged group), Other Backward Caste (OBC) and finally, Scheduled Caste and Tribes (SC-ST) based on the Census survey of India. Among the two discriminated caste groups (OBC and SC-ST), the inequalities faced by the SC-ST groups are considered to be more severe than the OBC category. While the OBCs are in the lower ranks of the caste hierarchy, the SC (Dalits) were considered to be outside of the caste system and deemed 'untouchables'. Similarly, the ST or tribals were stigmatized and considered primitive with an inclination of having criminal tendencies (Deshpande, 2013). Such historical exclusion can be observed today not only in the form of economic deprivation but also low standard of living, extreme poverty and health deprivation (Thorat and Newman, 2010). As a result, we expect subjective earnings expectations from education for SC-ST groups to be lower than OBC relative to the advantaged upper caste groups. Apart from caste, gender has been an important component when inequality in access to education and equal opportunities is discussed. Studies observing actual earnings in the labor market, show females to have low returns to education compared to males (Kingdon, 2005; Kingdon and Unni, 2001; Duraisamy and Duraisamy, 2017; Madheswaran and Attewell, 2007). Considering inequality traps whereby lower returns in the labor market further impedes investment in the same, we expect females in our sample to have lower earnings expectations relative to males (Bourguignon et al., 2007; Deininger et al., 2013). Among females, upper caste girls are expected to have higher earnings expectations compared to Muslim and lower castes. The hypothesis is supported by recent secondary data evidence that human development outcomes are far more inferior for SC (Dalit) and Muslim women compared to upper caste females. The 2011 Indian census shows that while 64% of the upper caste Hindu women were literate, this statistic was only at 56% for SC-ST and Muslim women.

Stated beliefs have been used to observe decision making in various domains such as migrant behaviour McKenzie et al. (2013), environmental concerns Luseno et al. (2003), credit constraints Attanasio and Kaufmann (2009) to name a few. In the context of demand for education and schooling decisions, subjective expectations are shown to differ for students across different economic backgrounds. Studies by Avery and Kane (2004); Dominitz and Manski (1997, 2006); Attanasio and Kaufmann (2009) find actual returns and subjective returns are not correlated, and low income students either tend to underestimate expected earnings or overestimate tuition costs. As a result more credit constrained students are likely to drop out (Attanasio and Kaufmann, 2014). Controlling for the student's socioeconomic background, Stinebrickner and Stinebrickner (2014) find academic and cognitive abilities of children to explain higher subjective expectations from education. Another mechanism that impacts demand for schooling, through increasing monetary expectations is parental interest (Dizon-Ross, 2013; Attanasio and Kaufmann, 2014). Attanasio and Kaufmann (2009) measure percieved earnings for education not only among children but also their mothers. They find the mother's expectations regarding their child's earning capabilities as an important indicator of demand for schooling. Dizon-Ross (2013) find parents in Malawi have inaccurate perceptions regarding their children's academic capabilities resulting in less investment in education. She emphasises the effect to be particularly significant among low income households.

This study contributes to the above literature by focussing on whether horizontal inequalities based on an indivdual's social group could impact subjective returns[1]. Controlling for economic and educational backgrounds of the parents, the paper estimates stated beliefs regarding returns to education for children from disadvantaged and minority groups such as females, Muslims and lower castes (OBC and SC-ST). The closest to this study is work by Huntington-klein (2015) who estimated subjective returns at different educational levels among students in Washington (USA) with a particular focus on the heterogeneity across children from different races. Furthermore, a comparison of the subjective and observed data show them to be uncorrelated. While he does not find a gender difference in the subjective and projected earnings, black students have a higher projected return, but seem to have low subjective expectations. Other studies focusing on race in the US find similar results (Henderson et al., 2011; Cunha and Heckman, 2007; Connor, 1999). However the study has two drawbacks; firstly returns are estimated only using a point estimate and second, since he has cross sectional data, the author is unable to provide evidence of whether the data is driven by measurement error or it captures the actual education choices made by the students.

We extend this work and contribute to this scarce literature in three ways; (a) Implement rigorous methods to illicit subjective responses from individuals belonging different social identity groups. Following the studies by (Delavande, 2009; Attanasio and Augsburg, 2016; Dominitz and Manski, 2006), the paper collects information on the minimum and maximum earnings (thresholds) that students expected to earn for different levels of education and the likelihood of

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[1]Except for two papers I am aware of, Maertens (2011) reports subjective earnings expectations for girls and boys in rural India and finds the former to expect lower earnings. A second paper by Chari and Maertens (2014) also find parents report lower earnings for girls compared to boys and explain this disparity based on differing abilities. Both the studies do not use robust methods to ellicit subjective earnings and they are conducted for a small rural sample in India.

earning an amount greater than the midpoint of this self indicated threshold (See (Delavande and Rohwedder, 2008; Delavande, 2009)). This method allows to construct a distribution of subjective earnings for each individual for each level of education. One of the main reasons to use the conditional probability distribution is the need for comparability. Dominitz and Manski (2006) shows that individuals formulate expectations of the point estimate based on different thresholds and there is extensive heterogeneity on how people update their beliefs. The probability distribution for each individual, controls for this level of uncertainty[2]. (b) Secondly, the paper analysis a panel data of the student's subjective returns over two years. This dataset allows to use statistical methods that controls for individual specific unobservables thereby testing whether the expectations reported by the students are consistent. (c) A third contribution of this paper is on the methodological front. By using the novel Distributional regression technique, the study is able to analyse the differential effect of belonging to a specific social identity not only on the mean outcome variable (subjective returns to education) but the entire conditional distribution of the outcome. This method is developed as complementary technique to OLS estimation that only observes a linear change of explanatory variables on point estimates of the outcome (Stasinopoulos et al., 2018; Hohberg et al., 2017). Finally, as a comparison to the Huntington-klein (2015) study, I correlate the inflation adjusted actual earnings for the three levels of education with the subjective earnings reported by the students.

The findings reveal females expect to gain lower earnings compared to males for all three levels of education. While Muslims expect low returns compared to upper caste Hindus for high school and technical education, the difference is not significant for college. Rejecting our hypothesis, lower caste groups (SC-ST and OBC) expect higher returns from college education relative to the Hindu upper caste males. Incorporating other moments in the distribution, we find females, Muslims and SC-ST students have significantly more left skewed earnings distribution for school and diploma education. Past projected earnings are not correlated with current subjective returns. While most subsamples underestimate their earnings relative to actual earnings, male lower caste groups eg. SC and ST have higher subjective returns despite low actual returns. The final section of the paper discusses potential mechanisms explaining this result.

2.1 Local context

With the increasing violence and exclusion of certain social groups, it is important to study how different social identities perceive opportunities such as education, employment and economic growth in India. In this study, the focus is specifically on the perception of returns to education for females, disadvantaged caste groups, Muslims. There is an attempt to extend the analysis to study intersectionality; namely the responses of females from lower castes and Muslim communities.

There is extensive secondary evidence that the above mentioned disadvantaged groups have been excluded from the economic prosperity that India is experiencing. The Sachar Report in

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[2](Dominitz and Manski, 2006) find individuals to have the same point estimate but vary in the level of uncertainty, overconfidence bias resulting in downweighting of the mean and heterogeneity in each individual's process of belief updating.

2006 pointed out the mean years of schooling for Muslim children has been consistently low with nearly 25% of Muslim children between ages 6 and 14 years have either never attended school or have dropped out of school. A recent study by Asher et al. (2017) show a decrease in upward mobility for a child born into a Muslim family. Relative to other social groups, their likelihood for economic mobility drops from 31.5 in 1960 to 29 in 1980. Although overall dropout rates have drastically reduced among Indian children, the difference in dropout between all Indian youth and lower caste youth has significantly increased from 4% in 1989 to 16.21% in 2008. Further disaggregating disadvantaged caste groups as Other Backward castes (OBC) and Scheduled Castes and Tribes (SC-ST) (Deshpande, 2013)[3], the National Sample Survey (NSS) in 2000 shows 37% males of the SC-ST groups and 44% of OBC have never enrolled in formal education, compared to 17% among the upper caste Hindus or the general category (Desai and Kulkarni, 2008; Dreze and Sen, 2001; Thorat and Newman, 2010).

One aspect that distinguishes the two disadvantaged groups - Muslims and lower caste group such as the OBC, SC and ST is the provision of affirmative action (AA) or quotas that benefits the latter. With such institutional policies for the SC-ST and OBC, their situation is slightly better than Muslims who do not have institutional policies to overcome their consistent exclusion (Asher et al., 2017; Goel and Deshpande, 2016). A common thread across the disadvantaged religious and caste groups is the status of women within the Indian context. Relegated to the role of a second class citizen (Dyson and Moore, 1983), across the identity spectrum, women face discrimination. Right from birth, the culturally ingrained parental preference for a son can be observed from the increasing sex ratio in favor of men (Sharma, 2016; Pike, 2011), decreasing labor force participation (Sarkar et al., 2019) and entry into educational institutions (World Bank, 2014). This study provides evidence of whether the actual discrimination in education returns are reflected in the minds of youth, particularly children who are yet to complete schooling. The study focusses on highlighting whether these marginalized groups have internalized such overt discrimination and adjusted their beliefs on expected earnings. I hypothesize that the identity groups such as females, muslims, OBC and SC-ST castes expect to earn lower income from higher education levels compared to the privilidged groups; namely, Upper caste Hindu males and females.

2.2 Data and Methodology

This section provides a detailed description of the data collection procedures, measurement of the subjective earnings, summary statistics and finally the empirical strategy used to estimate the subjective expectations for the different social groups.

2.2.1 Survey procedure

A survey was conducted in 2017 and 2018, among children from 12-17 years of age in public schools across different parts of Mumbai, India. Information on subjective earnings expectations

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[3]Despite the caste system being complex with a number of groups under an established hierarchy, most studies follow the categorization by the National Census and the Affirmative Action (AA) program that divides the caste groups into broadly four categories; the general (Upper or privilidged) caste, OBC (other backward castes), SC (untouchables also known as Dalits) and ST (tribals)

was collected for three levels of education; high school, diploma or technical education and college. High school includes 10 years of education but does not provide any skills or specialisation in the labor market. Technical education or diploma can be considered as an alternative for college or university education. It provides technical skills and focusses on immediate employability. The courses can last from 6 months to 2 years[4]. Finally, college or a university degree results in 15 years of education within the Indian system.

In both years the exact same procedure was followed for the students. First, all the children completed an 'Education survey' in their classrooms. The survey included questions on socio-demographics and detailed information regarding their earnings expectations for different levels of education. In the subjective earnings schedule of the survey, the students had to answer the following questions: *In the future, when you will be 28 years old, do you think you will be working if you completed 12th standard(high school)/ Diploma (technical education) / College (University)?*. For each education level: namely high school, diploma and college only if the student mentioned 'Yes' they had to answer the follow up question regarding earnings [5]:

- In the future, when you will be 28 years old, what is the minimum (maximum) monthly income do you think you will earn if you complete 12th standard (high school)?

- In the future, when you will be 28 years old, what is the minimum (maximum) monthly income do you think you will earn if you complete diploma or a technical education course?

- In the future, when you will be 28 years old, what is the minimum (maximum) monthly income do you think you will earn if you complete college?

For the first question regarding whether the students expect to work for a given level of education, a total of 18 students said they will not work [6]. These 18 students did not answer the earnings question for the specific level of education. For the remaining students who said they will be working, we calculated the midpoint for the earnings at each education level. The midpoint was based on each student's reported minimum and maximum threshold. After two days, we went back to the same schools and conducted a one on one interview ('Exit survey') with the children. In this survey, the children were asked what is the likelihood (from a scale of 0 to 10) of earning greater than or equal to the midpoint of their self reported threshold (Guiso et al., 2002; Attanasio and Kaufmann, 2014). A final survey was conducted few weeks after the Education and the exit survey, where our enumerators made phone calls to the parents of our respondent and asked them a few questions regarding their children and their perceptions on equal opportunities in work and education for all genders, religious and disadvantaged caste groups.

2.2.2   Measuring subjective earnings

Subjective earnings expectation was calculated from the education and exit survey based on the following information; range of self-reported earnings expectations, midpoint and the likelihood

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[4]The courses include information technology, medical technician, accounting, home science to name a few

[5]However if the students wished to respond to the expectations questions they could, but we undertake the analysis conditional on this response

[6]Out of the 18 students, 7 said they will not be working after completing high school, 4 student will not work after diploma and 8 will not work after completing college education.

for earnings to the right of the midpoint. The paper follows the method that has been used in the recent literature to ellict expectations (Delavande and Rohwedder, 2008; Delavande, 2009; Attanasio and Kaufmann, 2014; Dominitz and Manski, 1997). By using the conditional probability distribution, the study is able to control for the variation in the inter-quantile range and account for heterogeneity across the different social identity groups of interest. The expected earnings are calculated in the following way:

$$E_d(y) = \int_{y_m}^{y_M} \ln(y) f_d(y) dy = \int_{y_m}^{y_{mid}} \ln(y) f_d(y) dy + \int_{y_{mid}}^{y_M} \ln(y) f_d(y) dy \tag{2.1}$$

where y_m and y_M are the log self reported minimum and maximum earnings by student i conditional on working full time with educational degree d (school, diploma or college). We make certain assumptions to calculate the individual specific expected mean of the elicited subjective distribution; first, the likelihood p that earnings are to the right of the midpoint is given by $p = Prob(y \geq (y_m + y_M)/2)$. Second, we assume the the probability mass within the two thresholds ie. $[y_m, y_{mid}]$ and $[y_{mid}, y_M]$ has a triangular distribution[7](Attanasio and Kaufmann, 2014; Guiso et al., 2002) (See Appendix 2 for details). Following the work by Huntington-klein (2015), the study additionally compares the projected returns for the three levels of education. The projected weekly earnings was calculated using the National Sample Survey (2011-12) for urban Mumbai using the Mincer equation. It was adjusted for the consumer price index of 2018 when the survey took place.

2.2.3   Descriptives of the data

This section discusses the descriptives of the sample. Table 2.1 shows the sample characteristics of the children who were on average 13 years old, 48% of the students were girls and 75% belonged to the Hindu religious group. The cognitive ability of the students was assessed using 6 Ravens matrices. Thus the score could range from 0 (no correct answer) to 6 (all correct answers). On average, the children answered 4 correct questions. Regarding the parent's responses, the father's monthly income within the household is on average Rs.16,000 and the mother's income is Rs.8000. Both parents have completed on average 10 years of education. When asked about the parent's subjective opinons on gender equality and discrimination against minorities, 41% of the parents supported gender equality. But they believed that when jobs are scare, men should be given priority (65%). When asked whether minorities and caste groups face discrimination at the workplace and in school, on average 75% of the parents agreed to this.These results are similar to the responses in the nationally implemented World Value survey.

In the Education survey, apart from collecting information on earnings expectations, we also collected detailed information on the aspirations of the children such as *What work would you like to do to earn an income?* and *What is the highest level of education you want to attain?*. These two questions on aspirations regarding work and education was not asked in an one to one format by the enumerator, but was included in the main survey that the children completed on their own. The question on aspirations is a categorical variable. Similarly, the caste identity of the children is also categorical. Table 2.6 provides a twoway frequency of the disaggregated

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[7]Studies have used both uniform and triangular distribution. (Attanasio and Kaufmann, 2009) used the triangular distribution which gives larger weight to the responses closer to the midpoint rather than the extremes

TABLE 2.1: Summary Statistics

	Mean	Std.Dev.	Min	Max	Obs
Panel A: *Children*					
Age	13.07	1.29	10	17	408
Female	0.49	0.50	0	1	408
Muslim	0.25	0.43	0	1	408
Cognitive ability	3.89	1.53	0	6	408
Leader caste	2.10	0.59	1	3	187
Panel B: *Father*					
Income	16458.96	13658.63	1000	90000	268
Gender equality	0.38	0.49	0	1	269
Men get more jobs	0.64	0.48	0	1	269
Minorities discriminated work	0.74	0.44	0	1	269
Minorities discriminated edu	0.66	0.47	0	1	270
Assets	0.67	0.47	0	1	270
Education years	10.84	3.27	0	15	386
Quota	0.71	0.45	0	1	115
Panel C: *Mother*					
Income	8367.31	7897.87	500	40000	52
Gender equality	0.37	0.48	0	1	275
Men get more jobs	0.63	0.48	0	1	275
Minorities discriminated work	0.75	0.43	0	1	276
Minorities discriminated edu	0.71	0.46	0	1	278
Assets	0.76	0.43	0	1	277
Education years	10.63	3.66	0	17	399

caste categories and the levels of education they wish to attain. The distribution of caste in my sample is 38% upper caste or general, 49% OBC (Other Backward caste) and 12% of SC-ST (Scheduled caste and tribes or Dalits i.e the oppressed). Regarding non monetary aspirations, 38% and 33% of our sample wish to complete upto diploma or college education. 13% reported wanting to complete high school and 14% said they didnt know.

Table 2.2 is the raw data of the earnings calculated for each level of education. It shows the minimum, maximum and midpoint earnings reported by the students. Using the range of variation, Log Expected Income (Subjective) and Log weekly income (Subjective) is calculated from the Equation 2.1. Log weekly projected income is the actual earnings estimated using the National Sample survey (2011-12) for urban Mumbai. Similar to the projected weekly income, the students on average expect highest earnings from a diploma or technical education. The last row is the probability mass to the right of the midpoint earnings. Figure 2.2 in the Appendix shows the correlation between projected and subjective earnings for school, diploma and college. Similar to Huntington-klein (2015) and Jensen (2010) there is no correlation between the projected and subsive earnings specifically for this sample. Following Delevande et al. (2011), we could observe whether the students understood the basic property of probabilities. We asked each child two questions about nested events (1) What is the likelihood (between 0

TABLE 2.2: Raw earnings - Subjective (2018) and Projected (NSS 2011-12)

	School		Diploma		College	
Minimum	77.29	(566.0)	156.44	(1135.9)	81.71	(432.5)
Midpoint	93.97	(439.7)	186.77	(857.2)	128.21	(534.4)
Maximum	110.65	(403.9)	217.10	(880.4)	174.71	(671.6)
Inter-Quantile range	33.35	(440.1)	60.66	(1091.8)	93.00	(366.3)
Monthly Income (Subjective)	5.44	(3.475)	6.17	(3.769)	6.26	(3.755)
Weekly Income (Subjective)	1.84	(1.230)	2.19	(1.351)	2.08	(1.292)
Weekly Income (Projected)	6.03	(0.492)	6.81	(0.413)	6.55	(0.498)
Probability > Midpoint	5.10	(2.820)	5.83	(2.911)	5.77	(2.920)
Test for Monotonicity	0.90	(0.294)	0.90	(0.294)	0.90	(0.294)
Observations	408		408		408	

All earning variables are presented as logs. Projected log returns were calculated using the National Sample survey data collected in 2011-2012 by the National Statistical and Survey Organisation in India.

and 10) that you will finish your homework in the next two day? (2) What is the likelihood (between 0 and 10) that you will finish your homework in the next two weeks? As a test to understand probability, the students should assign a larger likelihood to finishing the homework in two weeks compared to two days. Except for 39 students, the rest obey the nesting property and assign larger likelihood to completing their homework in two weeks (relative to two days) [8].

As we are keen to study how different social identity groups form earnings expectations, an interesting descriptive is a comparison between the projected and subjective earnings for each of the sub-groups. The projected earnings is calculated using the NSS data for Mumbai and corrects for selection bias using Heckman's two step procedure [9]. Figure 2.1 shows the standardized projected earnings in the y-axis and standardized subjective earnings in the X-axis. All the points on the red line passing through the origin (at 45 degree angle) is when the subjective and projected earnings are equal. Points above the line denote underestimation of earnings and those below reveal an overestimation of earnings. For schooling, we find most of the groups tend to be close to the 45 degree line. Muslim females and male lower caste groups who have lower earnings in the labor market tend to overestimate their expectations. A similar pattern is observed for college education among SC-ST males and females where they overestimate their earnings relative to the actual income. For diploma, females across caste and religious groups overestimate their earnings unlike males, eventhough their projected earnings (compared to the mean) is lower.

2.2.4 Empirical strategy

In this section, I describe two methods; namely the OLS or point estimates and Distributional regression to estimate the subjective earnings expectations for different social identity groups. Controlling for other covariates such as parental education, income, child's cognitive capacity,

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[8]Delevande et al. (2011) find 17% of their sample giving a 50-50 likelihood while the remaining follow the nesting rule. Their sample included rural boatman compared to adolescent urban students in our sample

[9]Therefore, we compare the subjective earnings to projected earnings that the groups could recieve if there was no identity based discrimination in the labor market

and subjective responses of parents regarding equal opportunites for different socio economic groups, the OLS and random effects specifications are described in Equation 2.2 and 2.3.

$$E(y)_{id} = \beta_0 + \beta_1 I_i + \beta_2 X_i' + \beta_3 F_i' + \beta_4 M_i' + \beta_5 ProjY_{id} + \epsilon_{id} \tag{2.2}$$

$$E(y)_{idt} = \beta_0 + \beta_1 I_i + \beta_2 X_{it}' + \beta_3 F_i' + \beta_4 M_i' + \beta_5 ProjY_{id} + \epsilon_{idt} + u_i \tag{2.3}$$

Equation 2.2 is the OLS model which uses the pooled sample of all students who participated in the survey over the two years. y_{id} is the subjective expected earnings for each individual i and is repeated for each education choice d. Equation 2.3 is the random effects model which includes all the students who participated in the survey in both 2017 and 2018. y_{idt} is the subjective expected earnings for each individual in time t and the specification is repeated for each education choice d. The levels of education are three counterfactual situations; namely completing school or diploma (technical education) and college. I_{idt} is the social identity (I) variable such as gender (male or female), religion (hindu or muslim) and upper or lower caste groups (OBC and SC-ST). X_{idt}' comprises a vector of individual level characteristics such as age, number of siblings and cognitive capacity. F_{id}' is a vector of covariates for the father such as income, education, subjective opinions on equality of opportunity for different social identities in India such as gender, caste and religion. M_{id} are the same measures obtained from the mother and $ProjY_{id}$ is the inflation adjusted weekly projected earnings calculated using the NSS data for Mumbai[10].

The OLS and random effects framework implies that the coefficients β_0 and β_i linearly determine the expectation (average) of the dependent variable. A subgroup analysis or interaction term can be used to observe the average linear effect of a specific covariate. However, both these techniques have a shortcoming - the former reduces the sample size. The latter is problematic if the variable that determines membership of the individual eg. gender or religion is also one of the outcomes of interest Hohberg et al. (2017). An alternative to point estimates or averages, this study uses Distributional regression as a methodological contribution. Distributional regression, henceforth DR (Hohberg et al. (2017); Stasinopoulos et al. (2018)) goes beyond the mean and takes into account variation over the entire distribution of the dependent variable for the covariates of interest. Using a maximum likelihood estimation, the distribution of the outcome y_i can be described as a density function $p(y_i|\theta_{i1}, \theta_{i2}, ..\theta_{ik})$ where $\theta_{i1}, ..\theta_{ik}$ are k different parameters of the distribution such as mean, standard deviation and skewness. For each parameter the following equation can be specified:

$$gk(\theta_{ik})_{dt} = \beta_0^{\theta_k} + \beta_1^{\theta_k} I_{it} + \beta_2^{\theta_k} X_{it}' + \beta_3^{\theta_k} F_{it}' + \beta_4^{\theta_k} M_{it}' + \epsilon_{id} \tag{2.4}$$

where gk is the link function which models a non linear relationship between the parameter θs and the explanatory variables. After selecting a suitable conditional distribution that fits the

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[10]I run the specification in Equation 2.3 for all the pooled sample as well as the panel sample over two years (in 2017 and 2018). I have a sample of 120 students that were surveyed over the two years. Taking advantage of a panel format of the data, I rerun the Equation 2.3 using a random effects model, incorporating earnings expectations in 2017 and 2018. 80 children who were in my sample in 2017 dropped out and I could not survey them in 2018. In the last section of the paper, I discuss the impact of dropouts for the results in the study.

outcome variable, the model (with relevant covariates) is estimated using maximum likelihood. The model presents effects of the selected covariates on the distribution parameters. If there are n observations, the model produces n distributions of the outcome variable. In this study, after a suitable distribution is selected based on the data, maximum likelihood estimates three parameters of the distribution; mean, standard deviation and skewness for each observation in the sample. A bootstrap sample is generated comprising of randomnly drawn estimated distributions. The DR is reestimated for this bootstrap sample. Now consider any two 'representative agents' that need to be compared eg. Female hindus and muslims, a conditional distributional comprising of the three parameters are obtained for the two groups. An estimate which is a combination of all three moments is computed for each group and the difference is called 'Estimated marginal treatment' effects (MTE). This process is repeated for many bootstrap samples and multiple estimate MTE are obtained and a bootstrap percentile confidence interval (at 95%) is computed. In the results section, table 2.4 shows the estimates for each of the moments mean, variance and skewness. The table 2.5 in the appendix includes the estimated MTE for each of the groups of interest, including a 95% confidence interval for the estimate.

In this study, since the outcome of interest is not the direct difference in the treatment and control group but rather the comparison of an entire distribution, DR can be considered a useful complement to the OLS framework. Although distributional measures (moments) can be individually calculated and used as dependent variables, the advantage of DR is that it yields one model from which several distributional measures can be obtained. Thus consistent and comparable measures are estimated since it is from the same model. Finally, as Hohberg et al. (2017) point out, if the aim of the study is to only compare distributions of the outcome variable for the treatment and control, we do not require DR - since we can compare the histograms or kernel densities. However, since this study does not compare only treatment and control groups but estimates the effects of non linear covariates in the final analysis, the implementation of the method is a useful contribution to the literature.

2.3   Results

2.3.1   Mean effects

In this section, linear regression techniques are used to estimate the mean effect of different identity groups on their subjective earnings expectations. For more robust estimates of how past actual earnings and different social identity groups explain subjective earnings expectations, I estimate an OLS and RE model using Equations 2.2 and 2.3. The OLS specification include seemingly unrelated coefficients based on the pooled data[11], while the RE model uses the panel data comprising of students who answered the survey in both 2017 and 2018[12]. Table 2.3 shows OLS and RE estimations for each level of education. Considering the OLS models, the inflation adjusted projected earnings are not correlated with subjective earnings expectations for the

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[11]Keeping in the mind, the error terms of the three models -school, diploma and college can be correlated, we report the coefficients for seemingly unrelated regressions.

[12]I use random effects model (and not fixed effects), since I am interested in studying between indivduals time invariant characteristics such as the identity. In FE, the model controls for these unobservables and only show the within individual variation over time

children (Descritives in Figure 2.2 show a similar result). This finding is also observed in previous studies by (Attanasio and Kaufmann, 2009; Huntington-klein, 2015; Jensen, 2010) across other student samples.

For the OLS models, females expect to earn significantly lower wages after completing a diploma or college. This is not the case for completing high school. For the average estimates, Muslim children expect significantly lower earnings compared to the Hindu males only for diploma. Comparing the two low caste groups (OBC and SC-ST), we reject the hypothesis that the latter expect lower earnings for higher education levels compared to the Upper caste groups. Specifically for college education, we find OBC and SC-ST expecting significantly higher subjective earnings relative to the reference (General/upper caste) group. Column 2,4 and 6 are random effect models that only consider children who participated in the survey in both years. Unlike Huntington-klein (2015), we are able to control for individual unobservables over a period of two years by using a panel dataset. However, this panel sample entails the risk of not considering the dropouts. If we include only those students who continued their education, we do not find significantly lower earnings expectations for both females and Muslims. However, Table 2.7 in the Appendix is a linear probability model that shows both females and Muslims are significanltly more likely dropout. Therefore,the lower earnings expectations for females and Muslims is driven by the students who dropped out in the next year. These implications of the dropout are discussed in the last section of the study.

Other important controls such as higher cognitive capacity measured by the Raven's matrix is positively correlated with earnings expectations for diploma education. Years of education of the father has a positive and significant effect on the earnings expectations for school (only in the OLS models). Actual earnings in the labor market are not correlated with present subjective expectations.

As a robustness check, Table 2.8 in the Appendix includes a pooled model for all three levels of education. We find similar results, whereby females have significantly low earnings expectations in the OLS model. However, there is no significant difference in earnings expectations for females in the random effects model that does not include the dropouts. For Muslim children, we do not find a significant difference in earnings expectations relative to the Hindu male upper caste. Children from the OBC caste group have significantly positive earnings in the pooled OLS and random effects model. Thus, both specifications (pooling all the education choices and analysing them separately) show similar patterns for mean estimates. However, given the significance of diploma as a technical course that offers immediate employment relative to college education and has higher actual returns, we think it is important to consider each education level as a counterfactual. Therefore, the study focusses on presenting the mean effects for each education level independently.

TABLE 2.3: Subjective Expectations - OLS and RE

	School		Diploma		College	
	(1) b/se	(2) b/se	(3) b/se	(4) b/se	(5) b/se	(6) b/se
Female	-0.044	0.106	-0.201***	0.069	-0.154**	0.040
	(0.076)	(0.153)	(0.077)	(0.204)	(0.070)	(0.180)
Muslim	-0.017	-0.104	-0.250**	-0.029	0.019	-0.031
	(0.117)	(0.202)	(0.106)	(0.296)	(0.075)	(0.228)
Age	-0.007	-0.015	0.018	0.106	-0.003	0.027
	(0.023)	(0.092)	(0.028)	(0.132)	(0.026)	(0.112)
OBC(low caste)	0.006	0.145	0.082	0.235	0.253***	0.262
	(0.114)	(0.228)	(0.088)	(0.267)	(0.077)	(0.248)
SC-ST(low caste)	-0.142	-0.343	-0.082	0.023	0.351**	0.137
	(0.203)	(0.358)	(0.137)	(0.322)	(0.141)	(0.352)
Cognition	-0.023	-0.033	0.062**	-0.065	-0.033	-0.014
	(0.021)	(0.039)	(0.025)	(0.053)	(0.027)	(0.051)
Father education	0.021*	0.030	0.016	0.016	-0.005	0.035
	(0.011)	(0.024)	(0.011)	(0.031)	(0.009)	(0.029)
Mother education	0.009	0.018	-0.013	0.021	0.005	0.024
	(0.009)	(0.021)	(0.012)	(0.027)	(0.010)	(0.025)
Actual earnings	-0.082	-0.242	-0.059	0.017	0.082	-0.091
(NSS)	(0.127)	(0.205)	(0.077)	(0.176)	(0.066)	(0.185)
2017		0.093		0.129		0.008
		(0.103)		(0.145)		(0.138)
Constant	1.768**	2.602	1.537**	-0.336	1.042*	1.066
	(0.877)	(1.943)	(0.686)	(2.287)	(0.582)	(2.084)
Observations	376	222	356	208	376	222
R sq	0.016		0.047		0.023	
Adj R sq	0.004		0.034		0.011	
R sq B		0.099		0.035		0.078

Column 1, 3 and 5 are pooled OLS models controlling for past actual earnings. Column 2, 4 and 6 are random effects and includes the sample of students who reported earnings expectations in both 2017 and 2018. The dependent variable for the above specifications is the log subjective earnings expectations. The OLS models are seemingly unrelated regressions. Robust standard errors in parentheses. *p <.1, ** p <.05, *** p <.01

2.3.2 Distributional effects

In the previous section the estimates showed on average, females have lower subjective returns in the pooled sample, but we do not find significant mean differences for the panel sample. Other disadvantaged groups such as Muslims do not show significantly different returns. Similarly, OBC and SC-ST groups show significantly higher earnings relative to male upper caste groups for college education in the OLS specification. As described in the Section 3.3, when the analysis does not entail a clean treatment and control comparison, and other explanatory variables are used in the final analysis, there are shortcomings when only point estimates are provided (Hohberg et al., 2017). This is true for the current study. As the objective of the paper is to observe the effect of explanatory variables, that are not independent of the outcome, one way of conducting robust (complementary) analysis would entail not only the mean but also other moments of the distribution eg. standard deviation and skewness.

We include a complimentary analysis known as the Distributional regression. Based on the gamlss code in R, we first observe which distribution fits the outcome variable (Subjective earnings). We compare the lognormal and Burr distrbution which are distributions frequently used to measure income. Figures 2.6 and 2.7 are the diagnostic plots for each distribution. The plots shows the Burr distribution fits the data better than the lognormal distribution as the latter has a distribution with a heavier right tail when comparing it to normalised quantile residuals. Using this preliminary evidence as support to continue the analysis, we assuming the data to have Burr distribution (Hohberg et al., 2017).

As a first step, we obtain the estimates for the moments of the distribution for the groups of interest. Table 2.4 shows the estimates of the three moments; mean, standard deviation and skewness for each education choice. Apart from the familiar mean effect, standard deviation shows the uncertainty or variance of the expected earnings and skewness reveals the extent to which the distributions of the two comparison groups are significantly left or right skewed. In the second step, we calculate the Marginal treatment effects (MTE) i.e. the difference in subjective earnings between any two comparative groups evaluated at the mean values for other explanatory variables[13]. The MTE is a combined estimate based on three moments forming a conditional distribution i.e θ_{ik} from Equation 2.4. The MTE is shown in Table 2.5. Both the moments and the MTE based on these moments are calculated for the panel sample of students over the two years[14]. We will first discuss the estimates for each of the moments of the groups we are interested in. Next, we will discuss the combined effect of these moments as the MTE.

In Table 2.4, we find females have significantly lower mean earnigns expectations for school and college. The standard deviation is significant and positive for the females compared to the Hindu male upper caste group i.e. significantly more variation (uncertainty) in the responses of the females. Finally, for school and diploma education choices, females have significantly more left skewed distributions. Although Muslims do not show significantly different mean earnings expectations (except for diploma which is positive at 0.194), their earnings expectations are significantly more left skewed for school and diploma compared to the Hindu male upper caste.

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[13]The other variables includes controls used in the OLS such as parent's education, cognitive ability of the student and past actual earnings

[14]The Distributional regression with the pooled sample showed similar results. Since RE is a more robust model, we include the latter in the paper.

Particularly, for school and diploma, both females and Muslims have significantly left skewed earnings distribution compared to the Upper caste hindu male. There is no significant differences in earnings expectations for the OBC (low caste group). However, the SC-ST group show on one hand higher mean earnings expectations and on the other hand, show significantly left skewed earnings distributions in the school and diploma education choice.

In table 2.5, we estimate the Marginal Treatment effect (MTE) which is a combined estimate of the three moments. In the first panel, we compare males and females where column 1 is the MTE of being a male and the 2nd column is the 95% bootstrap confidence intervals for the MTE. We can interpret the MTE as follows: For a male (at the mean values of all other control variables), the subjective earnings expectation is higher compared to a female by 0.224 units. This MTE is statistically significant at the 95% confidence interval for all three education levels. Similarly considering panel 2 (religion), we find the subjective expectations is significantly higher among Hindus for school and diploma, but not at the college level. The third and fourth panel compares OBC and SC-ST caste groups to the General caste. We find the MTE are not significantly different across all education choices. Table 2.9 in the Appendix further disaggregates the groups for males and females respectively.

Females show significantly lower MTE across all levels of education and this result is driven by not only the mean but also the skewness of the distribution. For Muslims, eventhough the mean earnings expectations are not significantly different, the MTE is lower for Muslims due to their left skewed distributions. For the OBC, there is no significant difference in the MTE and this is also observed across the estimates of the moments. However, for the SC-ST, while we do not find significant differences in the MTE, we observe their mean earnings expectations to be higher while their earnings distribution is significantly left skewed. Comparing the OLS and DR techniques, we find combining three moments that form a distribution provides more robust estimates compared to the linear OLS. Especially for females, we now observe their subjective earnings expectations to be significantly lower than males across all three education levels. Similarly, for Muslims we observe significantly low MTE compared to the Hindus for school and diploma. For low caste groups (OBC and SC-ST), the results do not change.

TABLE 2.4: Distributional Regression-Mean, Standard Deviation, Skewness

	School			Diploma			College		
	Mean	S.D	Skewness	Mean	S.D	Skewness	Mean	S.D.	Skewness
Female	-0.006*	0.39***	-0.43***	-0.105	0.262***	-0.33***	-0.196*	0.131*	-0.174
	(0.06)	(0.05)	(0.092)	(0.07)	(0.052)	(0.099)	(0.081)	(0.052)	(0.102)
Muslim	0.065	-0.11	-0.255*	0.194*	0.08	-0.44***	-0.096	0.057	-0.096
	(0.064)	(0.055)	(0.10)	(0.088)	(0.057)	(0.11)	(0.089)	(0.059)	(0.11)
OBC	0.057	0.051	-0.15	-0.052	-0.073	0.099	-0.126	-0.029	-0.088
	(0.063)	(0.054)	(0.097)	(0.085)	(0.057)	(0.108)	(0.087)	(0.057)	(0.11)
SC-ST	0.243*	0.138	-0.359*	0.402***	0.33**	-0.59***	-0.027	-0.005	-0.015
	(0.108)	(0.088)	(0.165)	(0.119)	(0.094)	(0.166)	(0.14)	(0.089)	(0.173)
Constant	0.26*	1.65***	-0.983***	0.508***	1.233***	-0.54*	0.532	1.249***	-0.609**
	(0.106)	(0.172)	(0.234)	(0.132)	(0.137)	(0.215)	(0.145)	(0.151)	(0.234)
Observations	652			632			652		
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

Notes: Dependent variable is the log earnings expectation.

Robust standard errors in parentheses.

* p<.1, ** p<.05, *** p<.01

TABLE 2.5: Distributional Regression

	Difference MTE	95% Confidence Intervals	
Gender	Male-Female	LB 0.025	UB 0.975
School	0.224	0.007	0.437
Diploma	0.342	0.059	0.507
College	0.326	0.074	0.399
Religion	Hindu-Muslim	LB 0.025	UB 0.975
School	0.224	0.0013	0.306
Diploma	0.209	0.027	0.403
College	0.18	-0.0427	0.459
Caste	General -OBC	LB 0.025	UB 0.975
School	0.433	-0.048	1.384
Diploma	0.357	-1.397	1.609
College	-0.325	-1.72	1.639
Caste	General - SCST	LB 0.025	UB 0.975
School	0.282	-0.166	1.38
Diploma	0.358	-1.526	1.557
College	-0.559	-1.867	1.639

The difference MTE is the difference in Log Earnings expectations between male-female, Hindus-Muslims and General-OBC and SC-ST respectively. This difference is calculated for school, diploma and college. Column 2 and 3 are 95% confidence intervals for the MTE. LB and UB are the upper and lower bounds of the CI. The difference in MTE is statistically significant at 95% confidence interval only if the bounds do not contain 0.

2.4   Discussion and Mechanisms

The primary objective of this study is to provide a descriptive picture of how students from social identities that are historically discriminated in the labor market, tend to form subjective expectations regarding their returns from human capital investment. Particularly when estimating different moments of the distribution, we find females and Muslims to have a lower earnings expectations for school and diploma, which no longer exist at the college level for Muslims. The discriminated caste groups, on the other, do not expect significantly different earnings relative to the Upper caste group. In this section, potential moderating factors are discussed, such as parent's opinions on gender equality, non monetary aspirations for education, knowledge of policies such as Affirmative action and the strong presence of local leaders that could impact the children's expectations on earnings. In addition, concerns regarding the study is also highlighted.

Gender

Controlling for cognitive ability and parents education, girls in the sample consistently have significant and lower earnings expectations for school and diploma education compared to the boys. The MTE from distributional regression also shows that females have significantly lower earnings expectations compared to males(Table 2.5). Contrastingly, table 2.6 in the Appendix shows the percent of girls having a higher aspirations of gaining education (44% of girls compared to 31% of the boys aspire to complete college education, p=0.000).

   For this sample, we find girls to have high non-monetary aspirations from education and schooling but they do not expect this education to translate into higher monetary benefits. Women in India are found to have a 12% lower likelihood of being employed compared to men. Even those in employment, earn annual incomes that are lower by 36% compared to the males, ceterius paribus (Mitra (2019); Bhandari and Bordoloi (2006)). Studies by (Maertens, 2011), (Drèze and Kingdon, 2001) and (Kingdon, 2005; Kingdon and Theopold, 2008) show the social norm of getting the girls married between the age of 18 and 23 further deters the parents from investing in her education. This inturn may likely impact the girls perspective of lower benefits from attaining higher education, but greater non monetary valuation of education eg. gains in the marriage market.

   In my survey with the parents, I correlate the opinions of the parents on gender equality and the student's self reported earnings expectations. I asked the parents of the children in a phone call survey, their opinions on a positive and negative statement on gender equality. They had to answer whether they Agree or Disagree to each statement. Based on the study by Dhar et al. (2018) that observe a positive correlation between parent's attitude towards gender equality and the children's attitudes, I expect the girls whose parents support gender equality will have higher subjective earnings expectations across all three levels of education. Figure 2.3 in the Appendix shows in the y-axis the mean expected earnings for boys and girls. However, we do not find a correlation between opinions on equality and higher earnings expectations for the girls.

Religion

The distributional regression show Muslim children to have lower earnings expectations compared to the Hindu children for schooling and diploma. While this might not be evident in the point estimates (Table 2.3), the distributional regression reveals significantly lower earnings for Muslim driven by their left skewed distributions (Table 2.5). Muslims, unlike the OBC and SC-ST caste groups do not benefit from targeted programs such as affirmative action. A recent study by Asher et al. (2017) show in terms of intergenerational mobility, while SC/STs and OBCs groups have experienced better upward mobility over the last 30 years, Muslims have a drastic decline. In this study a similar trend is observed for the sample of students in Mumbai, whereby earnings expectations and aspirations of Muslims is lower than expectations for children from disadvantaged caste groups.

Caste

Comparing the earnings expectations of disadvantaged caste groups; namely OBCs, SC-ST to the General category, I find both OBC and SC-ST students have marginally higher earnings expecations when considering the pooled sample. However, the RE or DR models show no difference in earnings expectations. Despite facing extensive discrimination in the labor market not only in terms of earnings gap but also the type of employment opportunities (Madheswaran and Attewell, 2007; Deshpande, 2012)[15], we find students from even the SC-ST caste groups having no difference in earnings expectations. Furthermore, the SC-ST groups overestimate their earnings compared to the inflation adjusted projected earnings.

Although widely debated (for a detailed discussion see (Deshpande, 2012) and (Deshpande, 2013)), the study postulates a potential role of affirmative action in favor of the OBCs, SC-ST groups to explain their high earnings expectations despite glaring labor market discrimination. Figure 2.4 plots the log earnings expectations for all caste groups depending on whether they are aware about the policy of Affirmative action (AA) and its benefits in education and the labor market. However, this is not statistically significant[16].

Another explanation for high earnings expectations of lower caste students can be attributed to the strong presence of OBC and Dalit (SC-ST) political movements in Mumbai. Many parts of Mumbai has experienced extensive Dalit and low caste mobilisation such as the Dalit Panthers in the 1970s[17] and emergence of local leaders Figure 2.5 plots the log earnings expectations of students from each caste group depending on the caste of their local leader[18]. We do find a

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[15]The projected earning calculated using the NSS for 2011-12 shows SC-ST have significantly lower rates of return across all levels of education.

[16]Table 2.10 in the Appendix is an OLS result and shows the total effect of the interaction term of awareness regarding AA and the caste category. The first two rows is total effect of the interaction between knowledge of AA policies for a OBC student relative to the General caste. The 3rd and 4th row are the mean estimates from knowledge about AA for a SC-ST student compared to the General caste. Controlling for individual and parent covariates, I find that both SC-ST and OBC students whose parents have the knowledge about AA policies report higher levels of earnings expectations compared to the general or upper caste category. However these estimates in Table 2.10 are not statistically significant

[17](Pien, 2018; Collins, 2017; Deshpande, 2013) The movement emerged as a voice against the oppression against the Dalits(SC-ST) and the need for change.

[18]The local leader is not at the individual level. Given that many students come from a similar locality, they also have a common local leader of MLA (Member of Legislative Assembly). As a result, our sample size is small

positive correlation (p=0.05) between earnings expectations of SC-ST students and the caste identity of the local leader(being the same). Similarly, when the local leader is from the general caste, the earnings of SC-ST students is significantly low (p=0.02). Future studies can explore these mechanisms by including diverse samples such as low caste groups in rural areas and urban cities that have not benefited from strong dalit movements.

2.4.1 Further concerns

In this section, I point out some concerns for this study. As described earlier, the survey was implemented for students in Mumbai across two years - 2017 and 2018. In an attempt to create a panel dataset, we found 80 students out of the 324 surveyed in 2017 to have droped out. Table 2.7 in the Appendix is a linear probability model on the likelihood of droping out. Over two years, the likelihood of droping out was higher for females, Muslim and OBC females. Father's education significantly decreased the likelihood of droping out for the pooled sample and the boys. There is a significant decrease in dropout for older male students. Particularly in this sample, it could reflect the opportunity cost of dropping out which is higher for older students as they are closer to completing their high school degree.

A notable concern that is likely to cause a downward bias in the earnings expectations of females is the working age stated in the question. All students were asked how likely they are to work after completing an education at the age of 28. It could be that most girls do not expect to be working at 28 years (on account of marriage and family responsibilities). One way to observe this is how many females said they do not expect to work for a given education at 28 years. Prior to asking the earnings question, I had asked if the students were likely to work. In this sample 9 females said they would not be working after completing either one of the education levels [19]. Although the results hold without including the 9 students, the high working age stated in the survey for females must be considered while observing their earnings expectations.

2.5 Conclusion

Based on both the OLS and distributional regression methods, females and Muslims (particularly at school and diploma) expected significantly lower earnings compared to upper caste males. However, students from disadvantaged caste groups such as the Other backward castes (OBC), Scheduled castes and scheduled tribes (SC-ST), did not have different earnings expectations compared to the Upper caste groups. The distributional regression revealed other moments of the earnings distribution such as uncertainty (variance) and left skewness to be prominent estimates impacting lower earnings expectations for females and Muslims.

Additionally, comparing projected and subjective earnings for each of the subgroups, we observe SC-ST students to overestimate their earnings compared to what they could earn in the labor market. On the other hand, advantaged groups such as male upper caste students who experience above the average projected earnings, underestimate what they could earn in the labor market. An important take away from this result is re-assessment of interventions that

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[19]Out of the 9 females, 4 said they would not work after school, 2 would not work after diploma and college respectively, and 1 claimed not to be working after both diploma and college

provide information about earnings to households and individuals as a potential policy option. While females and Muslims (who underestimate their earnings in the labor market) could benefit from such information interventions, it may not be beneficial to disadvantaged caste groups who have high aspiration levels.

This study shows that existing educational inequalities have been internalised by females and Muslim students. Inorder for these groups to expect gains and actively particapte in the education and labor market, they will require to have significantly higher aspirations. On the other hand, lower caste groups, that have been historically discriminated, do not seem to update their earnings expectations based on the discrimination in the labor market. Particularly in this study, the disadvantageous caste students belong to urban areas where the discrimination might not be explicit at the school or household level. Additionally SC-ST and OBC groups have been able to assert for their rights through collective political and social mobilisation over the recent years. Future studies can undertake a similar exercise amongst lower caste students from rural areas. Finally, inorder to gain closer to SDG goals such as 'Target4: Ensure inclusive and equitable quality education for all', it is also essential to urge for policy interventions on the supply side that encourage inclusive and accessible education from the primary levels, employment opportunities and subsequently enhance the agency of excluded social and economic groups.

2.6 Appendix A

TABLE 2.6: Highest Education level by Groups

| | HighestClass | | | | | | | | | |
| | Dont know | | High School | | Diploma | | College | | Total | |
	No.	%	No.	%	No.	%	No.	%	No.	%
Gender of student										
Male	122	21.2	90	15.7	170	29.6	193	33.6	575	100.0
Female	70	9.5	86	11.6	340	46.0	243	32.9	739	100.0
Total	192	14.6	176	13.4	510	38.8	436	33.2	1,314	100.0
Caste										
General	59	10.4	56	9.9	311	54.9	140	24.7	566	100.0
OBC	105	18.4	90	15.7	159	27.8	218	38.1	572	100.0
SC-ST	28	15.9	30	17.0	40	22.7	78	44.3	176	100.0
Total	192	14.6	176	13.4	510	38.8	436	33.2	1,314	100.0
Religion										
Muslims	74	14.6	108	21.3	137	27.1	187	37.0	506	100.0
Hindus	118	14.6	68	8.4	373	46.2	249	30.8	808	100.0
Total	192	14.6	176	13.4	510	38.8	436	33.2	1,314	100.0

TABLE 2.7: Likelihood of dropping out in 2018

	(1) b/se	(2) b/se	(3) b/se
Female	-0.092**		
	(0.042)		
Age	-0.076***	-0.133***	0.033
	(0.024)	(0.033)	(0.033)
Muslim	0.175***	0.167**	0.123**
	(0.046)	(0.082)	(0.054)
Cognitive	0.005	0.024**	-0.060**
abilities	(0.012)	(0.011)	(0.026)
Aspiration	0.027*	0.014	0.034
	(0.014)	(0.019)	(0.023)
OBC(ref:General)	-0.036	0.013	-0.084*
	(0.047)	(0.081)	(0.048)
SC-ST(ref:General)	-0.027	-0.083	0.136
	(0.052)	(0.075)	(0.092)
Education father	-0.011*	-0.021***	-0.006
	(0.006)	(0.008)	(0.008)
Education mother	-0.009	-0.007	0.005
	(0.006)	(0.006)	(0.008)
Minimum earnings	-0.024	-0.019	0.025
	(0.031)	(0.032)	(0.095)
Midpoint	-0.127	-0.088	-0.245
	(0.085)	(0.094)	(0.232)
Maximu earnings	0.140**	0.108	0.181
	(0.061)	(0.070)	(0.158)
Constant	1.365***	2.157***	-0.020
	(0.332)	(0.499)	(0.401)
Observations	351	213	138
R sq	0.182	0.297	0.229
Adj R sq	0.153	0.259	0.161

The linear probability model estimates the likelihood of dropping out based on the outcomes used in the final analysis. The dependent variable for all 3 models is a dummy (1-drop, 0-did not drop). Column 1 is pooled over gender, Column 2 and 3 are separate estimates for male and female respectively. Robust standard errors in parentheses. *p <.1, ** p <.05, *** p <.01.

FIG. 2.1: Subjective vs Projected earnings - Subsample analysis of returns to School, diploma and college education

(a) School
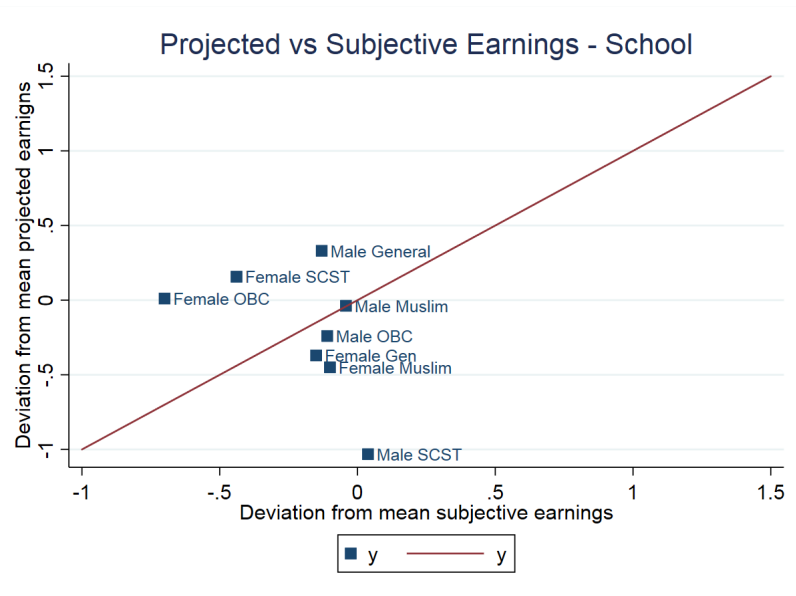
(b) Diploma
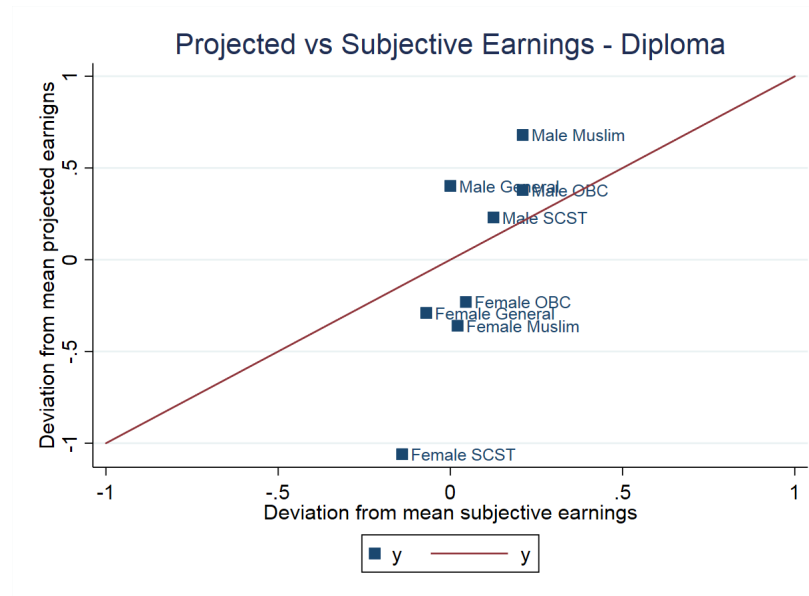
(c) College
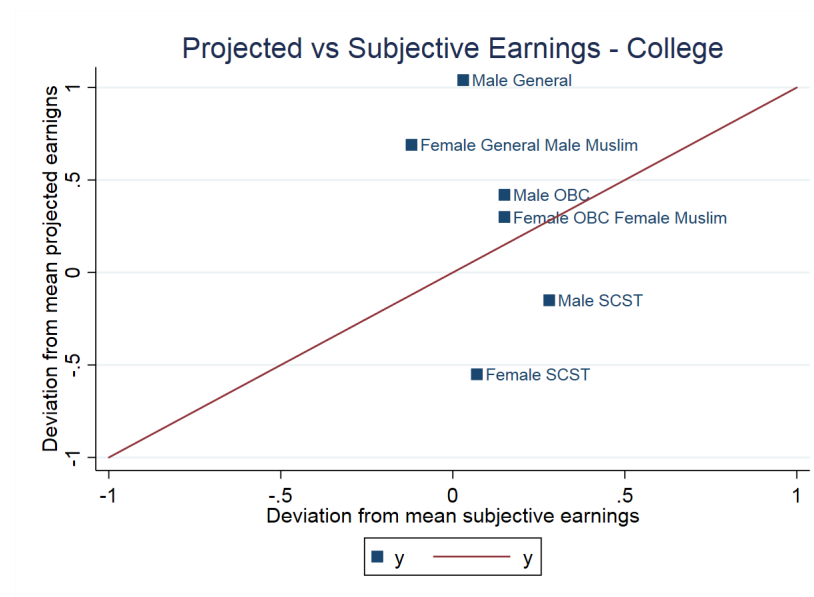
Table 2.8: Subjective earnings - Pooled

	Model 1	Model 2	Model 3
	(1)	(2)	(3)
	b/se	b/se	b/se
Female	-0.123**	-0.099*	0.058
	(0.052)	(0.056)	(0.136)
Diploma(Ref:School)	0.154**	0.213***	0.265***
	(0.061)	(0.068)	(0.089)
College(Ref:School)	0.185***	0.245***	0.253***
	(0.060)	(0.065)	(0.081)
Muslim	-0.044	-0.082	-0.040
	(0.061)	(0.066)	(0.118)
Age of student	0.013	0.013	0.034
	(0.019)	(0.019)	(0.064)
OBC(Ref:General)	0.185***	0.141**	0.256**
	(0.057)	(0.063)	(0.120)
SC-ST(Ref:General)	0.074	-0.035	0.028
	(0.072)	(0.103)	(0.175)
Cognitive ability	0.001	0.001	-0.036
	(0.018)	(0.018)	(0.044)
Education father	0.020**	0.020**	0.026
	(0.008)	(0.008)	(0.023)
Education mother	0.002	0.002	0.023
	(0.008)	(0.008)	(0.020)
Actual earnings		-0.090	-0.049
(NSS 2011)		(0.058)	(0.080)
2017			0.075
			(0.088)
Constant	0.919***	1.508***	0.628
	(0.278)	(0.477)	(1.219)
Observations	1473	1473	652
R sq	0.029	0.030	
Adj R sq	0.022	0.022	
R sq B			0.093

The dependent variable for all 3 model specifications is log earnings expectations. Model 1 and 2 are OLS (with and without controlling for projected earnings). Model 3 is a random effects model for students who participated in the survey in 2017 and 2018. It controls for projected earnings. Robust standard errors in parentheses. *p <.1, ** p <.05, *** p <.01.

TABLE 2.9: Distributional Regression

	Male			Female		
Religion	H - M	LB 0.025	UB 0.975	H - M	LB 0.025	UB 0.975
School	0.0003	-0.011	0.056	-0.002	-0.01	0.01
Diploma	0.192	0.04	0.28	0.125	0.024	0.16
College	0.25	0.048	0.34	0.145	0.026	0.23
Caste	H - OBC	LB 0.025	UB 0.975	H - OBC	LB 0.025	UB 0.975
School	-0.0004	-0.0009	0.004	0.0001	-0.0001	0.0001
Diploma	0	-0.0001	0.00013	0.00012	-0.00017	0.0001
College	-0.0003	-0.0001	0.00013	-0.00015	-0.0008	0.00045
Caste	H - SCST	LB 0.025	UB 0.975	H - SCST	LB 0.025	UB 0.975
School	0.0003	-0.001	0.0012	-0.0005	-0.001	0
Diploma	-0.0037	-0.023	0.0025	-0.001	-0.0035	0.0003
College	0.00024	-0.0034	0.0013	-0.0016	-0.0077	0.0003

Estimated Marginal treatment effect MTE for subsamples at 95% confindence intervals

Each panel is estimated difference between upper caste and Muslims or disadvantaged castes

FIG. 2.2: Projected vs Subjective earnings
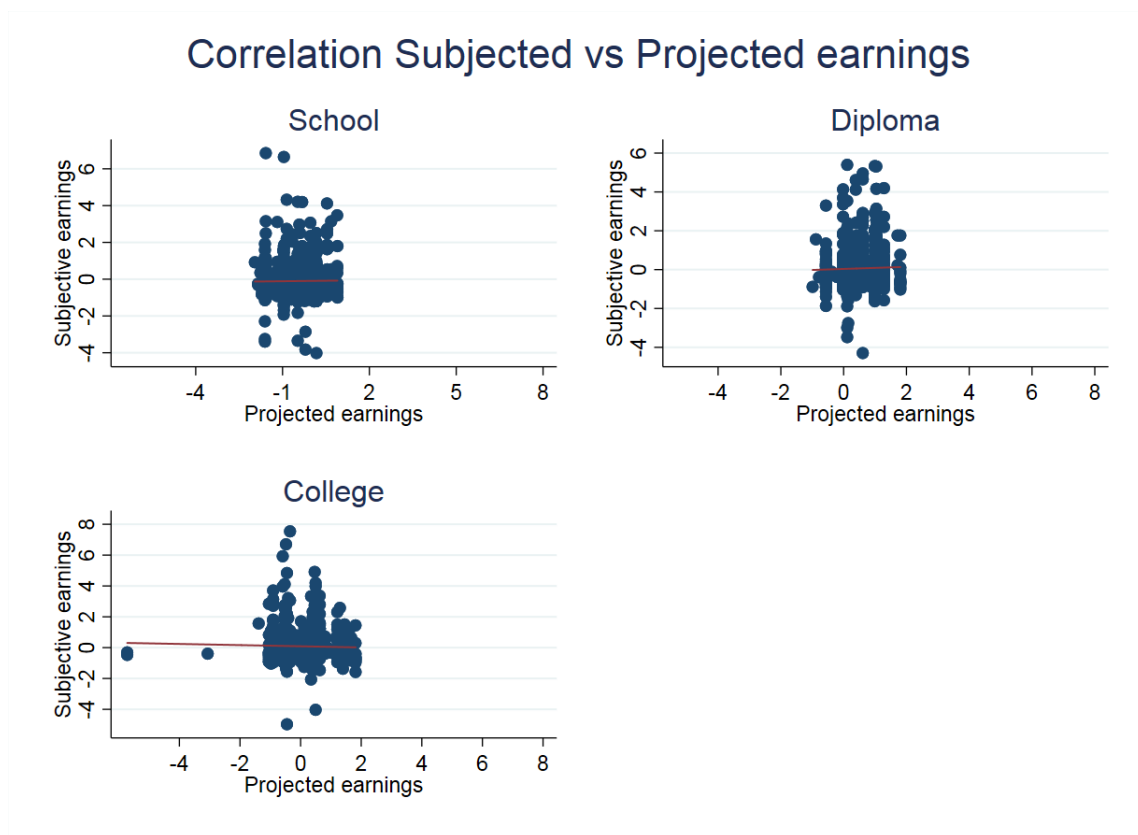
Fig. 2.3: Equal Opportunities - Gender
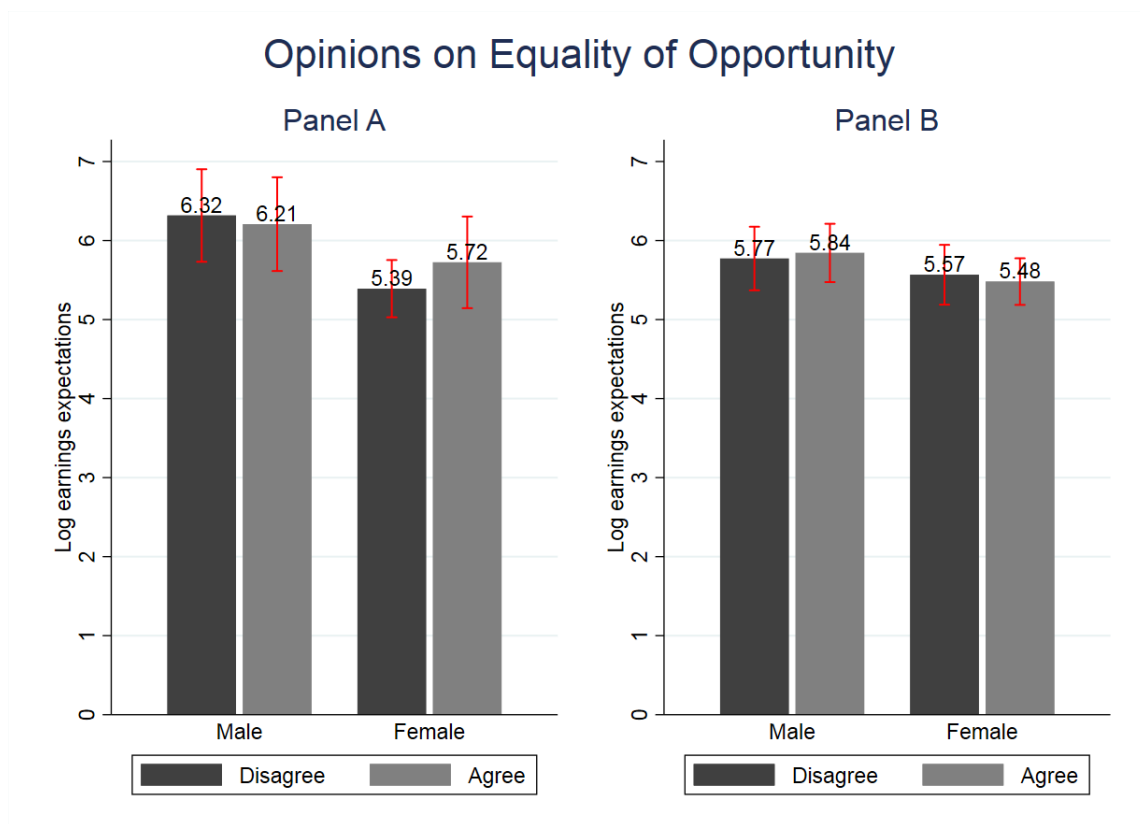
Panel A: All girls and boys should have equal opportunities in education and job. Panel B: When there are fewer jobs, men have more rights in getting the job than women

Fig. 2.4: Affirmative action and Earnings expectations
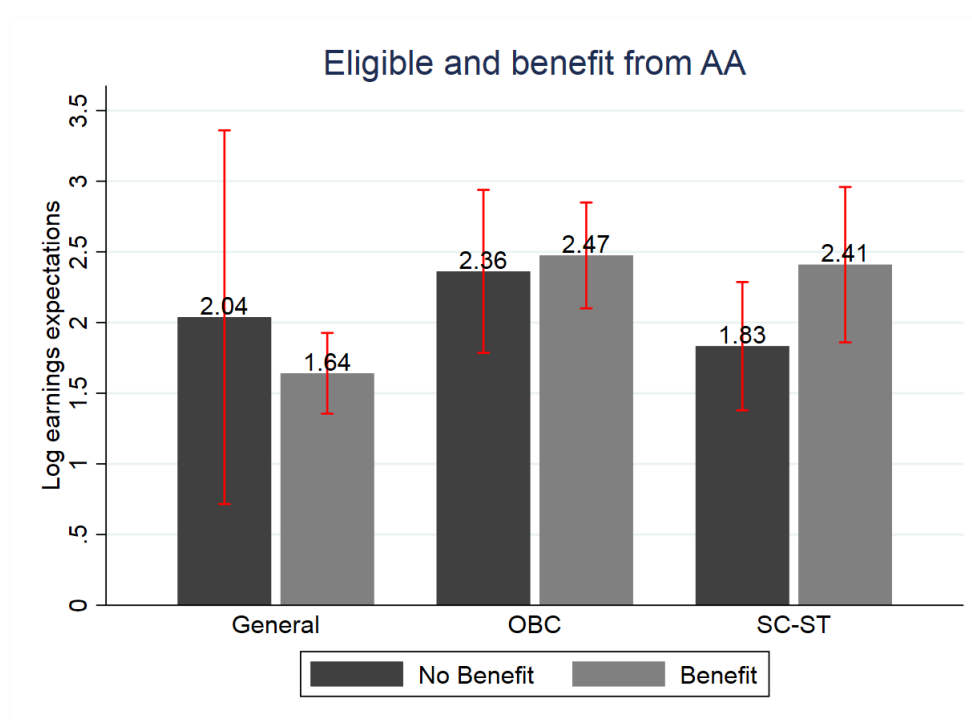
TABLE 2.10: Affirmative Action policies - OLS

	School	Diploma	College
	(1)	(2)	(3)
No benefit(OBC vs General)	-.925	.823	.868
	(1.61)	(0.719)	(0.599)
Benefit (OBC vs General)	.143	.459	.740
	(0.521)	(0.513)	(0.74)
No benefit (SC-ST vs General)	-1.151	-.106	.538
	(1.616)	(0.635)	(0.500)
Benefit (SC-ST vs General)	.401	.084	.901
	(0.691)	(0.681)	(1.056)
Observations	119	119	119
R sq	0.104	0.163	0.074
Controls	Yes	Yes	Yes

Notes: Dependent variable is the log earnings expectation.

Robust standard errors in parentheses.

* p<.1, ** p<.05, *** p<.01

FIG. 2.5: Caste of the local leaders
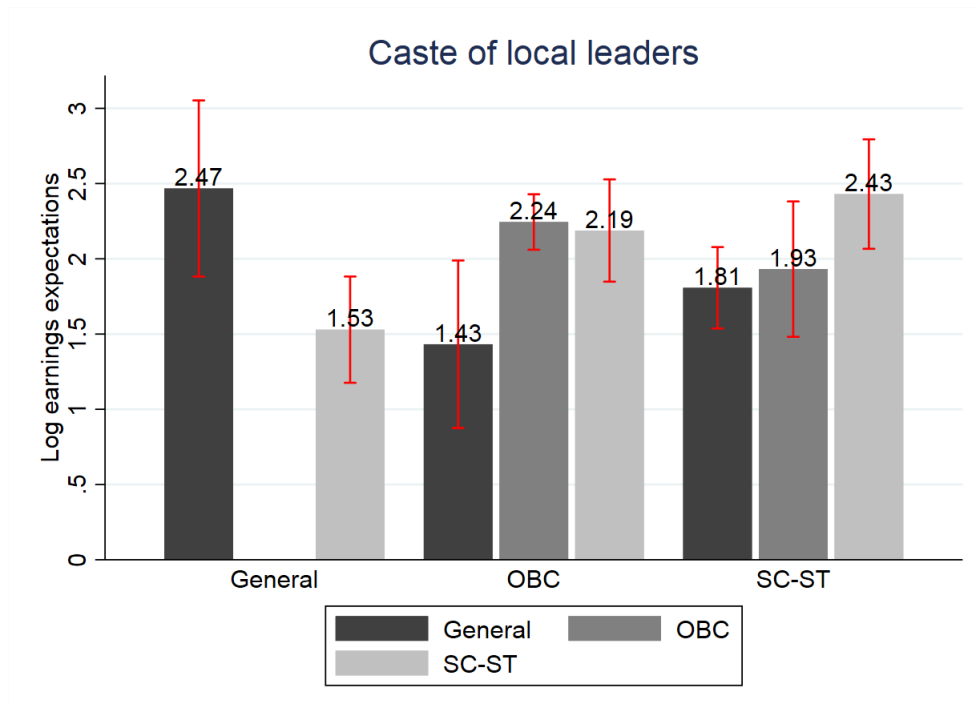
The bars represent the caste identity of the students. Each of the sub-groups in the X-axis denotes the caste identity of the local leader. Leader General: General vs SC-ST p=0.02**, Leader OBC: General vs OBC p=0.002***, Leader SC-ST:General vs SC-ST p=0.05*

FIG. 2.6: Log Normal Distribution
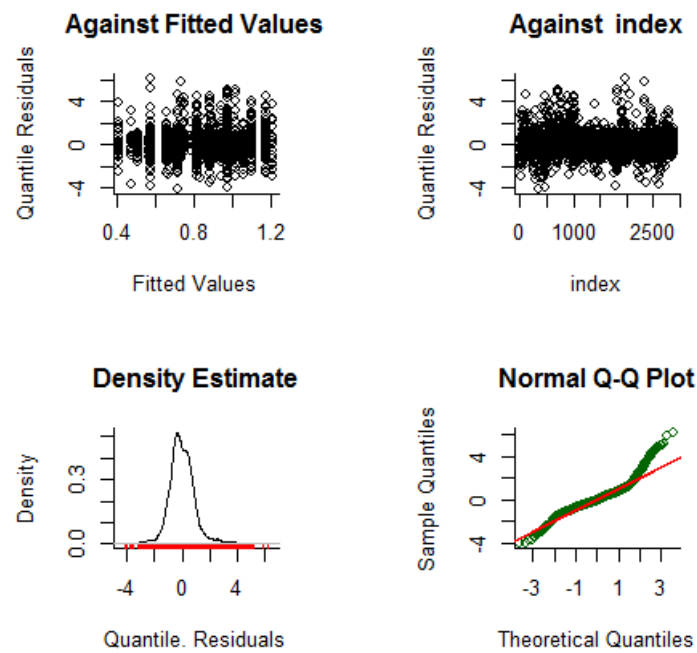
FIG. 2.7: Burr Distribution
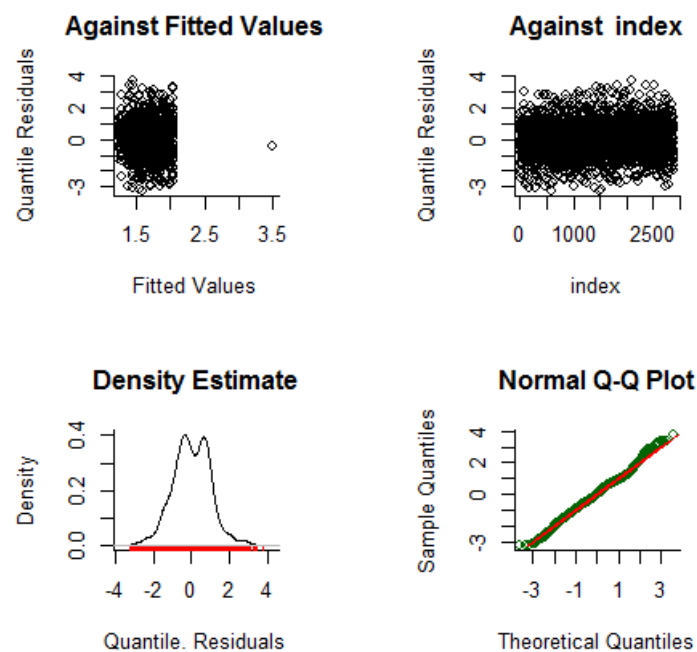
2.7 Appendix B

We assume the probability distribution for the expected earnings to have an assymmetric triangular distribution given by Figure. In our case, the most likely value is assumed to be the

midpoint calculated from the minimum and maximum threshold (If the triangular distribution was symmetric, the most likely value would be equal to the mean). The expected value of a left triangular distribution is given as $E(y) = p\frac{2y_{mid}+y_M}{3}$ and for a right triangular distribution is $E(y) = (1-p)\frac{2y_{mid}+y_m}{3}$.

Therefore, the expected mean can be written as;

$$E_d(y) = (1-p)\frac{2y_{mid} + y_m}{3} + (p)\frac{2y_{mid} + y_M}{3} \tag{2.5}$$

FIG. 2.8: Triangular Distribution
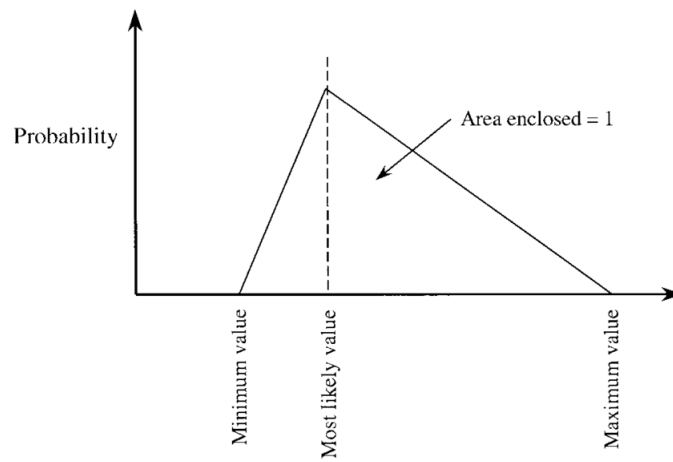
2.8   Appendix C- Questionnaires

Education survey

1. **School ID**:

   _____

2. **Your name**:

   _____

3. **Father's name**:

   _____

4. **Last name**:

   _____

5. **How old are you?**:

   _____

6. **Are you a boy or girl?**
   - ☐ Boy
   - ☐ Girl

7. **What is your caste?**:

   _____

8. **What is your home address?**:

   _____

9. **What is your phone number?Landline or parent's mobile phone**:

   _____

10. **What has your father studied?**
    - ☐ 1-4 (Primary school)
    - ☐ 5-10 (High school)
    - ☐ 11-15 (Graduate)
    - ☐ Post graduate
    - ☐ Others (Specify)
    - ☐ No education
    - ☐ I do not have a father

11. **What does your father work as?**
    - ☐ Office job
    - ☐ Daily wage laborer
    - ☐ Small business
    - ☐ Big business

☐ At home

12. What has your mother studied?

☐ 1-4 (Primary school)

☐ 5-10 (High school)

☐ 11-15 (Graduate)

☐ Post graduate

☐ Others (Specify)

☐ No education

☐ I do not have a mother

13. What does your mother work as?

☐ Office job

☐ Daily wage laborer

☐ Small business

☐ Big business

☐ At home

14. How many younger siblings do you have?

☐ Brothers

☐ Sisters

15. How many of you siblings go to school? (excluding you)

☐ Brothers

☐ Sisters

16. What is your position among your brothers and sisters?

☐ Oldest

☐ Youngest

☐ Other

17. How do you travel to school?

☐ Walk

☐ Cycle

☐ Auto

☐ School Bus

☐ Public Bus

☐ Van

☐ Other _____

18. How much time does it take for you to come to school?

_____ minutes

19. Is this the nearest school to your house?

☐ Yes

☐ No

20. What is the highest class you would like to complete?

☐ Class 7   ☐ Class 8   ☐ Class 9   ☐ Class 10   ☐ Class 12   ☐ Technical course   ☐ College   ☐ I do not know

21. In the future what work would you like to do to support yourself and your family?:

_____

22. In the future, when you are 28 years old, do you think you will be working if you completed 12th standard (high school)

☐ Yes

☐ No [Skip to 24]

23. When you are 28 years old, what monthly income do you think you will earn if you complete 12th standard?:

Minimum: _____   Maximum: _____

24. In the future, when you are 28 years old, do you think you will be working if you completed diploma or technical education?

☐ Yes

☐ No [Skip to 26]

25. When you are 28 years old, what monthly income do you think you will earn if you complete diploma or technical education?:

Minimum: _____   Maximum: _____

26. In the future, when you are 28 years old, do you think you will be working if you completed college or graduation?

☐ Yes

☐ No [Skip to 28]

27. When you are 28 years old, what monthly income do you think you will earn if you complete college or graduation?:

Minimum: _____   Maximum: _____

28. What are the reasons for coming to school?

☐ To study

☐ Meet my friends

☐ To get a job

☐ Parents told me to go

29. Do you want to do the same work as your father?

☐ Yes

☐ No

30. Do you want to do the same work as your mother?

☐ Yes

☐ No

Exit survey

Note: The exit survey includes questions on the probability distribution of earnings expectations for different levels of education.

I. Control questions

On a scale from 0 to 10, 0 being not possible at all and 10 being completely possible:

31. Between 0 to 10 what is the likelihood that you will complete your homework in the next two days?:   ☐

32. Between 0 to 10 what is the likelihood that you will complete your homework in the next two weeks?:   ☐

II. Subjective earnings

33. Between 0 to 10 what is the likelihood that you will earn greater than _____ **the midpoint if you completed high school education?**

0	1	2	3	4	5	6	7	8	9	10

34. Between 0 to 10 what is the likelihood that you will earn greater than _____ **the midpoint if you completed diploma or technical education?**

0	1	2	3	4	5	6	7	8	9	10

35. Between 0 to 10 what is the likelihood that you will earn greater than _____ **the midpoint if you completed college education?**

0	1	2	3	4	5	6	7	8	9	10

Chapter 3

Social Comparison at the workplace: A field experiment in Kolkata, India

Unjustified inequality can introduce a costly burden on firms from the point of view of the employees, through eroding worker morale (Greenberg et al., 2007; Krueger and Mas, 2004), affecting turnover levels (Card et al., 2012), absenteeism (Breza et al., 2017) and reducing effort supply (Gächter and Thöni, 2010; Cohn et al., 2014; Ku and Salmon, 2012). Despite the cost of discrimination from the employees perspective, unequal treatment of workers continue to persist in the form of wage gaps (ILO, 2016; Donohue and Heywood, 2004; World Bank, 2014; Fuller, 2008).

Our study focusses specifically on gender based discrimination wherein women across the world face worse employment conditions than men. According to an ILO analysis of 83 countries, women in paid work earn on average between 10 to 30 percent less than men. This inequality extends to part-time jobs where the gender gap is estimated to range between 3 and 13 percentage points (ILO, 2016). In addition to being disadvantaged in income (Kilbourne et al., 1994; Brady and Leicht, 2008; Tomaskovic-Devey, 1993), women face higher turnover rates (Fuller, 2008), lower promotions (Acker, 1990; Baldi and McBrier, 1997; Baron and Newman, 1990), and lower authority at the workplace (Baxter and Wright, 2000).

Despite the persistence of gender inequality at the work place, women report higher level of job satisfaction than men (Desmarais and Curtis, 1997; Wright et al., 1995; Parks et al., 1995; McDuff, 2001; Dawson, 2017). This phenomenon is known in the literature as the paradox of the contented female worker. One explanation for this paradox is the Social Comparison theory which expects individuals to compare themselves to a similar other or In-group in terms of skills, traits and circumstances (Festinger, 1954). In explaining why individuals fail to recognize discrimination directed towards one self, various theories in psychology provide alternative views to the Social comparison theory (Crosby, 1984; Blanton et al., 2001; Blaine and Crocker, 1993) For instance, Crosby (1984) and Blanton et al. (2001) describe the tendency of disadvantaged groups to compare their outcomes with those of an In-group, rather than with the relatively advantaged out-group. This is considered to be a defense strategy to protect the "self-concept" and avoid psychological distress resulting from being a victim of discrimination. There is also a tendency to accept and rationalize the prevailing social hierarchy in an attempt to integrate in the existing system (Jost, 1997; Jost and Andrews, 2011; Jost et al., 2004; Blaine and Crocker, 1993). As a result, members of stigmatized groups may believe that they possess lower ability than members of the out-group, hence attributing their failure to themselves instead of external prejudice directed towards them (Bylsma and Major, 1994; Auspurg et al., 2017; Buchanan, 2018).

In reference to the above theories, we propose that gender identity of the reference groups plays an important role when workers evaluate equality in the workplace. Our hypothesis is that in-group wage inequality reduces productivity or effort supply more than an out-group wage inequality. This is relationship between wage inequality and effort supply, when the gender identity of the advantaged coworker is known will differ for men and women respectively. Although there are notable recent contributions that study the impact of inequality on productivity at the workplace, to our knowledge only few studies attempt to empirically examine the impact of the reference group identity on equity considerations (Clark and Senik, 2010; Carlsson et al., 2009). To test the above hypothesis, we conducted a field experiment that exogeneously varies

wages and group compositions in a between-subject design. The experimental design allows us to examine the workers' response toward horizontal wage inequality when the coworker is of the same or different gender. Apart from effort supply, in a post experimental survey, we also included subjective responses of the workers such as the work satisfaction and own and coworker's performance evaluations.

The field experiment was implemented in Kolkata, India. In the experiment, recruited student assistants worked in teams of two for two successive working sessions in return for a fixed wage per hour. Workers were randomly assigned to one of the following treatment groups (1) a control treatment T1 (2) a unilateral wage cut treatment T2; (3) In-group wage cut treatment T3 and (4) Out-group wage cut treatment T4. The unilateral wage cut treatment (henceforth denoted by HL) and the In-group or Out-group wage cut treatment are similar such that they include a unilateral wage cut in the second working session. The only difference between these treatments is that workers in the HL treatment did not know the gender identity of their co-worker, while workers in the In-group and Out-group identity treatment, were made aware of the gender identity of their coworkers (in addition to a wage cut)[1]. Participants in the control group did not experience change in wages nor were they subjected to information on inequality. Productivity was measured in terms of the quantity and quality of entries completed in each session.

We find that both men and women reduce their productivity when unilateral wage cuts are introduced. This result is similar in sign and magnitude to existing experimental studies addressing the impact of horizontal pay inequality on productivity (when the identity of the coworker is not known). In addition, results show that male workers reduce their productivity when experiencing inequality, regardless of whether information on the gender identity of the co-worker is known or not. On the contrary, female worker's response to inequality was affected by the gender identity of the advantaged co-worker. In the post experimental survey, we find that beliefs regarding the relative performance of the coworker impacts how workers perceive inequality. We find female workers, on average, believe their performance is worse than that of their male colleagues, a fact that contributes to their mild response to out-group inequality.

The findings of this paper show that when inequality is consistent with the existing social hierarchies i.e. when women experience wage inequality relative to a coworker who is male, the former do not retaliate by lowering their productivity. This is specific to females who have internalized discrimination to an extent that they justify this unjustified inequality. We show evidence of this justification from their subjective evaluation of own and coworker's performance. The results highlight need for demand side policies that increase the cost of unjustified inequality in the labor market. Our results also shed light on the limitation of the Social comparison theory that assumes a symmetric response of males and females to wage inequality. We find males reduce their effort under inequality irrespective of whether their coworker is from the In or Out-group. Furthermore, we do not find differences in their response to inequality when the coworker is female.

The remainder of this paper is organized as follows. Section 2 presents an overview of the literature and our main hypothesis of this paper. Section 3 presents the experimental design and

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[1]Ideally we would have liked to include a fourth treatment comparable to the control treatment yet with the gender identity of the co-worker made salient. This, however, was not possible given the number of applicants that we have received. Adding this treatment would have compromised the statistical power of the experiment.

procedures. Section 4 presents the empirical analysis and results, and finally section 6 discusses possible mechanisms and concludes.

3.1   Literature Review and Hypothesis

Our study relates to the literature on the impact of inequality not only in comparison to one's past but also relative to others on individual's subjective assessment of utility (Fehr and Schmidt, 1999; Fliessbach et al., 2007; Luttmer, 2005; Poggi, 2010; Easterlin, 2009; Clark and Senik, 2010; Van Praag et al., 2011). To capture a response to inequality, lab experiments mainly use ultimatum and dictator games. The studies find that participants are averse to advantageous as well as disadvantageous inequality, with the latter having a larger effect on utility (List, 2007; Camerer, 2003b; Fehr and Schmidt, 1999).

A similar theory is postulated based on the wage effort hypothesis by Akerlof and Yellen (1990) which depicts workers as striving to restore fairness when actual wages deviate from what is perceived as fair (Akerlof, 1982, 1984). According to Akerlof (1982) workers respond to cognitive dissonance caused from inequality by either adjusting their beliefs concerning the fair wage or by adjusting their effort supply. In the lab, wage effort hypothesis is tested using gift exchange games that model bilateral exchange between workers and firms. These studies randomnly allocate participants to the role of a worker and an employer; the worker is asked to decide on the level of effort they want to supply in response to the wage level chosen by the employer. Results show that workers' effort choices are sensitive not only to changes in their own wages but also to changes in the wages of others (Clark et al., 2010; Gächter and Thöni, 2010; Abeler et al., 2010; Fehr and Goette, 2007; Charness, 2004). Our experiment focusses on such a horizontal comparison between workers in systems of wage inequality.

Similar to our study is a paper by (Cohn et al., 2014) who conducted a randomized field experiment in Germany to test the impact of general and unilateral wage cuts on productivity. The paper finds a negative and significant impact of wage cuts on performance, with a stronger drop in productivity associated with unilateral wage cuts. Another study by (Breza et al., 2017) in India, find that differential wages reduce output by 0.45 standard deviations and attendance by 18 percentage points. In additon, Breza et al. (2017) show that making the worker's effort visible mitigates the negative impacts of wage disparity. While both studies reveal a negative impact on worker productivity under unilateral wage cut, our study contributes to this literature but addressing worker's response to wage cuts when the gender identity of the advantageous worker is known.

A theory that addresses the impact of the reference group's identity on worker response to inequality is the Social Comparison theory. Initially proposed by Festinger (1954), the theory postulates that individuals prefer to compare themselves to others who are more similar in characteristics and abilities. This explanation has been utilised by several other studies that measure an individual's utility based on relative income or consumption (Clark and Senik, 2010; Clark et al., 2010; Buchanan, 2012). Life satisfaction and well-being are observed to be lower when individuals are further away from their reference or comparison group Luttmer (2005);

Clark and D'Ambrosio (2015); Card et al. (2011)[2]. Despite substantial evidence on the impact of group composition on behavior (Gneezy et al., 2003; Hoff and Pandey, 2006; Chen and Li, 2009), to our knowledge none of the existing experimental studies examine the impact of group composition and coworker's identity on perceptions of equity. As an exception, Carlsson et al. (2009) implement a hypothetical choice experiment to study the impact of income comparisons within and across castes in India on utility. Their findings show that an increase in the mean income of one's caste group relative to own income, reduces utility significantly more than a relative increase in the mean income of an out-group caste. The study uses subjective measures of well-being and hypothetical choices in a questionnaire setting[3]. We are able to exogenously vary the reference group and test the causal response of workers to wage inequality when their coworker's gender is known. We postulate the following hypothesis:

Hypothesis 1: In unequal wage systems, workers reduce their effort supply when they are matched to coworkers of the same gender. Therefore, both males and females will reduce their effort when they face unequal wages compared to a coworker who is of the same gender.

Hypothesis 2: In unequal wage systems, effort supply of workers does not respond to an increase in wages of their coworkers of a different gender. Therefore, both males and females will not change their effort supply when they face unequal wages compared to coworker from a different gender.

Based on the Social Comparison theory, workers will only respond to inequality when they are matched to advantageous coworker from their ingroup (in this case same gender). However, this theory does not account for assymmetrical response of men and women when they are compared to advantageous co-workers from the out-group. The 'paradox of the contented female worker' is an empirical evidence reflecting this assymmetry, whereby women tend to be satisfied with their wages despite being aware of the discriminatory practises against them (relative to men) by the firms. Contrastingly, male workers tend to show their dissatisfaction for lower pay. One of the theories that accounts for the asymmetry is the theory of System Justification Jost and Andrews (2011); Jost and Burgess (2000); Jost et al. (2004). It is recognised as an inclination to view group differences in social status as justified even when such differences are not beneficial for one of the groups. Recent study by (Sengupta and Sibley, 2013) apply the theory of System Justification to not only gender but also other minority or disadvantaged groups to find that unequal systems persist over time because even the most disadvantaged by these systems are motivated to support them.

Other theories within the labor market domain that complement the System Justification theory, are Depressed Entitlement effect Major and Testa (1989) and the Rewards Expectation theoryAuspurg et al. (2017); Buchanan (2018). A core assumption of these theories are that gender is no longer a nominal character and takes the form of a status. In social contexts where women are treated as second class citizens and gender inequalities already exist (in favor of men), higher abilities and competency are associated with men, further reproducing existing

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[2]Few studies show evidence of a tunnel effect wherein disadvantaged individuals consider their reference group as a signal of future growth (Poggi, 2010; Hirschman and Rothschild, 1973). However, in our case this channel will not be considered since our experiment is a one shot interaction and we promise no future employment opportunities

[3]The use of subjective measures of agency may result in a number of systematic biases related to order, scale, reputation, and halo-effects Podsakoff et al. (2003).

inequalities. Findings show that female workers allocate lower rewards to themselves (Hogue and Yoder, 2003) and justify the unequal treatment they experience (Butler, 2016). This is complemented by empirical data showing decreasing female labor market participation, self selection into segregated jobs (Sarkar et al., 2019; Biju Varkkey et al., 2012) and increasing gender wage gaps. In our third hypothesis, we are able to test whether expectations regarding coworker's effort supply is associated with the coworker's gender identity.

Hypothesis 3: In unequal wage systems, females expect their advantageous coworkers to be more productive when their reference group is male (Out-group) compared to female (In-group). Males, on the other hand, expect their advantageous coworkers to be less productive when their reference group is female (Out-group).

In the following sections we discuss the cultural context and the experimental design, results and discussions regarding the mechanisms and future research.

3.2   Cultural context

Gender based discrimination is a pervasive and long-running phenomenon in India. The culturally ingrained parental preference for sons in the country has been linked to poorer conditions for women on different measures of well-being (Gonsalves, 2002; Sharma, 2016; Pande and Astone, 2007). Despite recent reforms and progressive steps towards equality, the prevailing social stratification system in India continues to assign women to a second rate citizen position (Dyson and Moore, 1983). There is extensive evidence of the discrimination faced by women in India, particularly in the labor market such as participation (Biju Varkkey et al., 2012; Sarkar et al., 2019), stagnant wage gaps (World Bank, 2014) and gender based work segregation(Duraisamy and Duraisamy, 2016).

Despite the 6 percent growth in GDP that India experienced in the past decade, female labor force participation has declined from 34 to 27 percent. In addition, the male-female wage gap in India has been stagnant at 50 percent. Our study which took place in the urban city of Kolkata resembles to a large extent the average status of Indian women as described on a national level (Biju Varkkey et al., 2012; Mukherjee, 2001). Kolkata is the capital of West Bengal state, the third most populous metropolitan cities in India. Gender indicators for West Bengal reveal that despite more women being enrolled in education institutes, they constitute only 25 percent of the work force (World Bank, 2014). Statistics regarding female labor force participation and education levels in West Bengal and Kolkata are similar to the national level (Biju Varkkey et al., 2012), supporting the external validity of the context. Often the response to workplace inequality for the disadvantaged gender has been involuntary unemployment and dropping out the labor force (Sarkar et al., 2019) or self selecting into segregated jobs (Duraisamy and Duraisamy, 2016).

Apart from labor market discrimination, the cultural views and subjective perceptions on gender roles are also biased against women. Using data from a representative sample of young Indians, the World Value survey finds that more than 50 percent of men and women agree to the statement that "men must be more entitled to a job under conditions of work scarcity compared to women". More than 50 percent of respondents agree that "men make better leaders and

executives at the workplace than women" and more than 70 percent agree that "when a mother works for pay, children suffer".

These perceptions are correlated with behavioral traits adopted by women in India that may contribute to further worsening their status. For instance, in her article on Feminism in India(Mukesh, 2017), Mudra Mukesh discusses the low tendency of women to negotiate higher wages, show confidence and compete at the workplace. This argument is supported by surveys undertaken in India by tech companies showing that women set very low salary expectations relative to their male colleagues. These expectations are seven percent less than the expectations reported by men (Biju Varkkey et al., 2012).

The cultural setting and social hierarchy prevailing in India constitute an environment where the gender identity is percieved as a status. Therefore, we examine the main research question proposed in this paper in India.

3.3 Experiment Design

3.3.1 The Experimental Set-up

Our design is based on the studies by Cohn et al. (2014) and Breza et al. (2017) who observed the impact of unilateral wage cuts on worker productivity. In addition to the Unilateral wage cut treatment, we included two more treatments that not only included the wage cut but also revealed the gender identity of the coworker. To answer our research question, we recruited student assistants who worked for two sessions in the same day. There was a 30 minute break between each session. All workers in the pre-intervention stage (session one) were assigned a fixed hourly wage of 350 rupees, regardless of the effort level supplied.[4] To test the impact of wage cuts on productivity, some participants experienced a unilateral wage cut of 140 rupees in the second working session while others did not.

Recruitment Stage

We coordinated with three public universities in Kolkata: Jadavpur University, University of Kolkata, and Presidency University, to advertise a job vacancy for student assistants. Potential subjects were recruited via university websites and mailing lists in addition to direct appeal to students during their undergraduate and graduate courses. The announcement read that this was a *one-time job* that would take place over two sessions with a short break in-between. Students were informed that the job would take place in offices on campus, hence reducing transportation and other forms of costs that workers may incur in order to get to the work station. The advertisement emphasized that the job would not be repeated and was not related to any future hiring opportunities by the employer. This addition was necessary to rule out any fear of dismissal from the job and to eradicate reputation effects. Given the differences in payment across treatments, we refrained from mentioning the hourly wage in the advertisement. Instead, the job was advertised as a student job, thus allowing participants to formulate more

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[4]350 rupees was slightly higher than the average hourly wage for students at the three universities where the experiment took place.

or less accurate expectations regarding the hourly income.[5] Interested applicants submitted a short application form answering a set of socio-economic questions, in addition to questions on their field of study, average grade attained, and previous work experiences.

Interested participants received an email confirming their participation and were invited to a training session. In the training, the session coordinator thoroughly explained the purpose of the task to the workers and highlighted its value to the employers. The coordinator then described the task and conducted several examples using booklets similar to the ones used in the real task.[6]

The Task

The advertised vacancy was for a data entry task that aims at putting together a large data set to be later used in a systematic review by one of the authors of this paper. The task required participants to extract numbers from a set of descriptive and statistical tables, and in some cases to copy variable names and significance levels. This data entry task is particularly well-suited for our experiment as it allows for a precise measure of the two main outcome variables: the quantity, and quality of work produced. Quantity is measured by the total number of entries copied in each of the working sessions and quality is measured by the total number of mistakes made in each session. The number of mistakes is measured as the total number of incorrectly typed words or numbers. Misspelled words and deviations from the original text (omissions or additions) were counted as errors. In addition multiple errors in the same word were counted as a single error. Two research assistants worked independently on merging the data entered by each participant with the final data set. To calculate the final number of mistakes the assistants used a program that detects and counts differences between the two merged files.

Finally, the task used is relatively simple and can be done individually without the need to refer to the coordinator with questions and guidance requests.

Treatments

Participants were grouped in teams, every team was assigned a unique booklet of data that differed from that assigned to other groups. The data entered by participants working on the same booklet was merged together at the end of the experiment in a standard procedure for data cleaning and quality control. To create a reference point of comparison, participants were aware of the wage information of only one of the colleagues in the team. Depending on the treatment, some participants also had access to information on the gender identity of this co-worker. The information regarding gender identity was revealed in both sessions. To further emphasize the role of the co-worker as a reference, we kept group compositions fixed throughout the experimental session.[7]

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[5]We do not have data on these expectations, however, there is no reason to believe that students would formulate income expectations that are far from the range that their university usually pay for student jobs.

[6]Participants were not informed that this project is lead by international researchers nor that it belongs to an international institution.

[7]Given that this paper examines the impact of disadvantageous inequality on productivity but not visa versa, participants had access only to the wage information of colleagues not experiencing a wage cut.

Participants were randomnly assigned to one of the following treatment groups (see Table 3.6 in Appendix): (1) A control treatment: in this treatment the two workers of the same team received a similar payoff of 350 rupees in both working sessions; (2) A unilateral wage cut treatment: in this treatment unilateral wage cuts were introduced in the second working session i.e., only one of the two team members experienced a wage cut. Note that in both of these treatments workers were kept blind to the gender identity of the colleague they are matched with. (3) In-group wage cut treatment: in this treatment, the workers were matched to coworkers of the same gender identity. The gender of the coworker was made salient in both session one and two. However, the unilateral wage cuts were introduced only in the second working session. (4) Finally, the Out-group wage cut treatment: in this treatment, the workers were matched to coworkers of a different gender. Given the potential impact that gender group composition could have on performance, information about the gender of the team partner was revealed in both sessions.

3.3.2 The Experiment procedures

In the first working session, workers were assigned desks and computers in an office-like rooms within the university campus. Participants were instructed to sign an attendance sheet at the beginning of each working session to indicate their presence. The attendance sheets are an important feature of our experiment, they are used to make certain information about the co-worker salient to the participant. The attendance sheet was attached to the first page of each booklet and had two rows of information, each referring to one of the two workers assigned to work on the booklet. Participants were asked to sign next to the row resembling their identification number. The information presented on the attendance sheet for all the treatment groups were: each worker's identification number, and the hourly wage. In addition the gender identity was revealed only for participants assigned to the identity wage cut treatment. The gender identity was made salient by adding the first name of each team member next to their identification number, we abstain from including the full name given that family names in India can be used to deduce information on the caste identity.[8]

Each session lasted for one hour with a half an hour break in between. Workers were left to work unmonitored, the coordinator only interfered to announce the end of the working sessions and to pay the hourly wages. To reduce any potential bias, both the workers and session coordinators were blind to the research question and to the fact that this was an experiment.

In the second working session (post-intervention phase), workers returned to their desktops and were again asked to sign the attendance sheet before they continued working on their assigned booklets. This time, however, workers in the Unilateral wage cut treatment (T2) and In-group and Out-group wage cut treatments (T3,T4) experienced a unilateral wage cut and their new hourly wage was reduced to 210 rupees per hour as indicated next to their identification numbers.[9] Following the work by Cohn et al. (2014) the session coordinators were instructed

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[8] We however have information on the caste identity of each worker which we use later in the analysis to test for heterogeneous effects of the treatment by caste groups. Our results remain robust regardless of the caste that the participant belongs too.

[9] 210 rupees per hour is the average hourly wage paid for student assistants at each of the three universities in which we conduct our experiment.

not to give any further explanations or rationalizations for the cut, instead, workers had the full freedom to leave the session following the announcement of the new pay. It was clearly announced that workers who choose to leave the session would still be fully compensated for their efforts in the first working session, that is they would still receive the 350-rupee hourly wage for the work they had done earlier. None of the workers chose to leave the session.

At the end of the second working session the coordinator returned to the room to announce the end of the task and to pay the participants their wages for both sessions. The coordinator distributed short feedback forms that were filled in by all workers prior to payment. The feedback form incorporated questions on job satisfaction, the perceived difficulty of the task, and the clarity of instructions. In addition, participants were asked to indicate their beliefs on their performance and the performance of their co-worker.

3.4 Results

3.4.1 Descriptive Statistics

Our sample included a total of 312 student assistants. To conduct our analysis, we merge three forms of data sets: data extracted from application forms submitted before the experiment, experimental data, and finally data extracted from feedback surveys conducted at the end of the experiment. The application forms provide us with data on the basic demographic characteristics of the sample. The Table 3.7 in the Appendix shows the sample consists mainly of young workers between the age of 18 and 26. Participants were mostly single, Upper caste Hindus, and with little to no previous work experience. Finally, student assistants were hired from different disciplines including sciences, engineering, arts, and commerce.

Table 3.1 shows the average number of entries and average number of mistakes made by workers per entry in each treatment group. In the In-group treatment, workers are matched to coworkers of the same gender and they experience a wage cut relative to their coworker. In the Out-group treatment, the workers are matched to coworkers from a different gender, in addition to a wage cut in the second session. Table 3.1 shows that workers in the control group completed an average of 223.06 entries in the first session The number of entries drop in session two in the treatments that introduced a wage cut. Furthermore, this drop is especially evident in Treatment 3 (In-group) where workers are unequally treated relative to a coworker of the same gender. In the regression analysis, we further divide our sample into males and females and compare the average number of entries in session one relative to session two within and across treatments. Similarly, Panel B of Table 3.1 shows the average number of mistakes made in each of the sessions subject to the number of entries. Table 3.1 shows that the number of mistakes decrease in session two compared to session one. This decrease is evident across all treatments and could be associated with experience and a better understanding of the task.

3.4.2 Estimation Strategy

In this section we use regression analysis to estimate the causal effect of wage inequality on workers' effort supply. Workers exerted effort in two dimensions: quantity (number of entries produced) and quality (correctness of information entered). We, therefore, examine each of these

TABLE 3.1: Descriptive Statistics

	Control		Unilateral		In-group		Out-group	
	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
Productivity								
Session one	223.06	150.93	213.76	94.16	214.36	104.17	202.62	117.60
Session two	261.91	142.09	171.33	144.21	134.25	84.16	199.36	100.81
Number of Mistakes								
Session one	22.71	34.53	19.32	27.29	20.06	25.99	12.29	16.55
Session two	15.89	26.09	6.66	12.65	13.47	26.83	10.89	24.56
Total Observations	60		60		97		95	

Productivity is measured as the number of entries. For the productivity in each session across treatments, panel 2 measures the number of mistakes. Bonferroni test for mean comparisons across treatments: Session one p=0.7423, Session two p=0.000. * p<.1, ** p<.05, *** p<.01

outcome variables separately using the following specification:

$$Y_{it} = \alpha + \phi_i + \beta_1 Session_{it} + \beta_2 HL_{it} \times Session_t + \beta_3 Ingroup_{it} \times Session_t + \beta_4 Outgroup_{it} \times Session_t + \epsilon_{it}$$

(3.1)

The dependent variable in Equation 3.1, Y_{it} represents each of the two outcome variables of interest, quantity (number of entries) and quality (number of correct entries). The coefficients β_2, β_3 and β_4 estimate the effect of the treatments relative to the omitted control treatment. The constant α captures average number of entries in session 1 (before the intervention), ϕ_i represents individual fixed effects, and the variable $Session_t$ is a dummy variable that captures the time effect. $Session_t$ is equal to one if the work was undertaken in session two (after the intervention) and is zero otherwise. This coefficient ($Session_t$) measures the change in the outcome variable by comparing the performance in the post-intervention phase (session 2) to the average pre-intervention performance (session 1). Finally, ϵ_{it} is the idiosyncratic error term.

In addition to randomizing treatment assignment, the panel structure of the data allows us to control for worker's pre-treatment heterogeneity in ability and performance on the data entry work.

Quantity Produced

Based on the estimation strategy described above and specification from Equation 3.1, we begin this section by examining the Wage Effort Hypothesis (Akerlof, 1982) that states Unilateral wage cuts decreases worker's effort supply.

Table 3.2 is the difference-in-difference coefficients for each treatment group compared to the base group: Control treatment. To test the validity of the Wage Effort Hypothesis we refer to the estimates presented in the second row of Table 3.2. The coefficients show a negative and significant impact of the unilateral wage cut treatment (HL) on productivity. Columns 2 and

3 show that this result holds for both male and female workers. The decrease in productivity is smaller for females compared to males. We compare the impact of unilateral wage cuts on productivity with other studies by examining the percentage change in output from session one relative to session two for each treatment. Figure 3.1 shows an average increase of 18 percent in session two relative to the average in session one for the Control group. This increase can be attributed to possible learning effects resulting from practice and familiarity with the task at hand. Figure 3.1 shows a significant decrease in productivity following the introduction of unilateral wage cuts in the HL treatment. This drop is equivalent to 19 percent and resembles a performance elasticity of 0.5.[10] This result is consistent with the findings reported by previous literature examining the impact of inequality on productivity.[11] The study closest to our work is by Cohn et al. (2014). Following the introduction of unilateral wage cuts, the authors find a performance elasticity of 0.6 and a drop in productivity of 15 percent.

Similarly, Figure 3.2 presents the percentage change in performance in session two relative to session one, by gender. Panel one in Figure 3.2 shows a positive increase in output for both male and female workers in the control group, with female workers increasing their output slightly more than men. In contrast, panel two shows that male and female workers reduce their effort levels following unilateral wage cuts. This drop is slightly larger for men (23 percent) than women (16 percent). These gender differences, however, are not statistically significant.

Next, we test our Hypothesis 1 that expects workers to reduce their effort relative to advantageous coworkers of the same gender, under wage inequality. To test this hypothesis, we compare workers' productivity in the In-group treatment, to the control group. Using the control group as a base, results show that revealing the gender identity of the co-worker introduces a larger drop in productivity. This drop is especially relevant for the in-group comparison where Figure 3.1 shows a significant post-treatment reduction of nearly 38 percent. The drop in productivity for the in-group treatment is mainly driven by male workers matched with other male colleagues, as Figure 3.2 shows this reduction is equivalent to 42 percent for men and 30 percent for women. This gender difference is significant at the five percent level. Therefore, we cannot reject Hypothesis 1.

To test Hypothesis 2, we examine the impact of unilateral wage cuts for participants assigned to the out-group treatment. The difference-in-difference coefficient in Table 3.2 indicates a significant decrease in productivity with respect to the control group. According to Figure 3.1, this decrease is equivalent to a reduction in productivity of 4 percent in the post-treatment phase. As Figure 3.1 shows, productivity decreases less in an out-group comparison than in previous treatments. This decrease is 8 percent lower than that of Unilateral wage cut treatment and 30 percent lower than that of the In-group comparison, with both differences being statistically significant. Columns 2 and 3 of Table 3.2 show that gender differences in response to out-group inequality are driving the result.

Panels two, three, and four of Figure 3.2 show that male workers reduce their productivity

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[10]Elasticity of performance is calculated as a ratio of the percent change in output relative to the percent change in wages.

[11]Performance elasticity in Kube et al. (2012) =0.6, output drops by 20 percent, in Cohn et al. (2014)=0.6, output drops by 15 percent,
in DellaVigna et al. (2016)=0.04, output drops by 2 percent,
in Heinz et al. (2017)=0.6,output drops by 12 percent.

TABLE 3.2: Impact of unilateral wage cuts on quantity produced

reference treatment:control group

	Total	Female	Male
	(1) Number of Entries	(2) Number of Entries	(3) Number of Entries
Session two	38.84***	42.52***	34.63*
	(12.65)	(15.63)	(19.51)
HL × Session two	-81.28 ***	-75.12**	-89.02**
	(51.10)	(31.12)	(38.18)
In-group × Session two	-118.9***	-102.8**	-142.9***
	(18.93)	(20.75)	(24.71)
Out-Group × Session two	-42.10**	-10.36	-103.9***
	(19.35)	(17.41)	(25.47)
Constant	211.9***	197.0***	233.7***
	(5.222)	(3.512)	(4.952)
R squ.	0.186	0.180	0.326
Observations	624	370	254

Results from OLS regressions with individual fixed effects. Dependent variable is the number of entries produced in each working session. Results do not change for using the difference in number of entries as a dependent variable. HL, In-group, Out-group are treatment dummies set to one for the corresponding treatment (and zero otherwise). Standard errors reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

when subjected to a unilateral wage cut, regardless of the gender identity of the co-worker. Male workers drop their productivity by 11 percent in the out-group treatment and is not significantly different from the In-group treatment. Comparing effort supply for women workers in all four panels, Figure 3.2 shows that female workers' effort choices under conditions of inequality, unlike men, are affected by the gender identity of the co-worker. Female workers receiving a wage cut relative to a male co-worker reduce their effort supply by 3 percent with respect to the control group (p=0.810). Nevertheless, the decrease in productivity for female workers in the out-group treatment is significantly lower than that of Unilateral wage cut (p=0.053) and in-group-treatment (p=0.000). Our empirical findings show women who are compared to advantageous male workers do not decrease their effort supply under wage inequality. On the other hand, men significantly decrease their effort supply under wage inequality irrespective of the gender identity of the coworker, although the decrease is less in the out-group. We cannot reject Hypothesis 2 for the females, however, males decrease their effort supply irrespective of the gender identity of the reference group.

Quality of Work Produced

Next, we test for the impact of unilateral wage cuts on the quality of work produced. The difference-in-difference coefficients of Table 3.3 show no significant effect of any of the treatments on the quality of work produced by the workers with respect to the control group.

FIG. 3.1: Post-treatment effect on quantity produced
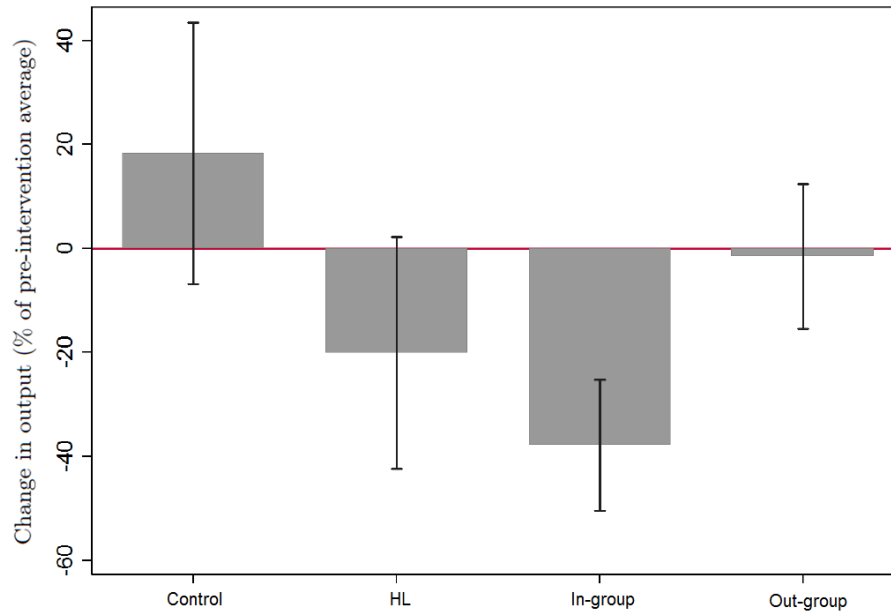
Figure 1 reports the change in the number of entries as a percentage of the pre-intervention average. Interval bars show the 95 percent confidence intervals

FIG. 3.2: Post-treatment effect on quantity produced, by gender
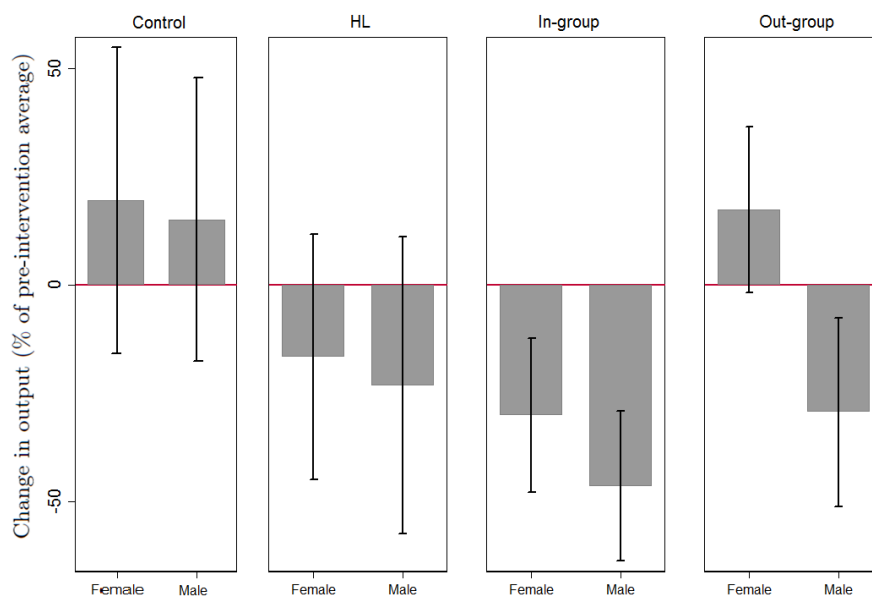
Figure 2 reports the change in the number of entries as a percentage of the pre-intervention average divided by gender. Interval bars show the 95 percent confidence intervals.

TABLE 3.3: Impact of unilateral wage cuts on quality produced

reference treatment:control group

	Total	Female	Male
	(1) Number of Mistakes	(2) Number of Mistakes	(3) Number of Mistakes
Session two	-0.845	3.030	-3.324
	(4.880)	(6.196)	(6.302)
HL ×Session two	-10.27	-10.14	-12.89
	(6.188)	(7.007)	(10.02)
In-group× Session two	-5.359	-6.722	-10.58
	(6.074)	(7.728)	(8.103)
Out-group×Session two	-0.454	-7.048	5.928
	(5.359)	(6.428)	(9.405)
Constant	16.92***	15.15***	18.15***
	(3.155)	(4.102)	(5.119)
R squ.	0.065	0.094	0.102
Observations	312	185	127

Results from OLS regressions with individual fixed effects. Dependent variable is the number of mistakes produced in each working session. Results do not change for using the difference in number of mistakes as a dependent variable. HL, In-group, Out-group are treatment dummies set to one for the corresponding treatment (and zero otherwise). Standard errors reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure 3.7 (in the Appendix) presents the percentage change in the number of mistakes made relative to the average pre-intervention phase. Figure 3.7, shows that the number of mistakes does not change significantly for all treatments compared to the control group. Running the same specification this time controlling for the number of entries filled in each session, does not alter the results.

The findings show that workers assigned to the out-group treatment have a mild change in the number of mistakes made. Dividing the estimation by gender we see that this result is mainly driven by male workers who have higher number of mistakes relative to the control group (see Figure 3.8 in Appendix).[12]

3.5 Post-experimental survey and Discussion

After the completion of the second session, we invited all workers to participate in a feedback survey. The survey asked the participants to rate how they believed to have performed in the task and how well they believe their co-worker had performed in each session. This helps us test Hypothesis 3 on whether the evaluation of the coworker's performance is associated with the gender identity of the reference group. In addition, the survey measured workers' subjective levels of work satisfaction in each of the two working sessions.

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[12]The absence of statistical significance can be explained by the small point estimates of this variable and the large standard errors. In addition, the confidence intervals include both reasonable and less reasonable effect sizes. Our focus is thus on the fact that we generally see a drop in the number of mistakes in session two, and less on the estimated magnitude.

3.5.1 Performance Evaluations

The field experiment revealed a decrease in productivity resulting from wage cuts for females when they were matched to a coworker of the same gender but not when their coworker was male. The male coworkers, on the other hand, significantly decrease their effort supply under wage inequality irrespective of the gender identity of the coworker. We observe that Social Comparison theory (Festinger, 1954) can only partially explain this behavior. The theory assumes that individuals respond to in-group and out-group comparison in the same direction and does not recognise the behavioral impact that gender identity could have given the cultural context. In other words, the theory does not take into account that males and females could each have a different response when matched to an out-group.

On the other hand, depressented entitlements (Major and Testa, 1989), rewards expectation theory (Auspurg et al., 2017; Buchanan, 2018) and theories of cognitive dissonance (Jost and Andrews, 2011) argue that societies consciously value certain groups such as males to be more competent, thereby legitimizing and providing reasons to validate unjustified inequalities (Bylsma and Major, 1994; Hogue and Yoder, 2003; Butler, 2016). At the end of the experiments, in our feedback survey, we asked the workers to evaluate the performance of their coworkers for each session across all treatments. The participants indicated on a scale from one to five, the performance of their coworker relative to theirs for each session - one being worse than own and five being better than own performance. We hypothesize that women in the Out-group wage cut treatment might expect the performance of their (male) coworkers to be better that their own.Similarly, we should observe the males to percieve the performance of their coworkers in the Out-group treatment as very low.

Figure 3.3 shows on average both male and female worker's expectation regarding their coworker's performance in session 1. In this session, the wage cut has not been introduced but the gender identity of the coworker is revealed in the In-group and Out-group treatment. We observe no significant difference in worker's expectations regarding coworker's performance in the control, Unilateral wage cut and Ingroup wage cut treatments. However, in the Out-group treatment, women expect their coworkers performance to be better than own and this is significantly higher than male expectations about coworkers in the same treatment. Table 3.4 confirms this result. Table 3.4 presents the correlation between the treatment and the variable measuring performance evaluations. If team composition does not matter, we should not find a significant difference in performance evaluations between participants in the identity treatment (gender of partner known) and participants in Unilateral wage cut treatment (gender of partner unknown). Interestingly Table 3.4 shows that female workers assigned to the out-group treatment, on average, expect their coworker's performance to be better than own performance. Particularly for women, we cannot reject Hypothesis 3 - female worker's evaluation regarding coworker performance is significantly higher when the advantageous coworker is male (from the out-group).

In addition, we test whether actual productivity mirrors the expected beliefs, we compare the number of entries across treatments in the first working session prior to introducing the wage cuts. Figure 3.6 in the Appendix show that female participants assigned to the out-group treatment have a significantly lower performance with respect to male participants assigned to the same treatment. This difference in performance is also significant with respect to female workers

FIG. 3.3: Relative Performance evaluations of coworkers in Session 1
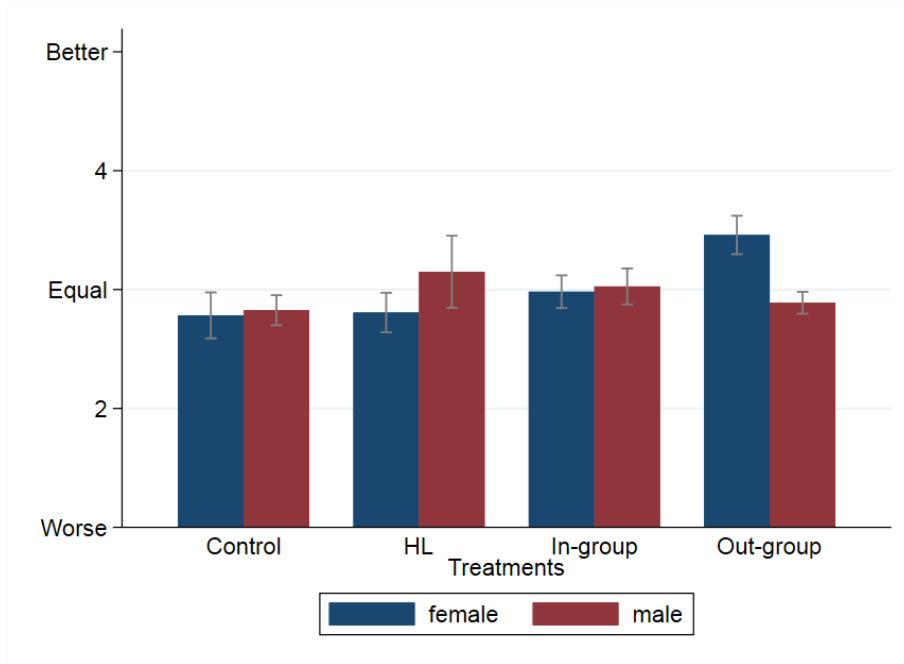
Figure 5 plots the mean of expectations formulated on the relative performance (effort supply) of the co-worker in session one, by gender. Participants indicate on a scale from one to five. Three indicates the worker expected equal level of effort supplied by the co-worker and themselves. A vote above three indicates that the worker expects the co-worker to be supplying higher effort levels. We expect that workers attempt to explain wage inequality in the second working session by formulating beliefs about their performance and the performance of the co-worker in the pre-intervention phase.

TABLE 3.4: Impact of Group Composition on Relative Performance Evaluations

	All	Female	Male
	(1)	(2)	(3)
	b/se	b/se	b/se
HL	0.278*	0.107	0.486**
	(0.156)	(0.210)	(0.227)
In-group	0.180	0.161	0.208
	(0.123)	(0.191)	(0.138)
Out-group	0.532***	0.773***	0.071
	(0.129)	(0.197)	(0.107)
Constant	2.820***	2.821***	2.818***
	(0.093)	(0.154)	(0.084)
Observations	301	182	119
R sq	0.053	0.118	0.064
Adj R sq	0.043	0.103	0.040

Dependent variable is the expected relative performance of the co-worker in Session 1. This variable is measured using a scale from one to five. The omitted reference category is the control group. Standard errors reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

assigned to the in-group comparison. While women on average have a lower performance than men in the first working session, this difference is only significant for the out-group treatment (p-value: 0.0303).

3.5.2   A Subjective Measure of Satisfaction

Previous literature find that female workers have higher or comparable job satisfaction levels relative to men despite their lower remuneration and working conditions (Crosby, 1984; McDuff, 2001; Donohue and Heywood, 2004; Parks et al., 1995).

Similar to existing studies, we ask participants to subjectively determine their level of job satisfaction using a scale from one to five, where one indicates a very low satisfaction level and five indicates a high level of job satisfaction. Figure 3.4 below shows the average levels of satisfaction reported by male and female workers for each of the two working sessions. On average, there is no significant difference in job satisfaction between males and females in the control group. We do not observe a difference in job satisfaction between men and women in session one (before the wage cuts) across treatments. Following the introduction of unilateral wage cuts in the second working session, workers report reduction in their satisfaction levels and this is not significantly different between men and women ($p=0.418$). While work satisfaction decrease for both men and women in the In-group and Out-group wage cut treatment, it is significantly lower for men ($p=0.003$, $p=0.014$). This result is corroborated in Table 3.5 that estimates the linear effect of the treatment on the change in job satisfaction in session two relative to session one. This specification is estimated for males and females. Thus, when identity is salient, men report significantly lower job satisfaction than women both in the In and Out-group treatments. This result finds support with the 'paradox of the contented female worker' narrative.

3.5.3   Further Concerns

This section describes certain points to be considered regarding the study design and outlays potential questions for future research. During the experiment we did not clarify to the participants whether we valued high quality data or high number of entries. Therefore, if the participants had chosen to invest their effort into producing data of higher quality, then we would see, similar to our findings, a reduction in the total number of entries completed in session two. One way we mitigated this is by paying the participants a fixed wage and not a piece rate wage. However, we also test for this possibility, by controlling, in the main regression, the average change in the number of mistakes made in each treatment. Table 3.8 (in the Appendix), shows that our main findings are robust with mild changes in the magnitude of the coefficients of interest.

While our experimental design allows us to carefully control the work environment and reduce potential biases, the chosen methodology does not come without drawbacks. Given the limited number of applicants we received (312) we had to constrain the number of treatment groups to four in order not to compromise the statistical power of the study. As a result our experiment design is unable to distinguish the change in productivity that is due to the wage cut and wage inequality. To do so, we need an additional treatment group in which all participants

Fig. 3.4: Job satisfaction by gender

Figure 3.4 reports mean level of work satisfaction by treatment. The graphs show mean level of work satisfaction for pre and post-intervention phases. Interval bars show the 95 percent confidence intervals.

Table 3.5: Impact of Unequal Treatment on change in Job Satisfaction

	All	Female	Male	p-value (2)vs(3)
	(1) b/se	(2) b/se	(3) b/se	(4)
HL	-0.378*** (0.108)	-0.301* (0.171)	-0.486** (0.232)	0.418
In-group	-0.575*** (0.105)	-0.315** (0.149)	-0.910*** (0.194)	0.003*
Out-group	-0.729*** (0.098)	-0.534*** (0.144)	-1.042*** (0.196)	0.014*
Constant	0.000 (0.058)	-0.032 (0.117)	0.042 (0.152)	0.549
Observations	283	167	116	
R sq	0.124	0.079	0.230	
Adj R sq	0.114	0.062	0.210	

Dependent variable is a an ordinal variable measuring the change in job satisfaction from session 1 to session 2. It is based on a scale from one to five. Male is a dummy variable equal to one if the participant is a male and zero otherwise. Regression (1) reports correlations between the different unilateral wage cut treatments and change in job satisfaction. Regression (2) examines change in job satisfaction by gender. Standard errors reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

in the same treatment receive an equal wage cut in session two. In addition, we limit our analysis to examining the impact of only disadvantageous inequality on productivity at the workplace without addressing the impact of advantageous inequality. While both of these distinctions are valuable from a policy perspective, we limit the experimental groups to those that would serve the main research question of this paper. In addition we base our choice on the existing empirical evidence showing a very small or no impact of advantageous inequality on productivity (Cohn et al., 2014; Gächter and Thöni, 2010).

Based on the feedback survey after the experiment, we observe that female workers in the Out-group wage cut treatment expected the performance of their male coworkers to be better than own performance. Thus one of the plausible mechanisms could be that females justified the inequality and therefore, did not respond negatively. However, having higher expectations regarding coworker performance might be subject to bias since the data was collected at the end of the experiment. Nevertheless, it points to an important question for future research about how justification of the inequality and introducing transparency in effort supply of others could impact fairness concerns. Breza et al. (2017) find that making effort observable mitigates the negative morale effects of wage inequality when the justification for the pay differences is transparent. While they do not have the identity component, future research could focus on disentangling response to wage inequality when the cause of inequality is observable.

An important factor to consider when analyzing the treatment effect is the degree of clarity as well as the degree of difficulty of the task as perceived by workers in each treatment. For that purpose we collect data on two main control questions addressing these points. The questions ask the participants to indicate on a scale from one to five how much they agree with the following statements: "The task was clearly explained to me by the trainer" and "I found the task difficult/challenging to execute". Figure 3.5 below, plots the average for each of the above questions by treatment. It shows that workers, on average, perceived the task to be clear and moderately difficult. More importantly, little difference is found across the different treatments for both questions, indicating that differences in the perceived difficulty or clarity of the task may not be confounding our results. Finally, our study is able to provide external validity of the importance of social comparison and the wage effort hypothesis. Although the experiment was conducted at the university, we recruited students assistants in the second and final year of their studies who would be entering the labor market. Furthermore, since the selected universities are public funded, the students come from diverse backgrounds and do not belong to the elite or high income households.

FIG. 3.5: Control questions on the degree of clarity and difficulty of task
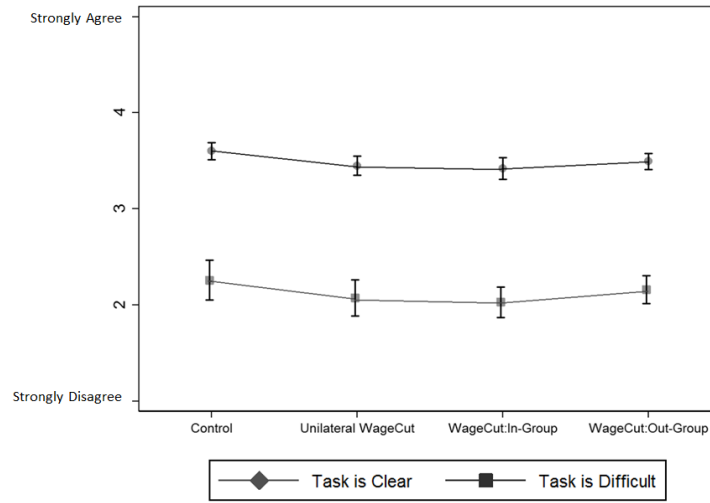
Figure 6 reports answers to two control questions the first addresses the perceived clarity of instructions given during the training session, and the second the perceived difficulty of the task. Answers are based on a one to five scale. A relatively high vote on the first scale indicates that the worker thought the task was clearly explained. A high vote on the second scale indicates that the worker perceived the task to be difficult. Interval bars show the 95 percent confidence intervals

3.6   Conclusion

This paper uses data from a field experiment to examine the impact of wage inequality at the workplace on productivity. We collaborated with three public universities in Kolkata to temporarily hire student assistants for a data entry task. Students were paired into teams of two and had identical tasks. They were paid the same hourly wage in the first session of the experiment. We subsequently implemented three treatments that enabled us to examine social comparison effects on productivity under conditions of inequality.

Similar to the existing literature, we find that unilateral wage cuts impact the quantity of work produced by both male and female workers. We, however, do not find any significant impact of inequality on the quality of work produced. On average, our findings show that in-group inequality introduces a bigger reduction in productivity relative to an out-group comparison. This is especially due to female workers who reduce their productivity significantly more when the advantaged co-worker is a female compared to a male co-worker.

In addition, we also find female workers' equity evaluations are associated with the gender identity of the reference group. Those females matched with male coworkers believed that their advantageous coworkers performed better and therefore did not respond negatively to wage inequality. This is contrary to male workers who reduce their productivity regardless of the gender identity of the advantaged co-worker. The paper suggests evidence for the role of performance evaluations as a mediating channel leading to the main findings. In particular, we find that, when effort is not observed, participants formulate evaluations of their performances relative to other co-workers. The gender identity of the coworker play an important role in

formation of these expectations, particularly for women.

The findings of this paper with respect to women is consistent with social comparison theories which expect individuals to compare themselves to the most similar other (Festinger, 1954). There is also evidence of identity based expectations that affect how minority and disadvantaged groups respond to inequality (Jost, 1997; Jost and Banaji, 1994; Jost and Burgess, 2000; Carlsson et al., 2009; Crosby, 1984; McDuff, 2001; Donohue and Heywood, 2004; Parks et al., 1995). In this paper we find that the impact of inequality on productivity is mitigated if workers expect pay differences to be justified leading to self-perpetuating inequality.

The findings suggest that heterogeneity in equity evaluations allows the cost of inequality to vary, hence reducing the incentive for firms to adopt an equal pay policy. This cost is especially low when inequality is consistent with the existing social order. The results encourage the need for exogenously imposed policies that increase the cost of discrimination and restore equality. In addition to interventions that offer disadvantaged groups equal access to opportunities, our results point at the need for future studies to implement interventions that make effort or productivity visible thereby disentangling justified and unjustified pay differences.

3.7 Appendix A

TABLE 3.6: Randomization

	Control	HL	In-group	Out-group	(1)-(2)	(1)-(3)	(1)-(4)	(2)-(3)	(2)-(4)	(3)-(4)
Gender(male=1)	0.475	0.451	0.412	0.463	0.807	0.451	0.889	0.654	0.898	0.506
	(0.066)	(0.070)	(0.050)	(0.056)						
Religion(Hindu=1)	0.966	0.902	0.866	0.887	1.000	0.468	1.000	1.000	1.000	1.000
	(0.024)	(0.042)	(0.035)	(0.036)						
Caste(general=1)	0.831	0.922	0.835	0.863	0.156	0.942	0.606	0.145	0.304	0.616
	(0.049)	(0.038)	(0.038)	(0.039)						
Age	1.407	1.588	1.656	1.362	1.000	0.506	1.000	1.000	0.146	0.025
	(0.065)	(0.070)	(0.064)	(0.057)						
Marital status(married=1)	0.000	0.059	0.010	0.013	0.148	0.435	0.392	0.165	0.225	0.897
	(0.000)	(0.043)	(0.010)	(0.013)						
Years of Education	0.661	0.588	0.885	0.925	1.000	1.000	0.221	1.000	0.305	1.000
	(0.071)	(0.085)	(0.063)	(0.075)						
Field of Stud (sciences and engineering=1)	0.676	0.625	0.510	0.585	0.152	0.099	0.098	0.016	0.134	
	(0.054)	(0.063)	(0.051)	(0.056)						
Average grade	0.875	0.960	0.895	1.075	1.000	1.000	1.000	0.155	0.992	0.232
	(0.045)	(0.057)	(0.046)	(0.046)						
Work experience(yes=1)	0.085	0.314	0.219	0.275	0.014	0.066	1.000	0.088	1.000	1.000
	(0.037)	(0.066)	(0.042)	(0.050)						
Total	60	60	97	95						

Columns (1) to (4) report mean values per treatment group. Standard errors are reported in parentheses. Columns (6) to (10) report the p-values resulting from running orthogonality test (t-test) of the differences of means across the treatment arms. Gender is a dummy variable that is equal to one if the worker is a male and zero otherwise. Religion is a dummy variable that is equal to one if the worker is from the Hindu religion and is zero otherwise. Caste is a dummy variable that is equal to one if the participant is of high caste. Non-Hindu participants i.e Muslims are considered low caste. Age is a continuous variable indicating the average age of the hired workers in each treatment group. Marital status is a dummy that is equal to one if the worker is married. Years of education is a continuous variable equal to the average number of years spent at the university till the date of the experiment. Field of study is a dummy variable equal to one if the participant is a student in the field of sciences and engineering and is equal to zero if the participant is a student in the field of arts and commerce. Average grade is a continuous variable indicating the average grade attained in the previous semester. Work experience is a dummy equal to one if the worker had any work experience before the interview date.

TABLE 3.7: Sample Characteristics

	Frequency	Percentage
Gender		
female	185	59.11%
male	128	40.89%
Religion		
Hindu	281	89.78%
non-Hindu	32	10.22%
Caste		
general	272	86.90%
low caste	41	10%
Age		
[17 to 21]	153	49.2%
[22 to 26]	149	47.9%
Marital Status		
single	307	98.72%
married	5	1.03%
Years of education		
Less than a year	108	34.7%
[1 to 4]	170	54.78%
More than 5 years	33	10.6 %
Field of study		
sciences and engineering	193	62.1 %
arts and commerce	118	37.98%
Average grade		
Less than 60	31	10.2%
[61 to 80]	256	83.9 %
[81 to 100]	18	5.9 %
Work experience		
no	243.0	78.1%
yes	68.0	21.9 %
Universities		
Calcutta University	144	46.15 %
Jadavpur University	82	26.28%
Presidency University	86	27.56 %
N	312	312

FIG. 3.6: Average performance in by male and female workers in Session 1
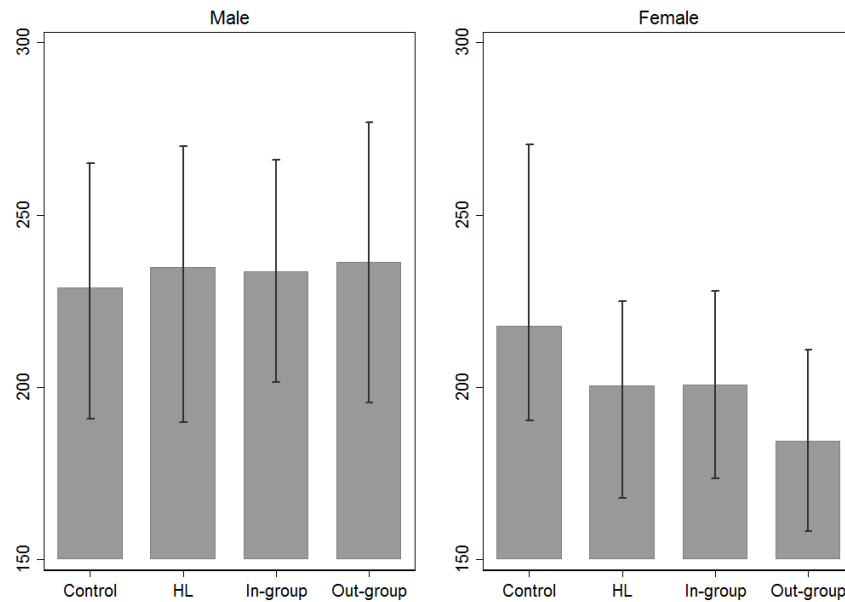
Figure 7 reports mean number of entries produced in session 1. Interval bars show the 95 percent confidence intervals.

two-sided t-test by gender:
Control: p-value 0.7841
HL: p-value= 0.1487
In-group: p-value= 0.1262
Out-group: p-vlaue= 0.0303**

FIG. 3.7: Post-treatment effect on quality of work
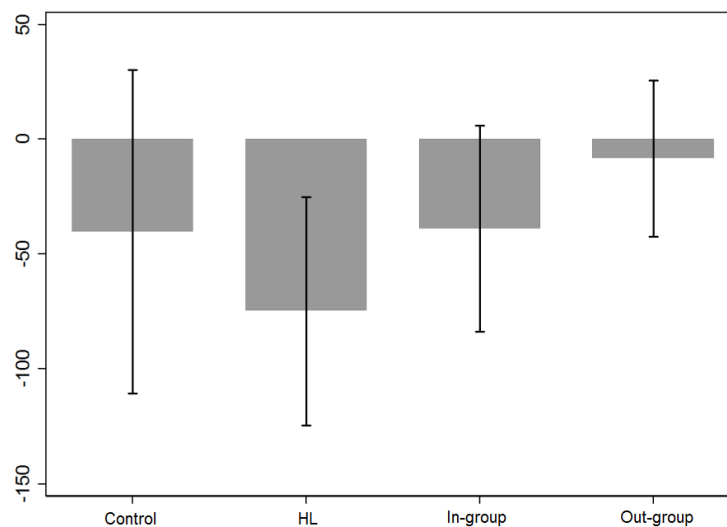
Figure 8 reports the change in the number of mistakes as a percentage of the pre-intervention average.Interval bars show the 95 percent confidence intervals

FIG. 3.8: Post-treatment effect on quality of work by gender
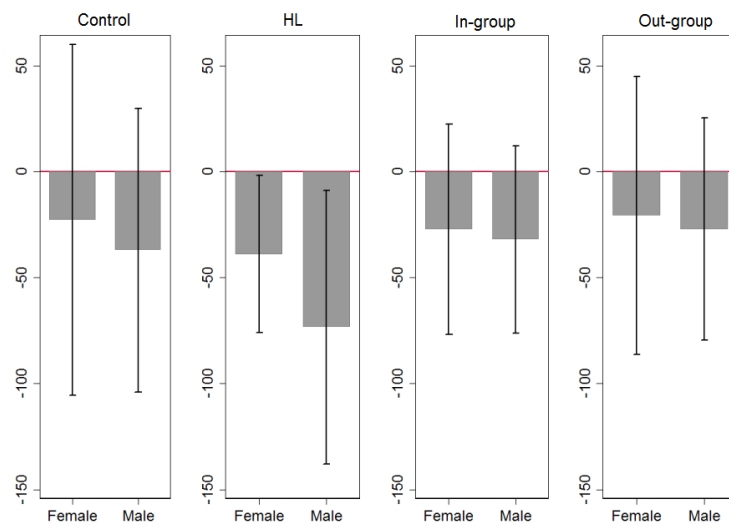
Figure 9 reports the change in the number of mistakes as a percentage of the pre-intervention average.Interval bars show the 95 percent confidence intervals

TABLE 3.8: Impact of unilateral wage cuts on quantity produced

	Total	Female	Male
	(1)	(2)	(3)
	Number of Entries	Number of Entries	Number of Entries
Session two	46.14***	46.66***	44.77*
	(14.81)	(17.33)	(25.47)
HL × Session two	-82.72***	-70.53*	-97.58**
	(28.01)	(36.23)	(45.61)
In-group × Session two	-126.9***	-105.4***	-163.3***
	(18.58)	(22.07)	(30.42)
Out-group × Session two	-50.87***	-11.27	-117.6***
	(17.41)	(18.92)	(30.49)
Number of mistakes	-0.497	-0.988***	0.740
	(0.377)	(0.216)	(1.057)
HL × Number of mistakes	1.272	2.113	-0.184
	(0.848)	(1.588)	(1.380)
In-group × Number of mistakes	0.563	1.378***	-1.560
	(0.569)	(0.463)	(1.296)
Out-Group × Number of mistakes	0.624	1.998***	-0.581
	(0.511)	(0.628)	(1.091)
Constant	206.1***	187.7***	227.0***
	(5.162)	(6.344)	(8.256)
R squ.	0.205	0.218	0.365
Observations	312	185	127

Results from OLS regressions with individual fixed effects. Dependent variable is the number of entries produced in each working session. HL, In-group, Out-group are treatment dummies set to one for the corresponding treatment (and zero otherwise). Controls account for the difference in quality of work produced with respect to the control. Standard errors reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

TABLE 3.9: Impact of unilateral wage cuts on quality produced

	Overall	Female	Male
	(1)	(2)	(3)
	Number of Mistakes	Number of Mistakes	Number of Mistakes
Session two	-0.845	3.030	-3.324
	(4.880)	(6.196)	(6.302)
HL × Session two	-10.27*	-10.14	-12.89
	(6.188)	(7.007)	(10.02)
In-group × Session two	-5.359	-6.722	-10.58
	(6.074)	(7.728)	(8.103)
Out-group × Session two	-0.454	-7.048	5.928
	(5.359)	(6.428)	(9.405)
Number of entries	-0.0466	-0.140	0.0377
	(0.0519)	(0.0852)	(0.0407)
HL × Number of entries	0.0773	0.163*	-0.00495
	(0.0591)	(0.0902)	(0.0646)
In-group × Number of Entries	0.0514	0.173*	-0.0904
	(0.0605)	(0.0933)	(0.0629)
Out-group × Number of entries	0.0543	0.179**	-0.0186
	(0.0551)	(0.0882)	(0.0523)
Constant	16.92***	15.15***	18.15***
	(3.155)	(4.102)	(5.119)
R squ.	0.065	0.094	0.102
Observations	312	185	127

Results from OLS regressions with individual fixed effects. Dependent variable is the number of entries produced in each working session. HL, In-group, Out-group are treatment dummies set to one for the corresponding treatment (and zero otherwise). Controls account for the difference in quantity of work produced with respect to the control. Standard errors reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

3.8   Appendix B - Questionnaires

To the research assistants:*Thank you for participating in the short term job. At the end of your contract agreement we would like to know your feedback regarding the experience of working with us. For that we would appreaciate your participation in the following short questionnaire.*

36. Name:

_____

37. Last name:

_____

38. Assigned ID:

_____

39. Task was clearly explained

   ☐ Strongly disagree   ☐ Disagree   ☐ Agree   ☐ Strongly agree

40. Please rate your level of satisfaction with regard to the payment recieved in the first session

   ☐ Very bad   ☐ Bad   ☐ Good   ☐ Very good

41. Please rate your level of satisfaction with regard to the payment recieved in the second session

   ☐ Very bad   ☐ Bad   ☐ Good   ☐ Very good

42. I would rate my performance in the first session to be:

   ☐ Very poor   ☐ Poor   ☐ Good   ☐ Excellant

43. I would rate my performance in the second session to be:

   ☐ Very poor   ☐ Poor   ☐ Good   ☐ Excellant

44. I believe that my performance relative to my team partner on the first working session be

   ☐ Much worse   ☐ Worse   ☐ Equal   ☐ Better ☐ Much better

45. I believe that my performance relative to my team partner on the second working session be

   ☐ Much worse   ☐ Worse   ☐ Equal   ☐ Better ☐ Much better

46. Suppose you are working in this firm, please specify the wage information that you would like to know about, other than your own wage, if any?

   ☐ Wages of other colleagues similar to me in gender

   ☐ wages of other colleagues similar to me in caste

   ☐ wages of other colleagues similar to me in gender and caste

   ☐ wages of any other colleague

   ☐ Only my own wage

47. Would you be interested in contract extension to participate in a third working session?

☐ Yes

☐ No

Chapter 4

Religious discrimination and Altruism: A field experiment with children in Mumbai, India

There is substantial generosity across the world (CAF, 2018). About 50 percent of the population offer help to strangers, almost 30 percent donated money, and 20 percent volunteered their time. According to the World Bank, in 2018 remittances accounted for US$689 billion, while US$27 billion was invested in humanitarian assistance. Therefore to design policies that encourage increased generosity, it is important to understand why people voluntarily contribute and engage in charitable behavior.

Two prominent explanations for charitable behavior are provided. On one hand, the theory of pure altruism assumes that individual donations are motivated solely by the interest in the welfare of the recipient (Becker, 1976). This theory implies that third-party contributions generate a one-to-one crowding out in donations (Warr, 1982). On the other hand, Andreoni (1989), proposed that donations are also motivated by warm glow or the utility that the donor experiences from contributing. Hence, as donations are motivated by an egoistic motive, there is no perfect crowding out of third-party donations.

This paper makes two contributions to existing research. First, we examine how pure altruism and warm glow motivations vary with the cognitive development of children. Second, we investigate how those motivations are affected by the identity of the recipient. Ample empirical evidence has identified that individuals display parochial altruism, discriminating in favor of in-groups and against out-groups (Bernhard et al., 2006; Fehr et al., 2013; Corr et al., 2015; Willard, 2017; Chiang and Wu, 2015). We trace the origins of such forms of identity based discrimination by investigating the motivations for giving to different groups and how those motivations change with age.

The context of our study is Mumbai, India. During the last decade, among other cities Mumbai has experienced extensive communal violence between two main religious groups- Hindus and Muslims. In addition to mass rioting, there is evidence of systematic institutional discrimination toward Muslim minorities in economic and social spheres (e.g., access to public goods (Banerjee et al., 2005), exclusion in education and labor markets (Deshpande and Sharma, 2016; Sachar, 2006), and lack of economic mobility (Asher et al., 2018)). Therefore, this context provides a backdrop to study the role of deeply rooted and salient identities in social preferences. Particularly, we study its impact among school age children between 7 and 17 years. To elicit how motives for giving could be affected by the identity of the recipients, we implement a field experiment in schools with a high concentration of either Hindu or Muslim populations.

To disentangle the role of pure altruism and warm glow, we use a modified version of the experimental design by Ottoni-Wilhelm et al. (2017). We invite children to complete a survey on educational aspirations and pay them in the form of school materials. We then ask the children if they would be willing to donate part of the materials they received to support a charity that works with disadvantaged children. Following Ottoni-Wilhelm et al. (2017), we present to each participant six scenarios that vary in the value received by the donor and the value that we as researchers donate to the charity. This allows us to disentangle the role of pure altruism and warm glow using a structural estimation of the utility function.

The experimental uses a between subjects design that allows us to disentangle if there is discrimination towards a particular group. The treatments vary the frame used to present the charity. In the control treatment, donors receive a flyer of the charity that contains pictures

of the library of the beneficiary organisation. The other two treatments present pictures of school-age children who are either Hindu or Muslim and receive assistance from the organisation. To compare the effect of in-group and out-group discrimination, we conduct the experiment in schools with a majority Hindu or Muslim population.

We find that warm glow preference is the most important motivation of giving among children. Yet, pure altruism is higher for older than younger cohorts. We find that for younger children, the motivations for giving do not depend on the identity of the beneficiary. Children aged between 14 and 17 display a higher degree of pure altruism toward the out-group than the in-group. Hence, participants in this group engage a larger degree of crowding-out of donations toward out-groups than in-groups.

In addition to the altruistic preferences of the children, we also measure the warm glow and pure altruistic motivations of their parents. We find that for both mothers and fathers, the pure altruism motivation of giving is more important than pure altruism We find a high degree of correlation between the altruistic preferences of parents and children.

We contribute to the empirical literature that investigates the motivations of voluntary giving. Previous papers tested theories of pure altruism (Ribar and Wilhelm, 2002; Eckel and Grossman, 2005; Bolton and Katok, 1998), warm glow (Crumpler and Grossman, 2008), or a combination of both (Tonin and Vlassopoulos, 2014; Konow, 2010). The closest paper to ours is Ottoni-Wilhelm et al. (2017), who uses a lab experiment and a structural estimation of the utility function to not only disentangle different motivations of giving but also provide evidence of interdependence in social preferences. We contribute to this literature by investigating how both warm glow and pure altruism vary toward recipients of different identities, and also how those motivations vary for children of different age groups.

A relatively large body of literature has documented in-group favoritism and out-group discrimination (Akerlof and Kranton, 2000; Kranton, 2016; Dotterer and Lowe, 2015). Similar to Bauer et al. (2014), we consider how norms of discrimination develop in children. We complement this research by investigating whether discrimination is associated with different norms of altruism. The emphasis of our study is religious discrimination in India.

4.1 Literature Review

The notion that norms of altruism affect behavior can be traced back to Adam Smith who wrote in the *Theory of Moral Sentiments (1976)*: "However selfish man may be supposed, there are evidently some principles in his nature, which interest him in the fortune of others, and render their happiness necessary to him, though they derive nothing from it except the pleasure of seeing it." Such a sympathy-driven motivation for voluntary acts was also propounded by Arrow (1977) and Sen (1977; 1985b).

Becker (1976) formalized this idea as a pure altruistic motive in which the utility of giving increases with the increase in the social income i.e the total income of both the donor and the recipient[1]. Bergstrom et al. (1986) and Warr (1983) show that this motivation for giving generates a one-to-one crowding out when donations of a third party increase. Yet, contradicting

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[1]Therefore, if the recipient receives transfer from a third party, the donor is expected to reduce own transfer so as to retain the social income i.e the total income of the donor and recipient

this proposition, empirical data revealed that any government grant did not result in the complete crowding out of private transfers, but instead, people continued to donate (De Wit et al., 2017; De Wit and Bekkers, 2017; Kingma, 1989).

An explanation on why complete crowding out did not occur was provided in Andreoni (1989, 1990)'s impure altruism model. He proposed that voluntary giving was associated with both a pure altruistic motivation and a warm glow motivation. The latter was related with the utility that individuals derive from the act of giving. One implication of warm glow giving is that individuals would donate irrespective of government grants, or any other third-party. A series of studies followed Andreoni proving the non-existence of the complete crowding out hypothesis. An earlier study by Ribar and Wilhelm (2002) reviewed this theory using experiments in the lab and actual donations by people to real charities. They found that despite large membership base of charities, people continued to donate. Thus, increase in the number of members and donations to the charity increased individual contributions, supporting the presence of a warm glow motivation of giving.

Eckel and Grossman (2005) – EGJ – introduced a novel method to disentangle this warm glow motivation. They varied the degree of fiscal illusion by making one group aware that a tax had been deducted from their earnings to benefit the charity, while the other treatment group was unaware about the tax deductions for a charity. EGJ find when participants are unaware of the tax deductions, there was incomplete crowding out, rejecting the null hypothesis of pure altruism. However, when there was no fiscal illusion regarding the tax, the results were close to a complete crowding out. Crumpler and Grossman (2008) – CG – implemented another method to isolate and measure warm glow giving. Participants were asked to donate to a charity of their choice, however, the amount that the charity received was fixed ex-ante. Any amount donated by the participant would be complemented by the researcher to fulfill the criteria of the fixed amount. A pure altruistic individual would not be expected to donate any amount (since donating would not impact the total amount of the charity good, and would further reduce the social income i.e the sum of own income and the income for the charity). A pure warm glow individual would donate despite the crowding effect that this would generate on donations of the research team. The results showed extensive warm glow motivations, wherein 57 percent of the participants donated and, on average, the donations amounted to 20 percent of their endowment. Similarly Tonin and Vlassopoulos (2014) found support for the warm glow motivation. The study included an additional treatment to disentangle to experimenter demand effect by including one treatment considering recipients to be the researchers, the other treatment replicated the CG study and the third treatment tested for baseline altruistic preferences.

While the above studies test the pure altruism model i.e the crowding out hypothesis, following the work by Andreoni (1989) and Ottoni-Wilhelm et al. (2017), this study situates the Impure altruistic model as the null hypothesis. Keeping in mind preference interdependence, our contribution to this literature is measuring the relative importance of both pure altruism and warm glow preferences in individuals. Furthermore, we observe these motivations of giving for children across different age groups. Two papers close to our study are by Liebe and Tutic (2010) and List and Samak (2013) who disentangle motivations for altruistic giving in children. Liebe and Tutic (2010) conduct an artefactual field experiment in primary schools in

Germany to study the effect of social status (determined by the type of schooling – Hauptschule, Realschule, Gymnasium and private Gymnasium in increasing order of social status) on voluntary contribution of children. They played dictator games and hypothesized that pure altruism is prevalent when high-status schools donate more than low-status school children and receive less compared to the latter. Warm-glow will persist if donations remain constant, irrespective of the income status of the recipient. The results showed support for warm glow preference of giving, whereby particularly students from high-status schools gave consistent amounts to both high-status and low-status recipients. Unlike them, in our study, the deservingness of the recipient (socioeconomic conditions of recipient) remains constant. List and Samak (2013) measure warm glow giving among very young children (aged three to five). They rejected warm glow motivations of giving as children donated less to teddy bears than to other children. In our study, we are able to observe these motivations over a longer age range (7 to 17 year-olds). Unlike these two studies, we are also able to estimate the relative importance of both warm glow and pure altruism.

Our study adds to the burgeoning literature on the development of social preferences in children which has been studied in both psychology (Fabes and Eisenberg, 1998) and economics (Fehr et al., 2008). Most of the studies unanimously agree that social preferences such as inequality aversion (Fehr et al., 2008), generosity, altruism (Gummerum et al., 2010; Harbaugh et al., 2003), and fairness preferences (Almås et al., 2010) increase with age. A recent literature review on the development of prosociality can be found in Fehr et al. (2013) and Angerer et al. (2015b). We add to this line of research by investigating how motivations for giving is correlated with age.

Apart from the importance of age, we are keen on studying how contextual factors such as the identity of recipients impacts the relative strength of warm glow and altruistic giving among children. Previous studies have shown that an increase in the social distance of the recipient (from the donor) is negatively correlated with charitable giving (Roth, 1995; Hoffman et al., 1996; Bohnet and Frey, 1999; Rotemberg, 2014). The Familiarity Hypothesis (Konow, 2010) and the Social Identity theory (Tajfel and Turner, 1979) is used to explain greater donations toward recipients who are closer in terms of identities such as race, ethnicity or citizenship (Gangadharan et al., 2014).

These theories have been operationalised in lab or lab in the field experiments using either induced identities (Kranton et al., 2013; Chen and Li, 2009; Costard, 2011; Corr et al., 2015; Ahmed, 2008; Pan and Houser, 2013) or make pre-existing identities salient (Chai et al., 2011; Goette et al., 2006; Chakravarty et al., 2016; Hoff and Pandey, 2006; Friesen et al., 2012). The studies find a strong in-group favoritism or out-group discrimination among adults when the identity of the recipient is revealed.[2] By making existing identities salient, Chakravarty et al. (2016) found that religious homogeneous villages have greater cooperation and Selten and Ockenfels (1998) observed greater altruism and reciprocal intentions toward in-group members in various solidarity games.

The importance of Familiarity Bias and Social Identity (Tajfel and Turner, 1979, 2019) has

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[2]Kranton et al. (2013) find that participants willing to destroy the social welfare of a member from the out-group at their own cost.

been observed among children from the age of five years (Banerjee et al., 2005). It was found that as children grow older, they increase altruism and decrease envy/spite toward recipients who belonged to the in-groups (Friesen et al., 2012; Angerer et al., 2015b). The in-group bias is seen to be higher in regions where individuals experienced conflict. This was observed by Bauer et al. (2014) who identified children exposed to conflict and found a significant increase in giving to the in-group compared to the out-group among those participants who had the most exposure to the conflict.

However, none of the studies observe whether the identity of the recipient impacts pure altruistic or warm glow giving. Our study contributes to this literature as it observes how saliency of religious identities, in cultural contexts where these identities are prominent, can motivate pure altruism and the warm glow preferences of giving, respectively.

In summary, our contribution to the existing research is as follows; first, we measure the relative importance of pure altruism and warm glow as motivations for voluntary giving across three cohorts of school children (7-10yrs, 11-13yrs and 14-17yrs). Second, we study how motivations for giving change according to the identity of the recipient. Finally, we study how the social background and other demographic factors of the children could affect overall altruistic giving.

4.2 Conceptual Model

The conceptual framework follows the empirical strategy of Andreoni (1990) and Ottoni-Wilhelm et al. (2017). Consider an economy in which individuals are endowed with wealth w_i that they can allocate between the consumption of a private good, x_i, and a contribution to a charity good, g_i. Let n be the total number of individuals in the economy and $G = \sum_{i=1}^{n} g_i$ the total amount of charity goods generated. Following the model of impure altruism by Andreoni (1990), the utility function can be written as:

$$U_i = U(x_i, G, g_i); \quad \forall \quad i = 1, ...n \tag{4.1}$$

where U is assumed to be a continuous and strictly quasi-concave function of its components. This model of impure altruism implies that the utility depends on the consumption of the private good, the total charity goods generated, and the own contribution to the charity good. Assuming a homogeneous Cobb-Douglas utility function of degree 1, Equation (4.1) can be written as:

$$U(x_i, G, g_i) = (1 - \alpha - \beta) \ln x_i + \alpha(\ln G) + \beta(\ln g_i) \tag{4.2}$$

$0 < \alpha < 1$ is the measure of pure altruism obtained from the total value of the charitable good. $0 < \beta < 1$ represents the degree of warm glow from own contribution to the charity. For a pure altruist $\alpha > 0$ and $\beta = 0$, whereas for a pure warm glow individual $\alpha = 0$ and $\beta > 0$. Equation 4.2 is subject to the budget constraint:

$$x_i = w_i - g_i; \quad \forall \quad g_i = G - G_{-i} \tag{4.3}$$

$$Z_i = w_i + G_{-i} \tag{4.4}$$

Z_i is the donor's social income i.e combination of own income w_i and giving by others G_{-i}. Based on the utility framework of Becker (1976), Andreoni (1989), and Ottoni-Wilhelm et al. (2017), the charity good in this model has the properties of a public good, namely both non-excludability and the generation of positive externalities[3].

Substituting the budget constraint 4.3 in Equation 4.2, the donor's maximization problem can be written as:

$$max \quad U = (1 - \alpha - \beta) \ln[Z_i - G] + \alpha \ln G + \beta \ln[G - G_{-i}] \tag{4.5}$$

The first order conditions can be solved for the implicit demand functions for the total amount of public good:

$$G^* = (-1)\frac{1 - \alpha - \beta}{Z_i - G} + \frac{\alpha}{G} + \frac{\beta}{G - G_{-i}} = 0 \tag{4.6}$$

In terms of the individual's giving, the predictions of warm glow and pure altruism within an impure altruism model can be rewritten as:

$$g_i^* = -G_{-i} + 0.5[(1 - \beta)G_{-i} + (\alpha + \beta)Z_i + \{[(1 - \beta)G_{-i} + (\alpha + \beta)Z_i]^2 - 4\alpha G_{-i}Z_i\}^{1/2}] \tag{4.7}$$

Assuming a Cobb-Douglas utility function[4], the model tests the null hypothesis of Impure altruism such that a.) $\alpha + \beta - > 1$ and an increase in giving by others increases own optimal giving. b.) the warm glow parameter β is greater than 0 and increasing, showing evidence of no complete crowd-out.

In the next section, we explain the experiment design, which uses different levels of giving by others to test for the Impure altruism model (Ottoni-Wilhelm et al., 2017).

4.3 Experiment Design and Hypothesis

In this section, we will discuss the experiment design, hypothesis and the procedures used to implement the experiment.

4.3.1 Experiment Design

We implement a between-within subjects design which allows us to disentangle different motivations of altruistic giving such as warm glow, pure altruism. We implement modified version of the within-subject design by Ottoni-Wilhelm et al. (2017). Each individual has to make six decisions as presented in Table 4.1. In each situation, participants receive a fixed endowment, either 40 or 46 rupees, and can donate part of their endowment to a foundation that receives an initial donation from us (researchers).

This design allows the analysis of three main effects – subsidy, tax, and income effect at two different levels of donations from the third-party (researchers) to the charity. The subsidy effect measures the change in a participant's donation when the initial endowment of the participant

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[3]We assume that a third-party contribution to the charity good creates a positive externality on the donor who gains utility even when they do not contribute on their own for the same good.

[4]In the discussion section, we provide potential limitations of assuming a Cobb-Douglas function to estimate the parameters.

remains the same but the foundation's initial donation increases by 6 units. This can be seen in budgets 1 and 2 (also 4 and 5). If participants are motivated by warm glow preferences, donations should be the same in both budget scenarios. Comparing the donation decisions in budgets 2 and 3 (5 and 6), we can examine a lump-sum tax effect. From Budget 3 to Budget 2, and from Budget 6 to Budget 5, 6 units are deducted from the participant's endowment and are directly transferred to the foundation's initial donation. If participants are purely altruistic, they would reduce their transfer by 6 units, resulting in a one-to-one crowd out. Finally, we analyze an income effect comparing budgets 1 and 3 (also budgets 4 and 6) wherein the foundation's initial donation does not change but the participant's endowment increases by 6 units.

TABLE 4.1: Experimental Budgets.

Budget	Participant's endowment (w_i)	Foundation's fixed donation (G_{-i})	Participant's social income ($G_{-i} + w_i$)
1	40	4	44
2	40	10	50
3	46	4	50
4	40	28	68
5	40	34	74
6	46	28	74

This is the original design by (Ottoni-Wilhelm et al., 2017) which we modify to test two main hypothesis: the strength of warm glow and pure altruism for different age groups and when the social identity of the recipient changes. Inorder to study how altruistic giving varies for different age groups, we implement the experiment by Ottoni-Wilhelm et al. (2017) across children of three cohorts; 7-10 yrs (youngest cohort), 11-13 yrs (middle cohort) and 14-17 yrs (oldest cohort). Using the experiment design with 6 donation decisions we can obtain a warm glow and pure altruism measure for each of the participants and compare the motivations of altruistic giving for the different cohorts.

Second, we investigate whether motivations for giving change for beneficiaries of different identities. To explore this question, we vary the information regarding the religious identity of the recipients using a between-subject design. One group of students received an abstract flyer showing photos of a school library (no identity treatment), a second group received an flyer showing photos of recipients who belonged to their own religious group (in-group treatment) and the third group received a flyer with photos of recipients who belonged to a different religious group (out-group treatment). By inducing this experimental variation we can assess whether participants discriminate positively or negatively towards beneficiaries of different identities relative to the abstract framework.

4.3.2 Hypothesis

This modified version of the Ottoni-Wilhelm et al. (2017) experiment enables us to test two hypothesis, which we discuss in this section.

Hypothesis 1: Pure Altruism, α, and warm glow, β, increase with age.

List and Samak (2013) find evidence of pure altruism but not warm glow giving among children (aged 3 to 5 years), thus providing evidence of a fundamental nature of pure altruistic

preferences. Since pure altruism is concerned with efficiency regarding the production of the public good, a higher cognitive capacity would be required to evaluate it. As the increase in bandwidth to assess the cost and benefits of contribution toward the good increases with age, we postulate a pure altruism parameter to be higher for older ages. In addition, a study by Harbaugh et al. (2007) reveals that as children grow older they are more aware of fairness, distributive concerns (Benenson et al., 2007; Fehr et al., 2008), and the presence of multiple donors (Guzmán et al., 2014). As a result, older children could be more prone to acting in a pure altruistic manner, since it reduces the inequality between themselves and the recipients.

On the other hand, warm glow which is benefit associated with own contribution to the charity is considered to be a consequence of repeated socialization which might develop only with time and is therefore more prominent among adults (Harris (1995)). Studies by Banerjee (2002) and Engelmann et al. (2013, 2018) show how prosociality is affected by concerns regarding social image, following social norms and peer influences, which are also higher among older children. Therefore, warm glow is hypothesized to increase with age. Liebe and Tutic (2010) in their study also provide support to the group socialisation theory and find that teenage children in school reveal greater warm glow preferences of giving. Since they do not have a variation across ages, the study is unable to provide conclusions on the role of age on such preferences. Finally, if we assume that pro-sociality and altruism generally increases and occurs through sympathy for other individuals (Sen, 1977; Smith and Adam, 1759), we would expect to see an increase in both pure altruism and warm glow. We expect the older children to display higher levels of both warm glow and pure altruistic motivations for giving. While there is sufficient empirical evidence of increasing altruism with age (Angerer et al., 2015a,b; Cárdenas et al., 2014; Kosse et al., 2019), we go one step further and compare the relative importance of the two motives, pure altruism and warm glow.

Hypothesis 2: We expect that overall altruistic motives (both warm glow and pure altruism) will be higher toward the in-group than toward the out-group. The relative degree of warm glow will be higher when the recipient is from the in-group compared to the out-group.

There is considerable theoretical (Konow, 2010; Tajfel and Turner, 1979) and empirical evidence that shows a high degree of in-group favoritism in social preferences (Gangadharan et al., 2014; Kranton et al., 2013; Chakravarty et al., 2016; Selten and Ockenfels, 1998; Sutter et al., 2019; Chakravarty et al., 2016; Chen and Li, 2009). Therefore, we expect altruistic motives will be higher towards recipients from the in-group. However, our study focusses on how motives of altruism; namely warm glow and pure altruism is affected by the identity of the recipient. A warm glow giver is expected to gain utility from own contribution to the charity good. If this warm glow is associated with status and reputational concerns, which are more relevant for the close social network, we expect individuals to have a higher degree of warm glow towards in-group members (Vesterlund, 2003; Hungerman, 2009; Banerjee, 2002; Engelmann et al., 2018). On the other hand, assuming that a warm glow giver can have non-egoistical motivations, e.g., giving is motivated by sympathy(Arrow, 1977), or a sense of commitment to the society (Sen, 1977), it would still not rule out the Familiarity Hypothesis (Konow, 2010) which increases non-egotistical motives depending on the closeness or familiarity to the recipient. Furthermore, empirical studies in neuroscience support these theories and show that empathy decreases when

the recipient is from an out-group (de Vignemont and Singer, 2006; Meyer et al., 2013; Xu et al., 2009).

In addition to observing the age and recipient's identity effect, we consider the association of other factors with motivations of altruistic giving. Factors considered are peer expectations and willingness to follow the social norm (Harris, 1995; Engelmann et al., 2013; Kosse et al., 2019; Simpson et al., 2017), religiousity Andreoni (2006); Bekkers and Schuyt (2008); Li (2017) and intergenerational transmission of altruistic giving Ben-Ner et al. (2017); Wilhelm et al. (2008); Brown et al. (2014).

4.3.3 Experimental Procedures

In this section, we delve into the context where the experiment was conducted and the procedures that were implemented.

We ran the experimental sessions in eight semi-randomly selected public schools in Mumbai.[5] To identify biased social preferences towards the in-group and out-group, we selected half of the schools with a high proportion of Hindu population, and the other half that was highly Muslim-dominated. Our aim was to capture an extreme form of discrimination, if any. As a result, we ensured that our sample came from segregated localities and particularly from areas that had experienced the riots in 1992-93. Mumbai is comprised of multiple administrative wards which are under the purview of the local municipality (BMC). Each ward has localities that are extensively segregated by religion and income. Within each ward, we selected areas that are either highly Hindu or Muslim dominant. Since we do not have information on the population composition by religion at the Ward level, our chosen Hindu and Muslim locations are based on detailed focus group discussions by our enumerators with various stakeholders, such as citizens living in these areas to the officers at the municipality level.

Children from grades 4 to 10 participated in one session that lasted approximately one hour. All the sessions were conducted during regular school hours, (i.e., there was no self-selection on who participated in the experiments). The children's participation was voluntary. Particularly in many Indian public schools, due to the large number of students, each class had at least three divisions. We randomized the identity treatments at the division level, but the altruism elicitation was undertaken for all the students.

In each session, the surveyors were introduced as researchers who were keen on studying the educational aspirations of young students. Accordingly, children were asked to complete a 30-minute educational survey and we informed them that all their answers and decisions would be treated and analyzed anonymously. The survey included some socio-demographic questions, a cognitive test (ravens matrices),[6] and some questions on expectations and aspirations from education. These questions were later utilized for another study on expected educational returns.

After completing the survey, as a means of thanking children for their time, it was announced that each child would get some payment that could be redeemed in the form of school items such as pens, pencils, notebooks, etc. At this point, participants where informed that they could

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[5]In total we have 8 schools - Maroli church (Muslim), Anjuman Islam (Muslim), Jaffri (Muslim), SIES (Hindu), Mori road(Muslim) , Sewri (Hindu) and Mahalaxmi (Hindu), Amarnath (Hindu).

[6]We selected a short version with 8 matrices of the original set of Raven's progressive matrices (Raven et al., 1998)

donate part of the endowment to a NGO with presence across different states in India, and whose objective is to help Indian children in need. Information of the NGO was given in the form of a flyer.[7]

As explained above, in each flyer, we presented different photos of the beneficiaries according to the treatment assignment. We asked participants to complete the six donation decision shown in Table 4.1 directly in the flyer. In order to avoid spillover effects across classes, we collected the flyers at the end of the session.

The selected NGO helped children across different religiously populated regions within India. Therefore, we could show photos of either NGO facilities with only Muslim children or only Hindu children who were potential beneficiaries without deception. While the information remained the same, the identity of the beneficiaries varied across the treatments. In the first treatment, called Abstract treatment, children saw photos of a school building and a library. In the other two treatments, children were shown photos of only Hindu recipients or photos of only the Muslim recipients of the NGO. We called the treatment in-group if they received flyers with photos of children from their own religious group or out-group if they received the flyer with pictures of children belonging to the other religious group. We implemented the control treatment to measure an average lower limit of giving relative to the religiously salient treatments. Treatment assignment was at the classroom level. The flyer, including the pictures and the information is provided in the Appendix (4.8, 4.7 and 4.9).

In each situation, children knew their endowment received from completing the education survey and the initial amount that the NGO received. They had to decide on the amount (from their earnings) that they would like to give to the recipients of the NGO. It was announced that the amount left would be given to the participants. Although each participant makes the six decisions, only one was randomly selected to calculate payments.

At the end of this activity, each child randomly picked a colored ball from a bag with six balls that represented the six situations from Table 4.1. Payments were calculated in a separate room, and each child received a package with school items that corresponded to the amount of rupees they kept for themselves. As a means to attenuate the experimental demand effects, we implemented a double blind format such that both students and the enumerators did not know the payment received by the participants. We ensured that the enumerators present in the classroom during the session were different from those handing out the gift packages. The students received a small voucher that stated which one of the six decisions was randomnly selected for payment. The enumerators present in the class did not know what would be written in the voucher. The student took this voucher to the enumerators outside the classroom to receive their payment. This drill was made clear to the students from the beginning of the session. One week after the sessions, surveyors came back to the schools and randomnly selected around 60 percent of the children to conduct a post experimental survey. The survey included questions regarding their religiosity and hypothetical questions such as willingness to follow a social norm and expectations regarding their peers (post-experiment Survey).

We also elicit the parents' pure altruistic and warm glow preferences. Attached to the consent

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[7]Information given about the NGO: "The NGO helps children and gives them good schooling. They give books, pens and pencils to the children. The children come from poor families. Some of the children do not have homes. The NGO is in Delhi. But they work in others parts of the country".

form for parents, they also received a survey and six questions (similar to those in Table 4.1), but without the identity component. In addition to the parent's consent, the project received approval by the principals in each school. Moreover, we informed the parents and teachers about the general objectives of the project and the payments to the children. Parents were also informed that they could withhold their child's participation, but we did not receive any denials.

4.4   Results

4.4.1   Descriptive Statistics

Socio-demographics

In this section, we provide an insight into the socio-demographic characteristics of our sample as well as their decisions in the experiment. Table 4.2 displays the mean values for the characteristics of our sample across the three treatment groups; namely abstract, in-group and out-group. The first panel of Table 4.2 describes the socio-demographics of our sample. Across all three treatment groups, girls comprise of 48 percent of the sample. The children are on average 12 years-old, 50 percent of the sample are children from the Hindu religion and the remaining are Muslims. On average, the children have three to four siblings and travel for 12 to 13 minutes to their school. The cognition variable denotes the number of correct answers entered in the Raven's matrices test and, on average, the children answered three to four questions correctly. The variable religiosity measures the frequency of visiting a religious shrine where 0 means never and 6 denotes every day. On average in our sample, children visited a religious shrine such as a temple or mosque a few times a month. All of the characteristics in our sample are balanced across the treatment groups

In the second panel of Table 4.2 is the information on the post-experiment survey where we asked the children some questions after the experiment regarding their decisions. Children who were exposed to the in-group treatment, on average, perceived charity to be good and believed that the NGO might be biased toward their own in-group (variable 'NGOfavorsingroup'). Columns 4, 5 and 6 in Table 4.2 is the orthogonality test that shows whether the baseline characteristics across the treatment groups are significantly different. The columns show on average (77%) of the children in the in-group treatment believe that the NGO favors their in-group compared to 58% of the children in the outgroup treatment (p=0.000). We consider this to be a sign of confirmation that our priming treatments for in-group and out-group identity worked. It should be made clear that the questions regarding the NGO and role of charity, i.e., from the variables 'Known NGO' onwards, were asked in a post-experiment survey only once the children had completed their decisions and were given the gifts. As a result, these questions did not frame the students before they made their donation decisions. It is worthy to note that majority of students across the three treatments declared that they would increase their contributions when there is a third party funding (variable: After subsidy). They also claim that their contributons would increase when there is a tax imposed on them (variable: After tax). These survey responses already hint at a tendency for the children in this sample to be more influenced by warm-glow giving. Finally, we asked the children for the reason why they had donated. Across the three

treatments, the children said they donated because the recipients were poor (the options included Poor, Poor and own religion, Own religion). However, slightly more students who were in the in-group treatment said they donated because the recipients belonged to their own religion and this is significantly different across the treatment groups (see Table 4.2).

In addition to the main survey and the post-experiment survey, we also spoke to the parents of the children and asked them a few questions. This household survey was conducted over the phone and included questions such as parents' education, monthly income, risk and time preferences (non-incentivized), subjective opinions of the parents regarding equal opportunities for all social identity groups in India. Parents were also asked questions on their charitable giving patterns and whether their children were aware of these donations. Finally, we conducted the same experiment on donation decisions with the parents (see Appendix tables 4.8, and 4.9).

TABLE 4.2: Summary Statistics - Children

	(1) Control	(2) Ingroup	(3) Outgroup	(4) (1) vs. (2), p-value	(5) (1) vs. (3), p-value	(6) (2) vs. (3), p-value
Socio-Demographics						
Female	0.489	0.486	0.474	0.918	0.617	0.678
Age	12.002	11.892	11.842	0.317	0.160	0.635
AgeGroups	1.987	1.929	1.950	0.164	0.387	0.584
Hindu	0.517	0.498	0.553	0.498	0.226	0.049
Siblings	3.444	3.341	3.623	0.403	0.346	0.108
Distance to school	12.458	13.444	12.620	0.180	0.822	0.105
Nearest school	13.274	12.717	8.345	0.931	0.402	0.438
Cognition	3.486	3.403	3.431	0.384	0.565	0.771
Religiousity	3.738	3.799	3.586	0.606	0.237	0.053
Flyer	3.460	3.545	3.426	0.388	0.752	0.236
Post Experimental survey						
Expectation	21.133	21.835	21.234	0.389	0.904	0.432
Familiar NGO	0.437	0.506	0.518	0.062	0.030	0.722
Charity is beneficial	0.855	0.920	0.857	0.005	0.956	0.003
NGOfavorsingroup	0.662	0.768	0.585	0.001	0.032	0.000
After subsidy	3.521	3.391	3.338	0.073	0.016	0.466
After tax	3.343	3.255	3.251	0.248	0.230	0.956
Follow norm (ingroup)	3.423	3.325	3.243	0.196	0.022	0.265
Reason to donate	1.164	1.302	1.120	0.014	0.268	0.000
N	547	647	626			

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4.8, provides information on the work status of the parents, the class distribution of the children across treatments, and mode of transport used to travel to school. Considering the entire sample, 41 percent of the fathers have permanent employment in offices, 24 percent are daily wage earners, and 16 and 8 percent of the respondents' fathers owned a small or large business, respectively, and 71 percent of the mothers in the sample were housewives. Table 4.9 provides information on certain subjective beliefs of the fathers and mothers. On average, 20

percent of the fathers and mothers have experienced discrimination. Although 90 percent of our sample of parents say they undertake charity, only 20 percent discuss their charitable giving with their children. When asked if all religious and caste groups should have equal access to education and work, only 30 percent of the sample agreed with this statement. When they were asked if minority religious and caste groups face discrimination at work and education, 60 percent of mothers and fathers agreed to this statement.

Charitable behavior

Next, we discuss the mean giving of the children and their parents for each of the donation decisions in the game. Figure 4.1 and Figure 4.2 are the mean proportion of income donated. The initial endowments for the children were Rs.40 or Rs.46 and for the parents was higher - Rs.100 and Rs.106.

For a pure altruism model to hold, we expect a compulsory tax to crowd out one to one private donations. Comparing Budgets 3 and 2 (6 and 5), we find that a compulsory tax of 6 units decreases giving by 1.37 units and 2.14 units for low and high donations respectively. Thus a tax in our sample results in a less than one to one crowding out effect (p=0.000). For the parents, a compulsory tax of 6 units reduces giving by 2.07 units and 0.77 units respectively for low and high level donations (p=0.000). Similar to Ottoni-Wilhelm et al. (2017), we find a significant difference in crowding out between low and high levels of giving (p=0.03) for adults. We can reject the null hypothesis of complete crowding out (or a pure altruism model) for the parents[8].

We can assess the impact of the third party 'subsidy' on donations by comparing budgets 1 and 2 (4 and 5). Under such an subsidy (without changing the donor's income), the donation is expected to decrease under impure altruism. For children, at low levels of giving by others (comparing Budget 1 and 2), own giving decreases by 0.03 rupees and it is not significantly different from zero (p=0.92). However, at high levels of giving by others (comparing budget 4 and 5), own giving reduces by 1.18 rupees (p=0.002). For the parents an increase in one rupee from the third party decreases giving by 0.84 rupees for low levels (p=0.007) and by 0.71 for high levels (p=0.01). From these preliminary non-parametric tests, we can already attribute the impure altruism model to reflect the motivations of altruistic giving [9].

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[8]Ottoni-Wilhelm et al. (2017) find very high crowding out at 97% and 82% for low and high levels of giving compared to our study which is 30% and 14%. While levels of crowding out are different, both reject pure altruism model for adults. Konow (2010) observes crowding out of 24% of endowment under tax treatment, Eckel and Grossman (2005) observes complete crowd out when there is no fiscal illusion about the tax - a tax of 3$ decreases giving by 2.84$ i.e 94% crowd out, fiscal illusion sees a crowding in of 78%

[9]Figures 4.4 and 4.5 in the Appendix are Kernel densities for the children and their parents. It depicts the difference in the distribution of giving before and after a subsidy or tax. For the children, the left side of the figure reveals the tax effect and the two distributions are not significantly different based on the Kolmogorov-Smirnov test for the equality of distributions. The right side of the panel shows the change in distributions under indirect subsidy effect. The KS test is significantly different under an indirect subsidy and the giving after the subsidy skewed the distribution to the right. These figures already provide a picture of the extent of the incomplete crowding out on average in the abstract treatment. Thus, giving decreases by 1 rupee in the subsidy condition and 2 rupees in the tax condition revealing incomplete crowding out (as opposed to a complete crowding out of 6 rupees).

FIG. 4.1: Average Giving
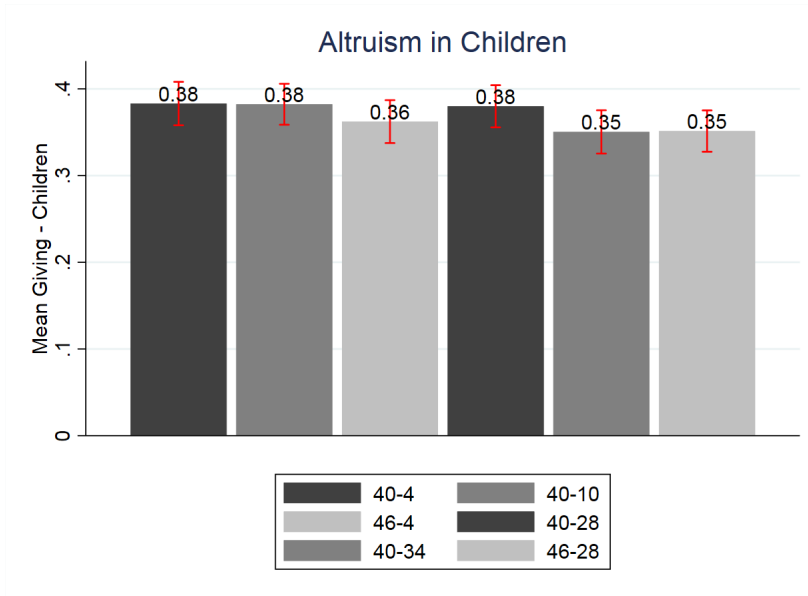
FIG. 4.2: Average Giving
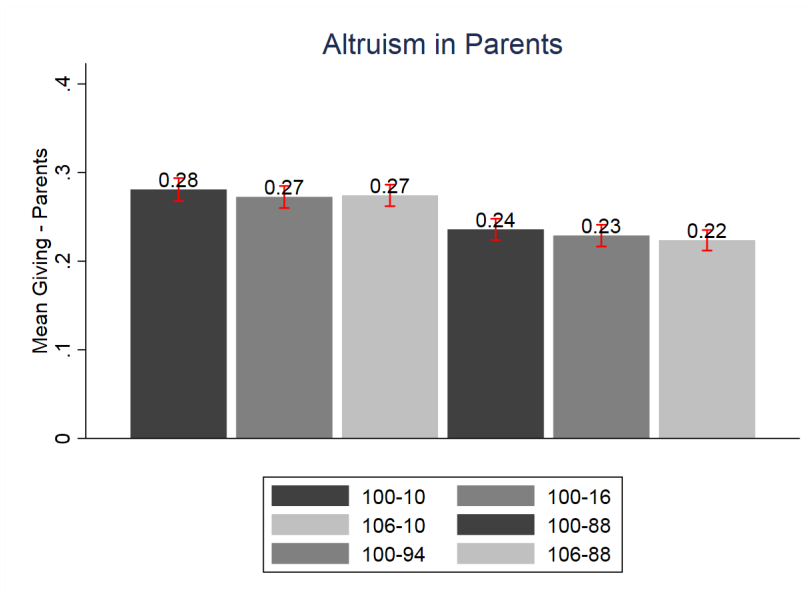
4.4.2 Empirical Strategy

In this section, we estimate the parameters of the Cobb-Douglas impure altruism utility function from Equation 4.2. The optimal gift g_{ib}^* derived from implicit demand function 4.6 is written as follows:

$$g_{ib}^* = -G_{jb} + 0.5[(1-\beta)G_{jb} + (\alpha+\beta)Z_{ib} + \{[(1-\beta)G_{jb} + (\alpha+\beta)Z_{ib}]^2 - 4\alpha G_{jb}Z_{ib}\}^{1/2}] + e_i + u_{ib} \quad (4.8)$$

Based on the theoretical model of Ottoni-Wilhelm et al. (2017) where $i = 1, ... N$ is the total sample size, $b = 1, ..6$ indexes the six decisions made by each participant. The first order

condition given by Equation 4.8 implies that the optimal gift g_{ib}^* is a function of the amount given by others G_{jb}, and the social income in the economy Z_{ib}. e_i is the individual-specific random effect and u_{ib} is the randomness in each participant's giving that is not correlated across their six decisions. We utilise the above first order condition to obtain an estimation of the coefficient of pure altruism α, and the coefficient of warm glow β.

Using a non-linear random effects Tobit estimation, we are able to calculate the pure altruism α and warm glow β estimate for each participant in the sample. We address these results as the individual estimations. The maximum likelihood routines assume the error terms u_{ib} and e_i to be normally distributed (Cappellari and Jenkins, 2006). Similar to Ottoni-Wilhelm et al. (2017), we are able to calculate the likelihood of optimal giving accounting for corner solutions when $g_{ib} = 0$ or $g_{ib} = w_{ib}$. As a robustness check, we also implement a maximum likelihood estimation without accounting for the corner solutions. In section 7, we discuss the potential convergence issues we faced while estimating the structural model.

Table 4.3 presents the mean estimates for the entire sample of all children who participated. We find that the estimated coefficient of pure altruism is 0.10 which is smaller than the coefficient of warm glow component (β) 0.289. Since the warm glow coefficient is significantly greater than zero, the pure altruism model can be rejected. The correlation coefficient, ρ, is 0.63 (p=0.008). This shows that there is substantial heterogeneity in the error term for within-participants decisions. Apart from the Table 4.3 for the entire sample, we estimate the individual effects of age on altruistic preferences and present the results in Table 4.4. Table 4.5 presents the estimated individual coefficients by the religious identity of the recipient and finally the interaction term of age and treatment on altruistic preferences are presented in Table 4.6. In the Appendix, we replicate the results by age, identity and the interaction using maximum likelihood estimations for the average of the 6 decisions (without considing corner solutions).

In the following subsection, we provide a detailed analysis of the individual estimatations.

TABLE 4.3: Altruistic Preferences- No linear random effect Tobit estimation

	Coefficient	Standard Error	p -value
α	0.10	0.0102	0.000
β	0.289	0.008	0.000
ρ	0.63	0.008	0.000

Notes: Sample size 1820 (All children who participated).

Altruistic Preferences and Age

We first study motivations for giving in the condition when the identity of the beneficiary is neutral. Therefore, we focus on the decision under the Abstract treatment when the flyer displayed the photo of a library). Table 4.4 presents the estimated coefficients for different age groups without the identity effects. The total number of observations is 3162 (or 527 individuals). The last columns of the table include the average of the individual estimations for all the parents of our participants. The participants are grouped in three age categories – Group 1 comprises children between 7 and 10 years, group 2 includes children between 11 and 13 years and group 3

children between 14 and 17 years.[10] Column 1 in Table 4.4 includes all children that participated between age 7 and 17 years. The warm glow (β) component is 0.22 and pure altruism (α) is 0.17, indicating warm glow to be the main motivation of giving[11]. The subsequent columns show the estimated coefficients for the subgroups and parents respectively. Pure altruism, indicated by the α parameter (top panel) is the lowest for the middle cohort (0.15) and is the highest for the oldest cohort where $\alpha = 0.203$. However, there is no significant differences in pure altruistic preferences across the three cohorts. We can reject the Hypothesis 1 that pure altruistic preferences is positively correlated with age. Column 5 is the estimated coefficient of pure altruism for the parents of children across all ages.

The estimates of warm glow preferences of giving, represented by the β parameter are not significantly different between the young and middle age groups (p=0.573). The oldest age group displays a lower estimate of warm glow giving $\beta = 0.26$ and is significantly different from both youngest (0.02) and middle cohorts (p=0.000). Thus, for our sample, warm glow preferences are stable until the age of 13, but we see lower motivations for warm glow giving for the older age group. Thus, we can reject our Hypothesis 1 that warm glow increases with age. We observe a non-linear development of warm-glow preferences that are constant between 7 and 13 years, but begin to decline for children up to 17 years of age. The coefficient of warm glow preferences for parents, β is 0.18. While warm glow motivation is stronger in magnitude for the younger and middle cohorts, this is not the case for the oldest cohort and parents. For the latter groups, relative degree of pure altruism is a stronger motivation for giving. We find a similar pattern when we consider the average of the 6 decisions i.e do not account for the corner solutions (See Appendix Table 4.10). However, unlike the individual estimations, there is no evidence of pure altruism (not significanlty different from zero) for the youngest cohort (7-10 yrs).

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[10]The groups are divided based on the class categories such that the lowest group includes children in primary, the second group has secondary students, and the oldest cohort are higher secondary students.

[11]This result is in line with previous research that found warm glow to be the stronger motivation to give

TABLE 4.4: Altruistic Preferences - Age (Discrete)

	All	7-10ys	11-13yrs	14-17yrs	Parents
	(1)	(2)	(3)	(4)	(5)
	b/se	b/se	b/se	b/se	b/se
Pure altruism(α)					
Constant	0.175***	0.178***	0.155***	0.203***	0.141***
	(0.005)	(0.009)	(0.006)	(0.009)	(0.002)
Warm glow(β)					
Constant	0.224***	0.247***	0.234***	0.181***	0.127***
	(0.004)	(0.007)	(0.006)	(0.007)	(0.002)
Obs	3162	912	1392	858	2934
Hypothesis testing	(2) vs (3)	(2) vs (4)	(3) vs (4)		
H0: α	0.443	0.354	0.131		
H0: β	0.573	0.020**	0.000***		

Notes: Dependent variable amount of giving.

Robust standard errors in parentheses.

* p<.1, ** p<.05, *** p<.01

Altruistic preferences and identity of the recipient

In this section, we show how contextual factors could influence different altruistic motivations. We particularly make salient the religious identity of the recipient and observe whether motivations of pure altruism and warm glow would be impacted. Identities, be it ethnic or religious, play an important role in different cultures. We use the strongly embedded Hindu and Muslim identity in our study as a potential distinction between the in-group and out-group. Our three treatment groups for comparison are in-group (same religion recipients), out-group (different religion recipients) and the abstract treatment (discussed in the previous section). Keeping the deservingness of beneficiaries constant, we observe how their religious identity might affect the altruistic preferences of the donor. The between-subjects design enables us to compare the proportion of warm glow and pure altruism, on average, across three treatment groups; abstract (no identity salient), in-group and out-group.

Table 4.5 includes the individual α and β estimates for each treatment; namely abstract, in-group and out-group. The hypothesis testing at the bottom of the table are Wald tests for equality of coefficients across treatment groups for pure altruism and warm glow, respectively. The maximum likelihood estimation for pure altruism is the highest at 0.20 when participants donate to recipients from the out-group. We do not find pure altruism to be significantly different when comparing the three identity treatments.

For warm glow, the estimated coefficient is the lowest in the in-group treatment. The warm glow coefficient is significantly lower in in-group compared to both the abstract (p=0.016) and the out-group(0.005). Considering the entire sample i.e. pooling the sample over all ages, we do not have any evidence of favoritism to the in-group or exclusion of the out-group. We can reject the Hypothesis 2 that warm glow and pure altruism will be higher towards the in-group. This finding is corroborated in the robustness checks where we estimate the pure altruism and warm

glow coefficients using the average of the 6 decisions (without accounting for corner solutions) (See Appendix Table **??**).

TABLE 4.5: Altruistic Preferences - Identity effects

	Baseline	Ingroup	Outgroup
	(1)	(2)	(3)
	b/se	b/se	b/se
Pure altruism (α)			
Constant	0.175***	0.186***	0.202***
	(0.005)	(0.004)	(0.004)
Warm glow (β)			
Constant	0.224***	0.206***	0.227***
	(0.004)	(0.003)	(0.004)
Obs	3162	3744	3660
Hypothesis testing	(1) vs (2)	(1) vs (3)	(2) vs (3)
H0: α	0.372	0.125	0.280
H0: β	0.016**	0.441	0.005**

Notes: Dependent variable amount of giving.

Robust standard errors in parentheses.

* p<.1, ** p<.05, *** p<.01

Altruistic Preferences by Age and Identity

In this subsection, we estimate the marginal change in pure altruism and warm glow for different age groups across the three treatments. Table 4.6 shows the marginal change in pure altruism and warm glow for the in-group and out-group treatment relative to the abstract (or control) group. The analysis is conducted not only for the pooled sample (Column 1) but also for each of the age-groups (Columns 2,3 and 4). For the pooled sample, we observe pure altruism to be higher in both the in-group and out-group treatment relative to the abstract group. There is no significant difference in altruistic motivations across the three treatments for the youngest age group (Column 2). The aggregate results are driven by the middle age group which shows a significantly higher pure altruistic preference in the in-group and out-group treatments. For the oldest cohort, pure altruistic preference is significantly greater in the out-group treatment.

Relative to the abstract treatment, we observe warm glow motivations of giving to be significantly lower in the in-group treatment (for the youngest and middle age group). However, there is no significant differences in warm glow motivations across the three treatments for the oldest age group. We can reject Hypothesis 2 that both pure altruism and warm glow motivations of giving are in favor of the in-group. Disaggregation by age groups further reiterates this finding. The total effect of warm glow and pure altruism by age and identity treatment is shown in Figure 4.6 in the Appendix A. Considering the estimates for the robustness check (See Appendix Table 4.12) where corner solutions are not accounted for, we observe a similar magnitude and direction for the coefficients but they are not statistically significant.

TABLE 4.6: Altruistic Preferences - Identity and Age

	All	7-9 yrs	10-13 yrs	14-17 yrs	Hypothesis test		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	b/se	b/se	b/se	b/se	(2) vs (3)	(2) vs (4)	(3) vs (4)
Pure altruism (α)							
Ingroup	0.011*	0.014	0.020**	-0.001	0.861	0.643	0.518
	(0.006)	(0.012)	(0.009)	(0.013)			
Outgroup	0.027***	0.013	0.042***	0.022*	0.552	0.756	0.741
	(0.006)	(0.012)	(0.009)	(0.013)			
Control	0.175***	0.178***	0.155***	0.203***	0.443	0.354	0.131
	(0.004)	(0.008)	(0.007)	(0.009)			
Warm glow (β)							
Ingroup	-0.018***	-0.032***	-0.028***	0.012	0.669	0.000***	0.000***
	(0.005)	(0.010)	(0.008)	(0.010)			
Outgroup	0.003	0.003	-0.003	0.007	0.778	0.792	0.443
	(0.005)	(0.010)	(0.008)	(0.010)			
Control	0.224***	0.247***	0.234***	0.181***	0.573	0.021**	0.000***
	(0.004)	(0.007)	(0.006)	(0.007)			
Obs	10566	2988	5118	2460			

Notes: Dependent variable amount of giving.

Robust standard errors in parentheses.

* p<.1, ** p<.05, *** p<.01

4.5   Drivers of Altruism

Among the two studies that attempted to disentangle warm glow and pure altruism, List and Samak (2013) found pure altruism to be the strongest motivation for giving among children aged between three to five. Liebe and Tutic (2010) observed giving by teenagers (aged between 14 and 18) and found warm glow to be the main motivation for altruistic giving. Other studies that observe the development of social preferences in children predict altruism to be driven by increased socialization (Engelmann et al. (2018)), saliency of identities (Shang and Croson (2009)), social pressure (Dellavigna et al. (2012))and a decrease in altruism when social distance from the recipient increases(Hoffman et al. (1996); Bohnet and Frey (1999)).

In our study, which observes warm glow and pure altruism in children aged seven to 17 and their parents, we find pure altruism to be positively correlated with age. Warm glow is lower for children over 14. For the oldest cohort and parents, we find pure altruistic motivations of giving are stronger than warm glow. Regarding the identities, similar to previous studies we expected religious identities to have a strong impact on motivations of altruistic giving. Particularly, we hypothesized that warm glow would be stronger toward recipients from the same religious group. On the contrary, we find warm glow to be decreasing both across age groups and treatments. On the other hand, pure altruism is significantly greater in the out-group treatment relative to the Abstract group, for the middle and oldest cohort.

Despite these tendencies on average, the positive and significant (ρ) parameter in Table 4.3 shows that there is substantial heterogeneity in the donor's random deviations from the model. There is heterogeneity across individuals in their α and β parameters. It is possible to conclude that the participants have neither pure altruistic or warm glow preferences, and there is a

tendency to support Andreoni's impure altruism model. We find evidence of interdependent preferences in our sample.

FIG. 4.3: Distribution of Individual Estimates
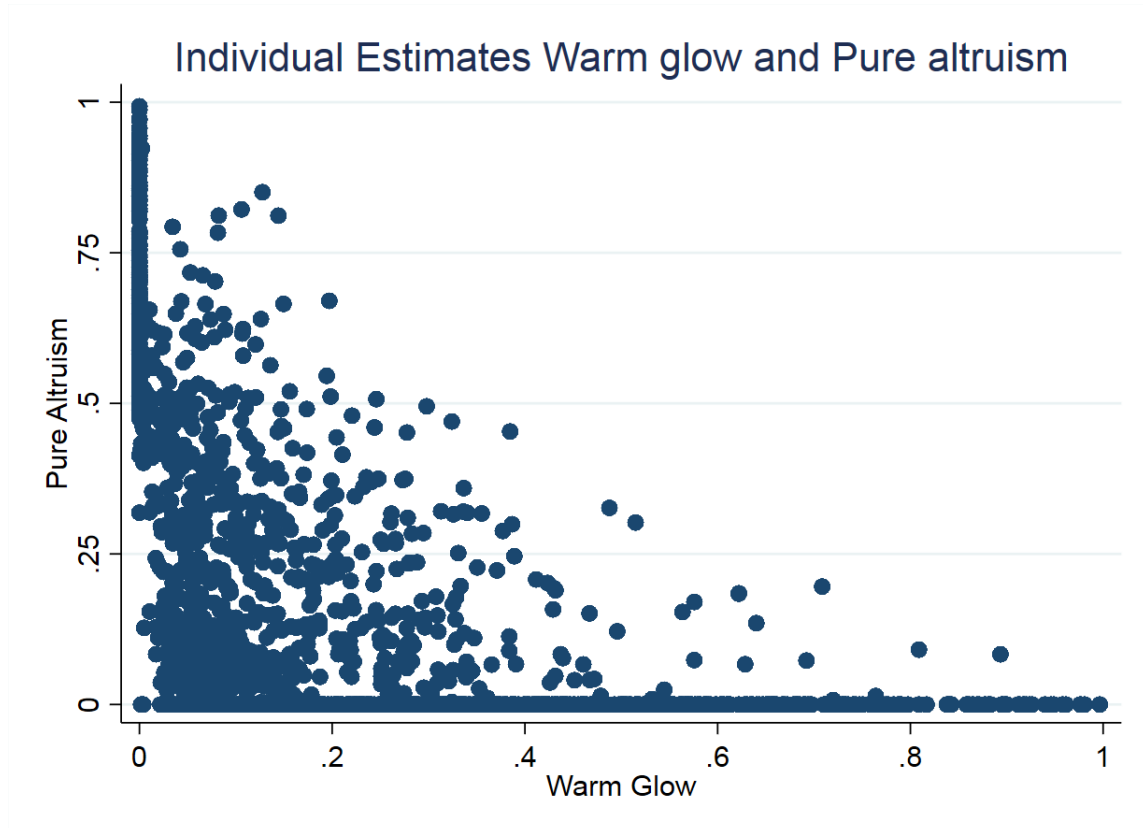
Figure 4.3 presents a distribution of altruism and warm glow parameters at the individual level. On the extensive margin, we can classify individuals as types; namely warm glow, pure altruistic, and impure altruistic. We find individuals to be either impure altruistic or warm glow givers (on average, 45%). The pure altruistic givers across the treatment vary from 10 to 13 percent. We observe a slight increase in pure altruistic givers toward the out-group and decrease in the number of warm glow givers toward the out-group. For the intensive margin, we observe the actual amount donated by the respondents. Even though a small proportion of individuals are pure altruistic givers, the amount of their contribution is the highest ranging from Rs.30.65 to Rs.28.82 for the in-group and out-group, respectively. Majority of the children are classified as warm glow givers and their average donations to the recipient is significantly smaller (ranging from Rs.14 to Rs.16). Back-of-the-envelope calculations show that even though pure altruistic givers donate large amounts, the total amount donated by all those with higher warm glow preferences is significantly larger, i.e., 3 times higher.

4.5.1 Other motivations for warm glow giving and overall altruism

Given the high heterogeneity, ρ parameter, in our sample, and the large deviations not only across but within individuals, we create a new variable that measures the strength of warm glow giving relative to the total measure of generosity, $(\alpha + \beta)$, for each individual. This term

is based on the assumption that more individuals are impurely altruistic and have a relative degree of warm glow associated to their charitable decision-making. We create an index of warm glow similar to that of Ottoni-Wilhelm et al. (2017) and it is defined as follows,

$$\gamma = \beta/(\alpha + \beta) \tag{4.9}$$

The index (γ) ranges from zero (pure altruism) to one (warm glow). We use this parameter γ, i.e., the degree of warm glow preferences, as a dependent variable in the following sections. In this section, we estimate a simple OLS regression to observe other covariates (controlling for age and recipient's identity) that could explain the degree of warm glow giving and total altruism for the participants in our sample.

We estimate two models with the following dependent variables - degree of warm glow or γ (Column 1) and the combined motivation for altruistic giving or $\alpha + \beta$ (Column 2). Since the errors of the two dependent variables could be correlated, with estimate a Seemingly unrelated OLS regression. Based on the results in Table 4.7, we observe that warm glow and overall altruistic motivations of fathers are significant and positively correlated with prosociality of their children. Furthemore, the parent's engagement with recent charitable giving and their beliefs on the importance of religous equality are both positively correlated with the child's donation in the experiment. This can be corroborated in other recent empirical studies that observe inter-generational preferences to be positively correlated, particularly with older children (Ben-Ner et al., 2017; Bettinger and Slonim, 2006; Brown et al., 2014; Wilhelm et al., 2008).[12].

We find that religiosity, measured as the frequency of visiting a religious place to be positively correlated with both relative degree of warm glow giving and overall altruistic motives. The positive association between religious practise and prosociality has been discussed in theoretical models whereby, religiousity is assumed to increase social contact among people and provide them with more opportunities to engage in charity (Bekkers and Schuyt, 2008). It also makes individuals more salient to other's suffering and increases the emotion 'feeling good about contributing' (Andreoni, 2006; Li, 2017). We find this empirically for our sample.

In the post experimental survey, we asked the participants questions about the NGO, their expectations regarding other's prosociality and the willingness to follow social norms. We measured peer expectations using first order beliefs i.e. 'How much do you expect the others in your class to have given to the NGO?'. In another question, we ask whether the participants would follow the social norm i.e contribute similar to others in their class and if the NGO favored their respective ingroups. We find expectations regarding other's giving is positively correlated only with the total altruism. This is in line with previous research that shows prosociality to be positively correlated with peer expectations and social norms (Kosse et al., 2019; Engelmann et al., 2018; Vesterlund, 2016). The warm glow giving was negatively correlated among those participants who believed that the NGO favored their ingroup and among those who were willing to follow the social norm.

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[12]Theories on inter-generational transmission of generosity (altruism) have been proposed by Becker et al. (2016), i.e., children as an investment, and Wilhelm et al. (2008) emphasize the parents' objective to make responsible citizens and generosity part of their identity

TABLE 4.7: Other explanations for warm glow and overall altruistic giving

	Degree of Warm glow	Altruism
	(1) b/se	(2) b/se
Warm glow father	0.202***	
	(0.042)	
Warm glow mother	-0.059	
	(0.045)	
Altruism father		0.123***
		(0.047)
Altruism mother		0.028
		(0.052)
Female	-0.020	-0.048**
	(0.037)	(0.022)
Hindu	0.127***	-0.057**
	(0.042)	(0.028)
Siblings	-0.006	0.028***
	(0.011)	(0.008)
Distance to school	-0.006***	0.009***
	(0.002)	(0.001)
Cognition	0.005	0.021***
	(0.010)	(0.006)
Religiousity	0.047***	0.017*
	(0.014)	(0.010)
Expectation	-0.002	0.004***
	(0.002)	(0.001)
NGO favors ingroup	-0.194***	0.038
(1=Yes)	(0.037)	(0.025)
Follow social norm	-0.151***	-0.113***
(1=Yes)	(0.038)	(0.025)
Father's years of education	0.003	-0.004
	(0.004)	(0.003)
Father recent charity	0.026	0.080***
	(0.049)	(0.029)
Parent's beliefs on	0.070***	-0.009
Religious Equality (1-Agree)	(0.019)	(0.013)
Constant	-2.109*	-0.959
	(1.156)	(0.763)
R squ.	0.211	0.275
Observations	672	762
Treatment dummies	Yes	Yes
Age controls	Yes	Yes
VIF	1.55	1.57

Notes: Dependent variable is degree of warm glow, total atruism.

Seemingly unrelated regressions. Robust standard errors in parentheses.

* $p<.1$, ** $p<.05$, *** $p<.01$

4.6   Future research and potential concerns

There are three important aspects with regard to the experiment design that need to be highlighted and brought in perspective with the results. Our experiment was based on the research design by Ottoni-Wilhelm et al. (2017). The within subject six decisions to disentangle altruistic motivations was provided to the participants without priming them about the tax and third party subsidies. This design varies from the study by Eckel and Grossman (2005) who implemented a between subject tax and subsidy based decision sets with and without priming the participants. Their results reveal a 98% crowding out of private contributions when the participants were aware of a 3\$ tax imposed on them. On the other hand, when the tax was not made salient, the participants increased their contributions (crowding in). Future research can implement a similar design as our study or Ottoni-Wilhelm et al. (2017) but include the priming treatment by Eckel and Grossman (2005).

Apart from disentangling the motivations of altruistic giving, our study attempted to observe how pure altruism and warm glow vary when the identity of the recipient is from an out-group. Despite historically contentious relations between the two selected groups and having implemented the treatments in either Hindu dominant or Muslim dominant schools, we do not find a significant difference in warm glow giving between the in and out-group treatment. In our experiment, the identity treatment was between-subjects wherein participants received a picture of either a library and school buildings (no identity), photos of potential Hindu recipients or Muslim recipients. One of the reasons why there is no evidence of in-group bias could be attributed to the weak identity treatment. However, we argue that this is not the case. In a post-experiment survey we asked the participants if they thought that the NGO favored children from their own religious group. We find that 78 percent of the sample in the in-group treatment recognized that the recipients belonged to their own religion, and this is significantly larger than the control and out-group treatments (Table 4.2).

Similar to Ottoni-Wilhelm et al. (2017), we use a Cobb-Douglas utility function to estimate the optimal demand for giving, pure altruism and warm glow parameters. Table 4.3 show the maximum likelihood estimates for pure altruism and warm glow. One of the concerns regarding the study is the use of a structural estimation assuming a Cobb-Douglas function. This could entail two issues; namely difficulty in model convergence and high heterogeneity in parameters across participants. To facilitate in the convergence of the model, non-linear Tobit estimation allowed for both upper and lower limit corner solutions. However, it did not include subjects that sometimes choose lower and other times choose upper limit across the 6 decisions (2 participants). In addition, 3 participants mirrored the exact same donation as the researcher in each decision set and 62 participants (7%) gave the same amount across all the decisions. For the last two cases, the structural estimation assumed these participants to be warm glow givers.

Second, is the high heterogeneity across participants based on the ρ estimate (0.63). The parameter indicates heterogeneity in individual's random deviation from the Cobb-Douglas model. This could be a consequence of misspecifying the model as a Cobb-Douglas function. Furthermore, a Cobb-Douglas specification assumes constant elasticity of substitution and linearity (for the parameters). While these assumptions have an advantage of algebraic tractability, they could result in bias from omitted variables (other factors explaining voluntary giving). We attempt

to overcome this bias by controlling for other factors that could explain demand for giving (Table 4.7). However, in future studies, researchers could assume alternative utility functions.

4.7 Conclusion

One of the main contributions of our paper is to observe warm glow and pure altruistic motivations when we consider voluntary giving, particularly across children of different ages. In addition, we attempted to explain religious identity-based discrimination using these motivations of giving. Inorder to obtain our estimates of pure altruism and warm glow, we run a structural estimation and use non linear Tobit maximum likelihood techniques (Ottoni-Wilhelm et al., 2017).

Previous studies that utilized pre-existing identities found strong evidence of in-group bias not only among adults but also children (Sutter et al., 2019; Ben-Ner et al., 2017; Chai et al., 2011; Gangadharan et al., 2018; Chakravarty et al., 2016). We go a step further to analyse whether such an in-group bias exists for different motives of altruistic giving. Our study is based in the diverse city of Mumbai in India which experienced recurrent communal violence between two main religious groups- Hindus and Muslims. Apart from communal tensions, there is evidence of systematic discrimination, segregation, and unequal access to public goods across these groups. Particularly, Muslims being the minority have faced extensive exclusion. In this study, we were interested in observing whether this systematic exclusion and conflict has percolated in the minds of the youth and children, particularly in non-market domains.

Inorder to study this question, we conducted surveys and charity experiments across different public schools in Mumbai. We particularly found locations within the city that were extensively segregated and as a result, the schools also had either only Hindu or Muslim children. Our results reveal a small but significant increase in pure altruistic giving towards recipients of the outgroup, among older ages (14-17 years). Warm glow remains constant across different identity treatments and is negatively correlated with age. Apart from age and the recipient's religious identity, we find altruistic giving to be positively associated with religiosity. Furthermore, we observe an intergenerational transmission of altruistic giving between the parents and children.

In terms of economic policy implications, we find that voluntary contributions under external policies of direct taxes or subsidies, are highly motivated by impure altruistic preferences. This finding contributes to the previous studies that do not observe a one to one crowding out. Another policy-relevant aspect of our study is how such heterogeneous altruistic motivations change when the recipient is from a salient outgroup. Given the widespread rhetoric that heterogeneous societies negatively impact access to public goods, we do not observe an ingroup bias in the domain of voluntary or charitable donations. On the other hand, pure altruistic preferences increase towards recipients from the outgroup (for the older ages) in our sample. We do not find in-group bias in warm glow motivations of giving.

4.8   Appendix A

TABLE 4.8: Frequency Table

	Control		Hindu		Muslim		Total	
	No.	%	No.	%	No.	%	No.	%
Class								
4	57	7.5	85	10.6	79	9.7	221	9.3
5	159	20.9	181	22.6	163	19.9	503	21.1
6	69	9.1	23	2.9	65	7.9	157	6.6
7	141	18.5	269	33.6	239	29.2	649	27.3
8	118	15.5	63	7.9	81	9.9	262	11.0
9	177	23.3	113	14.1	154	18.8	444	18.7
10	40	5.3	66	8.3	37	4.5	143	6.0
Total	761	100.0	800	100.0	818	100.0	2,379	100.0
Father Work								
Job	315	41.4	298	37.3	375	45.8	988	41.5
Daily wage	174	22.9	211	26.4	178	21.8	563	23.7
Small Business	136	17.9	137	17.1	125	15.3	398	16.7
Big Business	53	7.0	62	7.8	71	8.7	186	7.8
At home	19	2.5	19	2.4	22	2.7	60	2.5
Missing	64	8.4	73	9.1	47	5.7	184	7.7
Total	761	100.0	800	100.0	818	100.0	2,379	100.0
Mother Work								
Job	52	6.8	61	7.6	67	8.2	180	7.6
Daily wage	64	8.4	60	7.5	61	7.5	185	7.8
Small Business	23	3.0	39	4.9	33	4.0	95	4.0
Big Business	6	0.8	8	1.0	9	1.1	23	1.0
At home	549	72.1	555	69.4	600	73.3	1,704	71.6
Missing	67	8.8	77	9.6	48	5.9	192	8.1
Total	761	100.0	800	100.0	818	100.0	2,379	100.0
Travel to school								
Walk	502	66.0	536	67.0	590	72.1	1,628	68.4
Cycle	17	2.2	23	2.9	12	1.5	52	2.2
Auto	15	2.0	17	2.1	15	1.8	47	2.0
School Bus	70	9.2	60	7.5	61	7.5	191	8.0
Public Bus	36	4.7	35	4.4	39	4.8	110	4.6
Van	33	4.3	39	4.9	30	3.7	102	4.3
Train	5	0.7	9	1.1	7	0.9	21	0.9
Taxi	2	0.3	1	0.1	2	0.2	5	0.2
Motor Bike	21	2.8	22	2.8	16	2.0	59	2.5
Private bus	0	0.0	0	0.0	1	0.1	1	0.0
Car	2	0.3	1	0.1	3	0.4	6	0.3
Missing	58	7.6	57	7.1	42	5.1	157	6.6
Total	761	100.0	800	100.0	818	100.0	2,379	100.0

TABLE 4.9: Balance Table - Parents

	(1) Control	(2) Ingroup	(3) Outgroup	(4) (1) vs. (2), p-value	(5) (1) vs. (3), p-value	(6) (2) vs. (3), p-value
Father						
Monthly Income	12875.629	13763.446	14348.840	0.119	0.018	0.371
Years Education	8.674	8.780	8.845	0.634	0.445	0.764
Religiousity	4.140	4.098	4.175	0.444	0.533	0.134
Experience discrimin	0.203	0.217	0.220	0.666	0.584	0.917
Recent charity	0.881	0.910	0.886	0.285	0.842	0.325
Discuss charity	0.161	0.224	0.197	0.039	0.222	0.350
Risk seeking	0.727	0.695	0.681	0.223	0.091	0.614
Impatient	0.792	0.794	0.763	0.941	0.235	0.188
All equal education	0.269	0.281	0.325	0.653	0.041	0.093
All equal work	0.349	0.331	0.382	0.520	0.251	0.062
Respect all	0.403	0.348	0.447	0.059	0.140	0.000
Minority discrimin work	0.575	0.607	0.627	0.265	0.078	0.489
Minority discrimin edu	0.499	0.540	0.562	0.172	0.036	0.437
Mother						
Monthly Income	6697.312	7819.643	8460.507	0.223	0.104	0.539
Years Education	7.375	7.994	7.606	0.012	0.352	0.102
Religiousity	4.136	4.122	4.071	0.789	0.224	0.299
Experience discrimin	0.269	0.215	0.208	0.096	0.061	0.807
Recent charity	0.857	0.883	0.886	0.308	0.311	0.900
Discuss charity	0.217	0.198	0.200	0.558	0.613	0.931
Risk seeking	0.767	0.713	0.691	0.041	0.005	0.396
Impatient	0.816	0.807	0.768	0.715	0.050	0.092
All equal education	0.296	0.285	0.350	0.677	0.056	0.014
All equal work	0.376	0.339	0.395	0.187	0.522	0.040
Respect all	0.397	0.368	0.452	0.323	0.062	0.003
Minority discrimin edu	0.593	0.608	0.650	0.604	0.049	0.126
Minority discrimin work	0.496	0.557	0.585	0.042	0.003	0.319
N	547	647	626			

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

FIG. 4.4: Distribution under tax and subsidy
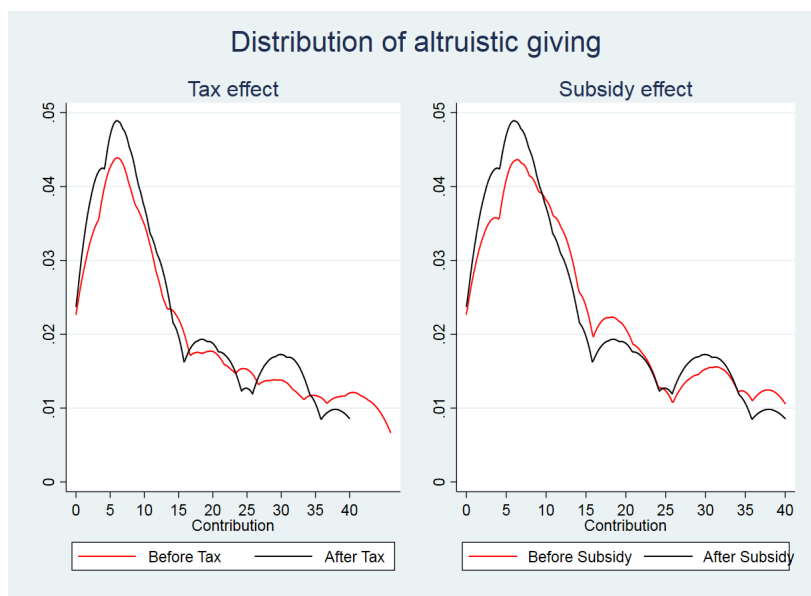
FIG. 4.5: Distribution under tax and subsidy- Parents
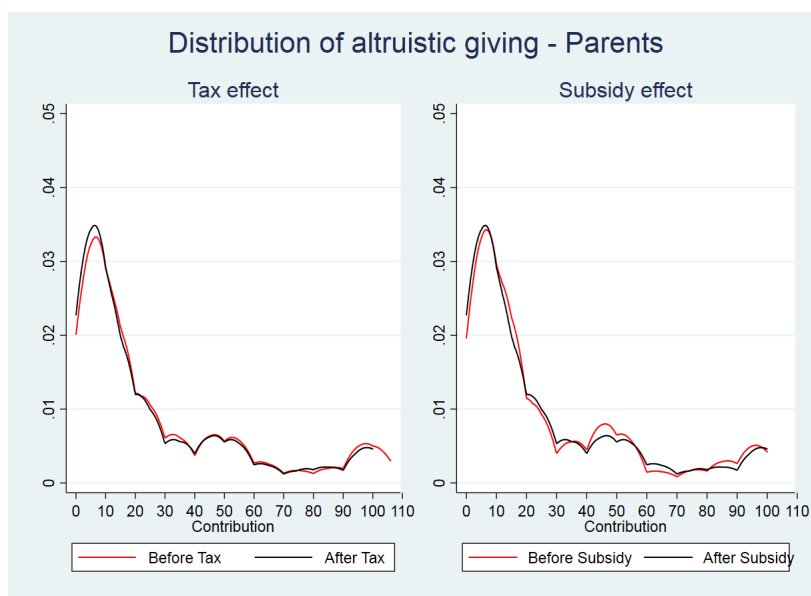
TABLE 4.10: Motivations of altruism - by Age

	All	7-10ys	11-13yrs	14-17yrs	Parents
	(1)	(2)	(3)	(4)	(5)
	b/se	b/se	b/se	b/se	b/se
Pure altruism(α)					
Constant	0.042	0.035	-0.006	0.118**	0.119***
	(0.036)	(0.070)	(0.060)	(0.057)	(0.022)
Warm glow(β)					
Constant	0.337***	0.362***	0.372***	0.264***	0.181***
	(0.026)	(0.051)	(0.044)	(0.040)	(0.013)
sigma_m					
Constant	12.227***	11.776***	12.670***	11.859***	28.819***
	(0.151)	(0.273)	(0.235)	(0.282)	(0.366)
Obs	544	155	242	147	517
Hypothesis testing	(2) vs (3)	(2) vs (4)	(3) vs (4)		
H0: α	0.138	0.213	0.025**		
H0: β	0.783	0.001***	0.000***		

Notes: Dependent variable amount of giving.

Robust standard errors in parentheses.

* p<.1, ** p<.05, *** p<.01

TABLE 4.11: Motivations of altruism - Religious identity of recipient

	Baseline	Ingroup	Outgroup
	(1)	(2)	(3)
	b/se	b/se	b/se
Pure altruism (α)			
Constant	0.042	0.093***	0.129***
	(0.036)	(0.028)	(0.030)
Warm glow (β)			
Constant	0.337***	0.286***	0.287***
	(0.026)	(0.020)	(0.021)
sigma_m			
Constant	12.227***	11.748***	11.812***
	(0.151)	(0.133)	(0.136)
Obs	544	645	624
Hypothesis testing	(1) vs (2)	(1) vs (3)	(2) vs (3)
H0: Alpha	0.052	0.000	0.123
H0: Beta	0.000	0.033	0.953

Notes: Dependent variable amount of giving.

Robust standard errors in parentheses.

* p<.1, ** p<.05, *** p<.01

TABLE 4.12: Motivations of altruism - by Age and Identity

	All	7-10yrs	11-13yrs	14-17yrs	Hypothesis test		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	b/se	b/se	b/se	b/se	(2) vs (3)	(2) vs (4)	(3) vs (4)
Pure altruism (α)							
Ingroup	0.050	0.010	0.097	0.033	0.017	0.805	0.384
	(0.046)	(0.090)	(0.071)	(0.078)			
Outgroup	0.087*	0.005	0.143**	0.081	0.053	0.217	0.477
	(0.046)	(0.095)	(0.072)	(0.075)			
Constant	0.042	0.035	-0.006	0.118**	0.138	0.213	0.025
	(0.035)	(0.069)	(0.058)	(0.055)			
Warm glow (β)							
Ingroup	-0.051	-0.033	-0.087*	-0.023	0.266	0.893	0.011
	(0.032)	(0.066)	(0.051)	(0.053)			
Outgroup	-0.050	0.002	-0.087*	-0.047	0.211	0.227	0.343
	(0.033)	(0.070)	(0.052)	(0.051)			
Constant	0.337***	0.362***	0.372***	0.264***	0.78	0.001	0.000
	(0.025)	(0.050)	(0.042)	(0.038)			
sigma_m							
Constant	11.915***	11.657***	12.233***	11.467***			
	(0.081)	(0.149)	(0.119)	(0.161)			
Obs	1813	544	645	624			

Notes: Dependent variable amount of giving.

Robust standard errors in parentheses.

* p<.1, ** p<.05, *** p<.01

FIG. 4.6: Total effect of Warm glow and Pure altruism
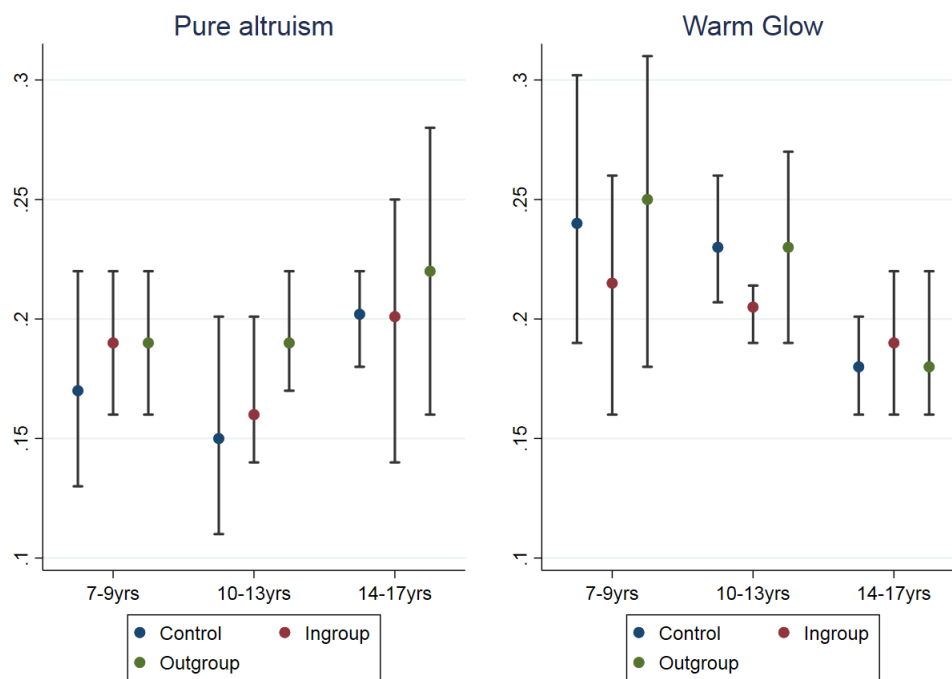
FIG. 4.7: Flyer-Hindu Identity treatment (English version)

(a) Pages 1 and 4

T12

Thank you!

धन्यवाद !

T12

Simple Education Foundation

SEF

- This NGO provides poor children support for their education.
- They provide the children with books, pens, pencils and other items that can help them to study.
- The children come from poor families. Many of them do not even have homes.
- The NGO is based in Delhi, but works in different parts of the country.

(b) Pages2 and 3

T12

Who gets your help?

T12

How much money would you give to the children from the NGO?

B: If you have 40 Rs and the children of the NGO have 10 Rs

C: If you have 46 Rs and the children of the NGO have 4 Rs

D: If you have 40 Rs and the children of the NGO have 28 Rs

E: If you have 40 Rs and the children of the NGO have 34 Rs

F: If you have 46 Rs and the children of the NGO have 28 Rs

A: If you have 40 Rs and the children of the NGO have 4 Rs

Fig. 4.8: Flyers-Abstract treatment

Fig. 4.9: Flyers-Identity treatment (Muslim children)

4.9   Appendix B - Questionnaires

I. Education survey

The education survey is the same as the survey 2.8 in Chapter 1.

II. Exit survey

The enumerators randomnly selected 50% of the students in the class and asked them questions regarding the pictures and the NGO mentioned in the flyer. In addition, they were also asked questions on their religiousity.

48. Student ID: _____

49. School ID: _____

50. Your name: _____

51. Father's name: _____

52. Last name: _____

53. Have you heard of this NGO (Show picture) before?

☐ Yes

☐ No

Below are some statements. Please answer by selecting one of the following options:

54. Giving some of your earned gift to this NGO will benefit the entire society.

☐ Yes   ☐ No

55. After looking at these pictures, do you think the NGO will help only those children from your own religion?

☐ Yes   ☐ No

56. You would give your gift to the children of this NGO because: You can answer more than one option

☐ They were children from your religion

☐ They were poorer that you

☐ They were poor and from your religion

☐ They were poor but not from your religion

57. If other children increased their giving to the poor children, what will you do?

☐ Follow what the other children did

☐ I will give more

☐ I will give less

☐ I will give the same as before

☐ I do not know

58. **If we reduce some money from your gift and give it directly to the children, what will you do?**
    - ☐ I will give more
    - ☐ I will give less
    - ☐ I will give the same as before
    - ☐ I do not know

59. **If other children from your own religion increased their giving to the poor children, what will you do?**
    - ☐ I will give more
    - ☐ I will give less
    - ☐ I will give the same as before
    - ☐ I do not know

60. **Expectation: How much do you think the other children in your class gave to the children of this NGO? State a number.**
    Minimum: _____

61. **Which of the following religious places do you frequently visit?**
    - ☐ Temple
    - ☐ Mosque
    - ☐ Church
    - ☐ None [End the questionnaire]
    - ☐ Others: _____

62. **How often do you visit this religious place**
    - ☐ Everyday
    - ☐ Once a week
    - ☐ Few times in one month
    - ☐ Once in 6 months
    - ☐ Once a year
    - ☐ Never

III. Parents survey

Both mothers and fathers of the respondents were asked a few questions over a telephonic conversation. At the end of the survey, they played a dictator game and received some money in the form of telephone recharge. Both the survey questions and the dictator game is explained below.

To the parents:*I am a researcher conducting research on schooling in Mumbai. We had recently visited your child [name of child] in their school. We would also like to ask you few questions. The questions relate to your household situation and your opinions regarding the society. We would be grateful if can respond to these questions. I would like to tell you that this information will be treated with complete confidentiality and never disclose your views.*

63. **Are you willing to answer the questions that I will be asking you? You can withdraw your consent incase you do not wish to answer any of the questions at anytime of this survey.**

   ☐ Yes [Continue to next question]

   ☐ No [End survey]

Opportunities 1

64. **All religious groups and caste groups should have equal chances to get a good education in this country.**

   ☐ Strongly disagree   ☐ Disagree   ☐ Agree   ☐ Strongly agree

65. **Women should have the same rights as men in every way.**

   ☐ Strongly disagree   ☐ Disagree   ☐ Agree   ☐ Strongly agree

66. **All religious and caste groups should have equal chances to get good Jobs in this country.**

   ☐ Strongly disagree   ☐ Disagree   ☐ Agree   ☐ Strongly agree

67. **Schools should teach students to respect members of all religious groups.**

   ☐ Strongly disagree   ☐ Disagree   ☐ Agree   ☐ Strongly agree

68. **When Jobs are scarce, men have more right to a job than women.**

   ☐ Strongly disagree   ☐ Disagree   ☐ Agree   ☐ Strongly agree

Opportunities 2

69. **Children who are members of certain minority religious and caste groups have fewer chances than other children to get a good education in this country.**

   ☐ Strongly disagree   ☐ Disagree   ☐ Agree   ☐ Strongly agree

70. **Girls have fewer chances than boys to get a good education in this country.**

   ☐ Strongly disagree   ☐ Disagree   ☐ Agree   ☐ Strongly agree

71. **Adults who are members of certain minority religious and caste groups have fewer chances than others to get better jobs in this country.**

   ☐ Strongly disagree   ☐ Disagree   ☐ Agree   ☐ Strongly agree

72. **Women have fewer chances than men to get Jobs in this country.**

   ☐ Strongly disagree   ☐ Disagree   ☐ Agree   ☐ Strongly agree

73. **Have you faced discrimination from people of other religions?**

   ☐ Yes

   ☐ No

74. **In the last 6 months, have you donated anything for charity or to poor people?**

   ☐ Yes

   ☐ No [Skip to 26]

75. **Do your children know about this?**

☐ Yes

☐ No

76. Do you speak to your children about charity and donations?

☐ Yes

☐ No

Socio-Economic details

77. Complete name: ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

78. What is the name of your child?: ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

79. What is your relationship with the child?

☐ Mother   ☐ Father   ☐ Guardian

80. What is your total monthly income? (in Rs.): ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

81. We would like to know something about the organisations in which you participate. Here is a list of several organisations. Please indicate if you are a member or not, if you are an active or non active member (Mark only one answer per line)

	I am not a member	I am an active member	I am a member but not active
Political party			
Religious organisation			
Housing society			
Workers union			
Others ⎯⎯⎯⎯⎯⎯			

Chapter 5

Development of Social preferences in informal risk sharing: A field experiment with Colombian children

In the absence of alternative mechanisms for formal protection such as insurances and social security, informal networks of risk-sharing, also referred to as solidarity networks, play an important role protecting households against idiosyncratic risks (Dercon, 2002). Gift-giving, interest free credit, shared meals, communal access to land, and work-sharing arrangements have been extensively documented in developing countries (Townsend, 1994; Udry, 1994; Fafchamps and Lund, 2003; de Weerdt and Dercon, 2006; Bhattamishra and Barrett, 2010; Angelucci et al., 2015; Kinnan and Townsend, 2012). Our contribution to this literature is twofold. First, we disentangle the role of different motivations for risk-sharing. Second, we investigate the development of risk sharing norms from childhood to adolescence.

The theoretical literature outlines various motivations that enable risk-sharing when there is limited commitment. In this paper, we consider five main motivations. First, following Becker (1981) we study the role of altruism. The theoretical models that formalized this idea show that while imperfect commitment constraints informal transfers in risk sharing networks, altruism counterbalances it, thereby increasing the utility of income pooling (Cox et al., 1998; Foster and Rosenzweig, 2001; Lin et al., 2014, 2019). The second norm that we consider is image concerns. Andreoni (1989) and Bénabou and Tirole (2006) consider that giving can elicit social esteem. Hence, individuals are expected to give more to the social network when their actions are public. An alternative motivation that could guide participation in risk sharing networks is reputational concerns. The theoretical models of Ligon et al. (2002) and Foster and Rosenzweig (2001), consider that past history matters so individuals that have made net transfers in previous rounds are more likely to receive subsequent transfers than households that have been the net recipients of transfers. Following, this prediction, individuals should transfer larger amounts when this gives them the possibility to receive larger transfers. Associated with this motive, the fourth aspect that we consider is the norm of reciprocity. Kimball (1988) and Coate and Ravallion (1993) propose that expected future reciprocity, or quid pro quo norms, in which 'I will help you today if you help me tomorrow', explain the subsistence of informal risk sharing. Last, we consider norms of deservingness. Individuals who are more prosperous could attract more giving (Fong, 2007; Cardenas et al., 2008; Candelo et al., 2019), but being more prosperous could also lead to more demands from the social network (Jakiela and Ozier, 2016).

The second aspect that we investigate is how motivations for risk sharing develop with aging. Piaget's theory of cognitive development(Piaget, 1971) proposes that children analyze problems differently than adults and that they change the way they analyze problems as they get older. Kolberg's theory of moral development (Kohlberg, 1964) builds on this idea and proposes that there is a close relation between cognitive and moral development. At an early age, children are motivated by hedonistic motives. At this stage children act in an individualistic way and try to seek pleasure and minimize punishment. At this stage they are more individualistic. At early adolescence a child's acts are guided by social norms. Children care about what others would think and therefore are guided by maintaining a good image. At this stage children recognize that there is something to gain by behaving in a prosocial way and are guided by strategic motives. As adolescences and young adults internalize the social norms they act to maintain social order. At the highest stage of moral development individuals can act according

to internalized principles.

In order to better understand the motivations for risk sharing and how they develop with age, we designed an economic experiment and implemented it with a population group that is exposed to substantial amount of risk and for whom risk sharing is common. The context of our analysis is Bogota, Colombia, where the population is subject to substantial degree of idiosyncratic risks, such as unemployment and diseases. Among our sample, almost 40 percent of the participants reported that their household had faced a difficult economic situation in the previous month. Risk sharing is common and about one third of the sample reported that their families received or offered help to others in need. To trace the development of norms of altruisms, we built a panel data set in which school-age children between 7 and 16 years are followed over three consecutive years. Hence, we can study the development of motivations for risk sharing at the critical age when social preferences are nurtured.

Our empirical strategy is based on a lab-in-the-field experiment that uses a modified version of the Selten and Ockenfels (1998) solidarity game. This experiment replicates the main components of informal risk-sharing agreements. In this three-person game, participants engage in a real effort task and receive piece-rate payment. Simulating the effect of negative income shocks, one randomly selected participant in the group loses all their earnings. Before knowing who is affected, participants simultaneously and privately decide how much of their earnings they want to transfer to the affected participant. Hence, solidarity has the character of a public good.

To disentangle different motivations for giving, we use a within-between experimental design in which each of the participants play the solidarity game repeatedly over four rounds without receiving feedback. The within treatment conditions vary the privacy of the information on decision makers behavior (private or public), and the extent to which participants can react to this information (not at all or possible). The between treatment conditions vary the type of information that is public knowledge (donations, earnings or both).

We find that solidarity is a common behavior among children and, on average, 79 percent decided to send a transfer. Yet, transfers were relatively low and participants only sent on average 17 percent of their endowment. The probability of sending a transfer increased between the age of seven and 13 and remained rather stable for older children. We find that the main motivation for risk sharing is altruism. Social image concerns or strategic motives do not appear to motivate additional transfers or likelihood to send a transfer. Lastly, we find that there is positive reciprocity in older cohorts but not for the youngest children. Reciprocity norms are rather weak as there is a low correlation between the value sent and the value transferred. Participants in our experiment did not display norms of deservingness and the amount given did not increase proportionally with the amount lost. The motivations for solidarity are rather stable over aging. Yet, we find that between the age of 7 and 11 there is an increase in altruism. Norms of reciprocity developed between the age of 13 and 17.

The closest to our paper are Ligon and Schechter (2012) and Beer and Berg (2012). Similar to them, we consider the relative importance of different social preferences on solidarity giving. Yet, in this paper we analyze different set of motivations for giving. In our design we consider explicitly the difference between image concerns and strategic motives for giving. In addition, we can explicitly distinguish whether giving is motivated by reputation or reciprocity motives. In our experimental design, participants receive information on the behavior of others and can react to this information by conditioning the value transferred.

There is an increase interest in investigating the social preferences in children in both psychology (Eisenberg et al., 1991; 2005) and economics (Harbaugh et al., 2001, 2003; for a recent review of the experimental literature see Sutter et al. (2019)). This is the first paper that focuses on risk sharing norms among children using a solidarity game. The modified three-player solidarity game Selten and Ockenfels (1998) that we use in our analysis, has the advantage over dictator games that the context of the decision is much clearer for participants. In addition, as different norms are evaluated for each individual, we can asses whether the development of one norm complements or substitutes the other norms.

Previous studies considered the stability of social preferences with an adult population (e.g., (Chuang and Schechter, 2015; de Oliveira et al., 2012; Carlsson et al., 2014). Yet, relatively few papers have used panel data to study the development of social preferences of young to teenage children (Deckers et al., 2015; Eisenberg et al., 1991, 2005; Van der Graaff et al., 2018; Malti et al., 2012). We extend this line of analysis considering a longer age range (7- to 17-year-olds) to capture the critical age at which social preferences change.

This paper is divided into six sections. In Section 5.1, we present a review of the related experimental the literature. Section 5.2 presents the experimental design and procedures. In sections 5.3, we present the data and results. In Section 5.4, we discuss our results and present our conclusions.

5.1   Related experimental literature

Following Harbaugh and Krause (2000), a relatively large number papers have investigated the development social preferences in children (For a recent review of experimental literature see Sutter et al. (2019)). The evidence indicates that older participants transfer a larger proportion of the income in dictator games and in public good games (Bettinger and Slonim (2006); Gummerum et al. (2010); Brocas et al. (2017); Chen et al. (2016b); Sutter et al. (2018); Angerer et al. (2015b)). Similarly, there is a positive association between children's age and egalitarian preferences (Fehr et al. (2008); Almås et al. (2010); Bauer et al. (2014); Martinsson et al. (2011)) and lying aversion (Maggian and Villeval (2016)). We extend this line of research by implementing a modified three player solidarity game (Selten and Ockenfels (1998)) and by following the same set of individuals over three consecutive years.

In Selten and Ockenfels (1998) three-player solidarity game, participants decide on the amount that they would like to transfer in case they win and one or two of the other players lose. Our paper is closely related to Bolle et al. (2012) and Beer and Berg (2012) who modify the solidarity game to identify different motivations for risk sharing. Bolle et al. (2012) allow participants to condition their donation on the value donated by the other benefactors. As the conditional donations are constant, decreasing or increasing they can identify the role of warm-glow, pure altruism or guilt. They found that most of the participants could be classified as altruistic followed by guilt. Beer and Berg (2012) use a four-person solidarity game and show that solidarity is motivated by direct reciprocity (give more to those that gave them more) rather than indirect reciprocity (give to participants who have donated more).

Leider et al. (2009) and Ligon and Schechter (2012) used dictator games to investigate different motivations for giving. Subjects make multiple transfer decisions that vary i) the anonymity of the recipient, and ii) the social distance of the recipient. Leider et al. (2009) find that transfers are 52 percent larger to close friends compared with strangers. When decisions are public, participants increase transfers toward friends relative to strangers, suggesting that norms of reciprocity favor pro-social behavior. Ligon and Schechter (2012) uses four dictator games to elicit altruism toward an anonymous person, altruism toward friends, generalized reciprocity, enforced reciprocity (social sanctions). They find that the most important motive for giving to an anonymous person is altruism. In this paper, we aim at disentangling the role of altruism, image concerns and strategic behavior as intrinsic motivations for giving. In addition, we consider how perceived deservingness and reciprocity of the beneficiary affects solidarity.

Ours is one of the few papers that build a panel data set to study the development of norms of cooperation in children. Deckers et al. (2015) show that there is a high stability in giving for 7- to 10-year-old children. Eisenberg et al. (1991, 2005) observed an increase in prosociality among children over a 11-year time frame. They ascribed that moral reasoning for empathy-related responses are a key predictor of increasing prosociality with age. A recent six-wave longitudinal study by Van der Graaff et al. (2018) for children aged 13 to 18 also paid tribute to higher moral reasoning and perspective, taking increasing prosociality as the main drivers. Carlo et. al (2007, 2010) observed 700 children in a middle income neighborhood in Spain and Eastern United States over a period of three years and found the initial presence of prosociality both in terms of cognitive reasoning and parental influence to have a strong positive impact on adolescents' prosociality in the future. Their study supports the internalization of motives and cognitive development as key roles in the development of social norms in children (Fabes and Eisenberg, 1998). However, similar to the cross-sectional studies, the few longitudinal studies have a short age span, mostly specific to mid and late adolescence.

Other experiments have examined the efficiency of risk sharing. For example, Barr and Genicot (2008) find that under the exogenous commitment contract, participants take more risk and receive higher payments than in the condition with limited commitment. Public information on the defection of risk pooling decrease risk-pooling compared with the condition of secret information. This suggests that there are either costly enforcement mechanisms in place or

that individuals avoid temptations to default the risk-sharing network and experience public shame thereafter. Barr et al. (2012) findings support this idea as public information on defection decreases risk sharing with members of the same cooperative group. Charness and Genicot (2009) find that transfers increase with risk aversion and continuation probability. A recent paper, Jain (2015) show the proportion of people who contribute to the mutual insurance increases with monitoring.

Following Selten and Ockenfels (1998)'s seminal paper, various studies have investigated how self-inflicted neediness affects solidarity. For example, Costard (2011) extended the solidarity game, allowing participants to select between two lotteries with the same expected payment but a different probability of losing. They find that risk-takers receive fewer transfers than those who select the safer option. Similar results are reported by Bolle and Costard (2015), Trhal and Radermacher (2009), Cettolin and Tausch (2015), Lenel (2017) and Attanasio and Pavoni (2011). On the other hand, de Oliveira et al. (2014) show that participants who prefer not to insure, increasing their neediness, receive the same conditional gifts as those insure. In our paper, shocks are exogenously determined and bad luck cannot be attributed to participants therefore we do not assess the role of self-inflicted neediness. Instead, close to Eberlein (2008), we consider how performance in a real effort task affects solidarity. Our analysis focuses on the perceived deservingness of the beneficiary.

5.2   Experimental Design and procedures

5.2.1   Experimental Design

To simulate an informal risk-sharing network with limited commitment, we implemented a modified version of the solidarity game by Selten and Ockenfels (1998). Participants were randomly and anonymously matched in groups of three members. To disentangle the solidarity motives in risk-sharing groups, we used a repeated game over four rounds. Yet, to replicate decisions under repeated interaction over an infinite number of periods, the number of rounds was not announced to participants as in Charness and Genicot (2009). Similar to Schildberg-Hörisch (2010) individuals made decision under the veil of ignorance, hence they did not receive feedback on income shocks or solidarity decisions between rounds. This allows to avoid income effects. Following Ligon and Schechter (2012), and with the objective of making transfer decision more consequential, we randomly selected only one of the four rounds for payment at the end of the session.

Each round of the game has a common structure of two stages. In the first stage, participants perform a real effort task and received a payment based on individual performance. The task is an adaptation of the experiment by Gill and Prowse (2012) (see a test of this method in Gill and Prowse (2013)). On the screen of the tablets, 30 slider bars were displayed, and participants were asked to to position as many slider bars as possible exactly in the middle of a bar within 120 seconds. They received information on their individual performance as well as the time

left for the task. Participants received 500COP (0.16USD)[1] for each slider bar that they could move at exactly 50.The maximum amount that participants could earned was therefore slightly larger than the 10,000COP (3.27USD) that they reported to receive as weekly pocket money. Compared with a daily minimum wage of 22,981 COP (7.52USD) in Colombia, this represented a relatively high value (Source: https://www.salariominimocolombia.net/en/). The aim of this first stage of the game was to entitle individuals to these earnings and avoid 'house money' effects (Thaler and Johnson, 1990; Cherry et al., 2002, 2005). Each participant received payments from the research assistants using play money. Children received a combination of bills and coins, such that they could transfer any value multiple of 500COP. We use tangible endowments to trigger a 'cash-in-hand' situation (Reinstein and Riener, 2012; Brandts and Charness, 2000).

In the second stage of the game, one member of the group was randomly selected and lost all her endowment. The other participants decided how much of their endowment they wanted to transfer. We used the strategy method and allowed all participants to behave as donors and only at the end of the experiment was it revealed who had lost their endowment, and the decisions of the other participants were implemented. Participants had two envelopes per round, in one envelope they had to insert the amount of bills and coins that they wanted to transfer in that round, and in the other they put in the amount that they wanted to keep for themselves. Finally, they had to register their decisions on the tablets. We verify that the values registered on the tablets were consistent with those from the envelopes. We did not find any statistically significant difference between the two values. Thus, payments were calculated based exclusively on the information collected on the tablets. To facilitate mental calculations, each transfer was restricted to a multiple of 500 COP. Furthermore, instructions were explained using neutral phrasing in order to avoid framing effects. Instead of 'donation' to refer to the amount transferred, we use the word 'pass,' which does not imply charitable giving.

Treatments

To dissentangle the different motivations for giving and how they change with aging we used a between-within subject design. We randomly allocated participants to one of four treatments. Table 5.1 summarizes the structure of the experimental design. In the control treatment (T0), information regarding participation in the game remained anonymous in all four rounds. This treatment allows to control for trend in earnings and transfers over the different rounds. The other three treatment groups, are identical to the control treatment in the first round. However, at the beginning of the second round, before starting the real effort task, it was announced that information on behavior in the round would be public knowledge. The treatments varied the type of information that would be public at the end of the game: Transfers (T1), Earnings (T2) or Both (T3).

In the third round, it was announced that participants would not only know the behavior of the others in the game, but could in addition condition their transfer decisions based on the behavior of others. They made two types of transfer decisions: an unconditional transfer

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[1]Average exchange rate in 2016 was 3054.12COP per 1USD (Source: The World Bank).

decision that was independent of others' behavior and a conditional transfer that could vary according to the transfers (T1), earnings (T2) or transfers and earnings (T3) of others. Both decisions were payment-relevant. If that round was selected for payments, the unconditional donation determined the payoff for one of the donors and the conditional decision for the other. It was randomly decided at the end of the payoff who received which type of payment. In order to capture any possible end game effects, the fourth round was identical to the third round.

TABLE 5.1: Informational conditions for experimental treatments

Treatments	Round 1	Round 2	Round 3	Round 4
T0 **Control**	Anonymous	Anonymous	Anonymous	Anonymous
T1 **Transfers**	Anonymous	Info. transfers	Unconditional / Cond. on transfers	Unconditional / Cond.
T2 **Earnings**	Anonymous	Info. Earnings	Unconditional / Cond. on Earnings	Unconditional / Cond. on Earnings
T3 **Transfers/Earnings**	Anonymous	Info. transfers and earnings	Unconditional / Cond. on both	Unconditional / Cond. on both

5.2.2   Hypothesis

The experimental design allows us to disentangle five motivations that promote informal risk sharing where there is limited commitment. Furthermore, the real effort task allows us to observe how earnings change in the presence of informal solidarity networks for risk sharing. Below we describe the main hypothesis tested in our experiment. First we explain how the experimental design can allow to identify different motivations for risk sharing. Then we explain how those preferences change with aging.

Motivations for risk sharing

When participant's identity is anonymous and there are no possibilities to enforce risk sharing, transfers can be associated with a norm of altruism. Therefore behavior in the first round of the game can be associated with altruistic preferences. Following the theoretical models that propose altruism enables risk sharing (Cox et al., 1998; Foster and Rosenzweig, 2001; Lin et al., 2014), we expect there would be positive transfers in the first round of the game. In one shot dictator games, when participant's identity is anonymous, it has been observed that individuals transfer a large part of their endowment to the beneficiary (Castillo and Carter, 2011; Camerer, 2003a; Ligon and Schechter, 2012; Cox and Fafchamps, 2007). We expect that in the treatments there would be positive transfers in the fourth round when there are no possibilities of further interaction.

Hypothesis 1: Participants send positive transfers when risk sharing is anonymous.

Another motive considered for participating in solidarity giving is reputation or social image concerns (Bénabou and Tirole, 2006; Barr et al., 2012). Giving can be motivated not only by a strategic motive but is also associated with self-esteem. The possibility that transfers could become public is expected to motivate individuals on building a reputation of a 'good' contributor. Thus, strengthening the risk sharing networks (Andreoni and Miller, 1993; Engelmann and Fischbacher, 2009; Bénabou and Tirole, 2006; Fafchamps and Lund, 2003). We identify the impact of social image concerns by observing whether transfers increase when giving is public knowledge. We expect that in (T1:Transfers) and (T3:Both) transfers will increase in round two relative to transfer in rounds one.

Hypothesis 2: Participants care about their image and increase transfers when giving is public knowledge.

Ligon et al. (2002) and Foster and Rosenzweig (2001)'s theoretical models suggests that reputational concerns can motivate risk sharing. In their models, the likelihood to receive a transfer increases with the net transfers sent in previous rounds. This opens the opportunity for strategic behavior. Individuals can increase transfers with the objective of receiving transfers in the future. In round three, we give participants the opportunity to reciprocate generous behavior. Consistent with evidence on reciprocal behavior, we expect that participants will send more transfers to participants who have been more generous. As participants anticipate this behavior, they can act strategically and send more transfers when reciprocity is possible compared to cases when it is not. In our experiment this would be in round three compared with rounds one and two for treatments T1-Transfers and T3-Both.

Hypothesis 3: Participants reciprocate giving behavior. As participants anticipate reciprocity motives in giving, they act strategically and increase transfers when there are opportunities to act strategically.

A burgeoning literature shows that presence of public insurances and redistribution could have a detrimental effect on effort supply and productivity (Azam and Gubert, 2006; Alger et al., 2018; Alger and Weibull, 2010). Further highlighting the 'dark side' of social capital, the presence of kin networks or relatives shows lower self protection (Di Falco and Bulte, 2012) and participating in informal risk sharing groups is seen to act as a barrier to entrepreneurial activities and profits (Grimm et al., 2011). There are studies that also show individuals willing to hide their income at a cost, so as to avoid participating in informal risk sharing (Beekman et al., 2015; Alger and Weibull, 2010; Di Falco and Bulte, 2012). When there is public knowledge on earnings, we expect that individuals might prefer to be perceived as poor so as to avoid making large transfers (Jakiela and Ozier, 2016; Alger et al., 2018).

Hypothesis 4: Demands of social network have a detrimental effect on productivity when earnings are public knowledge.

Empirical evidence, on the other hand, shows that the perception of deservingness of the beneficiary is an important factor affecting giving behavior (Fong, 2007; Cardenas et al., 2008; Candelo et al., 2019). It is observed that solidarity is partially crowded out when the neediness is self-inflicted (Trhal and Radermacher, 2009; Lenel, 2017). High effort levels could portray the image of a 'hard worker' motivating high transfers in case of a negative income shock. We expect that transfers would be positively correlated with deservingness measured as effort levels (Jain, 2015; Chavanne et al., 2014; Eberlein, 2008). In case that norms of deservingness are common, we expect that individuals will attempt to act strategically keeping high levels of productivity to elicit more transfers. Therefore, compared with round 2, we expect that in round 3 participants will maintain higher levels of effort in T2-Earnings and T3-Both. In other words, norms of deservingness are expected to mitigate the detrimental effect of re-distributional norms on productivity. We expect that:

Hypothesis 5: Transfers are larger to individuals that are perceived to be more industrious and who lost higher income compared to individuals that are less industrious. Individuals anticipate this behavior and increase effort to attract more generosity.

Development of prosocial giving

To understand how the motivations for risk sharing develops with age, we identify two salient pillars within the development psychology literature: social-cognitive theories and social affective theories.

Based on the seminal work by Piaget (1971)[2] and Kohlberg (1964)[3], social cognitive theories explain the development of prosocial norms within children as a combined impact of logical or operational thought and moral reasoning (Crone and Dahl, 2012). Basic social detection and perspective taking[4] are expected to start developing between the age of 7 and 12 years. Furthermore, this age is also associated with a shift from self-oriented behavior to other oriented behavior (Crone and Dahl, 2012; Eisenberg et al., 2005). Specific skills such as mentalizing – defined as the ability to infer other's mental states, expectations or beliefs regarding other's action develop after 12 years (Crone and Dahl, 2012; House et al., 2013; Leimgruber, 2018). Consistent with those theories, we expect:

Hypothesis 6: Reciprocity and deservingness increases with age.

Within the purview of social-cognitive development, self-presentation theory Bond (1982) and audience effect Triplett (1898) suggest that individuals maintain an image of themselves and consider how their actions would be evaluated by others in case it became public. Similar to these image theories is the reputation management theory Tennie et al. (2010), wherein individuals work to ensure a good reputation of themselves subject to changing context and social norms. All of these theories are embedded within the social-cognitive umbrella. Unlike

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[2]Basic logical operations

[3]Moral Judgement theory

[4]the ability to consider other people's feelings, thoughts and action

the perspective taking and mentalizing theories, the audience effect is already expected to be salient in early childhood from the age of 5 years (Banerjee et al., 2012; Engelmann et al., 2013; Hamilton and Lind, 2016).

Hypothesis 7: Social image and reputation building for younger cohorts is greater than transfer based on strategic giving.

The second pillar is social-affective development. It includes empathy or 'einfühlung', a term derived by German Philosophers Vischer and Lipps. An important distinction from cognitive theories, empathy is the ability to share an affective state of another person, spontaneously e.g. your sorrow can become my sorrow (Stietz et al., 2019). While Kolhberg and Piaget's theories suggested that affective development was an extension of the cognitive process, recent evidence reveals that the morality based decisions and empathy are a spontaneous response to other people's feelings, actions or expectations (Francia, 2018; Decety and Michalska, 2010). There is a distinction between moral based judgments motivated by cognitive processes and empathy driven decisions.

Hypothesis 8: Altruism, as an affective process develops with age.

5.2.3 Experimental Procedures

The experimental sessions took place between August and November 2016, 2017, and 2018. We conducted the sessions in two private and two public low-income schools located in Bogota, Colombia. The experimental game and questionnaires were programmed using the open-source software *oTree* and implemented with tablets (Chen et al., 2016a). The children in selected schools can study from the first grade of elementary school until the 11th grade of high school within the same facilities. This allowed us to follow children from primary to secondary school. All sessions were implemented in the morning during regular school hours, and each session lasted approximately one and a half hours. On average, there were three classrooms per grade in each school with 20 to 30 students in each group.

In 2016, around 1,660 children from four schools participated. Next year, we could follow 1304 children from the initial sample. In addition, we included one additional school with 391 students. In 2018, we could follow 550 children from the initial panel and 131 of the additional school. Due to a high children mobility between public schools and dropouts, the attrition rate in our sample is around 30 percent from one year to the next. Figure 5.1 presents the structure of the data set over the panel.

In 2016 the treatment assignment was done randomly at the classroom level, so that we could implement at least three treatments in the same grade per each school. In order to lessen spillovers between children of the same grade, we scheduled three sessions the same day to collect the information of all groups per grade. in 2017 and 2018 we could repeat the sessions with most of the students that participated in 2016, yet, we could not implement the same treatments for all of them because children were distributed in different classes each year. Prior to starting the

sessions, we verified the number of children that participated in each treatment the previous year and the treatment with the highest number of children was implemented.[5]

Teachers were informed of the schedule of activities, so that they could adjust their regular teaching hours. Furthermore, parents were sent a letter from us with information on the main objective of our study and children's payments. They were also informed that participation was voluntary and that they could refuse their child's participation.[6]

In all sessions, one research assistant read the standardized instructions out loud, so that participants from different sessions received the same information (see Section 5.6.1 for experimental instructions). Children knew that their participation was voluntary and they could abandon the session at any moment. We also informed them that they were not allowed to interact with their classmates during the session and all the information collected would be managed and analyzed anonymously. At the end of the game, participants were asked to answer a post-experimental questionnaire that included basic socio-demographic data, and social capital questions (see the complete questionnaire in Section 5.6.2).At the end of the session, participants received a voucher equivalent to a participation fee of 1,500COP (0.51$) and the payments that they received from the game. They could redeem this voucher at the school store for food and refreshments.
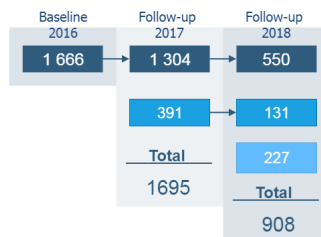
FIG. 5.1: Sample size per year

5.3   Results

In this section, we present our main results from the economic experiments. First, we describe the characteristics of our sample and children's prosocial behavior. Next, we explain the empirical strategy used in the study to disentangle different motivations for solidarity giving. The third section of the results is divided into three parts: First, provides estimates on the various motivations of solidarity transfers for the pooled sample. Second, we discuss an important negative aspect or the 'dark side' of social capital and solidarity transfers. Finally, using the advantage of the panel data, we show how each of the motivations develop for children over time.

5.3.1   Descriptive Statistics

This longitudinal study includes data collected in a baseline and two follow-up years. Table 5.2 summarizes the socio-demographic information of our sample in each wave. In the baseline, girls

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[5]The attrition from 2016 to 2017 was around 30%. This is explained by dropout rates and the high mobility of students between schools, especially in public schools.

[6]We received, in total, four denials from parents.

represent 43 percent of participants. On average, children are 13 years old, have three friends in the classroom, 25 friends in total, have visited around two schools, and had been in the same school for five and a half years. An average household has six members, with three children. In one third of households, parents live together and almost all parents work (96 percent of fathers, and 81 percent of mothers). More than one third of the households (38 percent) have faced a difficult economic situation in the last month, and 65 percent of the time receive help from other families, and only 10 percent of the time receive help from the state.

In the post-experimental questionnaire, children answered some questions about their social capital. Helping behavior is common for half of them, either helping family members, other families or the community. At schools, 63 percent of them had participated in socio-cultural activities. Around 72 percent of children preferred to cooperate than compete. Moreover, 65 percent of them trusted their friends and only 28 percent had trust in other people. In the baseline, 2016, we found that our sample is balanced across treatments across most of the socio-demographic characteristics, except for age, where the control group is the youngest group, and father's employment status (see Table 5.7 in the Appendix).

TABLE 5.2: Summary statistics

	2016		2017		2018	
	Mean	Std.Dev.	Mean	Std.Dev.	Mean	Std.Dev.
Panel A: Children characteristics						
Age	12.94	2.71	13.92	2.71	14.28	2.41
Female	0.43	0.50	0.44	0.50	0.49	0.50
Number of attended schools	2.02	2.89	1.99	1.44	2.15	1.49
Years in the current school	5.48	3.34	6.09	3.47	5.95	3.47
Years with the same group	3.63	3.04	3.14	2.63	3.38	2.83
Friends in the classroom	2.81	0.84	2.90	0.83	2.82	0.88
Total friends in general	24.88	37.43	22.36	34.14	20.99	35.14
Low SES school	0.55	0.50	0.57	0.50	0.90	0.30
Work in the last month	0.25	0.43	0.25	0.43	0.26	0.44
Help household members in the last month	0.69	0.46	0.76	0.43	0.78	0.41
Helped other families in the last month	0.43	0.49	0.45	0.50	0.45	0.50
Helped community in the last month	0.50	0.50	0.50	0.50	0.45	0.50
Socio-cultural activities participation	0.63	0.48	0.69	0.46	0.59	0.49
Trust in friends	0.65	0.48	0.65	0.48	0.60	0.49
Trust in others	0.28	0.45	0.22	0.41	0.20	0.40
Cooperation better than compete	0.68	0.47	0.77	0.42	0.73	0.44
Others opinion about my helping behavior	2.26	0.56	2.27	0.53	2.24	0.54
Others help me	2.44	0.58	2.40	0.58	2.32	0.59
Importance of others' opinion about me	1.68	0.72	1.58	0.68	1.44	0.61
Forgiveness	2.57	0.55	2.53	0.53	2.51	0.55
Panel B: Family characteristics						
Family with both parents	0.59	0.49	0.56	0.50	0.45	0.50
Single parent family	0.38	0.49	0.42	0.49	0.53	0.50
Total household members	5.58	14.84	5.07	2.74	5.43	2.91
Total siblings	2.18	2.01	2.09	1.86	2.55	1.94
Father has a job	0.97	0.17	0.96	0.19	0.95	0.21
Mother has a job	0.82	0.38	0.83	0.38	0.79	0.41
father's education	3.30	1.43	3.35	1.46	2.50	1.19
mother's education	3.36	1.39	3.37	1.40	2.81	1.22
Father's age	44.30	9.51	45.15	9.05	43.36	9.55
Mother's age	40.06	8.33	40.70	8.04	39.36	7.71
Difficult economic situation in last month	0.38	0.49	0.40	0.49	0.47	0.50
Family helped others in the last month	1.24	0.67	1.24	0.66	1.14	0.67
Someone would help your family?	1.35	0.55	1.35	0.54	1.43	0.58
Help from other families or people	0.65	0.48	0.67	0.47	0.65	0.48
Help from the state	0.10	0.30	0.07	0.25	0.08	0.27
Observations	1666		1695		911	

Note: This table includes all children that participated at least in one wave.

Table 5.3 summarizes the results of the children's decisions in the solidarity game over the three years. On average, participants received 11,110COP (SD=173.2) in the real effort task. Giving was quite frequent among children with 89 percent of them deciding to transfer part of their endowment. In comparison, in experiments with adults, Selten and Ockenfels (1998) found that 79 percent of participants in their study were not completely egoistic and transferred a positive amount.

TABLE 5.3: Mean values of game outcomes across treatments - All rounds all years

	(1) T0	(2) T1	(3) T2	(4) T3	(5) Overall	(6) p-value
Earnings (1.000 COP)	10.73	10.99	11.56	11.06	11.11	0.00
	(0.07)	(0.05)	(0.05)	(0.05)	(0.03)	
Transfer (1.000 COP)	1.61	1.94	1.94	1.83	1.85	0.00
	(0.03)	(0.02)	(0.03)	(0.02)	(0.01)	
Positive transfer	0.85	0.90	0.91	0.89	0.89	0.00
	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	
Prop. of income transferred	0.15	0.18	0.17	0.16	0.17	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
Exp. earnings (1000COP)	8.57	8.30	8.96	8.58	8.59	0.00
	(0.08)	(0.08)	(0.08)	(0.07)	(0.04)	
Exp. transfer (1000COP)	2.22	2.32	2.20	2.15	2.22	0.03
	(0.04)	(0.04)	(0.04)	(0.03)	(0.02)	
Redistributive equity	0.05	0.08	0.07	0.06	0.07	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
N	2600	4444	4040	6004	17088	

Note: Standard errors in parentheses. Average results including final round. Sample includes all children who participated, even if they participated only one year.

In our sample, children transferred on average 1,850COP (SD=100) which is equivalent to approximately 17 percent of their endowment. This result is slightly lower than similar studies with adults, e.g., Bolle et al. (2012) found that participants gave away 23 percent of their endowment. Participants in our sample on average underestimated what their partners received, 8,590COP (SD=200), and overestimated what their partners transferred, 2,200 (SD=141). Moreover, the proportion of children who followed a re-distributive equity principle, i.e., transfer between 30 to 36 percent of their income, is only 6.79 percent.

5.3.2 Empirical Strategy

In this section, we present the econometric specification used to evaluate motivations for solidarity giving and participating in informal risk sharing. Our research design allows to estimate a difference in difference model to disentangle three motivations for giving: altruism, social image concerns and strategic giving. We also consider the role of social demands of the group and norms of deservingness on motivations to exert effort. In order to control for unobserved time invariant individual characteristics, we use our panel database and random effects or fixed effects model for robust estimates. [7]

$$Y_{ir} = \beta_0 + \beta_R Round_i + \beta_T Treatment_i + \beta_{RT} Round_i \text{ x } Treatment_i$$
$$+\beta_E Earnings_i + \beta_Z Z_i + \varepsilon_i + \upsilon_{ir}$$

(5.1)

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[7]We use two tests to determine whether the panel analysis is random or fixed effects. Hausmann test, but when Hausman shows that matrix of difference in variance is not positive definite, HT is invalid. Instead we use the Breusch-Pagan test in favor of using RE. The Hausmann Test rejects the fixed effects model Prob>chi2, p=0.14, the Breusch-Pagan test cannot reject the homoskedasticity assumption Prob>chi2, p=0.000.

In Equation 5.1, Y_{ir} is the dependent variable which measures either the likelihood of a positive transfer, proportion earnings transferred or the income earned by the participants in each round. In order to disentangle image concerns, strategic giving and deservingness we use the positive and proportion transferred as the dependent variable. β_0 is the constant and estimates the altruistic motivations for transfers in the first round. The coefficients β_R and β_T denote the rounds ($R = (2, 3, 4)$) and treatments ($T = (1, 2, 3)$) in the game. The first one considers the change in altruism over rounds, while the second captures initial differences in altruism between treatments and control. The coefficient β_{RT} of the interaction term '$Round_i$ x $Treatment_i$' estimates whether information about the behavior of others or strategic motives affect game outcomes over rounds compared to the control group. β_E controls for the income earned by the individuals, Z is a vector of socio-demographic characteristics of the children and ε_i constant individual unobserved effects and v_{ir} the error term.

When individuals have image concerns, we expect that the likelihood of positive transfers and value transfer will be larger when donations are public knowledge (T1-Transfers and T3-Both). Hence, the coefficients β_{21} and β_{23} are expected to be positive. This reflects a motivation to create a positive social image or giving. If strategic giving is an important motivation, we expect that the likelihood to transfer and the value transfered to increase when reciprocity is possible. Therefore, coefficient β_{31} and β_{33} should also be positive.

When information of earnings is public, members of the social network can increase the demands of transfers. Therefore, we expect that earnings will decrease in the second round for T2-Earnings and T3-Both, compared with the control. The interaction term β_{22} can explain the 'dark side' of social capital, wherein individuals tend to either hide income (at a cost) to avoid contributing. We expect that this coefficient to be negative for the regression on earnings. On the other hand, norms of deservingness are expected to mitigate and even reverse the detrimental effect of redistribution networks. The interaction term β_{32} is expected to be positive.

In order to measure reciprocity we regress conditional donations in round three on transfers of others. Deservingness is measured as the correlation between conditional donations in round three and earnings of others. In T1-Transfers, we estimate only reciprocity conditional on previous transfer by others and T2-Earnings, we estimate deservingness since the conditional transfers is based on the previous earnings by others. We estimate motivations for risk sharing among participants within an unbalanced panel data. We run separated regressions for each of the treatments (T1 to T3). The specification can be written as follows:

$$Y_{ir} = \beta_0 + \beta_{PB}Y_{j,r-1} + \beta_E Earnings_i + \beta_Z Z_i + \varepsilon_i + v_{ir} \qquad (5.2)$$

Here β_{PB} captures the norm of reciprocity and deservingness as the response to other's behavior in the previous round.

In order to observe how altruism develop for children over time, we use the unbalanced panel dataset over three years- 2016, 2017 and 2018. We divide the children into three cohorts

according to the age in 2016, c=(9 years, 13 years and 16 years). An important contribution of our study is to understand how motivations explaining informal risk sharing develops in children over time. The panel structure of the data allows us to answer this question. We use the random effects model and estimate the following specification:

$$Y_{ir} = \beta_0 + \beta_T Treatment_{ic} + \beta_Y Year_{icr} + \beta_{CY} Treatment_{ic} \text{ x } Year_{icr} + \beta_E Earnings_{ic} +$$
$$\beta_Z Z_{ic} + \varepsilon_i + v_{ir}$$
$$(5.3)$$

To understand how image concerns develops over time, we estimate Equation 3, where Y_{ir} is the difference in the likelihood of transferring or proportion of earnings transfered between round 1 and round 2. Similarly, to understand how strategic motives change over time, we estimate Equation 5.3, where Y_{ir} is the difference in likelihood and proportion between round 1 and round 3. Equation 5.3 is estimated separately for each cohort $c_i = (1, 2, 3)$.

Reciprocity and deservingness are measured as the conditional transfers of participants in round 3 given the past transfers or earnings of the other's in the previous round. Hence, the specification is slightly different and can be written as follows:

$$Y_{i,r} = \beta_0 + \beta_{PB} Y_{j,r-1} + \beta_Y Year_{itcr} + \beta_{PBY} Y_{j,r-1} \text{ x } Year_{itcr} +$$
$$\beta_E Earnings_{ict} + \beta_Z Z_{ict} + \varepsilon_i + v_{it}$$
$$(5.4)$$

The Equation 5.4 is estimated separately for each cohort and for each treatment.

5.3.3 Behavioral Results

Motivations of solidarity giving and earnings

In this section we consider first the different motivations of solidarity giving namely altruism, reputation or image concerns, strategic giving. Then we discuss the potential dark side of solidarity networks, and conclude with an analysis of reciprocity and deservingness. In the analysis we pool data over treatments and years.[8] Panel A in Table 5.3.3 presents the estimates of Equation 1 for the likelihood of positive transfers, Panel B presents the estimates of the amount transferred and Panel C presents the estimates on earnings. The estimated coefficients and significant levels are presented in Table 5.7 in Appendix.

In the control treatment, 73% of the participants send a positive transfer in the first round, while only 66% did so in the fourth round. The difference is however, not statistically significant indicating that altruistic preferences are quite stable over the different rounds (See Appendix Figure 5.7). Similar trend is found for the proportion of earning transfered. While in T0-Control the fraction of the earnings transfer drop from 7.1% in the first round to 5.9% in the last round, the difference is not statistically different. This finding is consistent with Hypothesis 1.

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[8]Includes all the children who participated in the experimented at least twice (i.e an unbalanced sample).

In treatment groups T1 to T3, the proportion of participants that transfer income and the proportion of earnings transfered is not significantly different than in T0-Control in the first round. While in T0-control, the proportion of participants that transfer income and the proportion of income transfered tend to decrease over time, in treatments T1 to T3, they are more stable (see Figure 5.7 in Appendix). This indicates that social image and strategic motives help to sustain more risk-sharing.

TABLE 5.4: Motivations for solidarity giving

	Round 1 Altruism	Round 2 Social Image	Round 3 Strategic motive	Round 4 End game
Panel A:Positive Transfers **N=15011**				
T0-Control	0.735	0.71	0.707	0.66
	(0.051)	(0.052)	(0.053)	(0.053)
T1-Transfer	0.75	0.76	0.75	0.73
	(0.051)	(0.052)	(0.054)	(0.052)
T2-Earnings	0.77	0.75	0.74	0.71
	(0.051)	(0.052)	(0.054)	(0.053)
T3-Both	0.75	0.74	0.74	0.73
	(0.051)	(0.05)	(0.053)	(0.051)
Panel B:Proportion Transferred **N=13910**				
T0-Control	0.071	0.065	0.065	0.059
	(0.022)	(0.022)	(0.022)	(0.022)
T1-Transfer	0.074	0.076	0.076	0.077
	(0.023)	(0.023)	(0.023)	(0.023)
T2-Earnings	0.074	0.08	0.078	0.076
	(0.022)	(0.023)	(0.023)	(0.023)
T3-Both	0.074	0.069	0.069	0.074
	(0.023)	(0.022)	(0.022)	(0.022)
Panel C:Effort or Income earned **N=15184**				
T0-Control	8.38	8.8	9.07	9.38
	(0.73)	(0.73)	(0.739)	(0.737)
T1-Transfer	8.33	8.76	9.03	9.52
	(0.744)	(0.747)	(0.759)	(0.746)
T2-Earnings	8.604	8.91	9.18	9.49
	(0.732)	(0.752)	(0.764)	(0.749)
T3-Both	8.33	8.83	9.11	9.43
	(0.744)	(0.734)	(0.747)	(0.73)

Mean values; Standard deviations in parenthesis

To understand how image concerns and strategic motives affect giving behavior, we plot in Figure 5.2 the estimated coefficient of the interaction terms in Equation 1. Panel A presents the results for the likelihood to send a positive transfer (extensive margin) while Panel B presents the results on the proportion of earnings transfer (intensive margin). Panel C considers the impact of solidarity giving on earnings and allows to evaluate the hypothesis on the 'dark side' of

social capital. To compare the effect of image concerns, we consider first the interaction between round two and the different treatments which we denominate as image concerns. We find that image concerns do not have an effect at the extensive nor at the intensive margin. Contrary to Hypothesis 2, we find that in T1-Transfers and T3-Both, the estimated interaction term is positive but not significant for the likelihood to send a transfer and proportion of income transfered. This indicates that social image concerns do no trigger risk sharing when transfers are public information. As expected, the interaction for round two with T2-Earnings, does not affect the likelihood to send a positive transfer nor the proportion of earnings transfered.

The third aspect that we consider in our design is strategic motives. Hypothesis 3, considers that when there are opportunities to reciprocate, participants act strategically increasing transfers to attract more future solidarity. To understand the effect of strategic motives, we plot the estimated coefficients of the interaction between round 3 and the different treatments in Figure 5.2. We find that strategic motives, have a positive and significant effect on the extensive and intensive margin. Possibilities to reciprocate transfers trigger a positive effect on the likelihood to send a transfer and the proportion of earnings transfered in of T1-Transfers while information on both earnings and transfers (T3-Both) have a positive and significant effect on the intensive margin. This finding hence provides support for Hypothesis 3. Unexpectedly, we find that T2-Earnings have a positive effect on the intensive margin.

The last column in Figure 5.2 presents the estimated coefficients of the interaction between round four and treatments. As this is the last round of the experiment, we denominate this as end-game effects. As in the last round there are no opportunities for future interaction, the value of participation in a risk-sharing network decreases. This is expected to lead to a drop in contribution in the last round. Contrary to that hypothesis, we find that treatment conditions T1-transfers and T3-Both have a significant and positive effect on both the likelihood to transfer and the proportion of income transfered. This suggests that having the opportunity to build an image in order to attract reciprocity helps to sustain risk sharing.

'Dark side' of social capital and solidarity giving

Using the dependent variable Y_{ir} as earnings in each round in Equation 5.1 we can test the hypothesis of the 'Dark side' of social capital. Hypothesis 5 considers that availability of informal risk sharing options could result in a disincentive for effort. Panel 3 presents the estimated coefficients of interaction effects of rounds and treatments on the regression with earnings as a dependent variable (See also Table 5.7). In the control treatment, by magnitude the earnings increase over the four rounds, although they are not significantly different. The small increase in earnings can be attributed to a learning effect as participants get better at the slider task with each round. Contrary to Hypothesis 4, we find that public knowledge of earnings does not have a negative effect on effort. We find that T2-Earnings, follow the same increasing trend in effort as the control treatment, while T3-Both, result in significantly higher levels of effort. This indicates, that participants in the sample care about keeping an image of hard workers.

FIG. 5.2: Motivations of solidarity giving and earnings - Difference in Difference estimates

(a) Positive transfers

(b) Proporiton transferred

(c) Income earned-Marginal effects
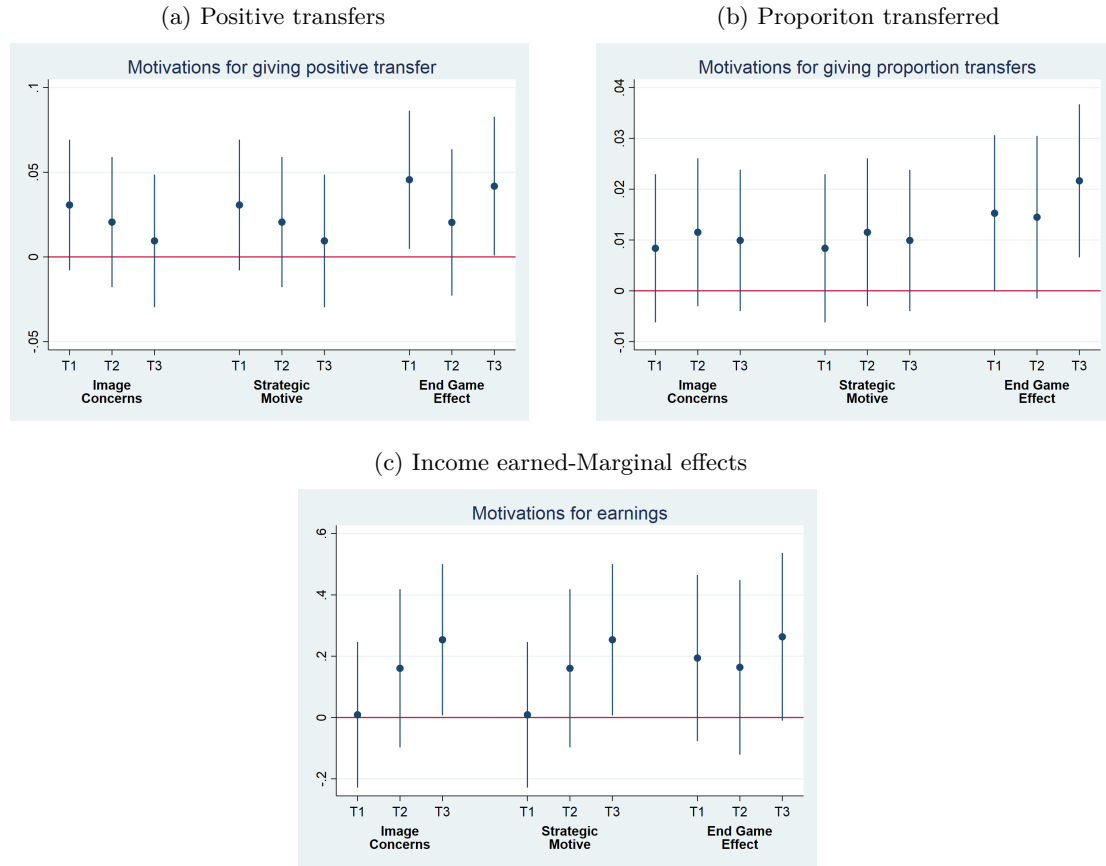
Reciprocity norms and Deservingness

Norms of reciprocity indicate that participants send transfers to participants that have sent more transfers in previous round. Estimation results of Equation 2 in T1-Transfers indicate that participants follow norms of reciprocity. For one unit transfered, participants transfered back 0.15 units. Similar patterns for social image and strategic giving is observed in T3-Both such that amount transferred is positively correlated with past transfers of the loser. One unit of transfered in the previous round increases transfers in 0.18. Our results, hence, support Hypothesis 3.

The last factor that we consider is the impact of deservingness, or a norm that consider giving more to those that appear as hard workers than those that are perceived as lazy. We expected that when there are opportunities to act strategically participants would increase in effort. Contrary to Hypothesis 5, we find that participants do no follow norms of deservingness. On the contrary, we observe an increase in past earnings of the loser significantly decreases the amount transferred in 1.4 percent. When participants receive information on both transfers of others and earnings, participants do not display norms of deservingness. We conclude that there is no support for Hypothesis 5.

Dynamics of risk sharing motivations

Altruism

In this section we study how the different motivations supporting risk sharing develop among children. We benefit from the panel dataset. To consider the dynamics of risk sharing, we consider three cohort groups. The first cohort correspond to children that in 2016 were in grade 3 or 4 and that on average had 9 years old. The second cohort is the children that in 2016 were in the grade 7, 8 and had on average 13 years. The last cohort was in grade 9, 10 or 11 and had on average 15 years.

For each cohort we were able to analyze how their decisions in the game changed over years. To understand the development of altruism we estimate Equation 3 considering decisions in the first round where all information about the decisions of others in the game is anonymous. We pool information over different treatments. To estimate the model in Equation 5.3 we decided to use a random effects model (Based on Hausmann test, Prob>chi2 = 0.140 and we cannot reject the test of homoskedastic variance Breusch-Pagan test, Prob>chi2=0.000). The marginal effects of the coefficients are in the Appendix Table 5.8.

Following the previous analysis, we estimate the development on both likelihood of a positive transfer and proportion of earnings transferred. Panel A in Figure 5.3 shows the proportion of children who decided to transfer part of their income by cohort and for each of the three years while Panel B presents the proportion of earnings transferred. We find that the probability of transferring increases significantly over time for those who are in the 9-year-old age cohort in the baseline. The proportion of children who transferred a positive amount is relatively stable over time for older children and there is no significant change in the likelihood to send a transfer for those cohorts. The proportion of income transferred is constant for all cohorts over time.[9]. We conclude that the data supports Hypothesis 8 and we observe an increase in altruism with aging. The critical age at which altruism develops is between the age of 9 and 10 years old.

Social image concerns and strategic giving

In order to understand whether public information affects individual behavior over time, we estimate Equation 5.3 using random effects model with differences in transfers between round 2 and round 1. Estimated marginal effects are presented in Appendix Table 5.11[10]. Figure 5.4 plots the estimated coefficients on image concerns by year, cohort and treatment. Panel A presents the estimated coefficients for T1-Transfers and Panel C for T3-Both. A positive coefficient indicates that public information on transfers, earnings or both, result in a larger change in transfers (likelihood or proportion) relative to the control treatment. We find that for the youngest cohort (9-years) image concerns have a significant positive effect at the extensive margin. In

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[9]As a robustness check, we consider a sample of children who exclusively participated over two years, e.g., they participated in 2016 and 2017 but not in 2018, or in 2017 and 2018 but not in 2016. We found similar results when we analyzed the unbalanced panel with the whole sample, and can confirm that there is an overall increase in altruism over time, but this change is smaller for older children (See Table 5.9 in the Appendix).

[10]Hausman test: T1:Prob>ch2=0.526, T2: Prob>chi2=0.982, T3:Prob>chi2=0.6823. We cannot reject RE is consistent and efficient.

FIG. 5.3: Dynamics of Altruistic giving

(a) Positive transfers

(b) Proporiton transferred
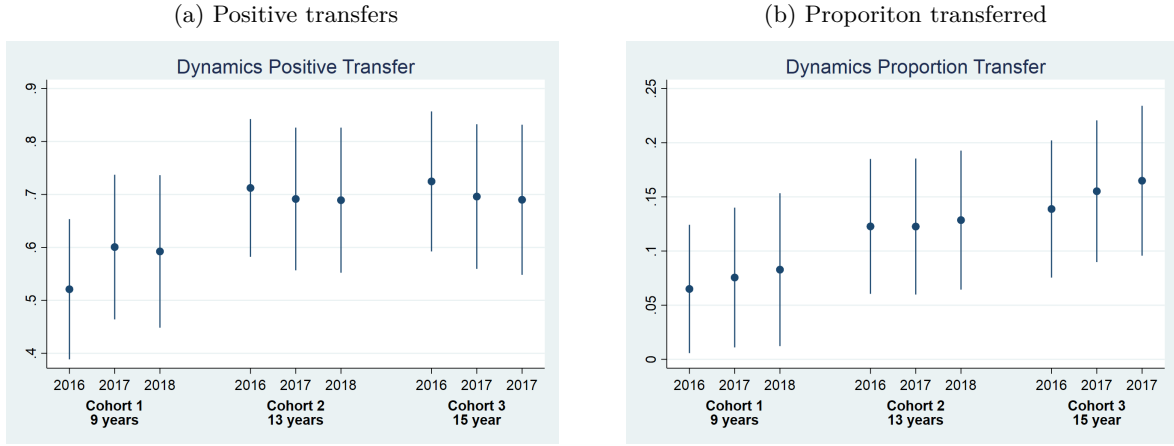
2016 participants in the youngest cohort, are 17 percent more likely to send a transfer in T1 compared with the control treatment. This is consistent with Triplett (1898) audience effect theory, that suggests already at an early age children care about their reputation. We find that image concerns are rather instable for the youngest cohort. In 2017, image concerns are significantly lower than in 2016 for this group in T1-Transfers, but in 2018, they are again at the same level as 2016. For the other cohorts, image concerns do not result in a significant increase in neither the likelihood or the proportion transfer. This finding suggest, as previously observed that image concerns do not promote risk sharing. Hence we cannot reject the Hypothesis 7.

Contrary to expected, we find that public information on earnings in T2-Earnings results in a decrease in likelihood of transfers for the youngest cohort compared with the control treatment in 2016. Yet, this effect reverses with aging and in 2018, the coefficient is positive.

Next we compare the differences in game outcomes for the third round relative to the first round across cohorts, years and treatment groups. In this case, we are measuring a combined effect of image concerns and the strategic behavior of participants. Figure 5.5 plots the estimated coefficient of Equation 3 when the dependent variable is difference in transfers. Estimated coefficients are presented in Appendix Table 5.12. When we consider each cohort separately by year, we find that participants do not respond to strategic motives and the likelihood to transfer and the proportion transfered do not change significantly when there are opportunities to elicit reciprocity in T1-Transfers and T3-Both. We find that strategic motives are rather stable and we find no significant changes in strategic motives across periods. We therefore reject Hypothesis 7.

Dynamics- Reciprocity and Deservingness

In this section, we analyze the dynamics of reciprocity and deservingness as motives for solidarity transfers by enabling participant's transfer to be conditional on other players' behavior in the previous round. Furthermore, we observe how conditional reciprocity and deservingness develop over time for different cohorts. The model described in Equation 5.4 is estimated for

FIG. 5.4: Dynamics of Social image motivated giving

(a) T1-Transfer
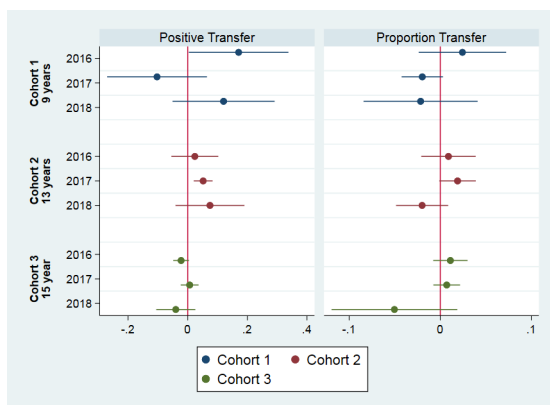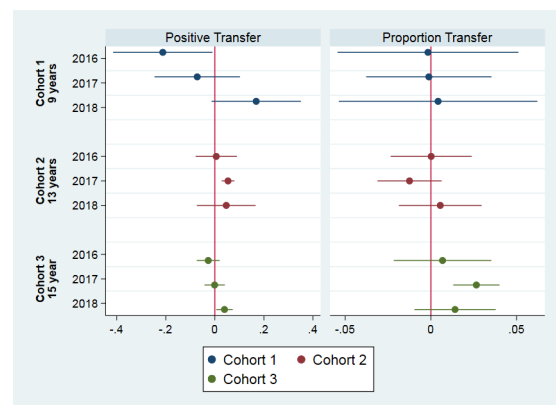
(b) T2-Earnings

(c) T3-Transfer & Earnings
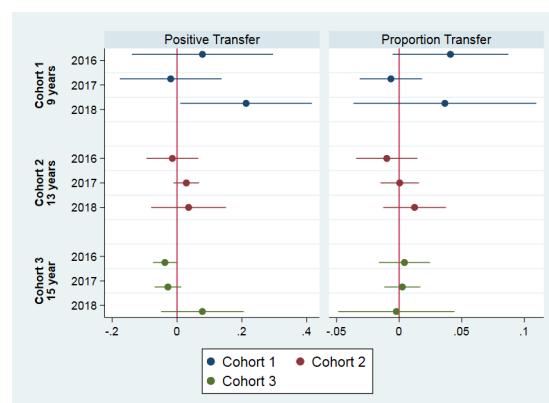
FIG. 5.5: Dynamics of Strategic giving

(a) T1-Transfer
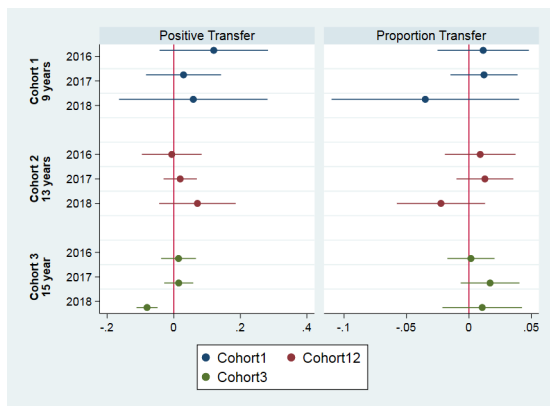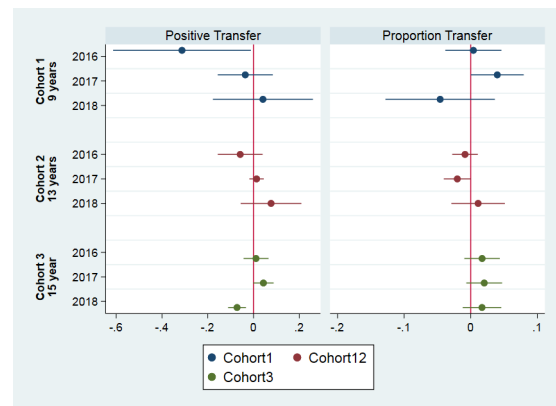
(b) T2-Earnings

(c) T3-Transfer & Earnings

FIG. 5.6: Dynamics of Reciprocity and Deservingness

(a) T1-Transfer

(b) T3-Transfer

(c) T2-Earnings or Deservingness
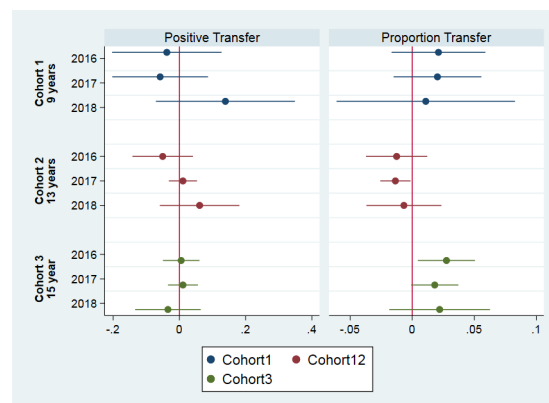
(d) T3-Earnings
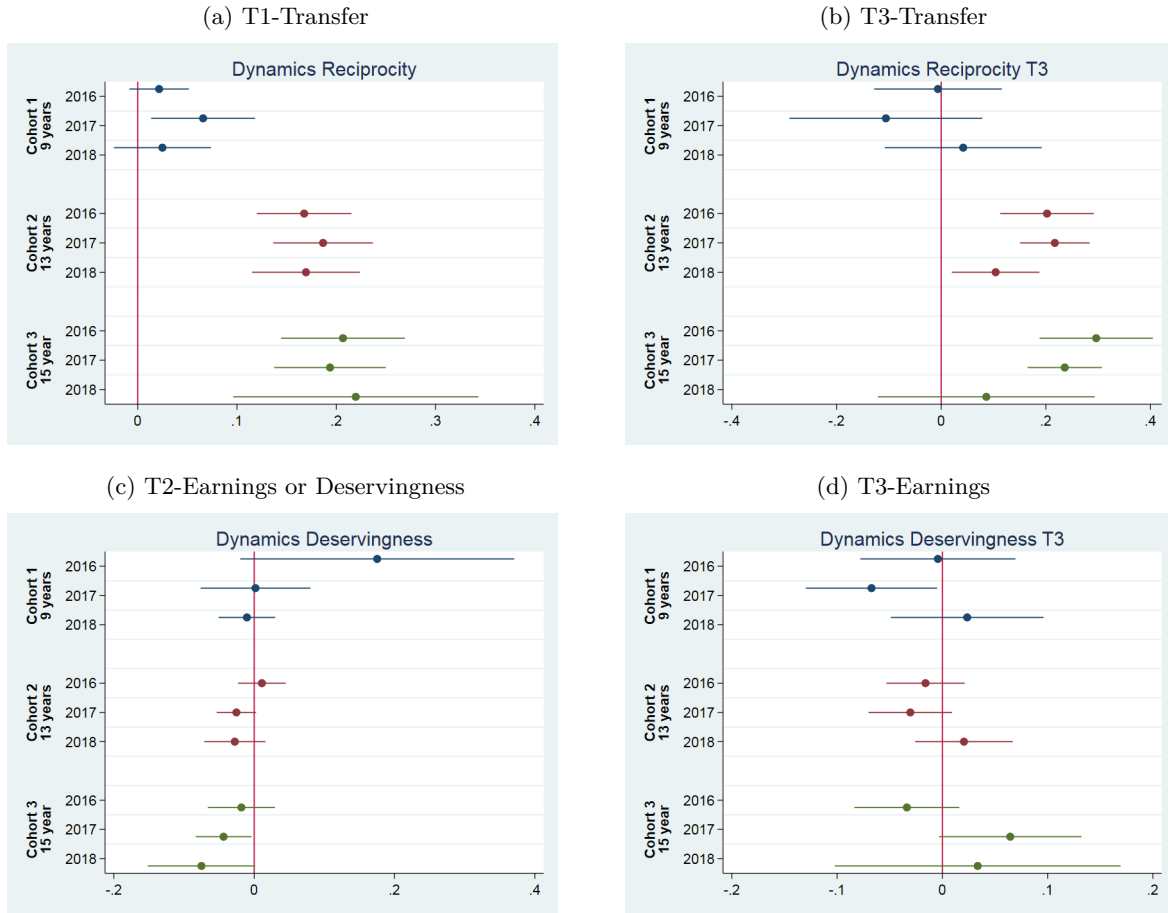
each treatment using a fixed effects model. Estimated coefficients are presented in Appendix Tables 5.12, 5.13 and 5.14.[11] Panels A and B presents the dynamics of reciprocity in treatments T1-Transfers and T3-Both, while Panels C and D present the dynamics of deservingness for T2-Earnings and T3-Both.

We observe that reciprocity motives are not important for the youngest cohort and the value transfered is not correlated with the transfers of others in none of the treatments. The middle and older cohort do display norms of reciprocity. One unit transfered in the past by the loser is reciprocated with 0.18 to 0.2 units. This suggest, that norms of reciprocity while present for older cohorts, are quite weak. Across years, there is no significant change in the reciprocity norms for any of our groups. In T3-Both we observe that reciprocity decreases over time for the middle and older cohort, though this effect is not significant. We reject Hypothesis 6 - reciprocity increases with age.

Earnings signal the hardworking nature of the loser, hence we would expect that if participants follow a norm that favor hard working losers over lazy ones, there should be a positive correlation between conditional transfers and earnings. Figure 5.6 plots the estimated coefficients of Equation

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[11]Hausman test for C1:Prob>chi2=0.0005, C2:Prob>chi2=0.000, C3:Prob>chi2=0.0006. We reject the H0: RE is consistent and efficient. Hence we use a fixed effects model

4 considering how conditional value transfered is correlated with previous earnings of the loser. In T2-Earnings, we find that only the youngest cohort follows a norm of deservingness. In 2016, for one unit of income lost, participants in the youngest cohort transfered 0.17 units. Between 2016 and 2018 this norm losses importance significantly for the youngest cohort. Older cohorts do not observe norms of deservingness and over time there is no change in the correlation between conditional transfers and earnings. Considering T3-Both, we find no evidence on norms of deservingness playing an important role on solidarity decisions. Thus, we can reject Hypothesis 6 that importance of deservingness increases with age.

5.3.4   External Validity

In this section, we correlate solidarity transfers and income earned in the game with reported experiences of the participants outside the lab. Table 5.5 is a panel random effects regression model for each of the dependent variables - positive transfer, proportion transferred and earnings used in the analysis. Controlling for the rounds, treatments and school dummies, we observe the correlation between socio economic characteristics of the participants and their behavior in the game. The results shows altruism and reciprocity as important intrinsic motivations of solidarity giving. We measure real life altruism using two variables - Index offer help and Parent's charitable actions. The index of offered help is a combination of different avenues when the child or their family has helped others. It includes - helping other people, other households, other communities and outsiders. We observe that frequency of helping others is positively correlated with the likelihood and proportion of transfers. However, parent's voluntary or charitable action is not correlated with increased transfer for the children. We also observe parent's lending and gift giving activities as positively correlated with the likelihood of transfering by the children. However, experiencing direct reciprocity from others does not increase transfers in the game. Similar to the results of the game, image concerns, measured by the statement 'I care about what my friends think about me' does not correlate with solidarity giving.

TABLE 5.5: Survey data and Transfer outcomes

	(1) Positive Transfer		(2) Proportion trasnfer		(3) Earnings	
	b	se	b	se	b	se
13 years-old	0.1450**	(0.064)	0.0304	(0.036)	4.1423***	(0.563)
16 years-old	0.1820***	(0.059)	0.0647*	(0.038)	5.5698***	(0.566)
Earnings (1.000 COP)	-0.0041	(0.005)	-0.0046	(0.003)		
Female	0.0132	(0.036)	0.0022	(0.020)	-0.8865**	(0.395)
Low SES school	-0.0584	(0.055)	0.0212	(0.032)	-1.3985**	(0.625)
Economic shock(last month)	0.0003	(0.063)	-0.0145	(0.034)	-1.0272	(0.880)
Mother works	-0.0007	(0.034)	0.0040	(0.020)	0.5745	(0.481)
Number of siblings	-0.0026	(0.007)	-0.0001	(0.005)	0.0337	(0.104)
Total household members	-0.0106***	(0.003)	-0.0010	(0.001)	0.0305	(0.028)
Friends in the class	-0.0004	(0.021)	0.0169	(0.012)	0.6428***	(0.232)
Socio-cultural activities	-0.0265	(0.038)	-0.0118	(0.025)	0.3364	(0.440)
Single parent family	-0.0106	(0.029)	-0.0164	(0.022)	0.4704	(0.386)
Index offer help	0.0367***	(0.014)	0.0248***	(0.007)	0.0905	(0.153)
Index received help	-0.0465	(0.031)	-0.0147	(0.016)	0.0378	(0.289)
Image concerns	-0.0084	(0.027)	-0.0300	(0.022)	-0.3223	(0.408)
Reciprocity from others	-0.0015	(0.029)	-0.0152	(0.020)	-0.6676**	(0.336)
Parent's charity	-0.0050	(0.013)	0.0172	(0.013)	0.1917	(0.223)
Parent's lend to others	0.0756*	(0.040)	0.0385	(0.030)	-0.4524	(0.600)
Parent's gift giving	0.0338*	(0.018)	-0.0048	(0.010)	-0.3536	(0.275)
Constant	0.4905***	(0.151)	-0.0964	(0.094)	6.7050***	(1.972)
Period	Yes		Yes		Yes	
Treatment dummies	Yes		Yes		Yes	
School dummies	Yes		Yes		Yes	
sigma_u	0.138		0.109		2.201	
sigma_e	0.287		0.099		1.888	
rho	0.188		0.549		0.576	
Observations	805		714		820	
Groups	152		152		152	

Note: Pooled sample of children who participated over the three years. Random effects model and clustered standard errors at session level

* p<.1, ** p<.05, *** p<.01

5.4   Conclusion

In this study, we implemented a modified version of Selten and Ockenfels (1998) solidarity game. This lab-experiment was set-up with children from between 7 and 16 years old. Children participated in the solidarity game for four rounds under different informational conditions. The experimental design allowed us to measure motivations for solidarity giving such as altruism, image concerns, strategic giving, deservingness and reciprocity in an informal risk-sharing group. One of the primary motives of implementing the solidarity game among children was to observe motivations for solidarity giving without the endogeneity resulting from adult networks and groups. Previous findings amongst adults shows that informal risk sharing networks are not randomly formed but are seen amongst kin, friends, neighbors and across households Fafchamps and Gubert (2007); Attanasio et al. (2012); Murgai et al. (2002). Children being not only an important recipient of informal solidarity transfers, but also potential social security for parents in their old age, we believe that it is essential to understand how they perceive the importance of different motivations of solidarity giving.

In addition, there has been a recent interest in studying social preferences shifting the narrative from self interested utility maximizing agent. While studies within the experimental literature have shown how motivations such as altruism, egalitarianism, efficiency concerns and trust are positively correlated with age (See a detailed review by Sutter et al. (2019)), our aim is to study motivations for solidarity giving and informal risk sharing. We followed a sample of Colombian children over three years. Our findings revealed reciprocity and altruism as strong motives for solidarity giving similar to Leider et al. (2009); Ligon and Schechter (2012); Cox et al. (1998) and Lin et al. (2014). Furthermore, altruism was observed already at early age and increased over time. Reciprocity was only observed for children of the middle and older cohort and it remained quite constant over time. This is in contrast to survey based panel studies in psychology that find reciprocity motivated by perspective taking and cognitive development to increase with aging, while altruism based pro-sociality requires effortful control and self regulation and arise earlier in life (Luengo Kanacri et al., 2013; Van der Graaff et al., 2018).

Apart from reducing the information asymmetry, our information treatments in the experiment allowed to disentangle deservingness as a motive for risk sharing. Similar to the study by Jakiela and Ozier (2016) we find that participants attribute more importance to neediness than whether the beneficiary was a 'good worker'. The income earned also enables us to test the 'dark side' of social capital hypothesis Di Falco and Bulte (2012). Our sample of children from Bogotá, Colombia do not reduce their effort supply when earnings are public information. On the contrary, we observe an increase in income earned when participants can act strategically and elicit more transfers by keeping an image of hard workers. For this finding, it is important to highlight that previous studies observing the negative impacts of informal risk sharing networks focused on adult population in different cultural settings and studied outcomes such as productivity and profits.

5.5 Appendix A

5.5.1 Additional Tables

TABLE 5.7: Orthogonality table baseline - 2016

	(1) T0-Control	(2) T1-Transfer	(3) T2-Earnings	(4) T3- Earn./Transfer	(5) p-value orthogonality test
Age	12.24	12.92	13.47	12.95	0.00
	(0.18)	(0.14)	(0.11)	(0.11)	
Female	0.40	0.44	0.41	0.45	0.35
	(0.03)	(0.03)	(0.02)	(0.02)	
Work in the last month	0.25	0.25	0.27	0.24	0.72
	(0.03)	(0.02)	(0.02)	(0.02)	
Number of attended schools	1.90	1.78	2.11	2.19	0.14
	(0.08)	(0.07)	(0.07)	(0.18)	
Years with the same group	3.67	3.76	3.53	3.59	0.73
	(0.21)	(0.15)	(0.14)	(0.12)	
Total friends in general	25.48	22.40	25.62	25.76	0.52
	(2.03)	(1.73)	(1.98)	(1.64)	
Total siblings	2.01	2.43	2.07	2.18	0.03
	(0.11)	(0.11)	(0.10)	(0.09)	
Total household members	5.66	5.20	4.86	6.28	0.48
	(0.37)	(0.13)	(0.12)	(1.01)	
Family with both parents	0.62	0.62	0.58	0.57	0.31
	(0.03)	(0.02)	(0.02)	(0.02)	
Single parent family	0.37	0.35	0.39	0.39	0.56
	(0.03)	(0.02)	(0.02)	(0.02)	
Diff. econ. situation last month	0.39	0.37	0.37	0.40	0.83
	(0.03)	(0.03)	(0.03)	(0.02)	
Father has a job	0.98	1.00	0.94	0.97	0.00
	(0.01)	(0.00)	(0.01)	(0.01)	
Mother has a job	0.87	0.79	0.82	0.81	0.12
	(0.02)	(0.02)	(0.02)	(0.02)	
N	284	392	400	590	
Proportion	0.17	0.24	0.24	0.35	

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

TABLE 5.7: Difference in Difference across all rounds and treatments

	Positive transfer (1)		Proportion Transfer (2)		Income Earned (3)	
	b	se	b	se	b	se
Period=2	-0.0211	(0.017)	-0.0055	(0.006)	0.4144***	(0.091)
Period=3	-0.0278*	(0.017)	-0.0060	(0.006)	0.6882***	(0.101)
Period=4	-0.0709***	(0.018)	-0.0121*	(0.006)	0.9968***	(0.107)
T1-Transfer	0.0206	(0.019)	0.0029	(0.010)	-0.0502	(0.210)
T2-Earnings	0.0422**	(0.018)	0.0034	(0.009)	0.2169	(0.200)
T3-Earn./Transfer	0.0238	(0.018)	-0.0057	(0.009)	-0.2164	(0.199)
Period=2 × T1-Transfer	0.0307	(0.020)	0.0084	(0.007)	0.0090	(0.121)
Period=2 × T2-Earnings	0.0206	(0.020)	0.0115	(0.007)	0.1606	(0.132)
Period=2 × T3-Earn./Transfer	0.0095	(0.020)	0.0099	(0.007)	0.2537**	(0.126)
Period=3 × T1-Transfer	0.0365*	(0.020)	0.0159**	(0.007)	0.0216	(0.131)
Period=3 × T2-Earnings	0.0126	(0.019)	0.0131*	(0.008)	0.0914	(0.137)
Period=3 × T3-Earn./Transfer	0.0059	(0.019)	0.0148**	(0.007)	0.3230**	(0.135)
Period=4 × T1-Transfer	0.0456**	(0.021)	0.0153*	(0.008)	0.1941	(0.138)
Period=4 × T2-Earnings	0.0204	(0.022)	0.0145*	(0.008)	0.1638	(0.145)
Period=4 × T3-Earn./Transfer	0.0418**	(0.021)	0.0217***	(0.008)	0.2634*	(0.140)
Earnings (1.000 COP)	0.0012	(0.001)	-0.0031***	(0.001)		
Female	0.0173*	(0.009)	-0.0033	(0.005)	-0.6984***	(0.163)
ID school=2	-0.0006	(0.016)	-0.0049	(0.009)	-0.6389***	(0.222)
ID school=3	0.0143	(0.016)	0.0111	(0.009)	-0.3256	(0.240)
ID school=4	-0.0106	(0.017)	0.0015	(0.009)	-1.0067***	(0.254)
Constant	0.7356***	(0.051)	0.0711***	(0.023)	8.3875***	(0.738)
Sociodemographic controls	Yes		Yes		Yes	
sigma u	0.116		0.079		2.341	
sigma_e	0.318		0.104		2.321	
rho	0.118		0.368		0.504	
Observations	15011		13910		15184	

Note: Individual RE regression. Breusch-Pagan Prob>chi2: p=0.000

Standard errors in parentheses and robust to heteroskedasticity.

* p<.1, ** p<.05, *** p<.01

TABLE 5.8: Dynamics of Altruism unbalanced panel.

	Positive transfer (1)		Proportion Transfer (2)		Income Earned (3)	
	b	se	b	se	b	se
year=2017	0.0750**	(0.037)	0.0112	(0.014)	2.4507***	(0.159)
year=2018	0.0785*	(0.045)	0.0170	(0.017)	2.2729***	(0.287)
13 years-old	0.2054***	(0.031)	0.0656***	(0.012)	3.5341***	(0.188)
16 years-old	0.2169***	(0.032)	0.0863***	(0.013)	4.9292***	(0.195)
year=2017 × 13 years-old	-0.0961**	(0.038)	-0.0080	(0.015)	-0.8267***	(0.216)
year=2017 × 16 years-old	-0.0967**	(0.039)	0.0048	(0.016)	-0.8378***	(0.209)
year=2018 × 13 years-old	-0.0974**	(0.047)	-0.0095	(0.019)	-1.0635***	(0.342)
year=2018 × 16 years-old	-0.0857*	(0.049)	0.0184	(0.022)	-1.9305***	(0.400)
Earnings (1.000 COP)	0.0081***	(0.002)	-0.0070***	(0.001)		
Female	0.0416***	(0.011)	0.0004	(0.006)	-1.0540***	(0.127)
ID school=2	-0.0128	(0.020)	0.0039	(0.010)	0.0796	(0.209)
ID school=3	0.0121	(0.020)	0.0039	(0.010)	-0.3144	(0.211)
ID school=4	-0.0006	(0.021)	-0.0065	(0.010)	-0.7560***	(0.213)
Constant	0.6323***	(0.035)	0.1744***	(0.015)	7.0782***	(0.240)
sigma u	0.108		0.059		1.751	
sigma_e	0.258		0.132		2.428	
rho	0.150		0.166		0.342	
Observations	3396		3396		3422	

Note: Individual RE regression. Dependent variable is the average value of outcome per individual.

Standard errors in parentheses and robust to heteroskedasticity.

* p<.1, ** p<.05, *** p<.01

TABLE 5.9: Altruism two waves participation

	FE (1) Decision		RE (2) Decision		FE (3) Proportion income		RE (4) Proportion income	
	b	se	b	se	b	se	b	se
Age in 2016			0.0448***	(0.005)			0.0167***	(0.002)
year=2017	0.4965***	(0.071)	0.4692***	(0.065)	0.0742**	(0.034)	0.0666**	(0.031)
year=2018	0.3438*	(0.182)	0.4010***	(0.138)	0.0898	(0.086)	0.1164*	(0.067)
year=2017 × Age in 2016	-0.0343***	(0.005)	-0.0338***	(0.005)	-0.0036	(0.002)	-0.0037	(0.002)
year=2018 × Age in 2016	-0.0226	(0.014)	-0.0313***	(0.011)	-0.0024	(0.007)	-0.0062	(0.005)
Earnings (1.000 COP)	0.0027	(0.005)	0.0053**	(0.003)	-0.0084***	(0.002)	-0.0077***	(0.001)
Female			0.0457***	(0.016)			0.0010	(0.008)
Constant	1.0394***	(0.149)	0.1625*	(0.089)	0.2168***	(0.071)	-0.0758*	(0.043)
Sociodemographic controls	Yes		Yes		Yes		Yes	
Family controls	Yes		Yes		Yes		Yes	
Children behavior	Yes		Yes		Yes		Yes	
Treatment dummies	No		Yes		No		Yes	
School dummies	No		Yes		No		Yes	
R squ.	0.093				0.033			
R squ. adj.	-0.992				-1.126			
sigma_u	0.272		0.109		0.122		0.060	
sigma_e	0.258		0.258		0.123		0.123	
rho	0.526		0.151		0.498		0.191	
Observations	1717		1717		1717		1717	
Groups	918		918		918		918	
Mean	0.901		0.901		0.166		0.166	

Note: Sample of children who participated in two waves. Fixed and random effects models for (1)-(2) decision whether transfer or not and (3)-(4) proportion of income transferred as dependent variables.

Standard errors in parentheses.

* p<.1, ** p<.05, *** p<.01

TABLE 5.10: Dynamics - Image concerns

TABLE 5.11: Treatment comparison - Diff-in-Diff coefficients – all years, FE

	Positive transfer			Proportion Transfers		
	Cohort 1	Cohort 2	Cohort 3	Cohort 1	Cohort 2	Cohort 3
	9 years	13 years	15 years	9 years	13 years	15 years
	(1)	(2)	(3)	(4)	(5)	(6)
T1-Transfer	0.1734*	0.0239	-0.0208	0.0243	0.0090	0.0111
	(0.092)	(0.036)	(0.025)	(0.027)	(0.013)	(0.014)
T2-Earnings	-0.2115*	0.0057	-0.0266	-0.0017	0.0002	0.0068
	(0.120)	(0.036)	(0.035)	(0.032)	(0.010)	(0.017)
T3-Earn./Transfer	0.0813	-0.0143	-0.0366	0.0410	-0.0098	0.0043
	(0.094)	(0.036)	(0.030)	(0.026)	(0.012)	(0.013)
year=2017	0.0188	-0.0454	-0.0107	0.0229	-0.0043	-0.0181
	(0.084)	(0.035)	(0.029)	(0.031)	(0.010)	(0.011)
year=2018	-0.0858	-0.0688	-0.0222	0.0323	-0.0026	-0.0026
	(0.107)	(0.057)	(0.024)	(0.040)	(0.015)	(0.016)
T1-Transfer × year=2017	-0.2751**	0.0280	0.0270	-0.0441	0.0100	-0.0040
	(0.119)	(0.044)	(0.033)	(0.039)	(0.016)	(0.017)
T1-Transfer × year=2018	-0.0512	0.0508	-0.0206	-0.0459	-0.0289	-0.0614*
	(0.137)	(0.064)	(0.041)	(0.047)	(0.023)	(0.036)
T2-Earnings × year=2017	0.1397	0.0480	0.0259	0.0005	-0.0126	0.0197
	(0.152)	(0.043)	(0.038)	(0.041)	(0.016)	(0.019)
T2-Earnings × year=2018	0.3818**	0.0409	0.0668	0.0059	0.0053	0.0073
	(0.175)	(0.069)	(0.044)	(0.051)	(0.019)	(0.024)
T3-Earn./Transfer × year=2017	-0.0989	0.0430	0.0081	-0.0476	0.0103	-0.0017
	(0.112)	(0.045)	(0.040)	(0.036)	(0.014)	(0.016)
T3-Earn./Transfer × year=2018	0.1329	0.0502	0.1146*	-0.0044	0.0222	-0.0065
	(0.134)	(0.065)	(0.067)	(0.047)	(0.021)	(0.027)
Constant	0.1183	0.0238	-0.0609	-0.0392	-0.0022	-0.0646
	(0.218)	(0.074)	(0.095)	(0.058)	(0.026)	(0.048)
Sociodemographic controls	Yes	Yes	Yes	Yes	Yes	Yes
School Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
rho	0.012	0.003	0.064	0.000	0.000	0.000
Observations	617	1495	901	617	1495	901

Note: Individual RE regression. Hausman test Prob>chi2 = 0.5266

Standard errors in parentheses and robust to heteroskedasticity.

* p<.1, ** p<.05, *** p<.01

TABLE 5.11: Dynamics - Strategic giving

TABLE 5.12: Treatment comparison - Diff-in-Diff coefficients – all years, FE

	Positive transfer			Proportion Transfer		
	Cohort 1 9 years	Cohort 2 13 years	Cohort 3 15 years	Cohort 1 9 years	Cohort 2 13 years	Cohort 3 15 years
	(1)	(2)	(3)	(4)	(5)	(6)
T1-Transfer	0.1202	-0.0059	0.0144	0.0114	0.0091	0.0016
	(0.083)	(0.046)	(0.027)	(0.019)	(0.014)	(0.010)
T2-Earnings	-0.3126**	-0.0582	0.0109	0.0039	-0.0086	0.0170
	(0.153)	(0.050)	(0.028)	(0.022)	(0.010)	(0.014)
T3-Earn./Transfer	-0.0379	-0.0505	0.0053	0.0211	-0.0126	0.0276**
	(0.084)	(0.047)	(0.028)	(0.019)	(0.013)	(0.012)
year=2017	-0.0339	-0.0533	-0.0156	-0.0068	0.0006	-0.0092
	(0.076)	(0.044)	(0.027)	(0.022)	(0.007)	(0.009)
year=2018	-0.0649	-0.1233*	0.0753***	0.0418	-0.0030	-0.0196
	(0.091)	(0.073)	(0.028)	(0.032)	(0.016)	(0.013)
T1-Transfer × year=2017	-0.0908	0.0254	0.0006	0.0007	0.0038	0.0153
	(0.098)	(0.052)	(0.033)	(0.024)	(0.018)	(0.013)
T1-Transfer × year=2018	-0.0615	0.0771	-0.0946***	-0.0463	-0.0314	0.0090
	(0.125)	(0.074)	(0.031)	(0.039)	(0.023)	(0.018)
T2-Earnings × year=2017	0.2767*	0.0716	0.0323	0.0359	-0.0116	0.0032
	(0.158)	(0.053)	(0.033)	(0.028)	(0.014)	(0.017)
T2-Earnings × year=2018	0.3537*	0.1348	-0.0829***	-0.0498	0.0197	-0.0001
	(0.184)	(0.084)	(0.030)	(0.052)	(0.022)	(0.020)
T3-Earn./Transfer × year=2017	-0.0202	0.0611	0.0054	-0.0008	-0.0010	-0.0095
	(0.109)	(0.051)	(0.035)	(0.027)	(0.014)	(0.015)
T3-Earn./Transfer × year=2018	0.1767	0.1115	-0.0400	-0.0102	0.0058	-0.0055
	(0.115)	(0.077)	(0.056)	(0.038)	(0.020)	(0.024)
Constant	0.1125	-0.0454	-0.1617*	-0.0431	-0.0008	-0.0105
	(0.218)	(0.079)	(0.088)	(0.090)	(0.032)	(0.059)
Sociodemographic controls	Yes	Yes	Yes	Yes	Yes	Yes
School Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	616	1494	901	616	1494	901
Mean						

Note: Individual RE regression. Hausman test Prob>chi2 = 0.5266

Standard errors in parentheses and robust to heteroskedasticity.

* p<.1, ** p<.05, *** p<.01

TABLE 5.12: Dynamics - Reciprocity (T1-Transfer)

	All (1)		Cohort 1 (2)		Cohort 2 (3)		Cohort 3 (4)	
	b	se	b	se	b	se	b	se
Prev. other's transfer (1000COP)	0.1551***	(0.012)	0.0216	(0.015)	0.1677***	(0.024)	0.2068***	(0.032)
Earnings (1.000 COP)	0.1479***	(0.028)	0.1214*	(0.071)	0.1307***	(0.044)	0.1451**	(0.070)
Female	-0.2947	(0.204)	0.0602	(0.283)	-0.0738	(0.268)	-0.6379	(0.499)
ID school=2	-0.6026**	(0.259)	-2.4991*	(1.299)				
ID school=4	-0.6547***	(0.237)	-2.1329*	(1.146)	-0.0428	(0.386)	-0.3756	(0.594)
year=2017			-0.4057	(0.340)	-0.0443	(0.246)	-0.2658	(0.306)
year=2018			-0.2965	(0.368)	0.0585	(0.324)	0.1815	(0.623)
year=2017 × Prev. other's transfer (1000COP)			0.0443	(0.032)	0.0190	(0.032)	-0.0131	(0.036)
year=2018 × Prev. other's transfer (1000COP)			0.0033	(0.029)	0.0018	(0.035)	0.0129	(0.070)
ID school=3					0.1064	(0.372)	0.3310	(0.561)
Constant	-1.7574*	(0.919)			-1.3878	(1.321)	-0.7055	(2.222)
sigma u	1.846		1.000		1.976		2.142	
sigma_e	1.899		1.312		1.883		2.025	
rho	0.486		0.367		0.524		0.528	
Observations	3980		850		1920		1210	
Controls	Yes		Yes		Yes		Yes	

Note: Individual FE regression. Dependent variable is positive transfers, proportion transfered and the income earned.

Hausman test H0: Random effects is consistent and efficient Prob>chi2 = 0.005, Reject H0 and use FE.

Clustered standard errors.

* p<.1, ** p<.05, *** p<.01

TABLE 5.13: Dynamics - Deservingness (T2-Earnings)

	All (1)		Cohort 1 (2)		Cohort 2 (3)		Cohort 3 (4)	
	b	se	b	se	b	se	b	se
Prev. other's earnings (1000COP)	-0.0150*	(0.008)	0.1753*	(0.100)	0.0110	(0.017)	-0.0182	(0.024)
Earnings (1.000 COP)	0.0434	(0.032)	0.1002	(0.069)	0.0196	(0.036)	0.2515**	(0.104)
Female	-0.0583	(0.156)	-0.6716	(0.503)	0.0110	(0.190)	0.0491	(0.372)
ID school=2	-0.1908	(0.278)	-0.6973	(0.714)	-0.5786	(0.493)	0.0261	(0.424)
ID school=3	-0.1834	(0.284)	-2.2397**	(1.012)	-0.3657	(0.474)	-0.0742	(0.704)
ID school=4	-0.7177***	(0.275)	-0.3387	(0.538)	-1.0160**	(0.497)	-0.0523	(0.452)
year=2017			-0.2436	(0.696)	0.2336	(0.219)	0.2013	(0.321)
year=2018			-0.4081	(0.574)	0.6538**	(0.295)	0.7804	(0.487)
year=2017 × Prev. other's earnings (1000COP)			-0.1735	(0.110)	-0.0363	(0.022)	-0.0254	(0.031)
year=2018 × Prev. other's earnings (1000COP)			-0.1857*	(0.102)	-0.0386	(0.028)	-0.0569	(0.044)
Constant	0.3231	(0.944)	4.1784	(2.717)	-0.4218	(1.312)	0.5658	(1.820)
sigma u	1.624		1.533		1.538		1.803	
sigma_e	1.397		1.451		1.246		1.483	
rho	0.575		0.527		0.604		0.596	
Observations	3470		355		2045		1070	
Controls	Yes		Yes		Yes		Yes	

Note: Individual FE regression. Dependent variable is positive transfers, proportion transfered and the income earned.

Hausman test H0: Random effects is consistent and efficient Prob>chi2 = 0.005, Reject H0 and use FE.

Clustered standard errors.

* p<.1, ** p<.05, *** p<.01

TABLE 5.14: Dynamics - Reciprocity and Deservingness (T3-Transfer & Earnings)

	All (1)		Cohort 1 (2)		Cohort 2 (3)		Cohort 3 (4)	
	b	se	b	se	b	se	b	se
year=2017	-0.0766	(0.262)	0.0966	(0.367)	0.2226	(0.274)	-0.3663	(0.525)
year=2018	-0.5045***	(0.186)	-0.5720	(0.370)	-0.4909	(0.320)	-0.9005	(0.849)
Prev. other's earnings (1000COP)	-0.0163	(0.013)	-0.0391	(0.034)	-0.0066	(0.017)	-0.0373	(0.025)
year=2017 × Prev. other's earnings (1000COP)	-0.0020	(0.024)	-0.0027	(0.044)	-0.0243	(0.025)	0.0402	(0.041)
year=2018 × Prev. other's earnings (1000COP)	0.0384**	(0.018)	0.0553	(0.046)	0.0379	(0.028)	0.0639	(0.069)
Prev. other's transfer (1000COP)	0.2114***	(0.037)	-0.0062	(0.062)	0.2023***	(0.046)	0.2962***	(0.055)
year=2017 × Prev. other's transfer (1000COP)	0.0091	(0.053)	-0.0995	(0.112)	0.0149	(0.056)	-0.0600	(0.066)
year=2018 × Prev. other's transfer (1000COP)	-0.1264**	(0.050)	0.0482	(0.098)	-0.0982	(0.062)	-0.2099*	(0.118)
Earnings (1.000 COP)	0.1023***	(0.012)	0.0510**	(0.022)	0.0986***	(0.016)	0.1030***	(0.032)
Female	-0.0538	(0.081)	-0.0484	(0.142)	-0.0894	(0.115)	-0.0413	(0.200)
ID school=2	-0.0995	(0.143)			-0.0475	(0.197)	0.0115	(0.286)
ID school=3	0.1352	(0.140)	0.3097	(0.213)	0.0321	(0.198)	0.3691	(0.324)
ID school=4	0.1737	(0.142)	0.4489**	(0.202)	0.0923	(0.209)	0.1561	(0.297)
Constant	-1.4549***	(0.368)	-1.3607**	(0.631)	-1.4896***	(0.536)	0.1777	(0.997)
sigma u	0.912		0.588		0.847		1.191	
sigma_e	1.013		0.892		0.979		1.035	
rho	0.448		0.303		0.428		0.570	
Observations	2148		434		1090		624	
Controls	Yes		Yes		Yes		Yes	

Note: Individual FE regression. Dependent variable is positive transfers, proportion transfered and the income earned.

Hausman test H0: Random effects is consistent and efficient Prob>chi2 = 0.005, Reject H0 and use FE.

Clustered standard errors.

* p<.1, ** p<.05, *** p<.01

5.5.2 Additional Figures

FIG. 5.7: Motivations of solidarity giving across treatments and rounds

(a) Positive transfers

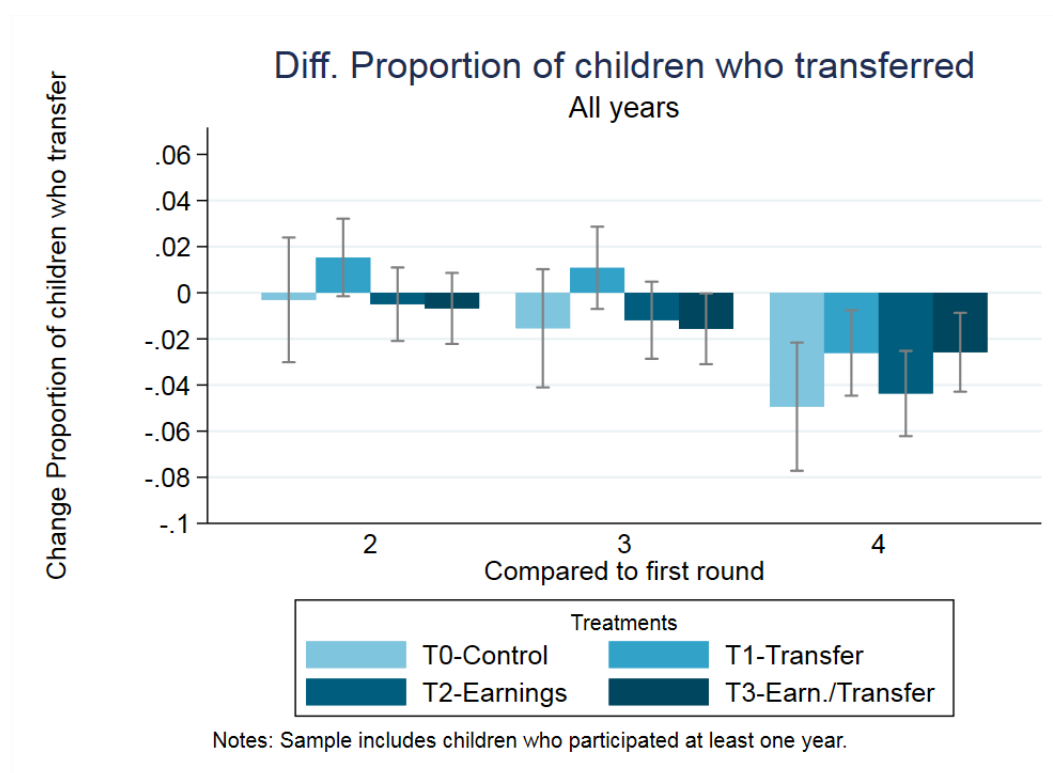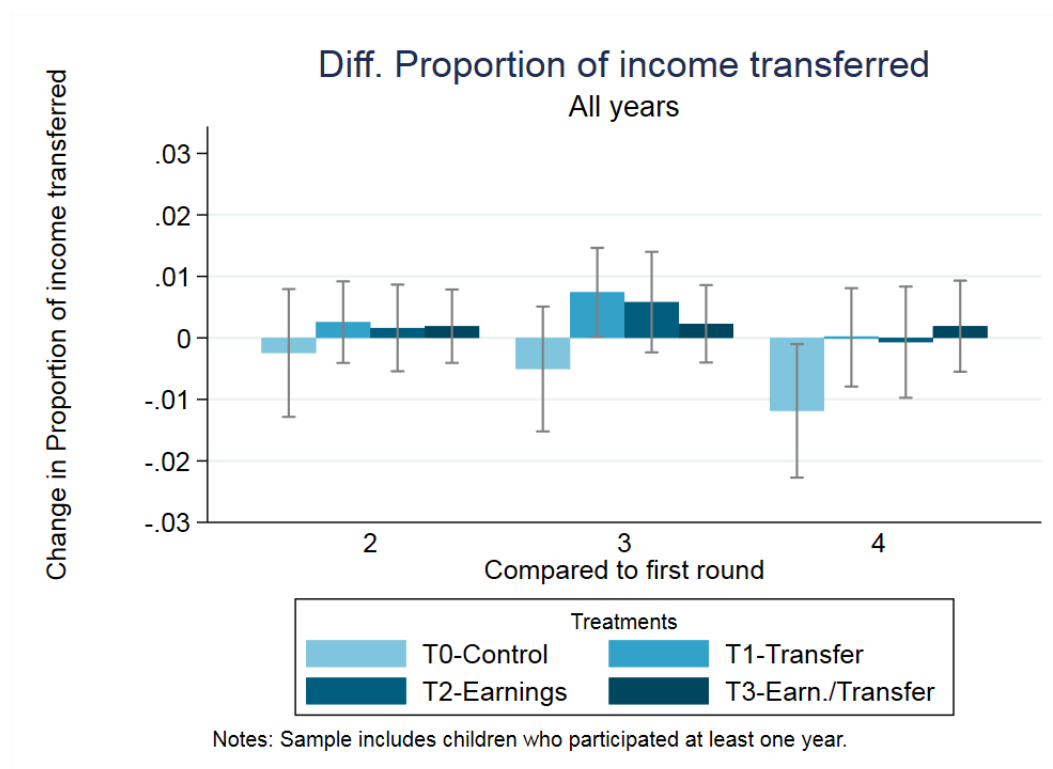(b) Proportion transferred

(c) Income earned
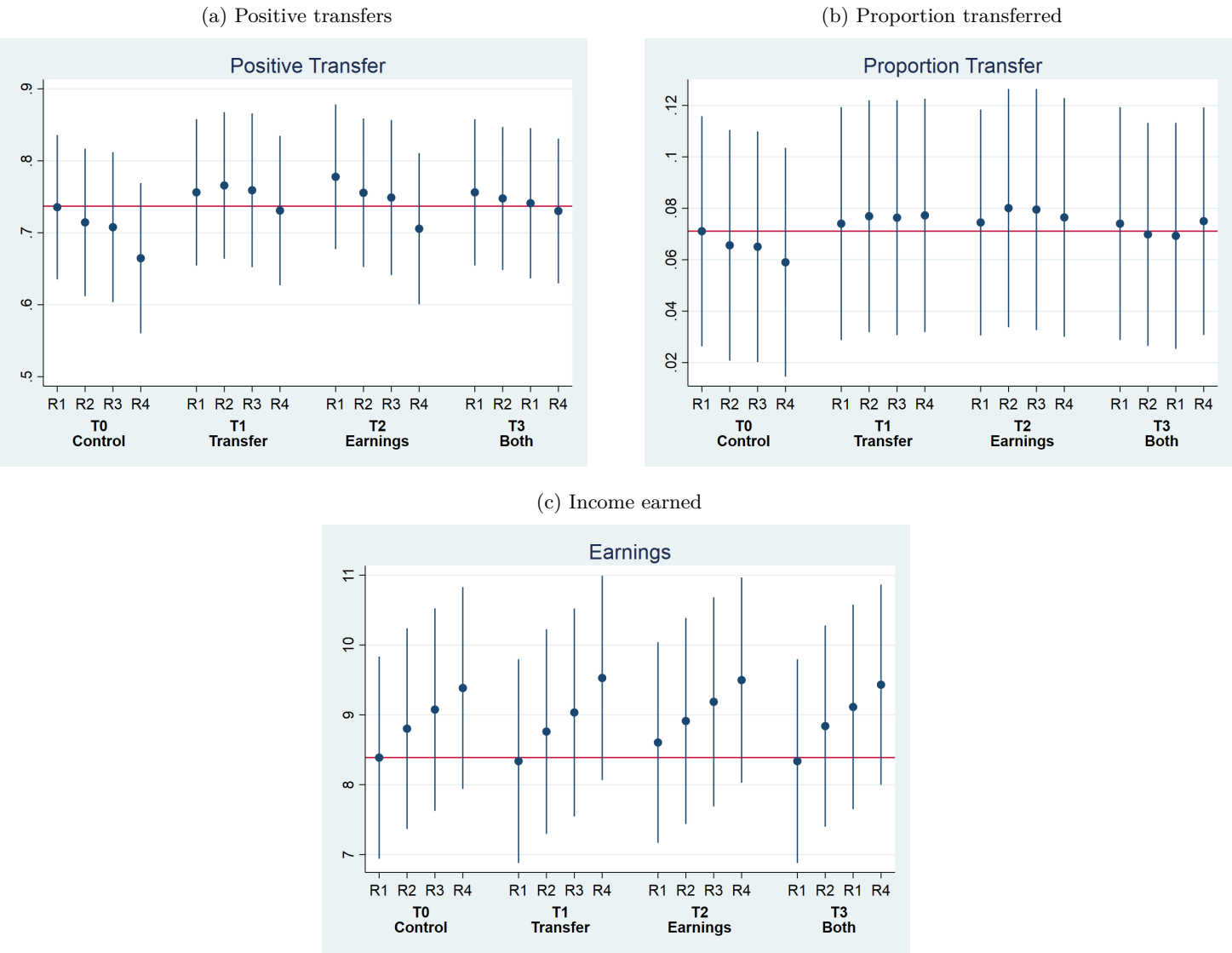
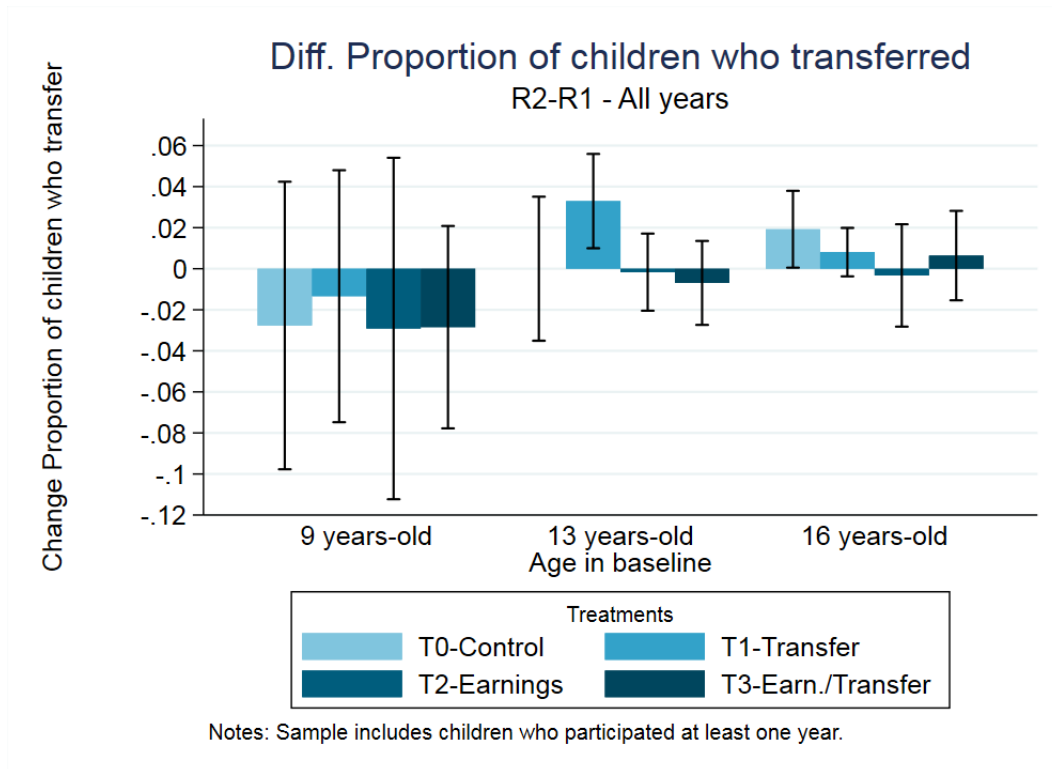Fig. 5.8: Positive transfers

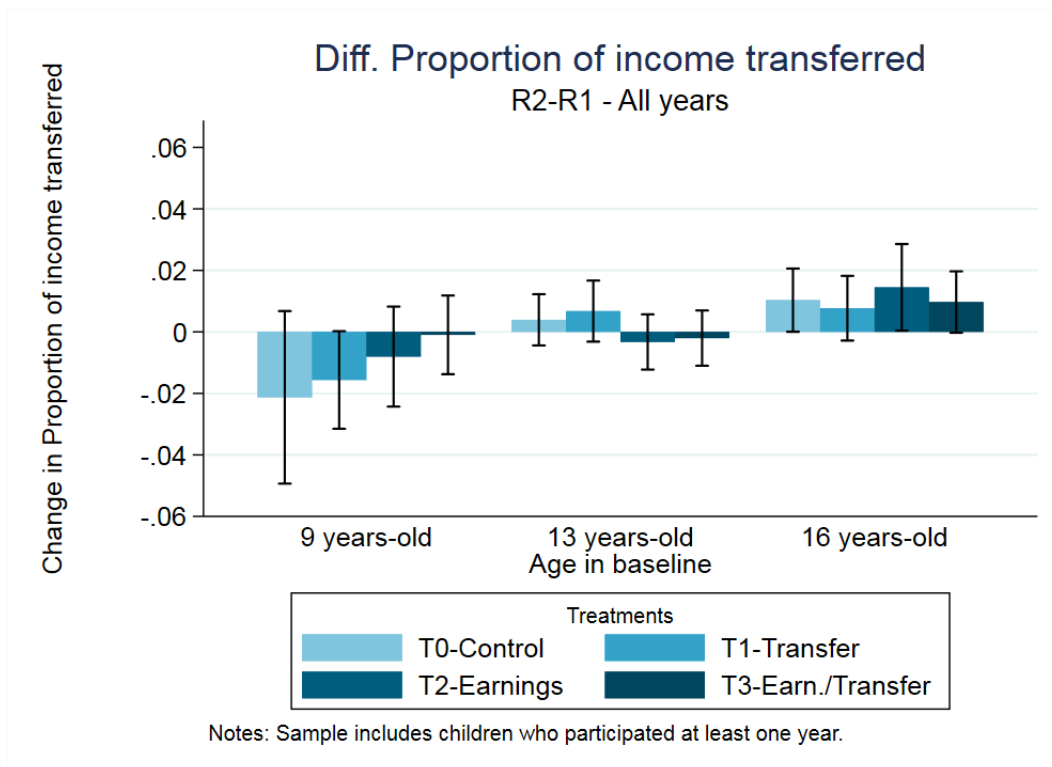Fig. 5.9: Proportion transferred

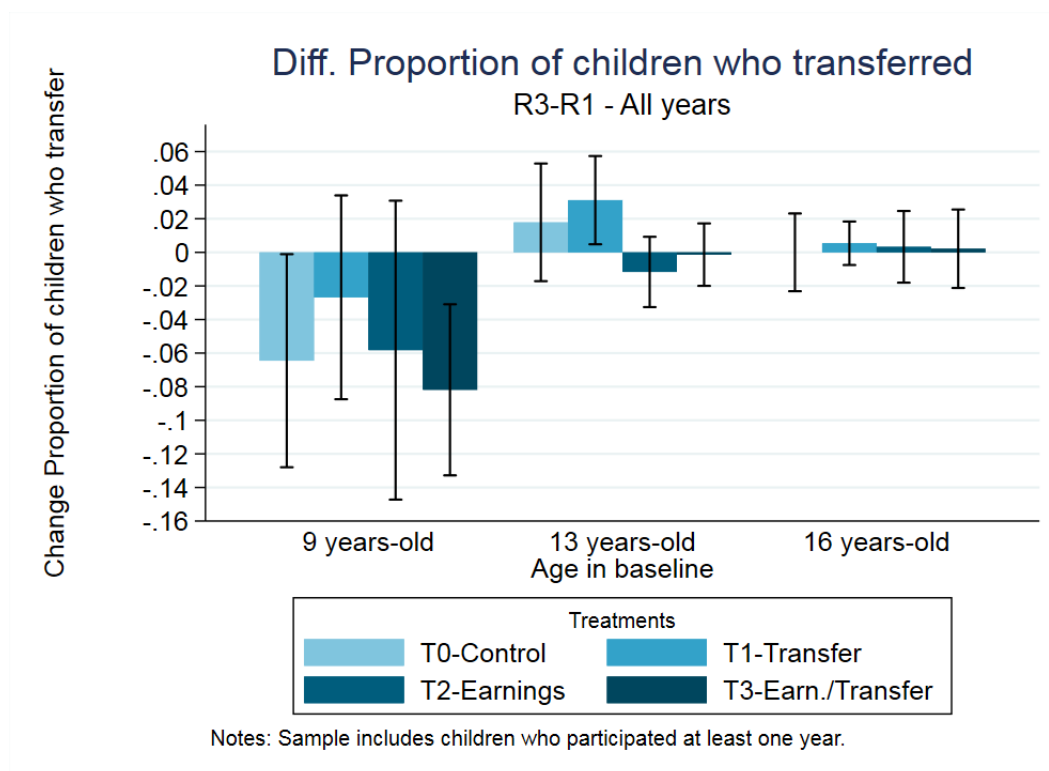FIG. 5.10: Positive transfers

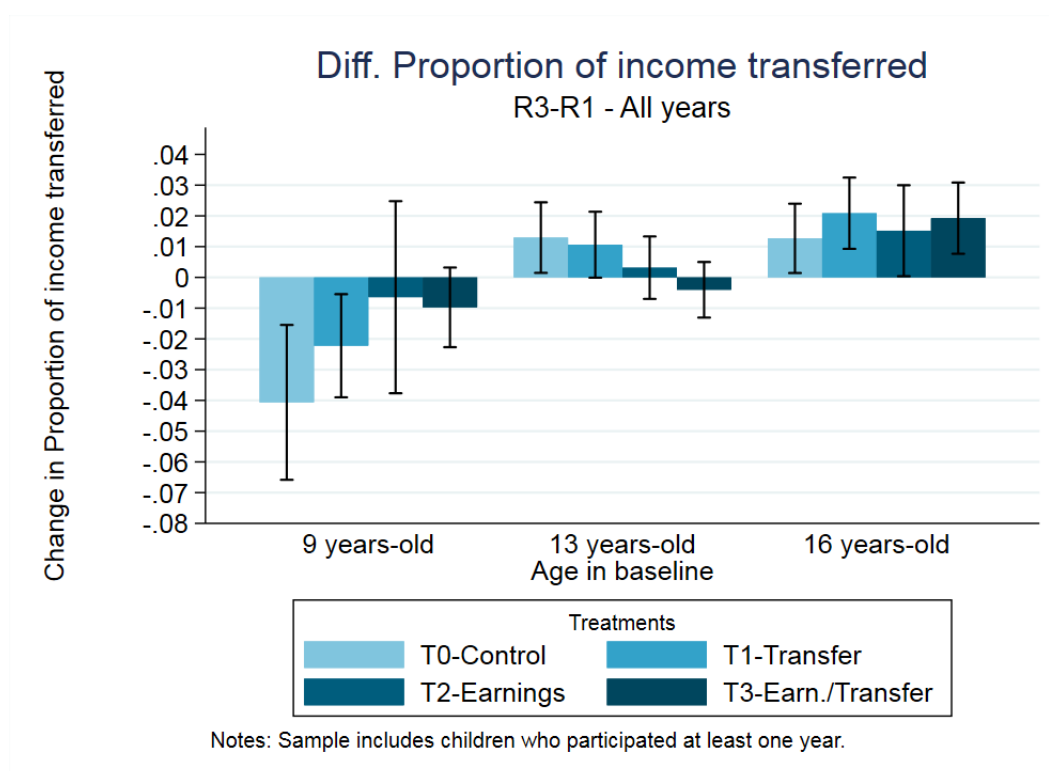FIG. 5.11: Proportion transferred

Fig. 5.12: Positive transfers

Fig. 5.13: Proportion transferred

5.6   Appendix B

5.6.1   Experimental instructions

Instructions

Welcome!

Before starting please open your tablets and press the update button that is in the upper-right corner of your screens, where the icon of the house is located.

- Wait for the coordinator's instructions to continue -

This activity has been organized by a group of students from the University of Goettingen, Germany, and will be carried out in different courses and in different schools. To make sure that everyone receives the same information, we will read the explanation out loud.

The goal of this activity is to understand the economic decision-making of middle and high-school students. During this activity we ask that you remain silent and do not talk to any of your classmates until the activity is finished. If you have any questions please raise your hand and one of our assistants will come to you to help. Regardless of the results of the activity, each of you will receive 1,500 pesos for participating.

What are we doing today?

We will be doing an activity where you can earn money that will be paid at the school store in the form of food and drinks. The amount of money you get will depend on your decisions, the decisions of your colleagues, and luck.

Please pay close attention to the instructions that we will give you during the game. We will then ask some simple questions and you will be ask to fill out a survey. The game takes roughly one an a half hours.

Before we start the activity, you will be organized into groups of three people. The groups are going to be randomly picked by the computer. You will be identified not by name, but by color: Yellow, Blue or Red. Each group will be made up of one Yellow participant, one Blue, and a Red. The group will be kept the same for the entire activity. During the game, you will not know what color you have been given, nor will you know the color of the other members of your group or who they are.

What is the game about?

During the game you have to do two things. Let's show an example of the first task.

- Enter the screen with the bars -

On the screen you will see 30 bars, divided into two columns, 15 on the left and 15 on the right. Each of these bars has a cursor that is located on the left at zero. Your task is to slide the cursor of each bar and place it exactly at 50. In some tablets at the bottom there are two hidden bars, slide the screen up to view them. You can make the number of bars you want. Since this is just an example, you have 1 minute to try it out. Go ahead and give it a try!

- When everyone finishes with the example, continue with the reading -

Remember that this was just an example. For each bar that you can position exactly at the 50 mark, you will receive 500 pesos (show a 500 pesos coin). If the bar is not exactly on 50, you will not receive any payment. You will be given 2 minutes to perform this activity.

Let's look at this example

- The examples of income are shown in the tablets -

The income in this activity will be equal to the number of bars located on the 50 times 500 pesos. That is, if you correctly place 10 bars at 50, how much will you receive? 500 x 10 = 5000 pesos

If you position 15 bars at exactly 50, how much will you receive? 500 x 15 = 7500 pesos

One of our assistants will pay you your income from this round in play money. Are there any questions so far?

- The trial round page is displayed -

Now, we are going to do a test round so you can learn how to do the activity. This round will NOT affect your final payments.

At the end of the round you will know how many bars you positioned at 50 during the 2 minutes. When the results appear, please read them and then press the "next" button to continue. During the activity, it is very important that you DO NOT COMMENT out loud on the results to your colleagues, nor should you look at the results of others. These results are private. Let us begin!

- At the end of the trial round, wait for the results to be shown and continue reading -

Please read the information that appears on the screen and press "next" to continue.

- Wait for the coordinator's indication to continue -

Second part of the explanation:

In this game there is the possibility that you may lose all the money you have won. This is all just a question of luck. At the end of each round, the computer will select a color, and the person who is identified with this color will lose all the money they got for positioning the bars. In each round one player in your group will lose all their income.

Your second task is to decide how much, from the money you earned, you want to give away to the player who lost. You can give away any value, how ever much you want, you can also decide to give nothing.

You will find on your table a total of 8 envelopes, 4 with the word PASS (PASAR originally in Spanish) and 4 blank envelopes.

If you want to give some of your money to the player who lost all theirs then put it in the envelope marked with the word PASS (show envelope). The rest of the money is yours to keep and you can put it safely away in one of the other blank envelopes (show envelope).

Please check that the envelopes have your tablet identification number on them and the number of the round. The number of the tablet is found in the upper-left part of the screen. The

envelopes are marked with R1, R2, R3, and R4. If you have any inconsistency or the number on the envelope does not match the number on your tablet, please raise your hand and one of our assistants will help you.

Once you have finished this task, you will find a bar on the tablet screen that shows the amount of money you deposited in the PASS envelope. Please remember that the amount of money you put in the envelope and the amount you enter in the tablet must match.

Please do not write, scratch, fold, seal, or make any marks on the envelopes, we need them again in other courses. Do you have questions so far?

How much will you win in the game? If you are not selected to lose, what you receive in the round will be equal to your income minus the amount you put into the PASS envelope.

For example, if you received 5000 pesos and spent 1000 pesos, your earnings will be 4000 pesos; if you received 7500 pesos and spent 3000 pesos, your earnings will be 4500 pesos. Keep in mind that the money that you and the other person in the group place in the PASS envelope will be what the loser in your group receives.

What happens if you lose? In that case you will receive what the other two members of the group have placed in the PASS envelope.

For example: if one player passes 500 pesos and the other passes 2000 pesos, you will receive 2500 pesos. Another example, if one player passes 3000 pesos and the other 1000 pesos, you will receive 4000 pesos.

To make things even clearer, let's look at an example on the tablet.

- The example of the game is shown on the tablets.

I will read the example and if you have any questions please raise your hand.

Suppose someone managed to position 12 bars at the 50 mark. Then their income would be: 12 x 500 = 6000 pesos

If the participant passed 3000 pesos to the person who lost, if he has good luck his profit will be: 6000 - 3000 = 3000 Pesos

How much do you get if you lose? It all depends on how much the other players in the group have given you. If they give 1000 pesos to the player who lost their money then that player will get 1000 pesos, if you are given 5000 pesos, you will receive 5000 pesos and so on. Do you have any questions so far?

Before we start we would like to ask you some questions to make sure we explained thinks clearly. Please read carefully and answer the questions. Do not use full stops, or commas when you write thousands, only numbers. When you finish answering the questions, press "next" to continue the activity. If you have any questions, please raise your hand and one of our assistants will help you.

- Do not read the control questions -

Control questions

1. There are three players in a group: Yellow, Blue and Red. The computer selects the player Red, who loses all his income.

a. The yellow player completes 10 bars and receives 5000 pesos. If she deposits 2000 pesos in the PASS envelope, what is the yellow player's payment? (Answer, 3000)

b. The blue player completes 12 bars and receives 6000 pesos. The Blue player decides to place in 1000 pesos PASS envelope. How much does this player receive? (Answer, 5000)

c. The Red player completes 8 bars and receives 4000 pesos. He passes 1000 pesos in the envelope. How much does the Red player get? (Answer, 4000)

2. Another situation: The Yellow player receives 8000 pesos for the bars and deposits 3000 pesos in the PASS envelope,

a. How much does the Yellow player win if they have good luck and is not selected to lose their money? (Answer, 5000)

b. How much does the Yellow player receive if they have bad luck, loses what they won in the bars, if it is known that the Red player placed 3000 pesos in the PASS envelope, and the Blue player placed 1000 pesos in the envelope? (Answer, 4000)

- Read the following sentence after 3 minutes -

Remember that if you have doubts you can raise your hand and one of our assistants will help you.

- Wait for everyone to answer the questions and instructions of the coordinator to continue -

When will you know whether you have lost or not? The game consists of four rounds. At the end of the four rounds the computer will randomly select a round for payment. Each player will receive the winnings ONLY from the selected round.

Between the rounds you will not know if you lost or not. Only at the end will you find out the color given to you and whether you lost your income or not. In addition, if you lose, you will know the total value that the other two players in your group passed on to you.

At the end of the game, the screen will show the amount of money you will be getting from the game. However, we will check that the amount of money in the envelopes matches the sum recorded on the tablet. It is very important that these values are the same. Therefore, you may receive more, or less of the amount shown on the tablet.

In the next few days we will give the store the list of the amount each person has in credit. The store will only give the payment in the form of things to eat (cookies, potatoes, etc.), and it is not authorized to give the payment in cash. Also, without the authorization of your parents we cannot make the payments. Is this clear?

First round

Let's start the game. The first task is to position the bars exactly at 50. For each bar that is exactly at 50 you will receive 500 pesos. You have two minutes to do this activity. If you finish before 2 minutes, please remain silent and wait until the 2 minutes are over. Let us begin!

- After 2 minutes. Continue reading -

Remember that the results are INDIVIDUAL. Now our assistants will go through each of your seats to give you the money for this round.

Please: Prepare the envelopes for ROUND 1, that is, the envelope marked with the word PASS and the other blank envelope (show envelopes). Remember that in the PASS envelope, you must put in the money you want to give to the person in your group who lost their money and you should put the rest of the money in the other envelope.

- The assistants distribute the income. Wait for the coordinator's instructions to continue -

A bar will now appear on the tablet, please record the amount you put into the PASS envelope by moving the cursor on the bar and pressing "next" to continue.

- When everyone decides how much to pass, the assistants collect the envelopes. Wait for instructions from the coordinator to continue and read the paragraph in bold -

While we collect the envelopes, please answer the following questions. For each correct answer you will receive 500 pesos, if this round is selected for payments. Do not use full stops or commas when you write thousands, only numbers. When you have finished answering the questions, please press "next" to continue the activity. Remember: If you have any questions, please raise your hand and one of our assistants will help you.

- Read and clarify questions only in sessions with elementary students -

1. How much do you think that, on average, each member of your group RECEIVED for the bar task in this round?

2. How much do you think that, on average, each member of your group PASSED on to the unlucky loser in this round?

- Everyone must be on the page to start round 2, wait for the coordinator's instructions to continue -

Second round

Instructions T0: In this round the rules of the game will be the same as in the previous round. Let us begin!

Instructions T1: The rules of the game are now going to change a bit. The players in your group will know the amount that you PASS ON to the loser in this round. The rest of the rules will stay the same as before.

Instructions T2: The rules of the game are now going to change a bit. The players in your group will be told the amount you RECEIVE for the bar task of this round. The rest of the rules will stay the same as before.

Instructions T3: The rules of the game are now going to change a little: The players in your group are going to be told the value that you RECEIVE for the bar task and what you decided to PASS ON to the loser in this round. The rest of the rules will stay the same as before.

- After 2 minutes. Continue reading -

Remember that the results are INDIVIDUAL. Now our assistants will go to each of your seats, giving you the money for this round.

Please prepare the envelopes for ROUND 2, that is, the envelope marked with the word PASS and the other unmarked envelope (show envelopes). Remember that you should deposit the money you want to give to the person who lost all of theirs in the PASS envelope and in the other envelope you deposit the remaining money.

- The assistants distribute the income. Wait for the coordinator's instructions to continue -

A bar will now appear on the tablet, please record the sum you put into the PASS envelope by moving the cursor on the bar and pressing "next" to continue.

- When everyone decides how much to pass, the assistants collect the envelopes. Wait for instructions from the coordinator to continue and read the paragraph in bold -

While we collect the envelopes, please answer the following questions. For each correct answer you will receive 500 pesos, if this round is selected for payments. Do not use full stops or commas when you write thousands, only numbers. When you finish answering the questions, please press "next" to continue the activity. Remember: If you have any questions, please raise your hand and one of our assistants will help you.

- Read and clarify questions only in sessions with primary school children -

1. How much do you think that, on average, each member of your group RECEIVED for the bar task in this round?

2. How much do you think that, on average, each member of your group PASSED on to the unlucky loser in this round?

- Everyone must be on the page to start round 3, wait for the coordinator's instructions to continue -

Third Round

Instructions T0: We are going to start the third round. In this round the rules of the game will be kept the same as in the previous round. Let us begin!

Instructions T1: The activity continues as before, except that at the end of the round, you can decide how much you want to pass on to the player who lost in this round, depending on what he or she PASSED ON to the loser in the previous round. Let's look at an example: (Go to the reading of the example below the table). For example: If the player who lost in this round PASSED from $0 to $3000 in the previous round, how much would you like to pass?

Instructions T2: The activity continues the same as before, except that at the end of the round, you can decide how much you want to pass on to the player who lost in this round, depending on what he or she RECEIVED from the bar task in the previous round. Let's look at an example: (Start reading the example below the table). For example: If the player who lost in this round RECEIVED between $0 to $3000 in the previous round, how much would you like to pass on to them?

Instructions T1 and T2: To indicate the value you want to pass, you will see at the end of the round one bar per row, which you can move to the corresponding value. Keep in mind that each row is independent and that all your decisions are going to be taken into account during the game. The amount you decide to pass on does not need to be equal to the values of the interval, you can pass ANY amount. Do you have any questions? (Read the explanation again if necessary) If you have doubts about the table, at the end of the round raise your hand and one of our assistants will help you. Let us begin!

Instructions T3: The activity continues as before, except that at the end of the round you can decide how much you want to pass on to EACH MEMBER OF YOUR GROUP, DEPENDING ON WHAT HE OR SHE HAS RECEIVED AND PASSED TO THE loser IN THE PREVIOUS ROUND, IF THEY ARE PICKED TO LOSE IN THIS ROUND. Is it clear? (Read again if necessary) Let us begin!

- After 2 minutes. Continue reading -

Remember that the results are INDIVIDUAL. Now our assistants will go to each of your seats, giving you the money for this round.

Please prepare the envelopes for ROUND 3, that is, the envelope marked with the word pass and the other unmarked envelope (show envelopes). Remember that in the PASS envelope, you should put in the money you want to give to the person in your who lost all theirs and in the other envelope you can put aside the rest of the money.

- The assistants distribute the income. Wait for the coordinator's instructions to continue -

A bar will now appear on the tablet, please record the value you deposited in the PASS envelope by moving the cursor on the bar and pressing "next" to continue.

- When everyone decides how much to pass, the assistants collect the envelopes. Wait for instructions from the coordinator to continue reading -

Instructions T0: While we collect the envelopes, please answer the following questions. For each correct answer you will receive 500 pesos, if this round is selected for payments. Do not use full stops or commas when you write thousands, only numbers. When you have finished answering the questions, please press "next" to continue the activity. Remember: If you have any questions, please raise your hand and one of our assistants will help you (same questions about expected behavior as in rounds 1 and 2).

Instructions T1 and T2: While we collect the envelopes, please complete the table that appears on the screen. Record the corresponding amount that you want to pass for each interval.

Instructions T1: For example: If the player who lost in this round PASSED from $3500 to $6500 in the previous round, indicate the value that you want to pass by moving the bar of the corresponding row.

Instructions T2: For example: If the player who lost in this round RECEIVED between $3500 and $6500 in the previous round, indicate the value you want to pass on by moving the bar of the corresponding row.

Instructions T1 and T2: Guys! You do not need to pass on the same amount as in the interval, you can pass ANY value.

Instructions T1: When you finish filling the table, you will see what the participants in your group passed to the loser in the previous round. Please read this information and press "next" to continue to the following round.

Instructions T2: When you finish filling in the table, you will see what the participants in your group received in the previous round for the bar task. Please read this information and press ?next? to continue to the following round.

Instructions T3: While we collect the envelopes, please indicate on the tablet, how much you want to pass to each member of your group if they lose in this round, depending on what they have received for positioning the bars and the amount they passed on to the loser in the previous round. When you have recorded the amount, press "next" to continue.

Fourth Round

- Everyone must be on the page to start round 4, wait for the coordinator's instructions to continue -

Instructions T0: We are going to start the final round. In this round the rules of the game will be kept the same as in the previous round.

Instructions T1: We are now going to start the final round, the conditions will stay the same as in the previous round: That is, you can decide how much you want to spend on the player who lost in this round, depending on what they PASSED to the loser in the previous round.

Instructions T2: We are now going to start the final round, the conditions will stay the same as in the previous round: That is, you can decide how much you want to pass on to the player who lost in this round, depending on what they RECEIVED in the bar task in the previous round.

Instructions T1 and T2: Remember that to indicate the amount you want to pass, at the end of the round you will see one bar per row, which you can move to the corresponding value. Each row is independent, it is not necessary that what you decide to pass equals the values of the interval. Remember that all your decisions will be taken into account during the game.

Instructions T3: We are now going to start the final round. The conditions will remain the same as in the previous round: That is, you can decide how much you want to pass on to the player who lost in this round depending on what he or she RECEIVED and PASSED on to the loser in the previous round.

Let us begin!

- After 2 minutes. Continue reading -

Remember that the results are INDIVIDUAL. Now our assistants will go to each of your posts giving out the money for this round.

Please: Prepare the envelopes corresponding to ROUND 4, that is, the envelope marked with the word pass and the other unmarked envelope (show envelopes). Remember that in the envelope PASS, you must deposit the money you want to give to the person in your group who lost and you should put the rest of the money in the other envelope.

- The assistants distribute the income. Wait for the coordinator's instructions to continue -

A bar will now appear on the tablet, please record the amount you deposited in the PASS envelope by moving the cursor on the bar and pressing "next" to continue.

- When everyone decides how much to pass, the assistants collect the envelopes. Wait for instructions from the coordinator to continue and read the paragraph in bold -

Instructions T0: While we collect the envelopes, please answer the following questions. For each correct answer you will receive 500 pesos, if this round is selected for payment. Do not use full stops or commas when you write thousands, only numbers. When you finish answering the questions, please press "next" to continue the activity. Remember: If you have any questions, please raise your hand and one of our assistants will help you. (same questions about expected behavior as in rounds 1 and 2)

Instructions T1 and T2: While we collect the envelopes, please complete the table that can be seen on the screen. Record the corresponding amount that you want to pass in each interval.

Instructions T1: For example: If the player who lost in this round PASSED to the loser between $3500 and $6,500 in the previous round, show the value that you want to pass by moving the bar of the corresponding row.

Instructions T2: For example: If the player who lost in this round RECEIVED between $3500 and $6500 in the previous round, indicate the value they want to spend by moving the bar of the corresponding row.

Instructions T1 and T2: You do not need to pass the equal value of the interval, you can pass ANY amount that you choose.

Instructions T3: While we collect the envelopes, please indicate on the tablet, how much you want to pass to each member of your group if they were picked to lose in this round, depending on what they received for positioning the bars and the amount they passed to the loser in the previous round. When you have recorded the values, press "next" to continue.

- Wait for instructions from the coordinator to continue reading -

Instructions T0: When you answer the questions, the final results of the game will appear on the screen.

Instructions T1 and T2: When you finish filling in the table, you will see what the participants in their group passed to the loser in the previous round. Please read this information and press "next" to continue to the following game.

Instructions T1, T2 and T3: The final results of the game will now appear on the screen.

You will find out your assigned color and the round selected for payment.

If you were chosen to lose, you will receive the value that the other two members of the group passed on to you. If you did not lose, you will receive the value of your income for the bar task, minus the amount that you passed to the loser in that round.

Please read the information, press next, and continue to the final game.

- Read instructions of the other game. When the other game ends, make the clarifications of the final survey and the questionnaire to parents -

- Wait for the coordinator's instructions to continue with the questionnaire -

Subsequently, you will answer the questionnaire that is shown on the tablet. Don't worry, the questions are very simple.

You can start now.

Thank you to the teacher for letting us interrupt their normal schedules and to you (students), thank you very much for participating in this activity! We will now wait for the teacher's instructions.

- End of instructions -

5.6.2   Exit questionnaire

A. Your opinion about the game

1. How often do you use mobile phones and/or tablets to play? (Select an answer from the following options)

() Everyday () Some days of the week () A few days of the month () Never

2. How well did you understand the rules of the game? (Select an answer from the following options)

() Very well () More or less okay () I did not understand

3. For me, finishing the tasks of the game was: (Select an answer from the following options)

() Very easy () More or less () Very hard

4. During the game I tried to ...

a. Get a high income for myself: (Select an answer from the following options)

() Too much () A little () Never

b. Get a high income for the group: (Select an answer from the following options)

() Too much () A little () Never

c. Help the other members of the group: (Select an answer from the following options)

() Too much () A little () Never

5. The people played badly because ... (Select an answer from the following options)

() They have fewer skills () They are lazy () They have bad luck () None of the above

6. If the results are bad for the participants of the game, it is your responsibility to help them? (Select an answer from the following options)

() Yes () No

7. Have you ever participated in a similar game? (Select an answer from the following options)

() No. This was the first time. () Yes. I participated in the past.

8. You are? (Select an answer from the following options)

() Boy () Girl

9. How old are you? [Box to type in (numbers)] years old

10. In which neighborhood do you live? (Box to type in)

11. How long have you been a student the school? (Include this year) [Box to type in (numbers)] years

12. How many have you been with the same classmates? [Box to type in (numbers)] years

13. How many schools have you attended? (Include this school; DO NOT include kindergarden) [Box to type in (numbers)] school(s)

13.1 How many years did you attend kindergarden? (Select from the drop-down list) (Next button)

14. During the last month,

a. Did you help other children from your school when they needed it? (Select an answer from the following options)

() Yes () No

b. Did you help family members without receiving any payment? For instance, babysitting, helping sick people or helping with repairs at home. (Select an answer from the following options)

() Yes () No

c. Did you help other families or people without receiving any payment? For instance, babysitting, helping sick people or helping with repairs at home. (Select an answer from the following options)

() Yes () No

d. Did you help your community without receiving any payment? For instance, keeping the community clean. (Select an answer from the following options)

() Yes () No

e. Did you participate in social and cultural activities? For instance, arranging parties, meeting, social activities (Select an answer from the following options)

() Yes () No

15. How much money do you get from your parents weekly? Include the money to buy food or drinks at school, transportation, MATERIALS, ETC. [Box to type in (numbers)] pesos.

16. During the last month, have you been given money for a job or for completing a task? (Select an answer from the following options)

() No () Yes (Next button)

B. You and your family.

17. How many siblings do you have in total? (Box to type in)

17.1 How many brothers do you have? (If you do not have brothers record zero) (Box to type in)

17.2 How many sisters do you have? (If you do not have brothers record zero) (Box to type in)

17.3 Among your siblings you are?

() I am the younger sibling () I am the middle sibling () I am the older sibling

20. In total, how many people live in your home (including yourself)? [Box to type in (numbers)] people

21. Do you live with your mother and father in a house? (Select an answer from the following options)

() Yes, with both () Only with my mom. () Only with my dad. () I do not live with my parents

22.1 How old is your father? (Box to type in)

22.1.1 What is the highest educational level of your father? (Select from the drop-down list)

() Incomplete primary education () Complete primary education () Incomplete secondary education () Complete secondary education () Incomplete Tertiary education () Technical level () College education () I do not know

22.2 How old is your mother? (Box to type in)

22.2.1 What is the highest educational level of your mother? (Select from the drop-down list)

() Incomplete primary education () Complete primary education () Incomplete secondary education () Complete secondary education () Incomplete Tertiary education () Technical level () College Education () I do not know

23.1 Does your father work?

() Yes () No () I do not know

23.2 Does your mother work?

() Yes () No () I do not know

24. If your family were in a difficult economic situation, do you think that somebody would help you? (Select an answer from the following options)

() Yes, absolutely () I am not sure () Nobody would help us

25. During the last month, has your family had a difficult economic situation? (Select an answer from the following options)

() I do not know () No () Yes

27. During the last month, does your family help some relatives of yours or neighbors when they needed it?

() Yes, almost always () Sometimes () No, almost never

C. You and your friends

28. About your friends:

a. How many female friends do you have in total? [Box to type in (numbers)] friends

b. How many male friends do you have in total? [Box to type in (numbers)] friends

30. What would you say about your classmates? (Select an answer from the following options)

() Every student in this course is a good friends of mine. () Many of the students in this course are good friends of mine. () Few students in this course are good friends of mine. () I do not have any friends in this course.

31. Please specify if you belong to a group from below

a. Do you belong to a sports team? (Select an answer from the following options)

() Yes () No

b. Do you belong to a religious group? (Select an answer from the following options)

() Yes () No

c. Do you belong to a musical group? (Select an answer from the following options)

() Yes () No

d. Do you belong to a theater group or something similar? (Select an answer from the following options)

() Yes () No

e. Please state if you belong to a different group, besides those mentioned above (Box to type in)

32. When you have a task to be done in groups, do you like to compete or cooperate with others? (Select an answer from the following options)

() I prefer to compete to have better results. () I prefer to cooperate to have better results.

33. What would the other students say about you? (Select an answer from the following options)

() You help others a lot. () You help others only occasionally. () You never help others.

34. If you needed something, do you think the other students would help you with it? (Select an answer from the following options)

() Yes, I am sure. () I am not sure. () Nobody would help me.

35. Do you care about what the others think of you? (Select an answer from the following options)

() I care about it very much. () I care about it a little () I do not care

36. If your friend damages a personal belonging that he or he borrowed from you, What would you do? (Select an answer from the following options)

() I would forgive my friend because they did not mean to damage it. () I would not lend them my personal belongings anymore, but we would still be friends. () I would get mad and I would not want them to be my friend anymore.

37. Do you think that you can rely on your friends? Or do you have to be very cautious instead? (Select an answer from the following options)

() I can rely on my friends. () I have to be very cautious.

38. Do you think that you can rely on other people? Or do you have to be very cautious instead? (Select an answer from the following options)

() I can rely on other people. () I have to be very cautious.

39. Generally, do you think you are someone that ... ? (Select an answer from the following options)

() likes to take risks. () prefers to avoid risks.

Well done! You have successfully finished this activity. Thank you for your participation.

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