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Development of locus of control: A comparison  
between adolescents from middle- and lower-  
socioeconomic class

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# Development of locus of control: A comparison between adolescents from middle- and lower-socioeconomic class

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## Abstract

Locus of control is one's perceived causality between action and reinforcements, with two extreme perceptions being *internal* and *external*. It is a key non-cognitive attribute that has serious influence on education and labour market outcomes, one's behavioural response to adversities in life and well-being in general. However, a child is not born with any perception of control. Control expectancies are shaped through life's experiences that are heavily determined by one's socioeconomic class. This study compares the developmental trajectory of control expectancies between adolescents from middle- and lower-class households in India. The results suggest that as the adolescents from middle-class feel more in control of their lives as they grow older therefore aligning their locus *internally*. Though the adolescents from lower-class feel more in control early on in their lives, this sentiment declines much faster, equalizing with the middle-class group at age ten and diverging thereafter, significantly shifting towards *external* alignment of locus of control. This study extends our knowledge about biases in perception of control among adolescents from lower-socioeconomic class in a developing country like India. This study also highlights the paucity of longitudinal studies in this literature.

JEL classification: D91, I24, I31, J24, O12, O15

Keywords: non-cognitive, locus of control, socioeconomic class, education, labour, inequality

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## Introduction

It is well known that individuals born to lower socioeconomic class perform worse than their middle- and upper-class counterparts virtually at all indices of achievement (Coleman, et al., 1966; Brooks-Gunn & Duncan, 1997; Sirin, 2005; Engle & Black, 2008; Evans, Brooks-Gunn, & Klebanov, 2011). In pursuit of explaining this achievement gap, a growing body of literature in economics has established the predictive power of non-cognitive attributes (Heckman, Stixrud, & Urzua, 2006; Borghans, Duckworth, Heckman, & Weel, 2008; Almlund, Duckworth, Heckman, & Kautz, 2011; Kautz, Heckman, Diris, Weel, & Borghans, 2014). One such critical non-cognitive attribute is control expectancies or locus of control that has not only been related to an array of outcomes like human capital investment (Coleman & DeLeire, 2003), educational achievement (Ekstrom, 1986; Coleman, et al., 1966) and labour market outcomes (Andrisani, 1977; Duncan & Dunifon, 1998; Goldsmith, Veum, & Darity, 2000; Heineck & Anger, 2010; Cobb-Clark & Tan, 2011), but also gritty behaviour (Sule, Boneva, & Ertac, 2019), ability to withstand and respond to aversive events (Lefcourt, 1976) and intergenerational social mobility (Von Stumm, Gale, Batty, & Deary, 2009).

Locus of control is synonymous to one's perceived causality between action and reinforcements. It is best explained in terms of its extremities "internal-external", where internal is someone who believes in the contingency between effort and outcomes and external is the one who believes outcomes are determined by external forces like chance or powerful others (Rotter, 1966). Rotter (1966) viewed locus of control as a stable characteristic of personality as he dealt mainly with adults. However, most studies thereafter have predicted that as children grow, they tend to develop internal control expectancies (Crandall, Katkovsky, & Crandall, 1965; Lefcourt, 1976; Sherman, 1984; Chubb, Fertman, & Ross, 1997). At least, studies suggesting growing internal locus of control safely outnumber the ones that do not conform to this result (Weisz & Stipek, 1982). However, there is also suggestive evidence from a midwestern community school that by sixth grade middle-class children are more internally controlled than lower-class children (Bartel, 1971). However, much of the work

exploring the relationship between locus of control and age has been conducted in the context of developed countries. There is no comparative evidence that could enhance our understanding about how differently or similarly control expectancies may develop among middle- and lower-class adolescents in a developing country like India, given the socioeconomic milieu varies significantly from that of a developed country. This study conducts a comparative analysis using cross-section data from two independent surveys conducted with adolescents in India, from middle-class (sample size=184) and lower-class (sample size=236) to explore the difference in development of locus of control with age.

As children grow into adulthood, the competence of controlling the environment and actualizing outcomes increases with the cumulative experience of successful outcomes (Crandall, Katkovsky, & Crandall, 1965). Therefore, the reinforcement of internal control expectancies is an outcome of positive interactions with the environment. On the contrary, if the child's goal-directed behaviour is blocked or frustrated too often and encountered with unpleasant outcomes, the child may begin to associate goal-oriented experiences with external control expectancies. There is suggestive evidence that control expectancies are associated with socioeconomic status (Battle & Rotter, 1963; Sherman, 1984; Beauvois & Dubois, 1988; Landau, 1995; Flouri, 2006). When a child is born to lower-socioeconomic class, the day-to-day socioeconomic struggles of the family forms an integral part of the child's environment and the probability of successful interactions is lower. Repeated failures in their small endeavours may block the gratification of goal-oriented behaviour and children may begin to see themselves as a passive agent unable to affect contingencies between events in their life and rewards available in the social system. Therefore, experiencing a stressful and disruptive life when young may lead to an external locus of control (Coleman & DeLeire, 2003). Conditions of low SES may affect one's locus of control analogous to the experience of crisis when negative influences overwhelm an individual due to which one feels relatively powerless to influence life outcomes (Smith, 1970).

There is no account on 'how internal' or 'how external' is optimal, however, an individual assessed of holding internal control expectancies would interpret stressors positively and try harder at the face of failures as they would attribute failure to the lack of effort (Rotter, Liverant, & Crowne, 1961; Lifshitz, 1973; Lefcourt, 1976). Therefore, internal control expectancies are a pre-requisite for successful life outcomes against adversity and it becomes imperative to understand how control expectancies develop with age among adolescents from lower-socioeconomic class. There exists a paucity of studies in the literature that explores this relationship and also draws any comparison with the adolescents from middle- or upper-class. This study closes this gap by using data from two independent surveys carried out in the state of West Bengal (middle-class sample) and Karnataka (lower-class sample) in India among adolescents aged between 9 and 18 that asks the same questions for socio-demographic controls and for measurement of locus of control. To measure locus of control, the study uses a novel index with questions put together from established locus of control scales. The developmental narrative essentially makes the case for the questionnaire. The results suggest gradually diverging trajectories of locus of control of the two groups from age 10. The middle-class adolescents shift towards internal locus of control and the lower-class adolescents shift towards external locus of control. The association between age and locus of control between the two groups remain same even after controlling for confounding factors through ordered logistic regressions.

This study is critical because it bridges a significant gap by informing us on the socioeconomic class differences in the developmental trajectory of control expectancies of adolescents in India. Though locus of control has been studied widely, this is a first attempt to account for the socioeconomic class differences in locus of control in the context of a developing country. Given the rising interest in non-cognitive attributes, this study does significant contribution to the labour economics literature that highlights the importance of non-cognitive factors in determining educational and labour market outcomes (Almlund, Duckworth, Heckman, & Kautz, 2011; Deming, 2017; Roy, Morton, & Bhattacharya, 2018). This phenomenon of non-cognitive bias among individuals from low-SES is not

exclusive to locus of control. Therefore, this study also contributes to the evolving literature in behavioural economics that study the connection between the experience of marginalization and other non-cognitive biases like lack of grit (Sharafi, 2019; Dasgupta, Mani, Sharma, & Singhal, 2020; Sule, Boneva, & Ertac, 2019; Sule & Ertac, 2019), fatalistic beliefs and self-defeating behaviours (Moffitt, 1983; Katz & Hofer, 1994; Currie, Grogger, Burtless, & Schoeni, 2001; Bertrand, Mullainathan, & Shafir, 2004; Bernard, Dercon, & Taffesse, 2011), lack of attention (Shah, Zhao, Mullainathan, & Shafir, 2018), aspirations failure (Appadurai, 2004; Dalton, Ghosal, & Mani, 2016; Bernard, Dercon, Orkin, & Taffesse, 2014; Genicot & Ray, 2017), poor self-image (Ghosal, Jana, Mani, Mitra, & Roy, 2016).

## Data and Measurement

### *Data*

This study uses data from two surveys conducted in West Bengal (India) and Karnataka (India) in the years 2018 and 2016 respectively. These surveys were conducted in schools with adolescents aged between 9 and 18. In West Bengal the survey was administered to 184 students spread across two schools in the sub-urban small town of Bandel located in Hooghly district. The locality where the schools are located is inhabited by middle-class population, mostly belonging to services or small and medium size business households. The medium of education in both schools are English. In Karnataka the survey was administered to 236 students in a school that is located in an urban poor locality of Bangalore city, again, the medium of education being English. The neighbourhood where the school is located is dominated by families that can be typically identified as lower-socioeconomic class. Both of these surveys were independent of each other, conducted at different points in time, however, intended to capture locus of control among adolescents falling under the same age group.

In both cases, data was obtained via distribution of surveys within the school premises. In West Bengal the school principals were approached directly for consent, whereas in Karnataka the school was accessed through an NGO called Dream A Dream that worked with the school on a regular basis. The choice of different states was intentional, to minimize any state-specific biases and keep the samples as independent as possible. Questionnaires took approximately 30 minutes to complete. Participants were provided with a plain language statement that summarized the purpose of the study two weeks prior and both parental and participant consent was sought before proceeding with the survey. Participation was voluntary and students who did not consent to participate waited silently and patiently while others filled out the survey.

**Table 1: Statistical Balance**

	(1) Lower (n = 236)		(2) Middle (n = 184)		(3) Combined	(4) t-test
	df	M/SD	df	M/SD	M/SD	Difference
Mother_School	231	0.78 <i>0.41</i>	184	0.39 <i>0.49</i>	0.61 <i>0.49</i>	0.39**
Mother_College	231	0.05 <i>0.22</i>	184	0.40 <i>0.49</i>	0.21 <i>0.41</i>	(0.35) **
Mother_University	231	0.01 <i>0.09</i>	184	0.16 <i>0.37</i>	0.08 <i>0.27</i>	(0.15) **
Mother_No Edu	231	0.16 <i>0.36</i>	184	0.04 <i>0.20</i>	0.11 <i>0.31</i>	0.11**
Mother Employed (=1)	231	0.65 <i>0.48</i>	184	0.16 <i>0.37</i>	0.43 <i>0.50</i>	0.50**
Father_School	231	0.68 <i>0.47</i>	183	0.26 <i>0.44</i>	0.50 <i>0.50</i>	0.43**
Father_College	231	0.08 <i>0.27</i>	183	0.52 <i>0.50</i>	0.27 <i>0.45</i>	(0.44) **
Father_University	231	0.02 <i>0.15</i>	183	0.20 <i>0.40</i>	0.10 <i>0.30</i>	(0.18) **
Father_No Edu	231	0.22 <i>0.41</i>	183	0.03 <i>0.16</i>	0.13 <i>0.34</i>	0.19**
Do not own (Rent =1)	236	0.84 <i>0.36</i>	183	0.17 <i>0.38</i>	0.55 <i>0.50</i>	0.67**
Occupancy Rate	234	4.28 <i>0.96</i>	182	2.36 <i>1.80</i>	3.44 <i>1.69</i>	1.92**

Note: (a) M = Group Mean; SD = Standard Deviation; SD are presented in italics below the group mean (b) p-values are for a two-tailed test for equal variances (c) \*\*= $p < 0.01$ ; \*= $p < 0.05$  (d) t-test results presented in parenthesis are negative values

Table 1 provides the statistical balance of sociodemographic indicators. As observed, the two groups vary significantly across parental education. The proportion of parents in the middle-class group who have attended college and university is significantly higher than the lower-class group. Complementarily, the proportion of parents in the lower-class group who have no education or only school level education is significantly higher compared to the middle-class group. The two groups also vary significantly in mother's employment, with a higher proportion of women in the lower-class being employed than middle-class, however, mostly employed in the low-skilled jobs like tailoring, house-help, daily labourer, etc. It also highlights the difference in living conditions with typical observations like significantly higher property ownership among the middle-class and overcrowded homes among the lower-class.

#### *Measurement scale – Locus of control*

The most commonly used measure of control expectancies in psychology literature has been Rotter's (1966) 29-item Internal-External (I-E) Scale. The I-E Scale has not only been used widely by diverse populations like adolescents (Klingman, Goldstein, & Lerner, 1991), women going through divorce (Morgan, 1988), therapy clients (Foon, 1986; Harper, Oei, Mendalgio, & Evans, 1990) and Bosnian refugees living in Norway (Van Selm, Sam, & Van Oudenhoven, 1997), but also been used in differing forms both in terms of number of items and scale of the item (e.g. John, Gentry, Tansuhaj, Manzer, and Cho (1988) translated I-E Scale into 6-item Thai version with a 5-point Likert type scale). The I-E Scale has been sparingly validated amongst the Indians living in India (Khanna & Khanna, 1979; Parsons & Schneider, 1974; Carment, 1974). The aim of this study is to use a scale that measures the general sense of control among adolescents for which Rotter's (1966) I-E Scale fits the need adequately. However, the I-E scale is not unidimensional (Hersch & Scheibe, 1967; Mirels, 1970; Reid & Ware, 1973). Largely there are three dimensions – (a) systems control (b) personal control and (c)



general control ideology (Carment, 1974). This study uses items under “general control ideology” based on classifications suggested by studies in psychology (Parsons & Schneider, 1974).

The 29-item scale with dichotomous response categories is adapted to a 5-item Likert type scale for the purpose of this thesis. The wording is changed to make it more appropriate and relatable for the target population. Taking into consideration the socioeconomic context of the participants, Q2 and Q3 on the questionnaire are situational questions. Nevertheless, integrity is maintained to the theme of the original question on the I-E Scale. The questions are formulated in a third person character named Hari to minimize self-reporting biases, as participants could feel conscious to give honest opinion when addressed in first person. Appendix A1 lists the questions along with the original item on Rotter’s (1966) I-E Scale.

Each question has ordered options and the option selected determines the score for that answer. Consequently, the individual scores on all the five questions are added up to determine the total score on a 26-point scale that is used as the desired outcome variable in this study. The five questions are combined to form a scale because combining is more reliable and precise and reduces measurement error (Spector, 1992). Participants did not report any trouble with understanding the questionnaire and the average time taken to complete the five questions was 15 minutes.

## Descriptive comparison

Figure 1 illustrates the collapsed mean of locus of control score by age for both the groups juxtaposed against each other. As observed, the mean score for middle-class increases with age which implies that the adolescents from middle-class shift towards internal locus of control, whereas, among the adolescents from lower-class mean score reduces with age indicating shift towards external locus of control.

Figure 1: Collapsed mean (middle-class vs. lower-class)

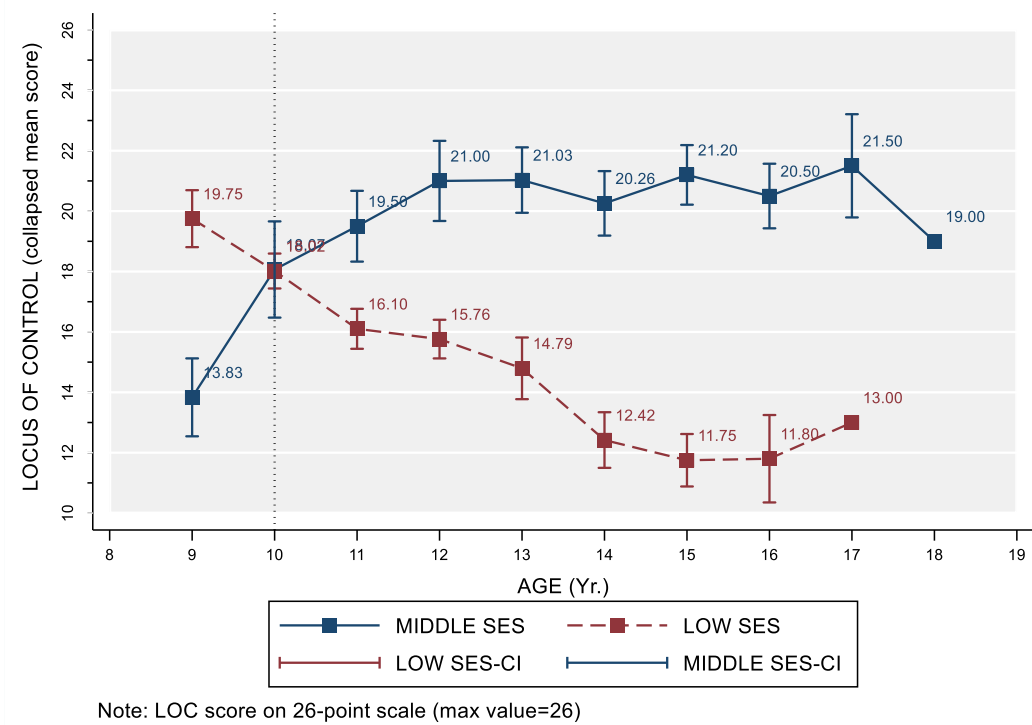


Table 2: Distribution of Age by grade and socioeconomic class

Grade	Middle-class				Lower-class			
	N	Mean Age	SD	Age Range	N	Mean Age	SD	Age Range
4th	14	9.71	0.73	9-11	39	9.97	0.16	9-10
5th	12	10.67	0.78	10-12	39	10.44	0.79	9-12
6th	30	11.40	0.86	10-14	45	11.40	0.69	10-13
7th	25	12.28	0.98	11-14	45	12.56	0.69	11-14
8th	28	13.25	0.70	12-15	35	13.74	0.89	12-16
9th	49	14.59	1.14	13-18	33	14.76	0.83	13-17
10th	26	15.19	0.98	14-17	-	-	-	-

The trajectory of the middle-class group conforms to results predicted by earlier studies that suggests that locus of control tends to be more internal with age as one grows from childhood to adolescence and to a young adult (Crandall, Katkovsky, & Crandall, 1965; Lefcourt, 1976; Sherman, 1984; Chubb, Fertman, & Ross, 1997; Weisz & Stipek, 1982; Nowicki & Strickland, 1973). The 9 years are more external than the older participants as illustrated by Figure 1, similar to results reported in

previous studies (Sherman, 1984). Between age 9 and 10, as one enters adolescence, we observe the biggest absolute increase in score from 13.83 to 18.02. This could be explained by the fact that between age 9 and 10 in the middle-class students belong to the 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> grade (refer to Table 2), the time period that covers movement from lower primary to upper primary, giving an opportunity to students to feel more in control of outcomes in their life as they achieve their first big milestone in their schooling life. This is driven by the idea that perception of perceived control may be associated with successful interactions with the environment (White, 1959). The earlier consensus has been that locus of control changes during adolescent or high school years which is 8<sup>th</sup>, 9<sup>th</sup> and 10<sup>th</sup> grade (Chubb, Fertman, & Ross, 1997), which is between age 12 and 17 for the middle-class group (refer to Table 2). We can observe in Figure 1 a gradual and linear increase between age 10 and 12 and finally flattening out between age 12 and 13, conforming to earlier results (Sherman, 1984). Between age 13 and 17, though locus of control consistently changes direction, the older participants at 17 finally have a higher score than the younger ones. Earlier studies have reported that between 9<sup>th</sup> and 10<sup>th</sup> grade adolescents may become more external (Chubb, Fertman, & Ross, 1997). As illustrated by Figure 1, between age 13 and 17 a similar pattern is observed that can be explained by the fact that during this period adolescents face their matriculation exams and especially in India they are under the spotlight in social discussions for their academic choices and results. However, at age 17, locus of control becomes significantly more internal with the highest mean score of 21.5, similar to observation reported by earlier studies (Cairns, McWhirter, Duffy, & Barry, 1990). Further, a significant drop in control expectancies at 18 is observed, just when adulthood is at doorstep, could be explained by the lack of control individuals may feel during this period due to the uncertainties of life. Overall, development of control expectancies across age in the middle-class group conforms to the predictions earlier that suggest that as adolescents gain more control over life's outcomes their sense of perceived control tend to orient internally.

On the contrary, the adolescents in the lower-socioeconomic class have a higher mean at age 9 than the middle-class, however this sentiment declines fast and the mean reduces consistently with each year of adolescence, meeting the middle-socioeconomic class at age 10, diverging thereafter and ending adolescence as a significantly more externally oriented individual, much like the adolescents who have suffered some form of adversity as a child (Steinhausen, 1982; Culpin, Stapinski, Miles, Araya, & Joinson, 2015).

The high mean score at age 9 in the lower-socioeconomic class may be explained by the Piagetian theory that young children tend to overestimate their influence over events, of the likes observed among 8-years olds where they believed that everybody could make clouds move when they walk (Piaget, 1930). As illustrated by Figure 1 and enumerated in Table 3, the lower-class group begins with a higher sense of internal control and converge with the middle-class group at age 10. The only period during which the two groups do not differ significantly is 5<sup>th</sup> grade and age 10. From 6<sup>th</sup> grade and age 11 onwards they begin to diverge and differ significantly in their control expectancies. Similar observation was made among sixth graders in a midwestern community school due to them taking cognizance of their accumulating disadvantage (Bartel, 1971). The possible explanation for this divergence might be the fact that adolescents from lower-class begin to get a sense of their inability to affect contingencies between events in their own life and the rewards available in the social system leading to a sense of themselves as passive agents (Litt, 1963). That must be the reason why after age 10 we observe the mean score in the lower-class group consistently shifting towards the direction of external locus of control with consistent drop in mean each year until the age of 16. However, at age 17 individuals are significantly more internal than their younger counterparts similar to the middle-class group (Cairns, McWhirter, Duffy, & Barry, 1990). Nevertheless, the lower-class adolescents finally enter adulthood with a significantly lower mean score than the middle-class group.

It is incidental that the divergence of control expectancies from age 11 aligns with the divergence in academic achievement observed between middle- and lower-class groups from age 11 (Caro, 2009; Jensen, 1966; Bartel, 1971). This brings forth a significant research question for future studies that could explore the causality between control expectancies and academic achievement and its predictive power in terms of any differences between middle- and lower-socioeconomic class in a developing socioeconomic milieu.

**Table 3: Statistical Balance of Dependent Variable by Age and Grade**

	M/SD (Lower-class)	M/SD (Middle-class)	Combined M/SD	Difference (t-test)
AGE 9	19.75 <i>0.96</i>	13.83 <i>1.60</i>	16.20 <i>3.33</i>	5.92*** (0.81)
<b>AGE 10</b>	<b>18.02</b> <b>2.27</b>	<b>18.07</b> <b>3.13</b>	<b>18.03</b> <b>2.44</b>	<b>-0.05</b> <b>(0.86)</b>
AGE 11	16.10 <i>2.10</i>	19.50 <i>3.14</i>	17.52 <i>3.07</i>	-3.40*** (0.68)
AGE 12	15.76 <i>2.10</i>	21.00 <i>3.08</i>	17.51 <i>3.49</i>	-5.24*** (0.75)
AGE 13	14.79 <i>3.02</i>	21.03 <i>3.25</i>	17.96 <i>4.42</i>	-6.23*** (0.76)
AGE 14	12.42 <i>2.60</i>	20.26 <i>3.20</i>	16.58 <i>4.90</i>	-7.84*** (0.72)
AGE 15	11.75 <i>1.97</i>	21.20 <i>2.50</i>	17.00 <i>5.26</i>	-9.45*** (0.67)
AGE 16	11.80 <i>1.64</i>	20.50 <i>2.03</i>	18.21 <i>4.37</i>	-8.70*** (0.91)
AGE 17	13.00 -	21.50 <i>1.73</i>	19.80 -	-8.50 -
AGE 18	-	-	-	-
GRADE 4	18.67 <i>2.38</i>	15.00 <i>1.88</i>	17.70 <i>2.77</i>	3.67*** (0.63)
<b>GRADE 5</b>	<b>17.05</b> <b>1.85</b>	<b>18.42</b> <b>3.75</b>	<b>17.37</b> <b>2.46</b>	<b>-1.37</b> <b>(1.12)</b>
GRADE 6	15.82 <i>2.34</i>	20.30 <i>2.98</i>	17.61 <i>3.41</i>	-4.48*** (0.65)
GRADE 7	15.89 <i>2.10</i>	21.32 <i>3.20</i>	17.83 <i>3.64</i>	-5.43*** (0.71)
GRADE 8	12.20 <i>2.08</i>	21.11 <i>2.88</i>	16.16 <i>5.09</i>	-8.91*** (0.65)
GRADE 9	12.06 <i>2.42</i>	20.39 <i>2.91</i>	17.04 <i>4.92</i>	-8.33*** (0.59)

Note: Standard errors in parenthesis \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; locus of control score on the 26-point scale

## Regression results

This study uses cross-sectional multivariate ordered logistic regression to determine if there is any association between age and locus of control, adjusting for the confounding effects of gender, parental education, mother's employment, parental involvement in the child's education and other indicators of standard of living for both middle- and lower-class and compares the effect size and direction of association of control expectancies with age between both the groups. Table 4 summarizes the results of the ordered logistic regression analysis.

Model (1) to (4) presents results of the middle-class group and (5) to (8) presents results of the lower-class group. As observed, from (1) through (4) locus of control exhibits a significant and positive relationship with age even after adjusting for other confounding effects and from (5) through (8) it exhibits a significant and negative relationship between the two variables. Therefore, the development of control expectancies with each year of adolescence clearly follows divergent trajectories for the representative middle- and lower-class groups in this study, where the movement of the middle-class adolescents is directional towards internal and that of the lower-class group shifts towards external locus of control.

As illustrated by Figure 1, the relationship between the mean score and age is not linear, therefore model (1) and (5) adjust for any non-linear growth by including the term  $age^2$ . In case of the lower-class this effect is not significant, however, for the middle-class group locus of control exhibits a significant and negative relationship with  $age^2$ , implying that the odds of control expectancies increasing with age increases at a decreasing rate. Earlier views on gender differences in locus of control has been mixed, with some suggesting no effect (Sherman, 1984) to others suggesting an interaction between gender and grade (Chubb, Fertman, & Ross, 1997). However, gender has no significant effect in this case. But after adjusting for gender and  $age^2$ , age continues to be significantly associated with control expectancies in both groups. According to model (1), in the middle-class group

with gender and age<sup>2</sup> held constant, if we were to increase age by one year, the ordered log-odds of moving one point higher on the locus of control scale increases by 3.42 and according to model (5) in the lower-class group the log-odds reduces by 1.97.

Consecutively models (2) and (5) include parental education and mother's employment; (3) and (6) include parental involvement indicators 'how often parents visit school' and 'how often parents take note of child's education'; (4) and (8) include occupancy rate, property ownership status and basic standard of living (indicated by having access to basic amenities of fresh drinking water, electricity, sanitation facilities and a kitchen) as cofounding factors. Parental education and employment status, occupancy rate and standard of living are included as indicators of socioeconomic status (Mueller & Parcel, 1981; Hauser, 1994) and parental involvement is included as it has been earlier associated with child's motivational attributes (Grolnick, Ryan, & Deci, 1991). As observed, even after adjusting for cofounding effects the association between locus of control and age remain significant and positive for the middle-class adolescents and significant and negative for the lower-class adolescents, however, the effect size reduces in both cases, consistent with the graphical representation in Figure 1 that suggests divergent trajectories of developmental path of locus of control for the two representative groups from India. In addition, it is also interesting that parental education portrays no significant effect on locus of control for the middle-class group. However, for the lower-socioeconomic class, mother attending college and university increases the log-odds of moving up the scale of locus of control by 1.6 and 2.93 times respectively in relation to mother having no education at all. Therefore, mother's education in case of the lower-class adolescents in a developing country could counterbalance much of the negative effect of age. This could be a significant question to explore in further research to see whether mother's education could mitigate the negative effect of socioeconomic adversities on the control expectancies of adolescents belonging to lower-socioeconomic class in developing countries.

Table 4: Ordered logistic regression results

<i>Independent Variables</i>	Middle-class				Lower-class			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
AGE	3.42*** (0.77)	3.25*** (0.79)	3.04*** (0.85)	2.99*** (0.86)	-1.97* (0.91)	-2.34* (0.92)	-2.24* (0.93)	-2.60** (0.95)
AGE^2	-0.12*** (0.03)	-0.11*** (0.03)	-0.11** (0.03)	-0.10** (0.03)	0.05 (0.04)	0.06 (0.04)	0.06 (0.04)	0.07 (0.04)
FEMALE (=1)	-0.06 (0.26)	-0.13 (0.27)	-0.12 (0.27)	-0.11 (0.28)	0.13 (0.23)	0.09 (0.24)	0.03 (0.25)	0.00 (0.25)
MOTHER_SCHOOL		0.46 (0.95)	0.47 (0.92)	0.72 (0.95)		0.44 (0.33)	0.47 (0.33)	0.50 (0.34)
MOTHER_COLLEGE		-0.06 (0.96)	-0.19 (0.93)	0.08 (0.97)		1.78** (0.59)	1.75** (0.59)	1.60** (0.60)
MOTHER_UNI		-0.32 (1.05)	-0.50 (1.02)	-0.43 (1.08)		3.26* (1.28)	3.12* (1.30)	2.93* (1.31)
FATHER_SCHOOL		-0.24 (1.21)	-0.02 (1.15)	-0.22 (1.18)		-0.09 (0.29)	-0.09 (0.31)	-0.15 (0.32)
FATHER_COLLEGE		0.24 (1.21)	0.55 (1.14)	0.51 (1.16)		-1.12* (0.52)	-1.24* (0.54)	-1.23* (0.56)
FATHER_UNI		0.82 (1.27)	1.13 (1.21)	1.21 (1.24)		0.51 (0.83)	0.49 (0.84)	1.13 (0.83)
MOTHER_EMP		0.36 (0.40)	0.45 (0.40)	0.65 (0.42)		-0.20 (0.25)	-0.15 (0.25)	-0.18 (0.26)
PARENTS_SCH_VST (=2)			-0.67 (0.48)	-0.84 (0.49)			0.01 (0.43)	-0.24 (0.44)
PARENTS_SCH_VST (=3)			0.18 (0.47)	-0.02 (0.48)			0.03 (0.44)	-0.22 (0.46)
PARENTS_TKNOTE (=2)			-0.82* (0.38)	-0.80* (0.39)			0.27 (0.30)	0.49 (0.31)
PARENTS_TKNOTE (=3)			-0.15 (0.47)	0.08 (0.48)			0.78 (0.66)	0.97 (0.66)
PARENTS_TKNOTE (=4)			-0.17 (0.37)	0.04 (0.37)			0.40 (0.44)	0.58 (0.46)
OCCUPANCY (PR./ROOM)				0.15 (0.08)				0.14 (0.13)
RENT (=1)				0.59 (0.39)				0.77* (0.36)
SOL_BASIC_AMN (=1)				0.24 (0.59)				1.02 (0.60)

Note: logistic regression coefficients with standard errors in parenthesis \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; dependent variables is locus of control score on the 26-point scale ; omitted variables of interest are mother's education (= no education), father's education (= no education), parents visit school (1= never), parents take note of children's studies (1=when results are out)

## Conclusion

All individuals are susceptible to non-cognitive or socioemotional biases as they develop through the process of introspection, interaction and absorption of social norms that can be quite inaccurate.



Additionally, poverty exposes one to a plethora of experiences that augments the possibility of non-cognitive biases, especially in the early years of childhood and adolescence (Heckman, 2008; Phillips & Shonkoff, 2000). Locus of control is one such critical non-cognitive attribute that represents one's behaviour-reinforcement contingency and is likely to depend on how the individual perceives the world while growing up (Nowicki & Strickland, 1973). It is critical to take cognizance of locus of control because it is a crucial pre-requisite to successful education and labour market outcomes, responding to adversity and coping with stressors in life. In this paper as we explore the development of control expectancies with age among adolescents using cross-sectional datasets and draw a comparison between middle- and lower-class groups, we find the trajectories to be divergent especially age ten onwards. The trajectory of the middle-class group conforms to earlier results that suggests gain in internal locus of control with age (Chubb, Fertman, & Ross, 1997; Crandall, Katkovsky, & Crandall, 1965; Lefcourt, 1976; Sherman, 1984), whereas, the trajectory of the lower-class group aligns with some indicative evidence presented earlier for sixth graders from a midwestern school that suggested a shift towards external locus of control among lower-class pupils (Bartel, 1971). However, this is the first study to present such a comparison of the developmental trajectory of control expectancies for the complete adolescent period between middle- and lower-class groups from a developing country. There is not enough of such studies conducted in developing countries. As Duflo (2006) stated, "what is needed is a theory of how poverty influences decision making, not only by affecting the constraints, but by changing the decision-making process itself" (p. 26). Therefore, such studies are critical for extending our understanding of the mechanisms that drive the decision-making process. This study is open to criticisms that the data does not reflect individual changes over time, however, it sure adds to the literature by bringing forth a gap in evidence that could be base for future longitudinal studies and studies designed to estimate the causal impact of socioeconomic adversity on locus of control and further economic choices.

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## Appendix

### A1. Locus of control questionnaire used to construct measurement scale

1. If Hari succeeds in life, would it be because of his own effort or will it be a matter of luck?  
(10-point scale)
  - (a) Reference item 11a – Becoming a success is a matter of hard work, luck has little or nothing to do with it (Rotter, 1966)
  
2. Hari works as a gardener in the house of a school teacher. When he got to know about Hari's love for books, he offered to teach Hari in the evening every day. However, for that Hari needs to finish work and then take out 2 hours every day in the evening and walk 2 Km to go to his house. What would you do if you were Hari?
  - (a) Reference item 11a – Becoming a success is a matter of hard work, luck has little or nothing to do with it (Rotter, 1966). Given this item forms the underlining theme of Q2, the motive is to check whether one believes hard work against odds could lead to success.
  
3. Hari plans to send his sisters to school and not let them work or get them married off soon. What would you do if you were Hari?
  - (a) Reference item 25a - Many times I feel that I have little influence over the things that can happen to me (Rotter, 1966). The aim of Q3 was to see given a choice to influence future outcome, what choices one makes.
  - (b) Reference item 9b- Trusting to fate has never turned out as well for me as making a decision to take a definite course of action (Rotter, 1966).
  - (c) Reference item 28 (CNSIE) - Most of the time, do you feel that you can change what might happen tomorrow by what you do today? (Nowicki & Strickland, 1973)
  
4. Do you think that Hari has control over the direction his life will take?
  - (a) Reference item 28b - Sometimes I feel that I don't have enough control over the direction my life is taking (Rotter, 1966).
  
5. Do you really believe that any child, who faces difficulties in life like Hari, can be whatever he/ she wants to be?
  - (a) Reference item 28a- what happens to me is my own doing (Rotter, 1966).
  - (b) Reference item 2f – Do you really believe a kid can be whatever he wants to be? (Bialer, 1961).