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APPROACH**

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TRANSFER OF BEHAVIORAL TRAITS FROM PARENTS TO CHILDREN: AN  
EXPERIMENTAL APPROACH

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## ABSTRACT

It is commonly believed that parents transfer their behavioral traits to their offspring. But where does one draw the line between nature and nurture? Most of us have received our first lessons in lying, trust, generosity and even selfishness from our parents. These non-cognitive skills, like patience, ambition, tenacity etc. are all thus malleable traits if we come to prove that they are transferred from parent to their child. A field experiment was conducted at a private school in Lahore, Pakistan. These experiments measured two key non-cognitive skills that literature believes are passed onto the offspring via their parents: patience and trust. To measure the correlation between parents and children, an ordered probit analysis was employed. Our findings show that there is a strong negative relationship between child's patience to that of her parent. Child and parent trust display no significant relationship. However, a positive significant relationship was analyzed between child reciprocity and parent reciprocity.

**Keywords:** behavioral games, trust, patience, intergenerational transfers

**JEL classification:** D01, D19

## 1. Introduction

With time the importance of culture on key economic outcomes has gained momentum and became an integral part of behavioral economics (Guiso, Sapienza & Zinagles 2006; Alesina and Angeletos 2005; Tabellini 2010; Fernández 2011). This (fairly) new strand of economic thought proclaims that nations not only differ in their economic and institutional settings but in their social preferences and beliefs as well. “Culture” as the latter term is identified in literature (Kroeber and Kluckhohn 1952) thus becomes an important, albeit an empirically difficult, phenomenon for economists to test. So what does culture depend on? And more importantly how is it carried forward because if there’s one detail that all economists agree on explicitly is that culture is not stationary (Guiso, Sapienza & Zinagles 2006). Fernández (2011) suggests that individuals make decisions based on strategies that benefit their economic payoffs. This is the reason that societies with the same economic and institutional settings, still differ in economic outcomes. The prior knowledge that the member of the society obtains from their history, whether from religion, ethnicity, or social group, is carried from one generation to the other. As mentioned above, this knowledge and belief being carried forward is not static. In addition to this, the importance of culture and its resulting effect on economic decisions has further piqued the interest of several researchers. As more and more research comes to light regarding role of culture in economic decisions, it has become even more important to study the process of formation i.e. how such beliefs are acquired.

It is commonly believed that parents transfer their behavioral traits to their offspring (Dohmen et al. 2006; Farré, & Vella 2007). But where does one draw the line between nature and nurture?

Both socialization and genetics have played a role in transmission mechanism. In this paper, we make the case of cultural transmission building on the assumption that parents can socialize the child through tacit or explicit teachings. Most of us have received our first lessons in lying, trust, generosity and even selfishness from our parents. These non-cognitive skills, like patience, ambition, tenacity etc. are all thus malleable traits if we come to prove that they are transferred from parent to their child. Parents while directly or indirectly affecting their child's attitudes and beliefs can purposefully invest in shaping the preferences of their children which in turn is a strong tool for policy making. Socialization thus is a powerful method in changing economic attitudes of the future generations (Heckman et al. 2006; (Zumbühl, Dohmen & Pfann, 2013); Tang 2016).

According to Bulte & Horan (2011), preferences can be changed over time via two passages: indirect evolutionary approach and cultural transmission. The focus of this paper is on the latter. The two models of cultural transmission suggest that one, parents desire for their child to follow onto their footsteps (Bisin & Verdier 2000) and two, parents want to transfer onto their children the preferences that would eventually raise their wellbeing.

Behavior patterns that one adopts from their parents is of particular importance for economists. A key implication one can draw out of the correlation of preferences and behavior between generations is of the correlation of economic outcomes (Bowles & Gintis 2002). Bisin & Verdier (2000) show how varying preferences have what led to the ethnic differences in the US.

According to Fernandez et al. 2004, these intergenerational transfers of attitudes towards women and female work participation led to notable increase in female labor force participation.

Kawachi et al. (1997) find how lack of social cohesion, measured through self-reported social

trust among individuals, lead to income inequality, which in turn is positively related to mortality rates.

The focus of our analysis has been on two key attitudes: willingness to trust other people and the ability to show patience. My study aims to analyze whether there exists a correlation between parents' behavioral traits with that of their children. Using experimental methods, we measure these two key behavioral traits in parents and in their child. Both of them are a cause of important economic implications. While trust encapsulates a belief, patience shows a person's individual preference (Dohmen et al 2013). Patience measured through time preferences has been a strong indicator of key economic outcomes: savings, borrowing, health, employment etc. (Fuchs 1982; Bickel et al. 1999; Heckman et al. 2006; Krebs 2003). Likewise, trust has been a significant variable in explaining differences in economic growth, financial development as well as international trade (Putnam et al. 1994; Zak & Knack 2001; Guiso, Sapienza & Zinagles 2006).

This paper concludes with three key empirical findings. First, we find that there is no significant correlation between child trust and parent trust levels. Using OLS estimation technique and computing the trust levels using the BDM (1995) experiment we find no correlation between the behavior of child to that of her parent. However, reciprocity between children and their parent is correlated significantly. This relationship holds even after we use a combination of different controls to our original empirical equation. Contrary to literature however, the result of my study reveal there exists a negative correlation between the patience level of parents to that of their child. Applying an ordered probit model, we find that the probability of the child being impatience rises as the parent becomes more patient. In this case, while we have been able to establish a significant correlation between generations, further gender dimensions could not be

explored because of our limited sample size. However, we were able to establish a stronger effect of a mother on her child as compared to a father. Correlating child impatience with that of the mother proved significant albeit the sign of the coefficient was opposite to what we originally hypothesized.

Our main aim of the study was to prove that an individuals' behaviors and preferences are carried forward, updated<sup>1</sup> according to the environment individual is being raised in. Both preferences (patience) and behavior (trust and reciprocity) make fundamental aspects of culture persistent in this (or any) part of the world. The next section of the paper highlights prominent literature on experimental methods and importance of these two factors along with the significance of intergenerational transmissions for economics.

## 2. Literature Review

In her famous book, nominated for a Pulitzer Prize in nonfiction, Judith Harris (1998) argues that parents have no role to play in shaping up the 'nature' of their children. In her opinion, it is rather the child's genetic imprint and peer effects that would eventually define their personality and social interactions. Harris, as expected, was severely criticized for her work by academics and psychologists alike. Their criticism was validated by strong empirical and scientific research that pointed towards a behavioral trail leading from the parents to their children.

This 'socialization' process is thus debatable; it can either be within families i.e. intergenerational or external in nature i.e. peers, media etc. Our focus in this paper is on the former: socialization carried within families. Children, from a very young age, are taught some necessary skills, both moral and cultural, that would help them become an acceptable citizen of

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1 Albanese et al. (2016) propose that one of the ways that values and beliefs change while being transmitted to one generation to the other is through "updating". This is when the individuals adapt these values based on the current surrounding environment and their own life experiences. Thus we may find a stark difference between the values transmitted to those received and adopted.

the civil society. While socialization and cultural transmission is associated with children's learning processes, there is no definitive end point to this learning (Brim 1966; Maccoby 2007). As mentioned earlier, it has not been necessarily always the case for parents' influence to remain long-lasting on their children. Children exert opposition during late adolescent and may not always adopt or follow their parents' socialization attempts (Kuczynski & Parkin 2007).

Parental influence on their children's behavioral and cultural traits is well documented (John 1999, Maccoby 2007; Gronhoj & Thogersen 2009). Parents are thus considered not only the primary caregivers but also primary influencers. This influence is dubbed in literature as intergenerational.

Transmission of values, behavior and culture has been lauded as a fundamental determinant for various traits including risk aversion, discounting and benevolence (Bisin & Verdier 2005). In addition to this, this transmission is vital in forming valuable cultural traits and norms related to family life as well as labor market. Behavioral traits explain how individuals 'react' to each other with strategic motives.

The intergenerational transfer of such values and behavior, as mentioned earlier, has been considered the primary mode of transfer. While children do acquire behavior from other sources as well, the parent-child transfer is considered to have played the largest impact on behavior and preferences on youngsters (Whitbeck & Gecas 1988; John 1999).

Cavalli-Sforza, Feldman & Dornbusch (1982) find high correlation between traits of parents and children using a pool of students and their parents for various traits and habits including political affiliation, religion, superstitions etc. Likewise, various other studies have found high correlation in risk and discounting preferences (Arrondel 2009), risk and trust (Dohmen et al. 2006), work



attitudes (Barron, Cobb-Clark and Erkal 2008), generosity (Wilhelm et al. 2008). In addition to this, Farrei and Vella (2007) have found a strong correlation between parents and their children regarding gender role attitudes.

Socialization mechanism works in stages; Clark and Worthington (1990), Cornwall (1988), Erickson (1992) have all come to a single conclusion that religious and ethnic traits are adopted in the early years of a child's psychology. Here, family and peer effect takes precedence in playing a vital role in adoption.

### ***Trust and Reciprocity***

Interpersonal trust has played an imperative role in creating a society that sustains (Rotter 1980; Deutsch 1973). Trust has always been seen as the driving force in nurturing the sense of socialization which is why it is equally important for researchers and economists alike to test how to carry it through generations. This transfer is part achieved through parents teaching their children values and part by the society itself. However, the lack of empirical evidence on the transfer has always been a conundrum for researchers. Our study takes help from behavioral experiments that measure only the element of trust so that one can without a doubt empirically test whether this attitude is transferred from one entity to the other.

In addition to this, children used in our experiment are aged between 7-12 thus our study tests the relationship between parents' and their children's trust levels during the time in childhood where children are more prone to adopt values taught by their parents (Erikson 1963). According to Erikson (1963), if parents hone their infants to view the world as 'fair' so would they. It is his theory that children even from the time of infancy can differentiate between trust and mistrust if these values are taught by a caregiver figure. Since the primary caregivers are the age of infancy

for a majority of the children are their parents, it is safe to hypothesize that they do play a critical role in shaping the socialization narrative for their children i.e. who to trust, who to mistrust, etc.

These teachings do not just affect the infant during its childhood but are carried beyond. This transfer can take both directions. For example, if the parents instill in their child values of trust, the child is going to form a similar opinion. However, if the caregiver relates a value of distrust, the child will still interpret the worldview from his caregivers' point of view. For this very reason, the primary caregiver is not just responsible of creating values and beliefs in their child with regards to the peers and society at large, but for themselves as well. This means creating an attitude of mistrust in infant will make him also prone to mistrust his own caregivers, peers and teachers as he grows older as well.

Despite the recent attention given to culture, the informal institution, and its role in economic growth, there still seems to be no consensus as to which of the methods used to test it is correct. A lot has been associated to the tricky nature of these indicators of social capital. For this reason, it is imperative to first understand what trust is. Coleman (1990) describes trust as a behavior. Making use of this definition, researchers have made use of experimental games such as the trust experiment crafted by Berg, Dickhaut & McCabe (referred to in this paper as: BDM 1995). We have also used a modified version of this game in this paper. Initially known as the “investment game” trust game designed by BDM has been modified to suit the respective demography.

Another important reason for us using the BDM experiment for our analysis was how with one game, we are able to calculate two different social outcomes: trust and reciprocity. While there needs to be no initial interaction between two individuals for trust to occur, reciprocity is an act based on a prior interaction. This interaction, whether positive or negative, is what determines the outcome of the action taken by an individual (Fehr & Gächter 2000). That said, reciprocity

cannot take place where there is no trust and vice versa. This means one always expects to be rewarded for their trusting behavior as one rewards the other for trusting them.

Multiple studies have shown a positive and significant correlation of trust with various socio-economic indicators. A cross-national comparison of trust revealed its importance to GDP growth, trade volumes and even inflation (La Porta et al. 1997; Buchan, Croson and Dawes 2002). Using World Value Surveys, Knack & Keefer (1997) show trust to be correlation with a nation's improved economic performance. In addition to this, in order to increase flow of international trade, it was suggested by Guiso, Sapeinza and Zingales (2009) to build more bilateral trust between the respective nations.

## ***Patience***

Patience measured through experiments has been studied by economists and psychologists alike. Time preferences are calculated through experiments so that one can study just the impact of patience or impatience on economic behaviors. According to Burks et al. (2009) patience was established as an important factors in the job performance of adults. In addition to this, Meier & Sprenger (2010) find adults with a higher patience level do not default on their credit card borrowings. They make use of incentivized experiments to show how people with present-bias preferences or in other words have low patience also end up with higher credit card debt.

The effects of having a higher discount rate preference is not limited to the finance. They have strong and positive implications on an individual's health as well (Chabris et al. 2008) Bickel et al. (1999) find that cigarette smokers have a higher discounting rate than non-smokers indicating latter pursuing a healthier lifestyle. Similar studies conducted reveal the same for cocaine users (Kirby & Petry 2004) and even obese women (Weller et al. 2008).

More importantly, time preferences have a long term significance. Dohmen et al. (2008) show how individuals with higher patience also display higher cognitive skills. Using experimental methods much similar to the ones used in this study, they found a positive and significant correlation between the higher cognitive ability and lower impatience levels. Sutter et al. (2013) expands on this theory and tests patience levels with children's (aged 10 to 18) outlook towards academic and health outcomes. They find that there is a positive correlation of the child being patient and his school grades; impatience also positively correlates with the child's smoking and alcohol consumption, denoting a degrading effect on health. Likewise, patience has been ascribed with higher verbal cognitive skills (Bartling et al. 2010) in children aged between five and six. Golstyen et al. (2014) established a connection with children's patience level at age 13 and concluded that patience measured at this age proved to be relevant in predicting the child's socio-economic behavior in the future. Their study shows how impatient children not only fail to achieve a higher level of education in academia, but their time preferences lead to lower earnings in the future and causing a problematic lifestyle (higher level of obesity and teenage pregnancies).

### **3. Methodology**

To understand the correlation between the traits of parents with those of their children, we have made use of widely used and adopted experimental games. We employed primary data collection method to collect the demographics of the participants. Children from a semi-private school in Lahore, Pakistan were invited to participate in the games as well as one of their parent. The reason this school was considered for research is to understand the demography of interest i.e. households with poor socio economic backgrounds. Bauer (2014) emphasizes the importance of parents socio economic background while testing for preferences and beliefs in children. The

cognitive and non-cognitive skills that an individual acquires during childhood is related to the parents' background (Bartling et al. 2010; Aughinbaugh & Gitterman 2003). In addition to this, studies show that the process of socialization i.e. the ability of the child to adopt certain preferences and beliefs from his environment, has a strong relationship with the parents' background (Evans 2004; Bisin & Verdier 2001). For instance, parents from disadvantaged backgrounds<sup>2</sup> may feel their child may not need to learn cooperation as he may never find the need to use it in an economic setting (labor market) and thus may never find the need to teach the child this skill. Likewise, adults with lower household income find themselves with a higher marginal utility of income thereby becoming more selfish.

While mothers are hailed as primary caregivers, research also affirms how fathers have proved to be source of attachment for their children. Thus, it would be a bias to only include one parent in the analysis (Belsky 1981). For our study we hypothesized that either parent could be responsible in instilling the socialization behavior as well as teaching the importance of time preferences in their child. Invitation letters that were sent to parents to invite them to participate in the experiment explicitly stated that either parent could attend the program but not both. The parents had to select which parent would be attending the program, sign the consent form and send back the letter via the students.

### ***Primary Data Collection Method***

The Lahore School of Economics Ethics Committee reviewed and analyzed all protocols and questionnaires used in this research. After their explicit consent and approval, two pilots were conducted at a private school in Lahore where parents of the children were invited along with their child to participate in the experiments. The pilot studies were conducted to check the

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<sup>2</sup> Less educated adults make for more selfish and spiteful parents (Bauer 2014).

response of the demography and to make changes to protocols before heading out to the field. This proved important for two reasons: one, we were able to understand how much time it would take to conduct the experiment; and two, we analyzed how the language used in the protocols was somewhat difficult for the children to understand.

After taking all this into consideration, a second pilot was conducted where both these issues were dealt with successfully. It was concluded and proposed to the Ethics Committee to have the experiments conducted in the same day so as to not lose a school work day for children and to hold a pre-game survey on the same day.

After taking consent from the Principal of the school, invitation letters were sent out to the primary school going class students. Only those parents and their children were included in the final study who sent and signed their explicit consent for this research. In addition to this, parents were provided with a signed copy of their consent forms on the day of the experiment. While enumerators helped the parents with the questionnaire, the children were assigned to random groups for the experiment.

### ***Experimental Design***

A total of 108 participants were a part of these experimental game (54 children and 54 parent). Both children and parents were incentivized for participating in the game. The adults were given a show up fee and told they could win additional amount in the two games designed for them. The children played with tokens that could be exchanged for small gifts (candies, cookies, stationary items). A stall was set up so that they could view all the things and pick out their favorite at the end of the games. In addition to this, since experiments took time, participants (both adults and children) were offered refreshments while they waited for the other to finish. Since the patience game involved payment to be received at a later date, the Principal of the

school (whom the parents trusted) acted as a mediator and assured the parents they would be paid as promised.

## **Patience Games**

We made use of Choice Lists that have been widely used by economists (Angerer et al. 2015). In this experiment (for protocols, see Appendix) we provided a list of binary tasks to both parents and their children. While the parents played with real money (Pakistani Rupees), the children were provided with tokens (tokens could be exchanged with sweets etc. at the end of the game). In each of the 5 questions posed to the participants, they were asked to make a choice between a smaller reward (Rs. 100 for parents; 1 token for children) and a larger reward (Rs. 200, Rs. 300, Rs. 400, Rs. 500, Rs. 600 for parents; 2, 3, 4, 5, 6 tokens for children). They were asked to either select the smaller reward now or wait for the larger reward at a later date (two weeks for parents; 2 days for children).

It was expected that the participants would switch from the smaller reward to the larger at one point as the larger reward becomes more lucrative. This switching point worked as our key dependent variable (Becker et al. 2012). The point (from 1-5) the participant decides to wait for the larger later reward denotes the level of his patience. The smaller the point, the more patient he is as he decided to wait for a comparatively smaller reward sooner.

Each of the payoffs were shown on a chart paper for better understanding. In addition, the enumerator solved one decision sheet to show how the participants were supposed to fill out the sheet. This also helped in participants filling out a consistent choice list. An inconsistent choice list is one where the participants has more than 1 switching point. For example, he chooses to wait for Rs. 400 and selects option LATER in question 3 of the choice list, but at question 5 of

the choice list, he marks option NOW creating an inconsistency in his preferences. While not uncommon, care can be taken to avoid inconsistent choice lists by repeating the instructions of the experiment until all the participants understand the rules (Coller and Williams, 1999; Bettinger and Slonim, 2007).

5 questions were posed by increasing the future amounts by a two-week gap for adults and 2 day gap for children.

The minimum tokens earned are 1 - Rs. 100

The maximum tokens earned are 5 - Rs. 600<sup>3</sup>

1. Would you prefer Rs. 100 NOW or 200 in TWO WEEKS
2. Would you prefer Rs. 100 NOW or 300 in TWO WEEKS
3. Would you prefer Rs. 100 NOW or 400 in TWO WEEKS
4. Would you prefer Rs. 100 NOW or 500 in TWO WEEKS
5. Would you prefer Rs. 100 NOW or 600 in TWO WEEKS

Dependent variable is categorical with values from 1-5 with 1 being most patient<sup>4</sup>.

## **Trust Games**

The second game that was played with parents and children is that of a standard BDM (1995) trust game. As with patience games, these were played separately with parents and children so as to remove any external contamination (Berg et al. 1995).

<sup>3</sup> The participants were paid by asking them to draw out a folded slip of paper from a bag with numbers 1-5 written on them for each question that they answered. For example, if they drew out No.5 and for that question they had answered to wait two weeks for Rs. 600, their response was noted and they were told they will be paid their winnings in 2 weeks' time.

<sup>4</sup> Lower values imply higher level of patience (Becker 2012).



Using laboratory games to analyze trust and trustworthiness has been frequently used over the last two decades. The game that has been used in this paper is also a modification of an oft-used game by Berg, Dickhaut and McCabe (1995). This two-stage game has been replicated widely to analyze behavioral trust and trustworthiness of subject. In the first stage the participants (player 1) were endowed with a fixed amount  $Y$  (Rs. 500 for parents; 5 tokens for children) and share this amount with an anonymous partner (player 2) who is playing this game with them. They were told that they could share this amount in a fixed denomination  $X$  (Rs. 100 for parents; 1 token for children) and it would be tripled by the enumerator ( $3X$ ) and handed over to player 2 to make his move. The subjects have the choice to not give anything at all. However, in this stage of the game, player 1 is told that he might be able to receive an amount back as well. Player 2 can return a portion of what is sent to him or send player 1 nothing at all. All this is made clear to the player 1 before he is asked to make his decision. Thus in this stage of the game, player 1 can keep  $Y-X$  for himself.

For parents, measure of Trust=  $X/Y$  where  $Y$  is fixed at 500

For children, measure of Trust=  $X$

The higher the value of  $X$ , the higher is the incidence of trust.

In the second stage of the game, player 2 receives the tripled amount and is asked to send some or no portion ( $Z$ ) of this amount back to player 1. However, in this stage, the amount he sends to player 1 will not be tripled. The game will end<sup>5</sup>, meaning player 2 will not receive anything back from player 1 now. The amount player 2 returns capture his trustworthiness (reciprocity) (Camerer 2003).

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<sup>5</sup> The total earnings in this game were computed as:  $Y-X+Z$

Measure of Reciprocity:  $Z/3X$

The BDM game has been lauded in capturing the element of trust and reciprocity of trust among subjects of all ages as there is no need for repeated interactions, can be played anonymously and with one player taking both roles thus saving time (Johnson 2011).

#### **4. Descriptive Statistics**

108 participants took place in the study conducted on a single day at a private school in Lahore, Pakistan. The children were aged between 7 and 12 with a mean age of 8.9 (see Table 1). We had an unequal representation of both children and their parent. 29 mothers participated in the study while there were 25 fathers. 37 girls aged between 7-10 were involved in the experiments whereas there were 17 boys aged 7-12. The socio-economic background of the parents revealed they belonged to a semi-rural population with most being unable to read or write.

The average trust shown by the parent was 0.50, whereas the mean trust incidence for children was 0.46, denoting adults showing a slightly higher trust level than the children (Table 1). In addition to this, the average reciprocity was 0.4 which means that on average adults returned 40% of their endowment received. Schechter (2007) finds on average adults returned 43.4% of the amount received in the second round of trust game.

The mean reciprocity for children was noted as 0.43 which denotes a higher (43%) rate of reciprocity shown to the other player (See Table 2). In a study conducted by Sutter & Kocher (2003), 2<sup>nd</sup> Graders (8 year olds) mean return (reciprocity) was 0.10 which in comparison, is lesser than what we have found in our study.

Table 4,5 and 6 show a significance test for difference in means for Child trust with Parent Trust, Child reciprocity with Parent Reciprocity, and Child Impatience with Parent Impatience

respectively. However, all three are statistically insignificant ( $p\text{-value} > 0.05$ ), denoting that the means are not statistically different from each other.

**Table 1: Summary Statistics (Overall)**

Variable	Obs	Mean	Std. Dev.	Min	Max
Child Age	54	8.9167	1.0892	7	12
Parent Age	54	35.4444	5.9706	26	53
Parent Education	54	8.0000	4.4848	0	14
Child Education	54	2.5740	1.3261	0	7
No. of Siblings	54	3.9444	1.9466	1	13
Parent Trust	54	0.5074	0.2153	0	1
Child Trust	54	0.4630	0.2482	0	1
Parent Reciprocity	54	0.4026	0.2733	0	1
Child Reciprocity	54	0.4353	0.3089	0	1
Parent Switch Point	54	1.7963	1.2344	0	5
Child Switch Point	54	1.6296	0.8752	0	5

**Table 2: Summary Statistics by gender of Parent**

<b>Female</b>					
Variable	Obs	Mean	Std. Dev.	Min	Max
Parent Trust	29	0.4483	0.2115	0	1
Parent Reciprocity	29	0.4075	0.2919	0	1
Parent Switch Point	29	1.9655	1.1797	0	5
Parent Age	29	33.6207	4.2461	27	42
Parent Education	29	7.9655	5.0673	0	14
<b>Male</b>					
Variable	Obs	Mean	Std. Dev.	Min	Max
Parent Trust	25	0.5760	0.2026	0.4	1
Parent Reciprocity	25	0.3969	0.2558	0	1
Parent Switch Point	25	1.6000	1.2910	0	5
Parent Age	25	37.5600	7.0005	26	53
Parent Education	25	8.0400	3.8022	0	12

**Table 3: Summary Statistic by Gender of Child**

<b>Female</b>					
Variable	Obs	Mean	Std. Dev.	Min	Max
Child Trust	37	0.4973	0.2522	0	1
Child Reciprocity	37	0.4476	0.3243	0	1
Child Switch Point	37	1.4865	0.9894	0	5
Child Age	37	8.8108	0.9231	7	10

Child Education	37	2.4865	1.2388	0	4
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<b>Male</b>					
Variable	Obs	Mean	Std. Dev.	Min	Max
Child Trust	17	0.38824	0.22881	0	1
Child Reciprocity	17	0.40850	0.27981	0	1
Child Switch Point	17	1.94118	0.42875	1	3
Child Age	17	9.14706	1.38930	7	12
Child Education	17	2.76471	1.52190	1	7

**Table 4a: Paired T test Child Trust and Parent Trust**

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Ctrust	54	0.46296 3	0.033781	0.248236	0.39520 8	0.530718
Ptrust	54	0.50740 7	0.0293	0.215312	0.44863 9	0.566176
diff	54	-0.04444	0.045069	0.331188	-0.13484	0.045953

mean(diff) = mean (Ctrust - Ptrust)      degrees of freedom = 53      t = -0.9861

Ho: mean(diff) = 0

Ha: mean(diff) != 0

Pr(T > t) = 0.3285

**Table 4b: Paired T test Child Reciprocity and Parent Reciprocity**

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
CHreci~y	54	0.435288	0.042031	0.308863	0.350985	0.519591
Precip~y	54	0.402572	0.037186	0.273258	0.327987	0.477157
diff	54	0.032716	0.050455	0.370766	-0.06848	0.133916

mean(diff) = mean (CHreciprocity - Preciprocity)      degrees of freedom = 53      t = 0.6484

Ho: mean(diff) = 0

Ha: mean(diff) != 0

Pr(T > t) = 0.5195

**Table 5: Paired T test Child Impatience and Parent Impatience**

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
childs~t	54	1.62963	0.119094	0.875156	1.390758	1.868501
pare~int	54	1.796296	0.167982	1.234407	1.459368	2.133224
diff	54	-0.16667	0.228552	1.67951	-0.62508	0.291751

mean(diff) = mean (childswitchpoint - Parentswitchpoint)      degrees of freedom = 53      t = -0.7292

Ho: mean(diff) = 0

Ha: mean(diff) != 0

Pr(T > t) = 0.4691

## 5. Empirical Strategy

### *Estimation technique*

#### Trust

(1)

To measure the correlation between the child trust and parent trust OLS was employed where,

- = measure of child trust i.e. amount transferred to second player/500
- = measure of parent trust i.e. amount transferred to second player /500
- = controls for parent and child personal characteristics (age, gender, level of education<sup>6</sup>, height-for-age Z scores for child, birth order<sup>7</sup>)
- = error term

#### Reciprocity

(2)

To measure the correlation between the child reciprocity and parent reciprocity we made use of OLS again where,

- = amount transferred by the child to player 1/ endowment received
- = measure of parent reciprocity i.e. amount transferred to player 1 by parent/endowment received
- = controls measuring child and parent characteristics- child age, child education, child gender, child birth order, height-for-age z scores<sup>8</sup>, parent age<sup>9</sup>, parent gender, parent education.
- = error term

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6 Harbaugh et al. (2002) find grade differences in amounts passed by children in the Trust game

7 Harbaugh et al. (2002) propose birth order and height as statistically significant contributors to children's economic behavior offering no theoretical explanation however.

8 These controls have proven to be statistically significant factors in many of children's behavioral economic studies hence our decision to include them as well (Harbaugh et. al 2002)

9 Harbaugh et al. (2001) find young children share less as first players in a dictator game than older children and adults; Harbaugh & Krause (2000) find age differences in a public goods game

## Patience

(3)

An ordered probit and logit<sup>10</sup> was employed as our key dependent variable child impatience is categorical and order matters. As explained earlier, the switch point made from a smaller-sooner reward to larger-later rewards denotes the impatience level of the player. Thus the scale from 1 to 5 denotes the level of impatience rising with 5 being the highest and 1 being the lowest.

- = probability of child being more impatient (1 is most patient; 5 most impatient)
- = categorical variable denoting parent impatience
- = controls measuring child and parent characteristics – child age, child education<sup>11</sup>, child gender<sup>12</sup>, child height and weight, child birth order, parent gender, parent education.
- = error term

## *Discussion of Results*

### Trust

Three separate regression were run. Column 3 in table 1 shows a simple correlation analysis without any controls. The correlation is insignificant. In columns 1, parent trust (overall) without parent gender differences is used an explanatory variable along with controls added for personal characteristics. Child reciprocity shows a positive correlation with child trust as it was noted earlier how either requires the other to exist. Column 2 in table 1 shows OLS regression with

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10 Two separate empirical specifications were used to identify correlation between parent and child's preferences

11 Following Bettinger & Slonim who observed that education may impact child's patience level (Becker & Mulligan 1997).

12See Bettinger & Slonim (2007); family and individual characteristics affect children's preferences over time.

child trust as the dependent variable and father trust<sup>13</sup> as independent variable. Results are yet again insignificant. According to our findings, parents trust levels are not correlated with the trust levels displayed by the child when they both play the same game with strangers.

We find no effect of child age, gender or education on child trust levels despite there being empirical studies documenting their significance (Eckel & Wilson 2000; Harbaugh et al. 2002).

**Table 6: OLS regression with Child Trust as Dependent Variable**

VARIABLES	(1) child trust	(2) child trust	(3) child trust	(4) child trust
Ptrust	-0.0197 (0.162)	-0.126 (0.188)		
CHreciprocity		0.289** (0.131)	0.268** (0.128)	0.280** (0.124)
Boy (=1 if gender of child is male)		-0.109 (0.0834)	-0.111 (0.0824)	-0.117 (0.0810)
childbirthorder		0.00365 (0.0407)	0.00936 (0.0402)	0.0135 (0.0392)
childdeduction		-0.0568 (0.0365)	-0.0526 (0.0361)	-0.0519 (0.0351)
Height for age z scores		-0.0100 (0.0332)	-0.0140 (0.0329)	-0.0176 (0.0323)
parenteducation		0.00444 (0.0103)	0.00393 (0.0101)	0.00519 (0.00992)
childage		-0.314 (0.399)	-0.302 (0.401)	-0.225 (0.397)
ChildageSQ		0.0189 (0.0219)	0.0180 (0.0220)	0.0138 (0.0218)
firstborn		-0.00268 (0.114)	-0.0108 (0.112)	0.0151 (0.112)
fatherTrust			0.0543 (0.123)	
MotherTrust				-0.167 (0.149)
Constant	0.465*** (0.0890)	1.807 (1.828)	1.687 (1.841)	1.365 (1.810)
Observations	54	54	54	54

13 Other gender dimensions could not be further explored because of our limited sample size. We were however able to add gender differences as we had an almost equal number of parents of either gender participating in the study (29 mothers, 25 fathers) hence statistically acceptable.



R-squared	0.000	0.172	0.178	0.202
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OLS regressions. Each row reports the estimated coefficients. Robust standard errors are in the parenthesis. Column 1 presents the results from specifications with no controls. Column 2 adds the basic set of covariates: child gender, child age, child birth order, child education, height-for-age z scores, parent education (years), child age squared. Column 3 presents results with Father's Trust used as independent variable and Column 4 with Mother's Trust.

\*, \*\*, and \*\*\* denote significance level at 10, 5, and 1% levels

## Reciprocity

Column 1 in the table 7 below shows a simple correlation factor for child reciprocity to that of the parent. It is insignificant. Column 2 of table 7 regresses child reciprocity with the parent reciprocity and we conclude that they are both positively related keeping all other controls fixed. Of the personal characteristics added, only child education reveals a significant and positive impact on the child's reciprocity. Thus, we can infer that the more educated<sup>14</sup> the child is, he is likely to display higher trust, keeping all other factors constant. In addition to this, the parent's ability to read or write also played a positive significant factor in determining the amount of trust revealed by the child. As it can be noted from the table below in column 2, the parent's ability to read or write measured as a categorical variable shows that a child whose parent could read or write displayed a higher reciprocity as compared to the child whose parent could not, keeping all other factors constant.

In the third column of table 7, we test the gender difference in parent reciprocity by taking into account only the father's reciprocity. However, the correlation between them is insignificant which could be because of the small sample size.

Child trust is significantly correlated with child reciprocity which reinforces our earlier theory that child trust is a necessary factor in determining whether the child will reciprocate trusting behavior.

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<sup>14</sup> Dohmen et al. (2012) includes these controls in both their risk and trust experiments and only report age having an insignificant impact on trust levels.

**Table 7: OLS Regression with Child Reciprocity as Dependent Variable**

VARIABLES	(1) child reciprocity	(2) child reciprocity	(3) child reciprocity	(4) child reciprocity
Preciprocity	0.275 (0.166)	0.358** (0.164)		
Ctrust		0.526*** (0.182)	0.516** (0.202)	0.565*** (0.191)
Boy (=1 if child is male)		0.0685 (0.0960)	0.0729 (0.105)	0.0779 (0.100)
childage		0.497 (0.444)	0.629 (0.500)	0.247 (0.463)
ChildageSQ		-0.0328 (0.0244)	-0.0413 (0.0275)	-0.0186 (0.0254)
parentage		0.00281 (0.00858)	0.00313 (0.00942)	0.00137 (0.00926)
childdeduction		0.105** (0.0411)	0.122*** (0.0438)	0.109** (0.0419)
Height for age z scores		0.0342 (0.0370)	0.0196 (0.0409)	0.0432 (0.0386)
firstborn		-0.0720 (0.128)	-0.0696 (0.142)	-0.0865 (0.134)
childbirthorder		-0.0537 (0.0423)	-0.0373 (0.0469)	-0.0591 (0.0448)
canreadorwrite		0.212** (0.0833)	0.172* (0.0925)	0.206** (0.0873)
fatherReci			0.240 (0.191)	
MotherReci				0.242 (0.163)
Constant	0.314*** (0.0807)	-2.220 (2.051)	-2.665 (2.294)	-1.028 (2.117)
Observations	54	54	54	54
R-squared	0.050	0.384	0.310	0.329

OLS regressions. Each row reports the estimated coefficients. Robust standard errors are in the

parenthesis. Column 1 presents the results from specifications with no controls. Column 2 adds the basic set of covariates: child trust child gender, child age, child birth order, child education, height-for-age z scores, whether parent can read or write (dummy variable), child age squared. Column 3 presents results with Father's Reciprocity used as independent variable and Column 4 with Mother's Reciprocity.

\*, \*\*, and \*\*\* denote significance level at 10, 5, and 1% level

## Patience

Column 1 in Table 8 tests a simple correlation between child impatience probability to that of their parent and we conclude no significant correlation. However, in column 2, with controls added for child and parent characteristics we determine a negative and significant relationship between the probability of child becoming more impatient to that of their parent. The probability of the child becoming more impatient decreases if the parent of the child is more patient, *ceteris paribus*. In addition to this, as compared to a girl, the probability of child impatience rises, if the child is a boy, keeping all other variables constant. This finding is consistent with literature (Alan & Ertac 2015; Bettinger & Slonim 2007<sup>15</sup>; Castillo et al. 2011)

In addition to this, we added z-scores for child height and weight as explanatory variables<sup>16</sup>. The probability of the child becoming more impatient decreases as HAZ increases, *ceteris paribus* i.e. comparatively a taller child leads to decreased impatience. Whereas the probability of the child becoming more impatience rises as the WAZ increases, *ceteris paribus*.

More importantly we see that education plays a vital role in determining the time preferences in children. A more educated child<sup>17</sup> decreases the probability of the child becoming more impatient, *ceteris paribus*. It is believed that a child's intellect plays a vital role in strengthening his self-control (Steinberg et al. 2009; Castillo et al. 2011).

Angerer (2015) uses relative IQ in the respective grade as a measure of level of

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15 An insignificant relationship is observed between child and parents' patience levels

16 Higher weight at birth decreases the probability of the child being more impatient (Bettinger & Slonim 2007; Kosse & Pfeiffer 2012).

17 Sutter et al. (2013) find that high ability students possess more patience.

education and they also find that students with a higher IQ make consistent patient choices.

In the third column we test the gender difference of the parent's impatience level and can successfully conclude that mother's impatience level has a significant correlation with that of their child in line with literature (Kosse & Pfieffer 2012). However, this relationship is also negative. This means that the probability of the child becoming more impatient decreases if the parent is more impatient. From our analysis, it seems the children are adopting a different view for time preferences to that of their parent.

**Table 8: Ordered Probit Regression with Child Impatience as Dependent Variable**

VARIABLES	(1) child impatience	(2) child impatience	(3) child impatience	(4) child impatience
parentswitchpoint	-0.197 (0.124)	-0.382*** (0.147)		
Boy (=1 if child is male)		0.887** (0.392)	0.790** (0.391)	0.695* (0.388)
chconsist		-0.694* (0.358)	-0.574* (0.348)	-0.721** (0.361)
childage		0.260 (1.711)	-0.354 (1.711)	0.939 (1.762)
parentage		-0.0214 (0.0338)	-0.00535 (0.0326)	-0.0237 (0.0339)
Height for age z scores		-0.716*** (0.216)	-0.577*** (0.205)	-0.665*** (0.211)
Weight for age z scores		0.446** (0.196)	0.378* (0.194)	0.377* (0.193)
childeducation		-0.406** (0.160)	-0.373** (0.155)	-0.392** (0.159)
childbirthorder		0.158 (0.142)	0.137 (0.140)	0.197 (0.142)
ChildageSQ		0.00403 (0.0932)	0.0353 (0.0931)	-0.0300 (0.0956)
parenteducation		-0.0256 (0.0460)	-0.0391 (0.0451)	-0.0219 (0.0461)
FatherImpatience			-0.0538 (0.153)	
MomImpatience				-0.328** (0.144)
Observations	54	54	54	54

Ordered Probit Regression. Each row reports the estimated coefficients. Robust standard errors are in the parenthesis. Column 1 presents the results from specifications with no controls. Column 2 adds the basic set of covariates: child trust child gender, child age, child birth order, child education, height-for-age z scores, whether parent can read or write (dummy variable), child age squared. Column 3 presents results with Father's Impatience used as independent variable and Column 4 with Mother's Impatience.

\*, \*\*, and \*\*\* denote significance level at 10, 5, and 1% level

To see whether our results hold with a different econometric model, we employed Logit model to our earlier regression analysis for Child Impatience.

(4)

All the variables are same except now the dependent variable measures the log of odds rather the probability of child becoming more impatient.

**Table 9: Ordered Logit Regression with Child Impatience as Dependent Variable**

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	(1)	(2)	(3)	(4)
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VARIABLES	child impatience	child impatience	child impatience	child impatience
parentswitchpoint	-0.250 (0.219)	-0.656** (0.283)		
Boy		1.768** (0.722)	1.482** (0.707)	1.359* (0.693)
chconsist		-1.187* (0.651)	-1.002 (0.630)	-1.205* (0.655)
childage		0.0726 (3.060)	-0.626 (3.081)	1.510 (3.173)
parentage		-0.0352 (0.0635)	0.00653 (0.0577)	-0.0332 (0.0631)
haz		-1.235*** (0.391)	-0.988*** (0.364)	-1.141*** (0.379)
waz		0.756** (0.351)	0.597* (0.335)	0.638* (0.341)
chileducation		-0.684** (0.281)	-0.641** (0.277)	-0.612** (0.275)
childbirthorder		0.302 (0.263)	0.223 (0.256)	0.369 (0.271)
ChildageSQ		0.0276 (0.165)	0.0617 (0.166)	-0.0459 (0.171)
parenteducation		-0.0170 (0.0870)	-0.0595 (0.0839)	-0.00942 (0.0892)
FatherImpatience			-0.0787 (0.283)	
MomImpatience				-0.582** (0.282)
Observations	54	54	54	54

Ordered Logit Regression. Each row reports the estimated coefficients. Robust standard errors are in the parenthesis. Column 1 presents the results from specifications with no controls. Column 2 adds the basic set of covariates: child trust child gender, child age, child birth order, child education, height-for-age z scores, whether parent can read or write (dummy variable), child age squared. Column 3 presents results with Father's Impatience used as independent variable and Column 4 with Mother's Impatience.

\*, \*\*, and \*\*\* denote significance level at 10, 5, and 1% level



## **6. Conclusion**

Our results provide us with an insightful view of the relationship between the values held by the parent as compared to their child. To our knowledge an experimental study with children has not been conducted in Pakistan. Our study adds to the literature by presenting findings of a behavioral experiment conducted in a lab setting with primary school going children. Numerous studies have documented behavioral analyses but there is dearth of economic experiments conducted with children. Our paper allowed us to replicate games that have been played by adults to primary school going children and learn whether their habits mirror their parent.

A primary reason as explained earlier for selecting experiments instead of any other empirical specification was to isolate the behavior free from any other environmental factors. However, our endeavors were not free from setbacks. We had to conduct two pilot studies with to weed out these issues. The experiments had to be conducted on the same day in the same school so as to avoid any bias more specifically the Hawthorne Effect. The experiments had to be conducted so as to not let the adults or children speak to the other about it in case they alter the original responses. Our pilot study revealed the language in the scripts, borrowed from literature, could not be precisely delivered to the sample because of misunderstandings. We had to take meticulous care in drafting the words in the local language so that the participants, a majority of whom were illiterate, could understand them. As was in the case of trust game, where individuals were required to understand each outcome of the game, so as to choose a strategy, we had to work with the children and reword the scripts for them to understand it better. Likewise, we had to ensure that games played by the children

were free from any ethical concerns. For that each script along with the questionnaire, revised and translated in local language, was approved by the Lahore School of Economics Ethics Committee. After considering their feedback and incorporating changes observed during pilot studies were we ready to enter the field for our experiments.

Our paper concludes with several important findings. If the parent displays trustworthiness, the child also displays positive reciprocity (trustworthiness) meaning there is certainly a transfer of values in this regards. While we can infer positive correlation between child reciprocity and parent reciprocity, we cannot determine from our analysis whether there exists a transfer of trust values from parent to child. Rejection of family values is not unheard of<sup>18</sup>. Individuals may adapt to the transmitted values differently, alter them slightly or reject them out rightly.

According to literature, within country migration may result in this phenomenon. It so happens that while the first-movers may not differ from their parents, the second-generation movers are said to adapt to the values carried down to them by their parents. In this case, the current environment plays a vital role in weakening the chains of intergenerational transmission. In addition to this, Zumbühl, Dohmen & Pfann, (2013) find how parents who have invested more to mold the preferences of their offspring have transferred their traits successfully. Furthermore, this transmission could be interrupted by other factors like choice of neighborhood, peer effects. Establishing a correlation between parent and child opens doors for policymakers to construct interventions keeping in mind that the repercussions will be

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18 Albanese et al. (2016); Inkeles & Smith (1974)

followed in the next generation as well. Parents possess the power to influence their children hence deeming the preferences and behaviors malleable. By creating awareness and relaying importance of these factors to the child explicitly, whether at home or in a classroom setting children can be taught to hone these skills (Alan & Ertac 2015)

In addition to this, as hypothesized in literature, we can conclude that child trust level is a significant contributor in child displaying an attitude of trustworthiness also. Meaning the more trust the child shows, the more trustworthy he is as well.

A negative relationship between child's impatience to that of their parent is a result that is contrary to popular literature. A further analysis is required to understand this stark difference in the preferences of parents to that of their child. According to our findings, the probability of the child becoming more impatient rises if the parent becomes more patient, keeping all other variables constant.

The dominant intergenerational effect is from the mother's side. A mother's impatience levels are significantly correlated with the child's impatience levels albeit negatively. This could be due to cultural factors prevalent in a country like Pakistan where a mother spends most time with the child. A child's overall economic wellbeing can be altered through socialization and parents' efforts. Bisin & Verdier (2000) offer an explanation on how this transmission weakens in certain groups. They theorize that if the parents themselves are dissimilar in nature, it would make it harder for the child to adopt a single behavior. For instance, a patient father and an impatient mother creates a conundrum for the child and as a result he is left to seek outside aid

to form his preferences and strategies. Apart from heterogeneous parents, Bisin & Verdier (2000) also imply that with single parents it gets difficult for a parent to make the effort to impart their preferences on their child. All of these factors are important to test as an extension of this paper.

## Appendices

### Explanation of Variables

Variable	Explanation
<b>Child Trust</b>	No. of tokens sent to player 2 in First Round of BDM game
<b>Parent Trust</b>	Amount (Rs.) sent to player 2 in First Round of BDM game/100
<b>Chile Reciprocity</b>	<u>No. of tokens sent to player 1 in Second Round of BDM game</u> No. of tokens received by player 2
<b>Parent Reciprocity</b>	<u>Amount (Rs.) sent to player 1 in Second Round of BDM game</u> Amount (Rs.) received by player 2
<b>Child Impatience</b>	The switching point- when a child switches from sooner-earlier option to later-larger option in the choice list table
<b>Parent Impatience</b>	The switching point- when a parent switches from sooner-earlier option to later-larger option in the choice list table
<b>pconsist</b>	Whether the parent made a consistent choice in Patience Game
<b>chconsist</b>	Whether the child made a consistent choice in Patience Game
<b>Boy (=1)</b>	Dummy variable; =1 if the child's gender is Male, 0 otherwise
<b>childbirthorder</b>	The birth order of the child
<b>HAZ</b>	Height-for-age Z-scores (constructed using WHO 2007 Multicentre Growth Reference Study)
<b>WAZ</b>	Weight-for-age Z-scores (constructed using WHO 2007 Multicentre Growth Reference Study)
<b>parenteducation</b>	Parent's education level (coded in the questionnaire)
<b>childdeduction</b>	Child's education level (coded in the questionnaire)
<b>childage</b>	Child's age
<b>ChildageSQ</b>	Square of Child's age
<b>firstborn</b>	Dummy variable; =1 if the child is first born, 0 otherwise
<b>Father*Trust</b>	Interaction term (level of parent trust*father's gender)
<b>Mother*Trust</b>	Interaction term (level of parent trust*mother's gender)
<b>parentage</b>	Parent's age
<b>canreadorwrite</b>	Dummy variable; =1 if the parent can read or write (is literate), 0 otherwise
<b>Father*Reciprocity</b>	Interaction term (level of parent reciprocity*father's gender)
<b>Mother*Reciprocity</b>	Interaction term (level of parent reciprocity*mother's gender)
<b>Mother*Impatience</b>	Interaction term (level of parent impatience*mother's gender)
<b>Father*Impatience</b>	Interaction term (level of parent impatience*father's gender)

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