How Does Household Income Affect Child Personality Traits and Behaviors?

Randall Akee* Emilia Simeonova** E. Jane Costello*** William Copeland*** Adrian Angold***

March 1, 2015

Short Abstract:

Existing research has investigated the effect of early childhood educational interventions on the child's later-life outcomes. These studies have found limited impact of supplementary programs on children's cognitive skills, but sustained effects on personality traits. We examine how a positive change in unearned household income affects children's emotional and behavioral health and personality traits. Our results indicate that there are large beneficial effects of improved household financial wellbeing on children's emotional and behavioral health and positive personality trait development. Moreover, we find that these effects are most pronounced for children who are lagging behind their peers in these measures before the intervention. Increasing household incomes reduces differences across adolescents with different levels of initial emotional-behavioral symptoms and personality traits. We also examine potential channels through which the increased household income may contribute to these positive changes. Parenting and relationships within the family appear to be an important mechanism.

Contact Information: *UCLA Department of Public Policy, 3250 Public Affairs Building, Los Angeles, CA 90095 (rakee@ucla.edu); **The Johns Hopkins Carey Business School, 100 International Drive, Baltimore, MD 21202 (emilia.simeonova@jhu.edu); *** Center for Developmental Epidemiology, Department of Psychiatry and Behavioral Sciences, Duke University Medical Center, Box 3454, Durham, NC 27710 (william.copeland@duke.edu, adrian.angold@duke.edu, jcostello@psych.duhs.duke.edu).

I. Introduction

Household income plays an important role in the current and future health and socio-economic outcomes for its members. Social scientists have spent a considerable amount of effort at uncovering the causal linkages between household resources and human capital formation in children. There are well known confounding issues as income is closely linked to parental effort, skills and preferences, which directly affect children's short- and long-term outcomes. Thus, separating out the direct effect of household socio-economic status on children's wellbeing and identifying the channels that enable this link is an important pre-requisite for any policy intended to break the intergenerational transmission of human capital

Most of the existing research has focused on establishing a causal link between parental resources and children's educational attainment or physical health in childhood and adulthood. At the same time, studies have demonstrated that the formation of positive personality traits and non-cognitive skills is crucial in determining long-term socio-economic wellbeing and may have strong effects on long-term health (see Conti et al, 2014; Cunha and Heckman (2008); Cunha, Heckman, and Schennach (2010)). A growing and related branch of the literature has shown that mental health conditions, such as attention deficit hyperactivity disorder and developmental delaysare more likely to affect poorer children (Currie and Lin, 2007). Indeed, low SES might work as an early-life stressor that determines part or all of the relationship between low parental income and children's mental health problems (see Lundberg, 1997; McLeod and Shanahan, 1993)

In the current analysis, we examine how positive changes in unearned household income affect children's behavioral, mental, and personality traits in their late teenage years. Prior research has shown that human capital interventions have a short-lived effect on cognitive abilities except at very early ages (Carneiro and Heckman (2003); Heckman, Pinto and Savelyev et al (2013)). However, we also know that personality traits may still be malleable at older ages (isn't there a Heckman reference for this?). This study finds that exogenous changes in unearned household income have large effects on child personality traits and symptoms of emotional and behavioral distress as measured at age 16. Furthermore, we find that the results are largest for children who exhibit the lowest levels of initial (pre-intervention) personality traits and had the most behavioral and emotional problems.

The detailed nature of our survey data allow us to examine a potential mechanism through which improved household income may affect the observed improvement in child personality traits

and disorders. Previous research has suggested that parents' emotional and physical well-being are affected by household income (Evans and Garthwaite (2014), Milligan and Stabile (2011)). In our analysis, we examine the effect of exogenous income transfers on parental behaviors, the quality of the relationship between the two parents, and the relationship between parents and children. We find that there is a marked improvement in parental mental health and the relationship with the other spouse and between the parents and children in the treated households.

II. Background and Related Literature

Several different approaches have been utilized to study the impact of extra family income on child outcomes. Blau (1999) in the US and Dooley (2004) in Canada examine changes to permanent income in a lifecycle framework and find that they had small effects on child outcomes. However, a series of papers by Duncan et al (1994, 1998) and Hill et al (1987) report that changes in household income are associated with improvements in IQ scores, child achievement, children's long-run wages and a reduction in behavioral problems. In a slightly different setting, Levy et al (2000) uses changes to household income over the life cycle and identifies their impacts using sibling pairs (born at different times) who are sufficiently different in age. Improving household income for one member of the sibling pair relative to the other one had a positive effect on educational attainment.

There are a series of papers that use quasi-experimental methods to examine the effect of changes in household income on child outcomes. The research uses changes in tax policy, government transfer programs, macroeconomic conditions, surprise income windfalls and crop failures to exogenously identify the change in household income. Case (2004) found that an unexpected increase in household income due to pension extension in South Africa improved self-reported health, but also health for the household as a whole. Using the same reform Duflo (2003) finds that there is a positive effect on child height and weight in the treated households.

Displacement of workers or economic shocks have also been used to help identify the impacts of a long-run change in economic conditions at the household level. The obvious difference with pure unearned income shocks such as the one in South Africa is that employment-related economic shocks may have effects on children's outcomes beyond what is attributed to the immediate measurable effects on households income. Further, employment shocks are only related

to negative earned income shocks, which may have different propagation mechanisms than positive unearned income shocks. Shea (2000) uses industry and job loss as an instrument for income. His results show no long-run effects on the child's earnings or schooling; however, he reports some effects for children from households with fathers who have less than a high school degree. Oreopolous and co-authors(2008) examine the effect of job displacement due to layoffs on the outcomes of sons from these households. The sons have lower earnings in the future and the results are primarily driven by children at the lowest end of the income distribution. In examining historical data for France in the 19th century, Bannerjee et al (2007) found that in young adulthood sons from households residing in wine production areas affected by new grape diseases were shorter than their untreated counterparts.

Finally, changes in government programs and provisions have been used extensively to examine changes in household income on long-run household outcomes. Milligan and Stabile (2011) investigate how positive changes in tax benefits for households with children affected those children in Canada. They find that there is an increase in child test scores, height and health. Interestingly, the incidence of mother's depression also decreases. Evans and Garthwaite (2013) examine the effect of the extension of Earned Income Tax Credits (EITC) in the US on maternal health. Their findings are that there's a reduction in maternal stress and an overall improvement in health using biometric measures of mothers' health. Dahl and Lochner (2008) examine how changes in EITC benefits affect child achievement. Their results also indicate that better financial standing leads to an improvement in achievement test scores for low income children. Morris et al (2004) examines changes in several welfare to work programs in the US on child outcomes. These program changes randomly provided differential amounts of benefits to similar households for evaluation purposes. The findings indicate that increased incomes have a positive effect on child achievement scores. In a recent paper Jacob et al (2014) examine outcomes for poor households that receive a randomly provided housing voucher in Chicago in the late 1990s. The Chicago housing voucher program may have a large effect on actual household income by serving as a true unearned income shock, which amounted to approximately $12,000 per year. The study fails to find any significant effects of this income intervention on child outcomes. In their discussion the authors note that most households do not move and that may play a role in the quality of schools attended and social environments.

III. Data Description

The Great Smoky Mountains Study of Youth (GSMS) is a longitudinal survey of 1420 children aged 9, 11 and 13 years at the survey intake, who were recruited from 11 counties in western North Carolina. The children were selected from a population of approximately 20,000 school-aged children using an accelerated cohort design.[1] American Indian children from the Eastern Band of Cherokee Indians were over sampled for this data collection effort. Their federal reservation is situated in two of the 11 counties within the study. The initial survey contained 350 Indian children and 1070 non-Indian children. Proportional weights were assigned according to the probability of selection into the study; therefore, the data is representative of the school- aged population of children in this region. Attrition and non-response rates across different survey waves were found to be equal across ethnic and income groups. The survey began in 1993 and has followed these three cohorts of children annually up to the age of 16 and then re-interviewed them at ages 19 and 21.[2] Both parents and children were interviewed separately up until the child was 16 years old; interviews after that were only conducted with the child alone.

After the fourth wave of the study, a casino opened on the Eastern Cherokee reservation. The casino is owned and operated by the tribal government. A portion of the profits are distributed on a per capita basis to all adult tribal members.[3] Disbursements from the casino revenues are made on a semi-annual basis to all adult members of the tribe. The transfers amount to approximately $4,000 annually and are disbursed to all adult members of the tribe. This extra income is subject to federal income taxes. In Figure 1 below, we provide the proportion of households with incomes above $30,000 by American Indian status. The trend prior to the opening of the casino was similar

---

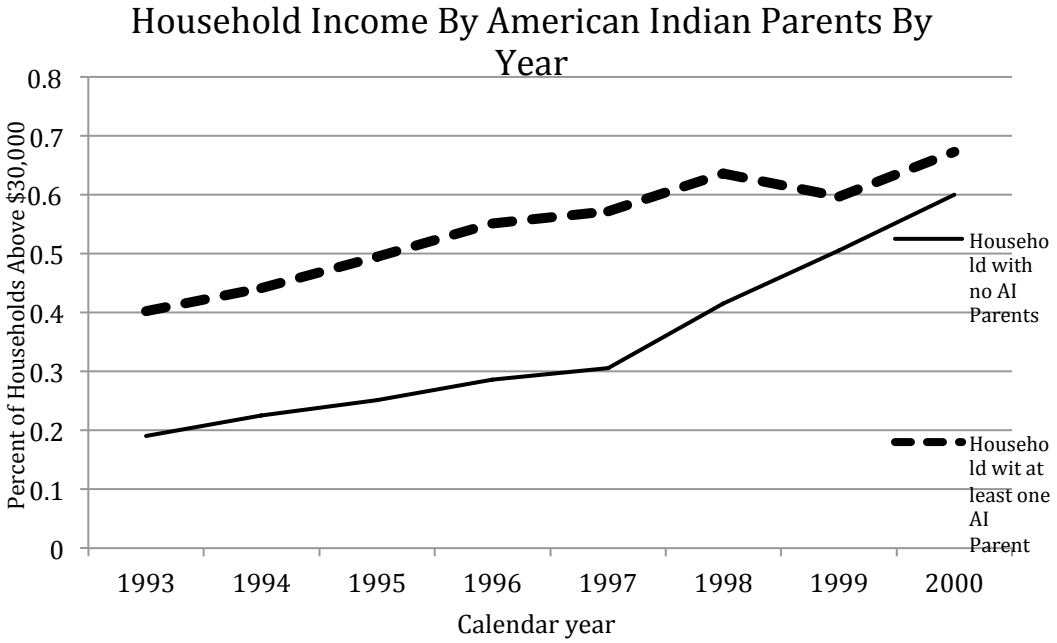
[1] See Costello E. Jane, Adrian Angold, and Barbara Burns, and Dalene Stangl, and Dan L. Tweed, and Alaatin Erkanli, and Carol M. Worthman (1996) for a thorough description of the original survey methodology.

[2] Individuals are interviewed regardless of where they are living (whether on their own, in college, or still living with their parents). No child is dropped from the survey simply because they moved out of their parent's home. We find no statistically significant difference due to attrition between the treatment and control groups. American Indians comprise 24% of the sample in the very first survey wave and comprise approximately 27% of the sample at age 21.

[3] All adult tribal members received these per capita disbursements. The average annual amount per person has been approximately $4000. If there were any non-compliers (American Indian parents that either did not receive or refused the additional income) then any estimates found here would be an under estimate of the true effects of additional income. All enrolled, American Indian children were eligible for the casino disbursements themselves at age 18 if they completed high school; even if they did not complete high school they would receive the casino transfers at age 21.

across American Indian and non-Indian households. However, there is a sustained upward movement in the proportion of American Indian households that earn more than $30,000 per year. No similar change is noted for the non-Indian households after the introduction of the casino payments.

Figure 1: Percent of households with annual income greater than $30,000 by ethnicity



As Figure 1 indicates, there was a sharp increase in the proportion of AI households reporting annual incomes in excess of $30,000 that started in the first year of casino operations. The steady increase in household income can be attributed to the fact that the casino payment was increasing over time due to increasing casino revenues. On average, the size of the casino payment was about $4,000 per year per tribal member. In the table below, we regress the household income on whether the household receives the casino transfer payment. The coefficient at 0.81 indicates that the average amount of the change in overall income due to the casino payment over the time period was approximately $4,100 (note that income is measured in bins which are $5,000 in size).

Table 1: Casino payments and household income

Household Income and Casino Payments

	(1)
VARIABLES	Household Income in $5000 bins
Casino Payment?	0.818**
	(0.395)
Number of Children Less than 6 years old in Household	0.0981
	(0.107)
Constant	5.502***
	(0.120)
Observations	2,386
R-squared	0.216
Household FEs	yes
Number of gsms	504

Note: American Indian Linear Time Trend, Survey Wave (calendar year) Fixed Effects and Standard errors clustered at the individual level provided in parentheses. For youngest age cohort over years in household.
*** p<0.01, ** p<0.05, * p<0.1

In the Great Smoky Mountains Study of Youth there are a number of questions asked repeatedly at all survey waves regarding the adolescents' personality and behaviors. Parents and children are surveyed separately up until age 16, subsequently the survey subject is interviewed alone at ages 19 onward. Survey questions were specifically designed to diagnose behavioral emotional disorders. Questions on the survey align with standard definitions for diagnoses and disorders from the DSM-IV.

The GSMS is specifically created assess mental health and well-being in children. The questions are designed to identify psychiatric, behavioral, and emotional disorders. We use the count of behavioral and emotional disorders as identified in the survey as outcome variables. Behavioral disorders are defined as anxiety or depression diagnosis from the "Any *Diagnostic and Statistical Manual of Mental Disorders* (Fourth Edition) (*DSM-IV*)". Emotional disorder variable is coded as any *DSM-IV* conduct, oppositional, or antisocial personality disorder. These variables are constructed based on parents' reported observed behavior of their children. A larger value indicates greater or more frequent instances of the outcome variable (higher probability of psychiatric diagnosis, more behavioral problems, more emotional problems). These variables have been

standardized with mean zero and unit standard deviation across all individuals by age.

We use several questions contained in the GSMS data that align with the Big Five Measures of Personality. Three dimensions of the Big Five are well-suited to the GSMS survey questions. They are: 1) Conscientiousness -- Tendency to be organized, responsible and hardworking. 2) Agreeableness -- Tendency to act in a cooperative and unselfish manner. 3) Neuroticism -- Chronic level of emotional instability and prone to psychological distress.

Using data from the GSMS survey questionnaires, we found comparable questions which are similar to those used in the determination of these three personality traits. We then used confirmatory factor analysis to reduce the number of questions to a smaller number. The full set of survey questions that were deemed informative of the three sub-parts of the Big 5 are listed in the appendix. We re-coded the personality trait measures such that a higher score indicates a movement in favor of the Big 5 personality trait (more open, more conscientious, more agreeable more neurotic). Thus, an improvement in personality traits would be reflected in an increase of the measured level of the trait, while a deterioration in personality traits will be reflected in a decrease in the measured level of the trait. We focus our analysis to three personality traits: Conscientiousness, Agreeableness and Neuroticism. These traits related most closely to existing questions in the GSMS survey. The list of survey questions used to create the personality trait measures is in Appendix Table A1. It was difficult to identify questions which relate to the other two dimensions of personality traits.

The GSMS survey contains a set of questions that help us construct additional variables measuring the quality of parental relationships and parental behaviors. These variables are measured in categories and increasing values indicate either better outcomes or relationships. The data includes information regarding parental supervision and relationships with their spouses and children. We describe these variables in the last panel in Table 2 below.

Table 2: Descriptive statistics of important outcome and control variables

Table of Means*

	American Indian		Non-Indian	
Variable	Mean	Std. Dev.	Mean	Std. Dev.
Number of Children Less than 6 years of age	0.498	0.787	0.326	0.619
Average Household Income in First Three Survey Waves by Category	4.429	2.857	6.533	3.385
Biological Parents Married?	0.431	0.496	0.503	0.500
Behavioral Disorders	-0.210	0.674	0.170	1.078

Emotional Disorders	-0.237	0.820	0.225	1.168
Conscientiousness	0.215	0.963	-0.363	1.460
Agreeableness	0.038	1.316	-0.639	1.684
Neurotic	0.156	1.050	-0.645	2.169
Adequate Parental Supervision*	1.971	0.208	1.956	0.231
Enjoyable Activities with mother*	1.866	0.397	1.876	0.382
Full Time Employed Mother	0.582	0.494	0.571	0.495
Poor relationship between parents?	0.344	0.476	0.452	0.498
Arguments with Parents	4.691	23.213	15.771	66.995
N subjects	327		1029	

* On a scale of 2 to 0. Positive number means higher amount of supervision/more enjoyable activities

IV. Conceptual Framework

The main question of interest in this study is whether and to what extent the receipt of exogenous unearned household income affects children's emotional wellbeing and behavioral health. While the existing theoretical and empirical literature has studied extensively how policy interventions such as Head Start, Project STAR or the Perry Preschool experiment affect children's short- and long-term outcomes, and there is increasing evidence that the observed net effects of exogenous shocks to children's human capital could be affected by corresponding parental investment, there is relatively little prior empirical evidence on the effects of shocks to *household* financial wellbeing unrelated to changes in parental employment. Our conceptual framework is mostly closely related to Becker and Tomes (1979), Heckman and Cunha (2008) and Aizer and Cunha (2012).

In these models, even with some distaste for skill inequality the family may invest more in those with higher levels of human capital. This is because the return on investment in these children is higher and because parents expect or can otherwise devise mechanisms that induce higher-endowment children to share at least some of their future resources with their less-endowed siblings. Families may tolerate some amount of skill inequality if it means that the average payoff to investments in skill level will be higher due to high returns from more gifted children.

The predictions from these models are that, all else equal, changes in children's human capital endowments brought about by external interventions will improve educational outcomes the most for those with higher initial endowments. Thus, a relative reduction in the cost of investing in children's human capital will lead to the reinforcement of inequality within a household. Further, these models predict that in equilibrium, families that received a better initial draw of human capital endowment for their children will invest more in these children's human capital in later periods than families who received a bad initial draw from the distribution of initial children's endowments.

Our framework differs from this setup because we examine the effects of a permanent increase in household unearned income, rather than exogenous changes in child endowments. The standard models cited above predict that this pure income effect would improve parental investments in all children regardless of their initial human capital endowments, as long as children are normal goods. The GSMS surveyed only one child per family, which precludes us from analyzing within-family responses to the permanent income shock. However, we can still evaluate how this tribal policy affected inequality among children with different initial endowments at the community level.

Based on these models it is quite straight forward to find that emotional and personality-related human capital production function is (weakly) increasing in parental investment and exhibits decreasing marginal returns to parental inputs. Therefore, similarly-sized changes in household income would predict largest increases in overall skills for those who are at the initially lowest levels of skills. Since household income has increased a similar amount for all individuals (it is a per capita payment), assuming a positive relationship between unearned income and parental investment , then an equal-sized increase in income will result in a larger positive change to human capital for individuals who start from initially lower levels of investment. If in equilibrium parents rationally invest less in less endowed children, then even among parents with the same initial income levels we would see lower levels of initial investment and stronger responses to the income intervention among less endowed children. We take these predictions to the data by using the initial levels of child abilities and personality traits in the years prior to the casino operations and payments.

V. Regression Models and Results

We compare young adult outcomes for adolescents who resided in households with extra income (youngest and middle age cohorts of American Indian children) to adolescents who were not exposed to the extra income by age 16 (the oldest age cohort). The two youngest age cohorts (Age 9 and Age 11 at survey intake; ages 13 and 15 at first treatment) function as the "after-treatment" cases and the oldest age cohort (Age 13 at survey intake) is the "before-treatment" case. We focus on the effect of the income transfer on personality traits and mental health at age 16. Non-tribal members serve as the control group.

We examine the effect of changes in unearned income on the outcome variables at all survey waves using a panel fixed-effects regression. We use all available data for each individual from ages 9 (11 and 13 respectively) onwards, interviewed every year until age 16. The empirical specification is:

$$Y_{it} = \alpha_i + X'_{it}\beta + \gamma * Transfer_{it} + \tau_t + \theta Age_{it} + \lambda Age_{it} \times Race_i + \varepsilon_{it} \quad (1)$$

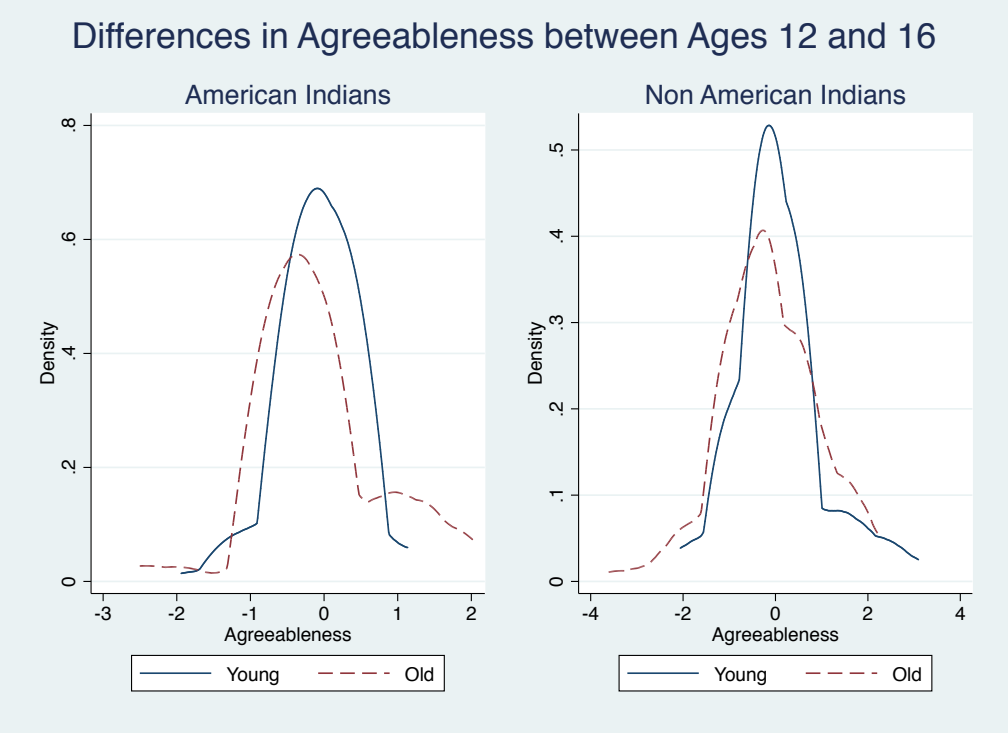
Where, α_i is the individual fixed effect, τ_t is a wave fixed-effect, θ_{it} is a set of age fixed effects, and λ is the coefficient on an age by race fixed effect. These fixed effects are necessary to other possible mechanisms that could affect the observed changes in our outcome variables. We are able to use an age and wave fixed effects as we have American Indian and non-Indians from the three different cohorts of children. The age by race fixed effects capture any time variant differences in the mental health and personality development between the two groups of children.

The variable X controls for the presence of children younger than six in the household. The variable *Transfer* measures whether the child resides in a household that receives the unearned income transfers due to the casino revenues. The variable is always zero for households that do not receive the casino transfers. For households that do receive the casino transfers, the variable is zero for the first four survey waves and then increases to one for all years thereafter.

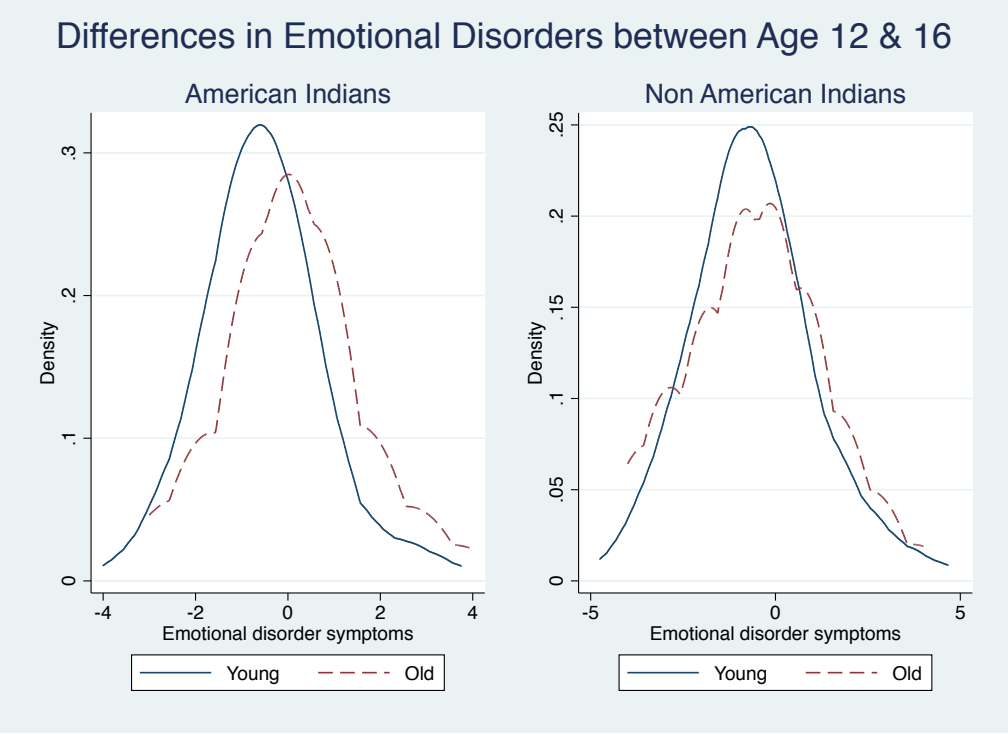
Our analysis examines differences in individual changes between the youngest and oldest cohorts of children across American Indians and non-Indians in the data set. In the figures below, we provide some evidence of the change in agreeableness and emotional disorders by American Indian ethnicity and by age cohort. In the first figure, we difference the level of agreeableness for the same individual at ages 12 and 16. Then we plot the distribution by age cohort and American Indian status. In the first plot the results indicate that, without controlling for other covariates, the youngest age cohort of American Indian children experienced a rightward shift of their level of agreeableness relative to the older cohort of American Indian children. This represents an increase in their level of agreeableness. For non-Indians, whose distributions are shown in the second plot of the figure, there is no discernable difference in the change in agreeableness by age cohort.

Figure 2: Evolution of behavioral and emotional traits across ethnicity and age cohorts

Panel A



Panel B



In the second panel in Figure 2, we provide evidence on the changes in the distribution of emotional disorders for children in the GSMS data. The graph on the left indicates that between the ages of 12 and 16 American Indian children from the youngest age cohort saw a decrease in the number of emotional disorders relative to the older cohort of American Indian children. The graph on the right again indicates that there is no similar change for non-Indians. These results preview our findings from the regression tables to follow.

VI. Results

In the table below we provide the results from the panel fixed-effects regressions described by equation 2 above. The five outcome variables are: behavioral disorder symptoms, emotional disorder symptoms, conscientiousness, agreeableness and neuroticism. The first two columns report the estimated effects of the casino transfers on the presence and severity of behavioral disorder symptoms observed in the child. The outcome variables are normalized to mean zero and standard deviation of one across all individuals by age. If we interpret the coefficients relative only to the American Indian population (see Table 2), the coefficients imply a reduction in the number of behavioral disorder symptoms by 26.7 percent of a standard deviation. The coefficient on casino payment in the second column indicates that the casino payment reduces the incidence of emotional disorder symptoms for treated children by 35.6 percent of a standard deviation.

The last three columns provide results using personality traits as outcome variables. These three personality traits take on both positive and negative values as they have been standardized by age to mean zero and unit standard deviation. The variables have been coded so that positive values indicate more of the respective personality traits indicated. The coefficient on casino payment in columns 3 and 4 indicate that the increase in household income has a positive effect on child personality traits. The casino payment increases the conscientiousness of treated children by 31.5% of a standard deviation while it increases agreeableness by 31.4 % of a standard deviation. There's a positive effect on neuroticism, however, it is not statistically significant.

Table 3: The effect of casino transfers on children's emotional and behavioral traits and disorders

VARIABLES	(1) Behavioral Disorder Symptoms	(2) Emotional Disorder Symptoms	(3) Conscientiousness	(4) Agreeableness	(5) Neuroticism
Casino Payment?	-0.180*	-0.292**	0.304**	0.412**	0.267
	(0.109)	(0.137)	(0.144)	(0.178)	(0.207)
Number of Children Less than 6 years old in Household	0.0554	0.0275	-0.0655	-0.0204	-0.121*
	(0.0338)	(0.0353)	(0.0430)	(0.0404)	(0.0635)
Constant	0.0446	0.179**	-0.462***	-0.776***	-0.749***
	(0.0657)	(0.0695)	(0.0853)	(0.102)	(0.119)
Child fixed effects	Y	Y	Y	Y	Y
Observations	6,050	6,050	5,893	5,695	5,880
R-squared	0.019	0.019	0.045	0.077	0.052
Number of gsms	1,405	1,405	1,402	1,396	1,400

Note: American Indian Trend and Age Fixed Effects and Robust Standard errors in parentheses. Standard errors are clustered on the child level ; *** p<0.01, ** p<0.05, * p<0.1

We next test for potential heterogeneities in these effects across children with different initial (pre-transfer) endowments. The coefficients on the interaction variables of the casino transfer dummy with initial levels of the measured outcomes indicate whether there were any differential effects of extra income across different children. The results indicate that the casino payments had the largest effects for those individuals who start off with the lowest initial endowments.

Table 4: Heterogeneous effects of casino transfer by initial conditions of the child

VARIABLES	(1) Behavioral Disorder Symptoms	(2) Emotional Disorder Symptoms	(3) Conscientiousness	(4) Agreeableness	(5) Neuroticism
Casino Payment?	-0.223*	-0.349**	0.415**	0.517***	0.432**
	(0.131)	(0.152)	(0.163)	(0.199)	(0.215)
Interaction of Pre-Casino Behavioral Disorder Symptoms Average x Casino Payment	-0.197				
	(0.235)				
Interaction of Pre-Casino Emotional Disorder Symptoms Average x Casino Payment		-0.270			
		(0.172)			
Interaction of Pre-Casino Conscientiousness Average x Casino Payment			-0.350**		
			(0.149)		
Interaction of Pre-Casino Agreeableness Average x Casino Payment				-0.351**	
				(0.148)	
Interaction of Pre-Casino Neuroticism Average x Casino Payment					-0.631***
					(0.143)

Number of Children Less than 6	0.0546	0.0261	-0.0619	-0.0218	-0.113*
years old in Household	(0.0334)	(0.0352)	(0.0422)	(0.0397)	(0.0636)
Constant	0.0421	0.177**	-0.466***	-0.776***	-0.752***
	(0.0656)	(0.0695)	(0.0852)	(0.102)	(0.120)
Child fixed effect	Y	Y	Y	Y	Y
Observations	6,050	6,050	5,886	5,692	5,879
R-squared	0.021	0.021	0.048	0.080	0.054
Number of gsms	1,405	1,405	1,399	1,394	1,399

Note: American Indian Age Trend and Age Fixed Effects and Robust Standard errors in parentheses.
SEs clustered at the child level; *** p<0.01, ** p<0.05, * p<0.1

In interpreting the interaction coefficients it is important to remember that the standardized measures take both positive and negative values and are standardized with mean zero. Thus, a negative interaction coefficient coupled with a negative initial value implies a positive overall effect of the treatment. In columns 1 and 2, individuals with initially higher levels of behavioral or emotional symptoms are most likely to observe a reduction in their symptoms after the start of casino payments. The estimated coefficients are negative but not statistically significant in either column. In comparison, the interaction coefficients of initial levels of behavioral traits with casino payments are negative and statistically significant in all cases.

The next three columns provide results for the Big 5 Personality Traits. The measures of personality traits range in value from negative to positive values with higher values indicating higher levels of that particular personality trait. As a result, individuals with initially low levels of conscientiousness will have negative values which imply a positive overall effect on the outcome measure due to the casino transfer. The same results holds for the other two columns. Another way to interpret these results is that the extra cash transfers improve emotional and behavioral health for all children, however the improvements are much more pronounced for those who had pre-treatment values below the mean of the estimated outcome.

Previous researchers have found that parents invest resources in children with the highest endowment as the returns are highest in these cases. Our results do not necessarily contradict those results as the intervention here does not alter child endowments, but instead relaxes the parent's budget constraint. Further, we do not observe more than one child per household so we cannot draw conclusions on the intra-household distribution of resources as a function of initial child endowments. Our findings are particularly helpful if we are interested in the effect of transfer payments on community-level inequality in adolescent personality traits and behaviors.

VII. Mechanisms

We next investigate the effect of changes in household income on parental behaviors and relationships as a potential mechanism that may contribute to improved child wellbeing. Increasingly, there is convincing evidence that parents' mental and physical health are affected by changes in household income (Evans and Garthwaite, 2013; Milligan and Stabile (2011)). The change in parental behaviors and relationships triggered by income transfers may be one of the mechanisms through which increased household income affects children. The table below provides results examining four variables that capture parental relationships contained in the GSMS data set. In column 1, there is evidence that the casino payment increases the level of parental supervision of their child (as reported by the parent). The coefficient is approximately 50% of a standard deviation of the observed variable for American Indians (see Table 2). The effect of the casino payment on whether the child has an enjoyable relationship with the parent (as reported by the child) is approximately 39.7% of a standard deviation of the observed variable for American Indians. Overall the effect of having additional household income is that there is an improvement in parental supervision of their children and relationships with their children (columns 1 and 2).

In column 3, we test whether the relationships between parents improve as a result of the transfers. The effect of the increase in income due to the casino payment decreases the likelihood that a parent characterizes their relationship with their spouse as poor. The coefficient on the casino payment variable is approximately 25.2% of a standard deviation of the poor parental relationship variable for American Indians. The fourth column indicates that there has been a reduction in the number of arguments with parents after the casino payments began. The coefficient on this variable is 32.7% of a standard deviation of the arguments with parent variable for American Indians. Overall, we find convincing evidence that the casino transfers resulted in a large improvement in parental relationships with children and with spouses.

Table 5: Effects of casino transfer on Parental Behaviors and Relationships

VARIABLES	(1) Adequate Parental Supervision?	(2) Enjoyable Relationship with Parent?	(3) Poor relationship between parents?	(4) Arguments with Parent
Casino Payment?	0.104**	0.158**	-0.120*	-7.591***
	(0.0516)	(0.0787)	(0.0676)	(2.819)
Number of Children Less than 6 years old in Household	-0.00585	-0.0202	9.61e-05	0.479
	(0.00965)	(0.0137)	(0.0159)	(0.803)
Constant	1.970***	1.865***	0.548***	10.68***
	(0.0225)	(0.0300)	(0.0331)	(1.494)
Observations	5,015	5,413	5,584	6,038
R-squared	0.013	0.008	0.035	0.010
Number of gsms	1,265	1,327	1,389	1,405

Note: American Indian Trend and Age Fixed Effects and Robust Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

In order to further investigate the channel through which additional household income affects children we include an additional interaction variable into the regressions. In Table 7 below we provide the coefficients from separate regressions where we include the casino payment variable and an interaction variable with the casino payment and the initial levels of the child's conscientiousness, agreeableness, behavioral disorder symptoms or emotional disorder symptoms.

In panel A, the coefficients on the interaction variable indicates that parents will increase their supervision for children with worse pre-transfer behavioral health. The number of parent-child arguments also decreases more for children with worse initial behavioral symptoms. There appears to be no statistical relationship between these interactions and the other two outcome variables and the magnitudes are quite small relative to the coefficient on casino payment alone.

In panel B, we find again that the quality of the parent-child relationship improves more among children with worse initial emotional disorder symptoms. Here we also find that the relationship between the two parents improves more for families with children who display worse emotional conditions pre-intervention. In panels C, D and E we show similar differences in effects by initial levels of conscientiousness, agreeableness and neuroticism. Parental supervision increases more for children who have the lowest initial values of these personality traits; the relationship between parents and these children improve; and the number of reported parent-child arguments decreases.

The overall results appear to indicate that parents are using the extra income to provide compensatory behaviors towards their children who have lower than average personality traits and higher than average behavioral and emotional disorders.

Table 6: Heterogeneous effects of income transfers on parental behaviors by initial level of children's endowments

VARIABLES	(1) Adequate Parental Supervision?	(2) Enjoyable Relationship with Parent?	(3) Poor relationship between parents?	(4) Arguments with Parent
Panel A				
Casino Payment	0.122**	0.155*	-0.129*	-8.708***
	(0.0538)	(0.0803)	(0.0695)	(2.866)
Behavioral Diagnosis x Casino Payment	0.0809**	-0.0118	-0.0407	-5.256**
	(0.0360)	(0.0401)	(0.0504)	(2.132)
Panel B				
Casino Payment	0.108**	0.170**	-0.149**	-7.708***
	(0.0547)	(0.0798)	(0.0683)	(2.831)
Emotional Diagnosis x Casino Payment	0.0188	0.0599*	-0.128***	-0.660
	(0.0510)	(0.0352)	(0.0435)	(1.013)
Panel C				
Casino Payment	0.125**	0.150*	-0.137**	-8.188***
	(0.0544)	(0.0806)	(0.0697)	(2.923)
Conscientiousness x Casino Payment	-0.0588**	0.0254	0.0549	1.970
	(0.0289)	(0.0347)	(0.0482)	(1.489)
Panel D				
Casino Payment	0.119**	0.165**	-0.129*	-8.863***
	(0.0537)	(0.0794)	(0.0696)	(2.862)
Agreeableness x Casino Payment	-0.0610**	-0.0239	0.0392	4.663***
	(0.0265)	(0.0220)	(0.0390)	(1.216)
Panel E				
Casino Payment	0.112**	0.151*	-0.137**	-8.032***
	(0.0545)	(0.0804)	(0.0680)	(2.828)
Neuroticism x Casino Payment	-0.0299	0.0287	0.0699	1.756
	(0.0346)	(0.0395)	(0.0498)	(1.169)

Note: Pairs of coefficients are from separate regressions in each column. All regressions include age fixed effects, wave fixed effects, age by race fixed effects and individual fixed effects, number of children less than 6 in the household and a constant. Robust Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Community Effects by Census Tract

In this section we investigate the role of community and peer effects for affected households. Using the geographic location of households, we merge in US Census data measures for the percent of household heads in a census tract (in 1990 prior to the casino operations) that are American Indian. The purpose of these regressions is to investigate an additional mechanism that

may explain how the introduction of higher per capita income affected child emotional and behavioral outcomes. Specifically, if a particular community has a high proportion of American Indians there resulting increase in incomes due to casino transfer payments would lift incomes for large proportion of the community. As a result, there may becommunity-level positive externalities which affect child outcomes in addition to any family-specific processes that contribute to child welfare. For example, as incomes increase, all households and parents may monitor not only their own children but those in their community as well.

In Appendix Table A4 we regress the child outcomes on the main set of controls including casino payments as provided in Table 3, but we also include an interaction variable of casino payments with the percent of household heads that are American Indian in the census tract. The interaction coefficient is small and statistically indistinguishable from zero, suggesting that the concentration of individuals receiving the casino transfer in the census tract does not have a strong effect on the child behavioral or personality traits. The coefficients on the main effects of casino payments are only slightly changed from our original results presented in Table 3.

The next four set of regressions in Appendix Table A3 uses a different interaction variable. In these regressions we include the standard set of control variables as well as an interaction between casino payments and whether the household resides on the American Indian reservation or not. The results from this analysis are similar to that found in the previous four columns – higher concentration of American Indian households in the census tract does not lead to disproportionately strong effects of the casino transfers.

Finally, in Appendix Table A4 we test the hypothesis that a higher concentration of transfer recipients in the census tract amplifies that effect of casino transfers on parental and parent-child relationships. We regress the parental behavior and relationship outcome variables on the same set of regressors and interaction variables. The results largely mirror the results presented in Table 5 although there is a slight reduction in statistical significance in some regressions for the coefficient on casino payments.

Overall, community-wide effects do not appear to be a strong mechanism in explaining the observed improvement in either child behavior and personality traits or parental behaviors and relationships. Ultimately, this may indicate that the community-wide effects of the additional income did not result in positive externalities that can be measured in our data.

Movements across Census Tracts

As an additional check on potential mechanisms, we examine whether and where individual households move as a result of the change in household income. In Appendix Table A5 we use information on the census tract location of the individual households at various survey waves to investigate whether the casino payment increases the likelihood of moving to a different neighborhood. The first column indicates that there is a positive effect of the casino payment on the probability of moving of about 7%. In column 2, we include an interaction effect between receiving the casino payment and living initially on the reservation. The level effect of the casino payment is still positive and statistically significant, however, the coefficient on the interaction variable is now negative. This indicates that those residing on the reservation are less likely to leave the reservation after the casino payments begin. Therefore, the observed increase in moves must be due to those receiving casino payments who reside off of the reservation.

We investigate this in the next two columns. Receiving the casino payments in column 3 has a small and statistically insignificant negative effect on living on the reservation. However, in column 4 we find that, once we include the interaction variable of casino revenue with initially living on the reservation, those living on the reservation are more likely to still be living on the reservation after the casino payments. The residual difference and any actual movements are due to those residing off of the reservation. There is little evidence that those residing off of the reservation are moving to live on the reservation. Finally, in column 5 we investigate whether the casino increases the number of moves. It has a small and statistically insignificant coefficient.

The next regression table A6 investigates the characteristics of the census tracts that the individual households move to as a result of the casino payments. All characteristics are measured in the 1990 Census data, measured before the casino transfers commenced, so that movements across census tracts by transfer recipients are not affecting the tract characteristics. The first five columns use the entire GSMS population (both American Indian and non-Indian observations). The final five columns report the results from a similar analysis on the American Indian population subset alone. In the first set of five regressions, the results suggest that casino payments do not have a statistically significant effect on where individuals move to as a result of the casino payments. The coefficients are relatively small in magnitude and are never statistically significant.

Restricting analysis to the American Indian subset, however, provides different results. We are exploiting the differences in the survey waves across the different age cohorts of American

Indian children in these regressions. Results should be interpreted with this caveat in mind. In column 6, the coefficient on casino payment indicates that among American Indians who move, they move to census tracts that have higher median household incomes. The coefficient on casino payment is large and positive for the percent in the labor force but not statistically significant. In the next column the coefficient on casino payments is large and barely misses statistical significance at the 10% level. Taken together, these results qualitatively indicate that among American Indians who are moving as a result of the casino payment they are moving to census tracts that have initially higher levels of educational attainment than those census tracts that they were initially located in. Column 9 indicates that among American Indians that move as a result of the casino payment they are moving to census tracts with lower concentration of American Indian heads of households than in the neighborhoods where they were located previously. The final column does not indicate a difference in relocations to either more or less populous census tracts.

VIII. Discussion and Conclusion

The results presented here indicate that there are significant positive effects of an increase in unearned household income on the prevalence of behavioral and emotional disorders and on the personality traits of affected children. We have also shown that the effect is most intense for children who were initially behind their peers in these traits and those who exhibited more symptoms of disorders. This suggests that parents may be reacting to the exogenous cash transfers by compensating for their children who have lower levels of mental health and worse personality traits. We further investigate the parental investment channel and we find that as income increases, parents invest more in their children in terms of supervisory roles. They monitor their children more, which is strongly associated with an improvement in child behavior and personality traits.

Given the longitudinal nature of our data, we can examine the potential long-run effect of these improvements in child characteristics on adult outcomes for the affected children. In the table below, we use the levels of disorders and personality traits of non-Indians of the same cohorts who reside in the same counties and face similar labor market conditions to predict employment, educational attainment and income at age 25. The non-Indians were not affected by changes in unearned income. Measures of emotional and behavioral wellbeing at age 16 are strongly predictive of labor market outcomes measured at age 25. Higher levels of behavioral and emotional disorders predict lower levels of educational attainment and employment probabilities. Higher levels of parental supervision also lead to positive effects for these two variables.

Table 7: Predicting Long Run Outcomes (Age 25) for Non American Indians using Age 16 Values

		(1) Years of Educational Attainment	(2) Full Time Employed?	(3) Household Income
Panel A				
	Behavioral Disorder Symptoms at Age 16	-0.475***	-0.0734***	-0.508***
		(0.0815)	(0.0165)	(0.170)
Panel B				
	Emotional Disorder Symptoms at Age 16	-0.421***	-0.0421**	-0.315*
		(0.114)	(0.0189)	(0.176)
Panel C				
	Conscientiousness Score at Age 16	0.517***	0.0481***	0.390**
		(0.0876)	(0.0169)	(0.162)
Panel D				
	Agreeableness Score at Age 16	0.263***	0.0412***	0.267*
		(0.0753)	(0.0147)	(0.145)
Panel E				
	Neuroticism Score at Age 16	0.279***	0.0504***	0.472***
		(0.0683)	(0.0112)	(0.141)

Note: Pairs of coefficients are from separate regressions in each column. All regressions include age fixed effects, wave fixed effects, age by race fixed effects and individual fixed effects, number of children less than 6 in the household and a constant. Robust Standard errors in parentheses, clustered at the child level. *** p<0.01, ** p<0.05, * p<0.1

A simple back-of-the-envelope calculation of the potential impact of casino payments on long-term labor market outcomes is possible using these estimates. Using the cash transfer effect estimates on child mental and emotional wellbeing from Table 4 and the correlation coefficients between age 16 measures of emotional and behavioral health and long-term SES outcomes from Table 7, we find that the transfer program increased the educational attainment, household income and probability of full time employment by 11 to 20 percentage points (educational attainment), 1.4 to 2pp (full time employment) and 11.4 to 20pp (income) of a standard deviation, respectively, depending on which measures we use in the analysis. Because these outcome measures are highly correlated, the most conservative estimates based on improvements in individual measures net of any other effects are used in the calculations above.

IX. References

Adhvaryu , Achyuta & James Fenske & Anant Nyshadham, 2014. "Early Life Circumstance and Mental Health in Ghana," CSAE Working Paper Series 2014-03, Centre for the Study of African Economies, University of Oxford.

Aizer, Anna and Flavio Cunha (2012). The Production of Human Capital: Endowments, Investments and Fertility. NBER Working Paper 18429, September.

Albright, Karen and Theresa LaFromboise. (2010). "Hopelessness Among White- and Indian-Identified American Indian Adolescents". Cultural Diversity and Ethnic Minority Psychology. Volumen 16 No 3.

Almlund, Mathilde and Angela Lee Duckworth, James J. Heckman, and Tim Kautz (2011) "Personality Psychology and Economics," In *Handbook of the Economics of Education*, Vol. 4, E. Hanushek, S. Machin, and L. Woessman, eds. Amsterdam: Elsevier. pp. 1-181.

Becker, G. and Tomes, N. (1979) 'An equilibrium theory of the distribution of income and intergenerational mobility', *Journal of Political Economy,* 87.6:1153-1189.

Behrman, Jere and Mark Rosenzweig. 2004. Returns to Birthweight, Review of Economics and Statistics, 86(2): 586-601.

Black, Sandra, Paul Devereaux and Kjell Salvanes (2005): The More the Merrier? The Effect of Family Size and Birth Order on Children's Education, Quarterly Journal of Economics, 120(2): 669-700.

Black, Sandra, Paul Devereaux and Kjell Salvanes (2007): Small Family, Smart Family? Family Size and the IQ Scores of Young Men, Journal of Human Resources, 45(1):33-58.

Blau, D., & Currie, J. (2006). Preschool, daycare, and afterschool care: Who's minding the kids? In E. Hanushek, & F. Welch (Eds.), Handbook of the Economics of Education, Handbooks in Economics, vol. 2, chap. 20. Amsterdam: North-Holland, pp. 1163–1278.

Blonigen, Daniel M., Brian M. Hicks, Robert F. Krueger, Christopher J. Patrick, and William G. Iacono. 2006. ''Continuity and Change in Psychopathic Traits as Measured Via Normal-Range Personality: A Longitudinal-Biometric Study.'' Journal of Abnormal Psychology 115(1):85–95.

Borghans, Lex, Duckworth, Angela L., Heckman, James J. and ter Weel, Bas (2008). "The Economics and Psychology of Personality Traits." Journal of Human Resources **43**(4): 972-1059.

Cameron, S. V., & Heckman, J. J. (2001). The dynamics of educational attainment for black, hispanic, and white males. Journal of Political Economy, 109(3), 455–99.

Cameron, S. V., & Taber, C. (2004). Estimation of educational borrowing constraints using returns to schooling. Journal of Political Economy, 112(1), 132–182.

Campbell, Frances, G. Conti, S. Moon, E. Pungello, R. Pinto, and Y. Pan and J. Heckman (2014) "Early Childhood Investments Substantially Boost Adult Health," Forthcoming in Science.

Carneiro, P., & Heckman, J. J. (2002). The evidence on credit constraints in post -secondary schooling. Economic Journal, 112(482), 705–734.

Chetty, Raj & John N. Friedman & Nathaniel Hilger & Emmanuel Saez & Diane Whitmore Schanzenbach & Danny Yagan, 2011. "How Does Your Kindergarten Classroom Affect Your Earnings? Evidence from Project Star," The Quarterly Journal of Economics, Oxford University Press, vol. 126(4), pages 1593-1660.

Clark, Damon and Heather Royer. 2013. "The Effect of Education of Adult Health and Mortality:

Evidence from Britain. NBER Working Paper 16013.
Cunha, Flavio and James Heckman (2007). The Technology of Skill Formation, American Economic Review, 97(2):31e47.
Cunha, Flavio and James Heckman (2010). Investing in our Young People. NBER Working Paper 16201, July.
Cunha, F., & Heckman, J. J. (2008). Formulating, identifying and estimating the technology of cognitive and noncognitive skill formation. Journal of Human Resources, 43(4), 738–782.
Cunha, F., & Heckman, J. J. (2009). The economics and psychology of inequality and human development. Journal of the European Economic Association, 7(2-3), 320–364. Presented as the Marshall Lecture, European Economics Association, Milan, Italy, August 29, 2008.
Cunha, Flavio, James Heckman, and Susanne Schennach (2010): Estimating the Technology of Cognitive and Non-Cognitive Skill Formation, Econometrica, 78(3):883-931.
Currie, Janet and Duncan Thomas (1995): Does Head Start Make a Difference? American Economic Review, 85(3):341e364.
Currie, Janet and Duncan Thomas (1999): Early Test Scores, Socioeconomic Status and Future Outcomes, NBER Working Paper No. 6943.
Currie, J., & Thomas, D. (2000). School quality and the longer-term effects of Head Start. Journal of Human Resources, 35(4), 755–774.
Dahl, G. B., & Lochner, L. J. (2005). The impact of family income on child achievement. Working Paper 11279, National Bureau of Economic Research. Manuscript under review, American Economic Review.
Dahl, R. E. (2004). Adolescent brain development: A period of vulnerabilities and opportunities. In R. E. Dahl, & L. P. Spear (Eds.), Annals of the New York Academy of Sciences. New York: New York Academy of Sciences, pp. 1–22.
Dai, Xianhua and James J. Heckman. (2013) "Older Siblings' Contributions to Young Child's Cognitive Skills," Economic Modelling, 35(September): 235-248.
Datar, Ashlesha, M. Rebecca Kilburn, and David S. Loughran (2010): Endowments and Parental Investments in Infancy and Early Childhood, Demography, 47(1):145-162.
Duncan, G., & Kalil, A. (2006). The effects of income in the early years on child outcomes. Unpublished manuscript, Northwestern University.
Duncan, G. J., & Brooks-Gunn, J. (1997). Income effects across the life span: Integration and interpretation. In G. Duncan, & J. Brooks-Gunn (Eds.), Consequences of Growing Up Poor. New York: Russell Sage Foundation, pp. 596–610.
Duncan, G.J. and Magnuson, Katherine (2010a). "The Nature and Impact of Early Achievement Skills, Attention Skills, and Behavior Problems." Working paper 2010 at the Department of Education, UC Irvine.
Duncan, Greg J., Dowsett, Changelle, . J., Amy Claessens, Katherine Magnuson, Aletha Huston, Pamela Klebanov, Linda Pagani, Leon Feinstein, Mimi Engel, Jean Brooks-Gunn, Holly Sexton, Kathryn Duckworth, Crista Japel. (2007)."School readiness and later achievement". Developmental Psychology, 43(6), 1428–1446.
Duckworth, Angela and Martin Seligman. (2005). "Self-Discipline Outdoes IQ in Predicting Academic Perfornmance of Adolescents." Psychological Science. Volume 16, No 12.
Garces, Eliana, Janet Currie, and Duncan Thomas (2002): Longer-term Effects of Head Start, American Economic Review, 92(4):999e1012.
Gennetian, Lisa and Greg Duncan, Virginia Knox, Wanda Vargas, Elizabeth Clark-Kauffman and Andrew London. (2004). "How Welfare Policies Affect Adolescents' School Outcomes: A

Synthesis of Evidence from Experimental Studies." Journal of Research on Adolescence. Volme 14 No 4, pp. 399-423.
Gertler, Paul and James Heckman, Rodrigo Pinto, Arianna Zanolini, Christel Vermeersch, Susan Walker, Suan Change , Sally Grantham-McGregor. 2013. "Labor Market Returns To Early Childhood Stimulation: A 20-Year Followup To An Experimental Intervention In Jamaica." NBER Working Paper 19185.
Glewwe, Paul and Phillip H. Ross and Bruce Wydick. (2013) Developing Aspirations: The Impact of Child Sponsorship on Self-Esteem and Life Expectations. Unpublished Manuscript.
Heckman, James J. (2011). Integrating Personality Psychology into Economics. NBER Working Paper 17378, August.
Heckman, James and Rodrigo Pinto and Peter Savelyev. 2013. "Understanding the Mechanisms through Which an Influential Early Childhood Program Boosted Adult Outcomes,"). American Economic Review, 103(6): 2052–2086.
Heckman, James, Seong Moon, Rodrigo Pinto, Peter Savelyev, and Adam Yavitz (2010): Analyzing Social Experiments as Implemented: a Reexamination of the Evidence from the High- Scope Perry Preschool Program, Quantitative Economics, 1(1):1-46.
Heckman, James J. and Rubinstein, Yona (2001). "The Importance of Noncognitive Skills: Lessons from the Ged Testing Program." American Economic Review **91**(2): 145-149.
Heckman, J. J., Stixrud, J., & Urzua, S. (2006). The effects of cognitive and noncognitive abilities on labor market outcomes and social behavior. Journal of Labor Economics, 24(3), 411–482.
Heckman, James J. and S.H. Moon, R. Pinto, P. Savelyev, and A. Yavitz (2010) "A New Cost-Benefit and Rate of Return Analysis for the Perry Preschool Program: A Summary," In Arthur Reynolds, Arthur Rolnick, Michelle Englund, and Judy A. Temple, (eds.) Cost-Effective Programs in Children's First Decade: A Human Capital Integration. New York: Cambridge University Press. pp. 366-380.
Heckman, James & John Eric Humphries & Sergio Urzua & Gregory Veramendi, 2010. "The effects of educational choices on labor market, health, and social outcomes," Working Papers 2011-002, Human Capital and Economic Opportunity Working Group.
Ludwig, Jens and Douglas L. Miller (2007): Does Head Start Improve Children's Life Chances? Evidence from a Regression Discontinuity Design, Quarterly Journal of Economics, 488(1):159e208.
McGue, Matt, Steven Bacon, and David T. Lykken. 1993. ''Personality Stability and Change in Early Adulthood: A Behavioral Genetic Analysis.'' Developmental Psychology 29(1):96–109.
Mani, Anandi, and Sendhil Mullainathan, Eldar Shafir and Jiaying Zhao. (2013) "Poverty Impedes Cognitive Function." Science. Number 341, August.
Meghir, Costas and Mårten Palme, Emilia Simeonova. 2013. "Education, Cognition and Health: Evidence from a Social Experiment." NBER Working Paper 19002.
Milligan, Kevin, and Mark Stabile. 2011. "Do Child Tax Benefits Affect the Well-Being of Children? Evidence from Canadian Child Benefits Expansion." *American Economic Journal: Economic Policy* 3 (3): 175–205.
Morris, P., Duncan, G. J., & Clark-Kauffman, E. (2005). Child well-being in an era of welfare reform: The sensitivity of transitions in development to policy change. Developmental Psychology, 41(6), 919–932.
Murnane, R. J., Willett, J. B., & Levy, F. (1995). The growing importance of cognitive skills in wage determination. Review of Economics and Statistics, 77(2), 251–266.

Oreopoulos, Philip, and Marianne Page, and Ann Stevens. 2008. "The Intergenerational Effects of Worker Displacement." Journal of Labor Economics, vol. 26, no. 3, pp. 455 –484.
Paxson, Christina and Norbert Schady (2007): Cognitive Development Among Young Chil- dren in Ecuador: The Roles of Wealth, Health and Parenting, Journal of Human Resources, 52(1):49-84.
Paxson, Christina and Jane Waldfogel. (2002). "Work, Welfare, and Child Maltreatment." Journal of Labor Economics. Volume 20, No. 3.
Plomin, Robert, and John R. Nesselroade. 1990. ''Behavioral Genetics and Personality Change.'' Journal of Personality 58(1):191–220.
Price, Joseph (2009): Parent-Child Quality Time: Does Birth Order Matter?, Journal of Human Resources, 43(1):240-265.
Stinebrickner, R., & Stinebrickner, T. (2008). The effect of credit constraints on the college drop-out decision: A direct approach using a new panel study. American Economic Review, 98(5), 2163–2184.
Thiel, Hendrik and Stephan Thomsen (2009). Noncognitive skills in economics: Models, measurement, and empirical evidence. ZEW Discussion Papers, No. 09-076.
Todd, Petra E. and Kenneth I. Wolpin (2007): The Production of Cognitive Achievement in Children: Home, School and Racial Test Score Gaps, Journal of Human Capital, 1(1):91-136.
Tominey, Emma. (2010). The Timing of Parental Income and Child Outcomes: The Role of Permanent and Transitory Income Shocks. Unpublished Manuscript.
Weinberg, B. A. (2001). An incentive model of the effect of parental income on children. Journal of Political Economy, 109(2), 266–280.

Income Intervention References:

Adda, Jerome, James Banks, and Hans-Martin von Gaudecker. 2009. "The Impact of Income Shocks on Health: Evidence from Cohort Data." *Journal of the European Economic Association* 7(6): 1361-99.

Banarjee, Abhijit V., Esther Duflo, Gilles Postel-Vinay, and Timothy Watts. 2007. "Long-Run Health Impacts of Income Shocks: Wine and Phylloxera in 19th Century France." NBER Working Paper No. 12895.

Behrman, Jere R., Piyali Sengupta, and Petra Todd. 2005. "Progressing through PROGRESA: An Impact Assessment of a School Subsidy Experiment in Rural Mexico." *Economic Development and Cultural Change* 54 (October): 237–75.

Behrman, Jere R., Susan W. Parker, and Petra E. Todd. 2005. "Long-Term Impacts of the Oportunidades Conditional Cash Transfer Program on Rural Youth in Mexico." Ibero-America Institute for Economic Research Discussion Paper 122.

Black, Sandra and Paul Devereux (2011) "Recent developments in intergenerational mobility." In Handbook of Labor Economics, Edited by Orley Ashenfelter and David Card. North Holland Press; Elsevier.

Blau, David M. 1999. The effect of income on child development. *Review of Economics and*

Statistics 81, no. 2 (May): 261–76.

Case, Anne. 2004. "Does Money Protect Health Status? Evidence from South African Pensions." In *Perspectives on the Economics of Aging*, ed. David Wise, Chicago: University of Chicago Press, 287- 311.

Conti, Gabriella, J.J. Heckman, S. Moon, R. Pinto, E. Pungello and P. Yi),
Science, Vol. 343 no. 6178, pp. 1478-1485

Dahl, Gordon B. and Lance Lochner. 2012. The Impact of Family Income on Child Achievement: Evidence from the Earned Income Tax Credit. *American Economic Review* 102:5, 1927-1956.

Dooley, Martin, and Jennifer Stewart. 2004. "Family Income and Child Outcomes in Canada." *Canadian Journal of Economics*, 37(4): 898–917.

Duflo, Esther. 2003. "Grandmothers and Granddaughters: Old-Age Pensions and Intrahousehold Allocation in South Africa." *World Bank Economic Review*, 17(1): 1–25.

Duncan, Greg J., Jeanne Brooks-Gunn, and Pamela Kato Klebanov, ''Economic Deprivation and Early Childhood Development,'' *Child Development* 65 (1994), 296–318.

Duncan, Greg J., Jean Yeung, Jeanne Brooks-Gunn, and Judith Smith. 1998. How much does childhood poverty affect the life chances of children? *American Sociological Review* 63 (June): 406–23.

Evans, William N. and Craig L. Garthwaite. 2014. Giving Mom a Break: The Impact of Higher EITC Payments on Maternal Health. *American Economic Journal: Economic Policy, 6(2): 258–290*.

Frijters Paul, John Paul Haisken-DeNew, and Michael A. Shields. 2005. "Estimating the Causal Effect of Income on Health: Evidence from Germany Reunifiation." *Journal of Health Economics* 24(5): 997- 1017.

Hill, Martha, and Greg Duncan. 1987. Parental family income and the socioeconomic attainment of children. *Social Science Research* 16:37–73.

Hoddinott, John, and Emmanuel Skoufias. 2004. "The Impact of PROGRESA on Food Consumption." *Economic Development and Cultural Change* 53, no. 1:37–61.

Kling JR, Liebman JB, Katz LF. Experimental analysis of neighborhood effects. Econometrica. 2007; 75:83–119. doi:10.1111/j.1468-0262.2007.00733.x.

Levy, Dan Maurice, and Greg Duncan. 2000. Northwestern University/University of Chicago Joint Center for Poverty Research Working Papers no. 168.

Lindahl, Mikael. 2005. "Estimating the Effect of Income on Health and Mortality Using Lottery Prizes as an Exogenous Source of Variation in Income." *Journal of Human Resources,* 50(1):144-168.

Ludwig J, Kling J. Is crime contagious? Journal of Law and Economics. 2007; 50:491–518. doi: 10.1086/519807.

Jacob, Brian A. and Max Kapustin and Jens Ludwig. 2014. Human capital effects of anti-poverty programs: evidence from a randomized housing voucher lottery. NBER WP 20164.

Milligan, Kevin, and Mark Stabile. 2011. "Do Child Tax Benefits Affect the Wellbeing of Children? Evidence from Canadian Benefits Expansion." *American Economic Journal: Economic Policy,* 3(3): 175-205.

Meer, Jonathan, Douglas L. Miller, and Harvey S. Rosen. 2003. "Exploring the Health-Wealth Nexus." *Journal of Health Economics* 22(5): 713-730.

Morris, Pamela, Greg J. Duncan, and Christopher Rodrigues. 2004. Does money really matter? Estimating impacts of family income on children's achievement with data from random-assignment experiments. Institute for Policy Research, Northwestern University.

Morris, Pamela, Greg J. Duncan, and Elizabeth Clark-Kauffman. 2005. "Child Well-Being in an Era of Welfare Reform: The Sensitivity of Transitions in Development to Policy Change." *developmental Psychology*, 41(6): 919–32.

Oreopoulos, Philip, and Marianne Page, and Ann Stevens. 2008. "The Intergenerational Effects of Worker Displacement." Journal of Labor Economics, vol. 26, no. 3, pp. 455 –484.

Schultz, T. Paul. 2004. "School subsidies for the poor: evaluating the Mexican Progresa poverty program." Journal of Development Economics. Vol. 74, pp. 199-250.

Shea, John. 2000. Does parents' money matter? *Journal of Public Economics* 77, no. 2 (August): 155–84.

Snyder, Stephen E. and William N. Evans. 2006. "The Impact of Income on Mortality: Evidence from the Social Security Notch." *Review of Economics and Statistics* 88(3): 482-495.

Solon, Gary. 1992. Intergenerational income mobility in the United States. *American Economic Review* 82:393–408.

Yeung, W. Jean, Miriam R. Linver, and Jeanne Brooks-Gunn. 2002. "How Money Matters for Young Children's Development: Parental Investment and Family Processes." *Child development*, 73(6): 1861–79.

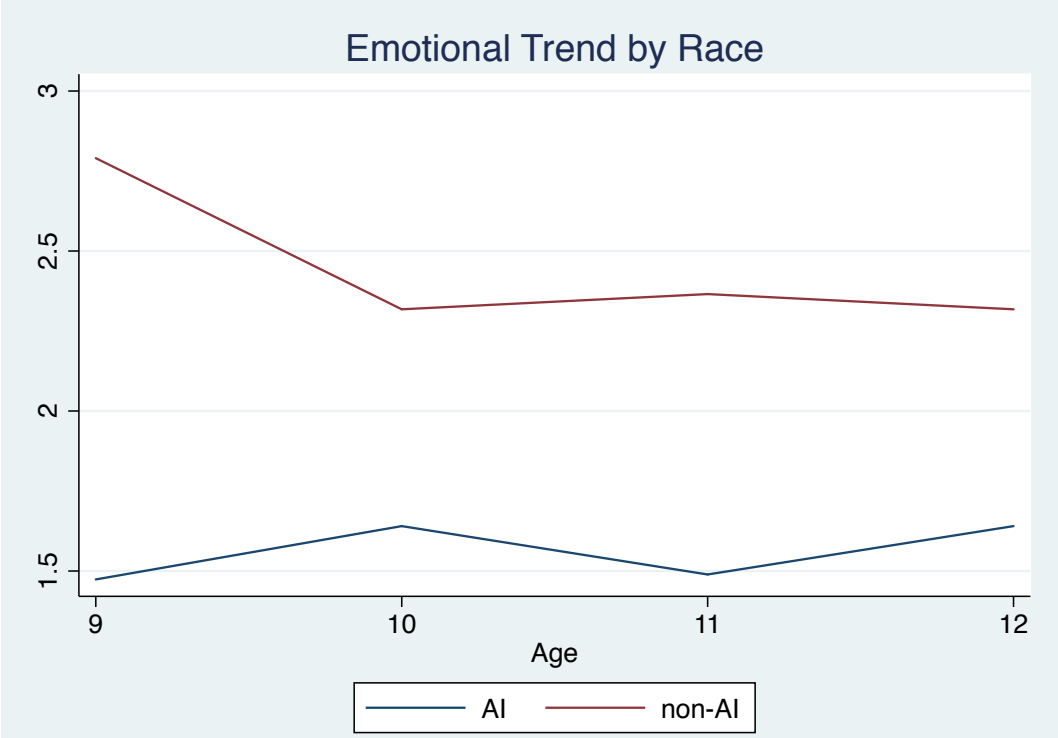
Appendix Tables

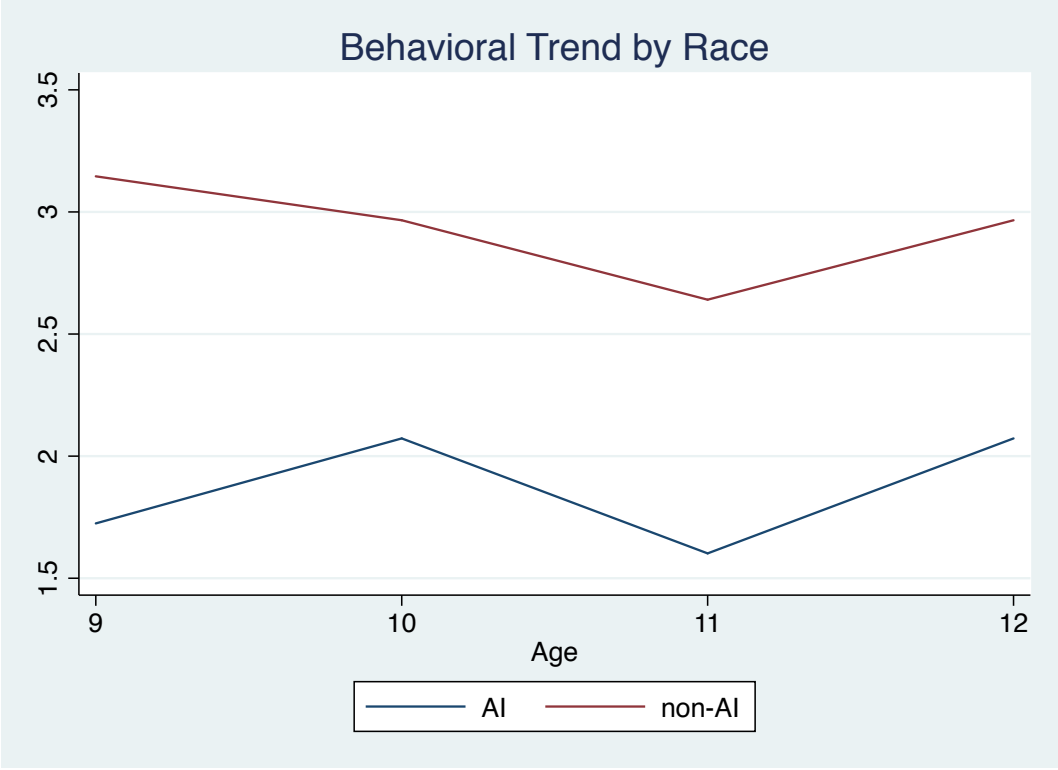
Table A1: Variables from GSMS Used To Create Big 5 Personality Traits: Agreeableness, Conscientiousness and Neuroticism

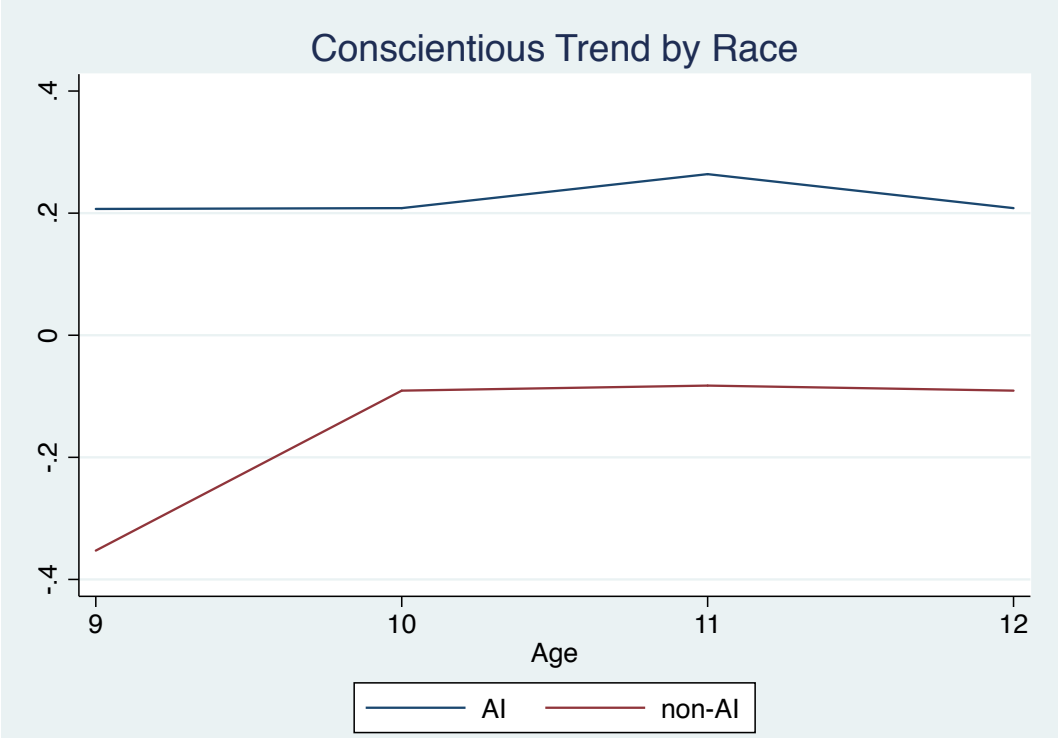
Agreeableness
Number of Arguments with Parent1 (PAD1F01)
Number of Arguments with Other Adults (PAL1F01)
Number of Arguments with Peers at School (PBC0F01)
Irritability Intensity (PDA8I01)
Bullies / Extortion (PGF7I01)
Cruelty to Animals (PGH3V01)
Rumors (PGH4I01)
Spiteful or Vindictive (PGA3I01)
Loses Temper (PGE0I01)
Angry or Resentful (PDA7I01)

Conscientiousness
Lying Intensity (PGC3I01)
Impulsive Intensity (PRC3I01)
Rule Breaking Intensity (PGA0I01)
Concentration / Difficulty Paying Attention (PCC3I01)

Neuroticism
Feels unloved (PDC0I01)
Feeling of Inferiority to others (PDC1I01)
Subject feels sorry for himself (PDC2I01)
Feels helpless in general (PDC6I01)
Depressed Mood (PDA0I01)


Emotional Trend by Race
3
2.5
2
1.5
9
10
11
12
Age
AI
non-AI


Behavioral Trend by Race
3.5
3
2.5
2
1.5
9
10
11
12
Age
AI
non-AI


Conscientious Trend by Race
.4
.2
0
-.2
-.4
9
10
11
12
Age
AI
non-AI

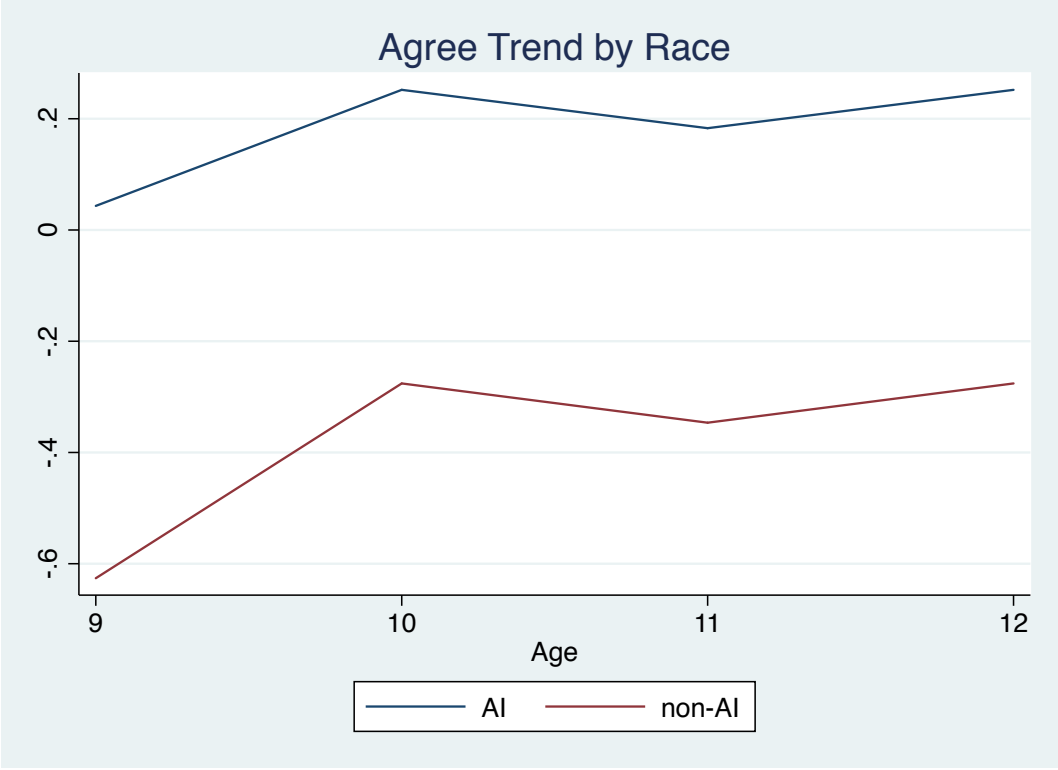

Agree Trend by Race
.2
0
-.2
-.4
-.6
9
10
11
12
Age
AI
non-AI

Table A2: Effects of casino transfers on parental marital arrangements

Parental Marital Status Fixed-Effects Regression

VARIABLES	(1) Parents currently married?
Casino Payment?	-0.0290
	(0.0323)
Number of Children Less than 6 years old in Household	0.00366
	(0.00792)
Constant	0.533***
	(0.0163)
Observations	6,004
Number of gsms	1,405
R-squared	0.047

Note: American Indian Trend and Age Fixed Effects and Robust Standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table A3: Casino transfers and parental employment

Parental Employment Fixed Effects

VARIABLES	(1) Mother Full Time Employed?	(2) Father Full Time Employed?
Casino Payment?	-0.0182	0.0493
	(0.0521)	(0.0400)
Number of Children Less than 6 years old in Household	-0.0274*	-0.00953
	(0.0155)	(0.0106)
Constant	0.532***	0.924***
	(0.0302)	(0.0223)
Observations	5,007	3,105
R-squared	0.022	0.010
Number of gsms	1,265	814

Note: American Indian Trend and Age Fixed Effects and Robust Standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table A4 : Child Outcomes regressed on Casino and Percent American Indian Household by Census Tract

VARIABLES	(1) Behavioral Disorder Symptoms	(2) Emotional Disorder Symptoms	(3) Conscientiousness	(4) Agreeableness	(5) Neuroticism	(6) Behavioral Disorder Symptoms	(7) Emotional Disorder Symptoms	(8) Conscientiousness	Agree
Casino Payment?	-0.172	-0.315*	0.284	0.393*	0.471**	-0.234*	-0.302*	0.366**	0.4
	(0.132)	(0.162)	(0.184)	(0.227)	(0.195)	(0.122)	(0.161)	(0.171)	(0.
Casino x Perecent AI Head of Household in Census Tract	-0.00111	0.000704	0.00217	0.00183	-0.00364*				
	(0.00137)	(0.00164)	(0.00202)	(0.00239)	(0.00208)				
Casino x Residing on Reservation						0.00429	0.0403	0.0276	0.
						(0.0902)	(0.103)	(0.126)	(0.
Number of Children Less than 6 years old in Household	0.0623*	0.0277	-0.0792*	-0.0349	-0.130*	0.0621*	0.0273	-0.0754*	-0.
	(0.0331)	(0.0374)	(0.0442)	(0.0412)	(0.0678)	(0.0331)	(0.0373)	(0.0442)	(0.
Constant	0.0698	0.140*	-0.466***	-0.776***	-0.756***	0.0770	0.129	-0.485***	-0.7
	(0.0770)	(0.0817)	(0.0865)	(0.102)	(0.121)	(0.0774)	(0.0819)	(0.0860)	(0.
Observations	5,650	5,650	5,510	5,333	5,497	5,601	5,601	5,464	5,
R-squared	0.022	0.018	0.049	0.078	0.054	0.022	0.017	0.051	0.
Number of gsms	1,289	1,289	1,286	1,281	1,285	1,276	1,276	1,273	1,

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A5: Parental Behaviors on Casino and Percent Indian Household by Census Tract

VARIABLES	(1) Adequate Parental Supervision?	(2) Enjoyable Relationship with Parent?	(3) Poor relationship between parents?	(4) Arguments with Parent	(5) Adequate Parental Supervision?	(6) Enjoyable Relationship with Parent?	(7) Poor relationship between parents?	(8) Arguments with Parent
Casino Payment?	0.0785	0.170**	-0.114	-7.836**	0.0727	0.162*	-0.100	-10.11***
	(0.0613)	(0.0832)	(0.0947)	(3.934)	(0.0617)	(0.0833)	(0.0930)	(3.110)
Casino x Perecent AI Head of Household in Census Tract	0.000486	-0.000110	-0.000218	-0.0204				
	(0.000662)	(0.000542)	(0.00121)	(0.0385)				
Casino x Residing on Reservation					0.0377	0.000971	-0.0344	1.766
					(0.0433)	(0.0342)	(0.0805)	(1.602)
Number of Children Less than 6 years old in Household	-0.00957	-0.0180	-0.00109	0.0863	-0.00971	-0.0182	-7.59e-05	-0.0199
	(0.00990)	(0.0142)	(0.0167)	(0.636)	(0.00995)	(0.0142)	(0.0167)	(0.643)
Constant	1.972***	1.862***	0.557***	11.98***	1.972***	1.862***	0.557***	11.77***
	(0.0227)	(0.0307)	(0.0337)	(1.768)	(0.0230)	(0.0310)	(0.0339)	(1.767)
Observations	4,722	5,078	5,215	5,639	4,679	5,030	5,169	5,590
R-squared	0.013	0.008	0.035	0.011	0.013	0.008	0.036	0.011
Number of gsms	1,168	1,219	1,276	1,289	1,156	1,206	1,263	1,276

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A5: Census Tract Changes Regressed on Casino Payments

VARIABLES	(1) Change Census Tract of Residence (Coded either 0 or 1)	(2) Change Census Tract of Residence (Coded either 0 or 1)	(3) Living on Reservation	(4) Living on Reservation	(5) Number of Moves across Census Tracts (OLS Regression at Final Survey Wave)
Casino Payment?	0.0726*	0.146**	-0.0216	-0.137**	-0.0896
	(0.0430)	(0.0592)	(0.0209)	(0.0565)	(0.120)
Casino x Living Initially on Reservation		-0.104**		0.157***	
		(0.0516)		(0.0576)	
Number of Children Less than 6 years old in Household	0.0107	0.0116	0.00348	0.00281	0.0251
	(0.0134)	(0.0134)	(0.00397)	(0.00400)	(0.0337)
Constant	-0.0827***	-0.0525***	0.197***	0.198***	-0.00565
	(0.0231)	(0.0202)	(0.00711)	(0.00676)	(0.111)
Observations	5,139	5,101	5,101	5,101	1,240
R-squared	0.059	0.060	0.010	0.043	0.086
Number of gsms	1,389	1,383	1,383	1,383	

Note: American Indian Trend and Age Fixed Effects and Robust Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table A6: Census Tract Changes Regressed on Casino Payments for American Indians Alone

VARIABLES	(1) Median Family Income by Census Tract	(2) Percent in Labor Force by Census Tract	(3) Percent with High School Plus	(4) Percent AI Head of Household by Tract	(5) Total Population by Census Tract	(6) Median Family Income by Census Tract	(7) Percent in Labor Force by Census Tract	(8) Percent with High School Plus	(9) Percent AI Head of Household by Tract	(10) Total Population by Census Tract
Casino Payment?	-321.6	0.0847	-0.325	-0.901	-38.56	2,086*	0.625	1.223	-6.587*	18.03
	(682.9)	(0.306)	(0.516)	(1.656)	(97.08)	(1,182)	(0.614)	(0.777)	(3.878)	(62.32)
Number of Children Less than 6 years old in Household	-51.50	-0.0396	-0.171	0.688*	-35.58	-121.4	0.0167	0.0779	1.419*	-31.92
	(195.2)	(0.1000)	(0.176)	(0.370)	(31.86)	(152.3)	(0.103)	(0.127)	(0.749)	(21.11)
Constant	49,561***	60.49***	37.98***	13.53***	4,743***	34,522***	59.19***	63.17***	61.14***	4,310***
	(535.7)	(0.224)	(0.477)	(0.559)	(84.07)	(1,812)	(1.277)	(1.524)	(7.551)	(172.9)
American Indians Alone?	N	N	N	N	N	Y	Y	Y	Y	Y
Observations	5,139	5,139	5,139	5,139	5,139	1,309	1,309	1,309	1,309	1,309
R-squared	0.006	0.004	0.006	0.022	0.006	0.018	0.017	0.017	0.037	0.026
Number of gsms	1,389	1,389	1,389	1,389	1,389	341	341	341	341	341

Note: American Indian Trend and Age Fixed Effects and Robust Standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1