

# **Master Paper**

## ***Culturally visible inequality and its effects on individual adult psychological health among Bolivian native Amazonians***

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**To my Dad, my Mom, Hermann, Cornelia Caren, and Yann Axel**

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## **Executive Summary**

The Tsimane are people living in lowland Bolivia amazon. Until recently, they were living in relative isolation and are a pre-industrial rural community. This study hypothesizes that, to hurt an adult psychological health, a resource has to be culturally visible to other members of the community. Two categories of resources have been considered: high culturally visible resources (education and stature) and low culturally visible resources (monetary income and expenditures in consumption). The study considers as psychological health, anger, sadness and smile.

Results indicated that high culturally visible resources have the hypothesized stronger effect on psychological health than low culturally visible resources. For the variable education, the effect is consistent even after controlling for different confounders into the model. The variable stature has shown mixed results of its effect on psychological health. The effect even though stronger than low visible resources wanes when controlling for some confounders. Education therefore is a meaningful asset in a pre industrial rural community and policy makers should put an emphasis on education even more than income generation.

## **1- Introduction**

Inequality in resources such as inequality in income or inequality in wealth affects negatively individual emotions (Kaplan, Pamuk et al. 1996; MacKenbach 2002; Deaton 2003; Jason 2004). Cognitive emotions are correlated with the health status of individual and negative emotions such as envy, fear and anger are associated with poor physical health (Cohen, Kaplan et al. 1999). In industrialized nations, especially in US, low socio-economic status is greatly related to poor health status (Gallo and Matthews 2003) and in a rural setting such as the Tsimane in the Bolivian Amazon, an increase in income inequality is associated with an increase in negative emotions (Godoy, Reyes-García et al. 2006).

Among the Tsimane', income inequality as well as inequality in wealth have demonstrated negative effects on health: envy, jealousy and fear (Godoy, Reyes-García et al. 2006). When negative emotions are unleashed within individuals it affects their physical health and therefore their capacity of production (Layte 2009). Non material inequalities such as social inequalities due to gender or race and inequalities in individual traits such as height or generosity could affect an individual psychological health (Krieger, Chen et al. 2003). Researchers found that social inequalities bore a negative association with adult nutritional status and the effect is stronger when considering dominance instead of prestige (Reyes-García, Molina et al. 2009).

The study of the effect of inequalities in resources or traits that have high cultural visibility among the Tsimane offers a unique opportunity to compare, between income inequality and inequality in other non material assets or traits, their differential effect on psychological health in a pre-industrial small-scale society. It is therefore important to evaluate at which degree income inequality or inequality in other social traits in a non industrialized society emerge to affect psychological health. This understanding will help to design policies that target poverty reduction.

The following study assesses the effect of inequality in resources or traits that have high cultural visibility and resources or trait that have low cultural visibility into a model of psychological health. Since the variables for emotions were ordered and categorical, an ordered logit regression will be used to estimate the effect of inequality on psychological health.

## **2- The Development Question**

Many studies from industrialized nations suggest that inequality in resources, such as income inequality or inequality in wealth, has a negative effect on individual adult psychological health through the increase of negative emotions such as anger, sadness, and fear. Income determines one's social standing in industrialized nations and even in some non-industrialized nations and

therefore, inequality in income affects people's health (Kaplan, Pamuk et al. 1996; Kawachi, Kennedy et al. 1999; Muller 2002; Wilkinson 2006). These studies stressed that the result persist even after controlling for different confounders which could affect a person's health such as a person's level of income and education (Godoy, Reyes-García et al. 2005). Income inequality has a strong effect on health, even after controlling for variables such as individual income, level of education, racial composition, regional effects and the lag effect of income inequality (Subramanian and Kawachi 2004). The relation between income inequality and health is also persistent with two other types of effects: relative income and relative rank in which an individual's health depends on not only her own level of income but also the rank that level of income confers in the social hierarchy (Wagstaff and van Doorslaer 2000). The results that inequalities in material resources have negative effects on an adult's psychological health in industrialized nations raise a question. Does inequality in traits hurt more than inequality in material resources in non industrialized nations or the results are the same as in industrialized nations? In fact, the relative appreciation of one's socio-economic status is different in industrialized nations and non-industrialized nations where people could be ranked based on characteristics other than income and wealth (Wilkinson 2006; Reyes-García, Gravlee et al. 2010). Therefore, to harm an adult's psychological health, inequalities in material resources or traits have to be culturally visible. Inequality in resources is culturally visible if a change in ownership – and therefore, in the distribution – of these resources is noticed quickly by members of a culture (Heffetz 2004).

### *Hypotheses*

The paper will test the following hypotheses

*H<sub>1</sub>: Village-level inequalities in resources or traits that have high cultural visibility will be more likely to harm individual adult psychological health than village-level inequalities in resources or traits that have lower cultural visibility.*

*H<sub>2</sub>: Village inequality in all resources will bear a positive association with negative emotions and bear a negative association with positive emotions.*

### **3- The Development Problem**

This paper addresses two broad issues: inequality and psyche, and tries to explain how inequality in resources that matter for a society could affect psychological health. In many developed countries, inequality in wealth or inequality in income affects psychological health through different pathways (Kaplan, Pamuk et al. 1996; Subramanian and Kawachi 2004; Wilkinson 2006; Zimmerman and Bell 2006). Even in some developing countries, there is evidence that inequality in income affects the psyche (Godoy, Reyes-García et al. 2006).

However, there is a strong perception that the effect of inequality on health could be more visible for some resources than others and income might not be playing the greatest role (Muller 2002).

The Tsimane' have been recently opened to market economies. However, there has not been a rapid modernization of their society (Godoy, Gurven et al. 2004; Godoy, Reyes-García et al. 2005). Therefore, they still have a strong connection with their cultural values and have a cultural view of well being which is not related to income. The Tsimane relate well being to spending time with close family, having a good agricultural plot, having good food and succeeding in hunting. (Reyes-García, Gravlee et al. 2010).

The paper has two major aims:

First, it pays attention to the cultural visibility of the traits examined. Income inequality might have a weak association with psychological well-being if it is not culturally visible.

Second, some resources affect more psychological health than other resources and knowing which one is important for a particular community will play an important role in design and implementation of policies for poverty reduction.

#### **4- Literature review**

##### *Psychological health*

Kubzansky, Cole et al. (2006), have suggested that three negative emotions, anxiety, anger and fear, have been most often related to the growth of coronary heart disease and that negative emotions have a shared and specific effect on health. Following the same template, Ortega, Lee et al. (2010) suggested that there is great risk of death from stress related negative emotions. Therefore high level of negative emotions has undoubtedly a great negative effect on health. The study will consider different negative emotions such as anger and sadness and a positive emotion (smile).

Mellor and Milyo (2001) state that humans are envious creatures who always want the best only for themselves. When they discover that there is a better off person elsewhere, they become jealous. This state of negative emotions increases stress and depression and therefore is a causal link for other physiological health problems. Most importantly, there are externalities of this depression status which cause accidents, drug abuse and violent crime. Therefore, income inequality affects everyone in a society, the rich as well as the poor.

The topic of my study is culturally visible inequality and its effect on psychological health. There is to date, no study on culturally visible inequality; however, I will focus my literature review on inequality in income and inequality in wealth and their effect on psychological health. I will also cover psychological health and negatives emotions.

There is a wide range of studies concerning the effect of inequality in wealth and inequality in income on psychological health (Weich, Lewis et al. 2001; Subramanian, Delgado et al. 2003; Subramanian and Kawachi 2004; Godoy, Reyes-García et al. 2006; Pickett, James et al. 2006; Wilkinson 2006; Layte 2009). Most of these studies took place in industrialized nations. However, Godoy et al (2006) have conducted a study on village income inequality and its effects on psychological health. The study has revealed that when inequality increases, negative emotions increase. Wealth rank has also a negative association with individual health rank Undurraga et al. (2010).

Deaton (2003) and Jason (2004) have demonstrated that there is not any strong evidence of the effect of income inequality on health. For them, level of income plays a bigger role in affecting mortality than income inequality, especially in poor countries where the level of income is a strong determinant of possibility of access to basic needs such as health centers, education, etc. Mellor and Milyo (2001) and MacKenbach (2002) have found that there is not a strong correlation between income inequality and health and that an embrace of inequality as a cause of depression might be premature.

Extensive reviews of the effect of income inequality on health have revealed some interesting results (Weich, Lewis et al. 2001; Subramanian, Delgado et al. 2003; Subramanian and Kawachi 2004; Godoy, Reyes-García et al. 2006; Pickett, James et al. 2006; Wilkinson 2006; Layte 2009). First, income inequality's effect on health greatly depends on the level of individual income. There is strong evidence that the level of income for an individual or his household determined at which level community inequality may affect him. Second, income inequality's effect on psychological health is expressing through the social safety nets that are available in a specific community (Subramanian & Kawachi, 2004). In the US for example, the effect of a state's income inequality depends on social policies that are being implemented (Subramanian & Kawachi, 2004). Third, the study of income inequality in a small setting has a weak effect on communities' health, because of the social capital which is stronger in small areas.

However, beyond individual/household income level, income inequality really matters for population health (Subramanian, Delgado et al. 2003). There is strong evidence that income inequality is related to physical morbidity, mortality and violence (Pickett, James et al. 2006). Because of his negative effect on society's well being, inequality cannot be ignored. Like income inequality, social inequalities also have a strong negative effect on health. There are many variables to take into consideration when it comes to social inequalities: difference in education, inequality in the distribution of power and wealth, and social dominance (Kaplan,

Pamuk et al. 1996; Wilkinson 2006). Income distribution is related to health where it serves as a measure of the scale of social class differences in a society. In small areas, where income inequality is unlikely to reflect the degree of social stratification in the wider society, it is less likely to be related to health (Wilkinson 2006). The negative effect of inequality on health is not only inherent to poor people; rich as well as poor are affected by the drawbacks of inequality. There is therefore a need to go beyond the widespread view of income and wealth inequality affecting only poor people health. Income inequality has a significant negative relation with health in society where it is used as a proxy for social rank and in a setting where income is not related to social class, there is no evidence of its link with health status. (Wilkinson 2006). This study set up a premise on my feeling that inequality in resources or traits that matter in a society will probably have a stronger effect on health than inequality in other resources such as income and wealth.

Income inequality and its effect on mortality among US citizens of age 18 and over revealed that income inequality does have an impact on adult mortality, but the effect wanes when controlling for percentage of people having high school degree. Level of schooling is then a strong predictor of how income inequality affects health (Muller 2002).

(Kawachi, Kennedy et al. 1999) summarized three mechanisms through which high levels of income inequality could adversely affect health status. first High levels of income inequality reduce social capital, which then leads to poor individual and community health; second, high levels of income inequality lead the rich to withdraw support for public services, leading to a decline in individual and community health and finally, high levels of income inequality increase the opportunity for “invidious comparisons”, which increase people's stress levels, leading to a decline in their individual and therefore the community's health.

Income inequality affects health through several paths. Zimmerman and Bell (2006) have shown that when state generosity increases in USA, there is less poor health status reported. They stressed that income inequality is still a strong risk factor for poor health even after controlling for all ecological and individual covariates. However, the results have not been the same among blacks, Hispanics and whites. Blacks and Hispanics have a reduced effect of income inequality through social capital, but the effect remains strong for whites.

#### *Culturally visible resources*

I consider as culturally visible resources, economic resources or traits that allow a social classification in a specific community.

## **5- Methods**

## **1- People and sample**

The Tsimane lived in the lowland of Bolivia. They are pre-industrial society of about 8000 who collect wild plants, hunt and fish (Godoy, Gurven et al. 2004). The Tsimane have not been opened to Western society until recently when they started to exchange with settlers who began coming into their land. (Foster and al 2005). Tsimane' have some contact with outsiders through settlers and ranchers who start to encroach them. However, despite this opening, the Tsimane' remain highly autarkic. After more than 1.5 years of observations in two villages of their community, it appears that most of the Tsimane household consumption came from their own plot, forest or hunting and account for 89.36% in monetary value and household goods from market account for 2.68% (Godoy, Gurven et al. 2004). The fact that Tsimane seem to participate at a very low level into the market economy is a great asset for this study because it made the Tsimane' setting a perfect pre-industrial rural community which is useful for our study.

This study uses panel data survey from 2002 to 2007 on the Tsimane. This data collected information on 2078 individuals in 14 villages. In this study, I consider 13 villages because in the last village, some observations have missing values in my variables of interest. As the study is about adult psychological health, I consider adult's Tsimane of age 16 and over. Anger, sadness and fear are considered in the study as variables on psychological health and have been collected only for adults. The adults constitute 852 people out of the total sample.

## **2- Rationale for High Culturally Visible Resources Choice**

Education accounts for a valuable human capital within Tsimane. Until recently, schooling has not been a major concern in the area. Despite the opening of schools in the 1970's by missionaries, Tsimane have not paid a special interest for having an education through schooling. Among the adults, 36.51% of our sample have no access to schooling and 79.43% have less than 4 years of schooling. But recently there is a great emphasis on schooling. Tsimane's parents want schooling for their children, and young people invest money and time into schooling (Reyes-García, Godoy et al. 2007). Education is today a major concern and is culturally visible in the area.

Physical dominance (height) has been chosen as a measure of embodied capital. Embodied capital plays also an important role in Tsimane's perception of his own beauty and reveals his ability to earn a decent life through hunting and agriculture. In fact, because most of the Tsimane use their labor for agriculture and hunting to earn their life, embodied capital is greatly valued. It therefore has a high cultural visibility.

### 3- Rationale for Low Culturally Visible Resources Choice

Income has been considered as a low culturally visible resource because of the setting. In fact, within Tsimane, there is a high probability of sharing between community's members, one's wealth. It is not possible within a community to know exactly the value of someone's income in the community just by looking at him. Therefore, because income is not visible, it could not affect so much people feelings.

Consumption goods such as maize, rice, and manioc are common crops among Tsimane. Almost every household grow them in their plot. By using such consumption goods, I suggest that Tsimane will not be hurt by seeing other members in their community having such goods. Therefore, it has a low cultural visibility.

### 6- Quantitative analysis

#### 1- Data and materials

##### i. Outcome variable(s)

To measure individual psychological health, we had asked participants questions on:

*anger*: A categorical variable about how often people felt angry in last seven days.

*sadness*: A categorical variable about how often people felt sad in last seven days.

*smile*: A categorical variable about the degree at which people smile during the interview.

##### ii. Main explanatory variables

Table 1: Explanatory variables

<b><i>High culturally visible resources</i></b>	<b><i>Low culturally visible resources</i></b>
<i>Education</i>	<i>Monetary income</i>
<i>Stature (standing, height)</i>	<i>Monetary expenditures on some consumption goods (maize, manioc, fish, rice)</i>

The main explanatory variables are composed of Gini coefficient of the following variables. The table 1 gives a categorization of these variables.

Education

It is the highest level of education attained by a Tsimane of 16 years and over;

Stature

It is the standing height of an individual in cm.

Monetary income

It is the total of income in bolivianos, obtained from sales and barter for an individual in last two weeks before the interview.

Expenditures in consumption goods

It is the total of expenses from consumption of common goods such as maize, manioc, fish and rice.

### iii. *Control variables and justification*

The following variables will serve to control for the effect of inequality on health at three different levels.

*Individual level:* Age and sex

*Household level:* total area of forest cleared as a proxy for household income

*Village level:* proximity to town and year of survey.

➤ Age, sex

The propensity of one's health to be affected by inequality could vary depending on one's age and sex. Men are more likely to be angry (due to testosterone) than women or women are more likely to be angry due to socio-cultural pressure and expectations from women.

Young people are more likely to be angry than older people because, wisdom gives to older people more wisdom and patience. People's sex and age could also affect their socio economic status as well as their socio cultural resources. For example, men are mostly taller than women and an inequality in stature could hurt women more than men.

I suspect that income will be positively associated with one's age and at a certain level it is negatively associated. This means that some people, depending on their age, will be more affected than other.

➤ Total area of forest cleared by the household

The total areas of forest cleared by a household will surely affect the psychological health of a person within the household. Also, it will affect the household resources especially in term of consumption, durable goods and income.

➤ Year of survey, proximity to town

Controlling for year of survey will surely pick up the effect on health due to aspects unique to a year (flood for example). Individual who are close to town could have less psychological harm than those who are far from town.

The nature of the year as well as the position of an individual to town could also affect one's resources such as income, traits and consumption.

## 2- Estimation strategy

To estimate the association between psychological health, the dependent variable represented by (anger, sadness, and smile), and village income inequality, village consumption inequality, village education inequality, and village stature inequality (explanatory variables), I use the following model:

$$\text{Health}_{ivt} = \alpha + \beta_1 \text{Gini\_high\_visibility}_{vt} + \beta_2 \text{Gini\_low\_visibility}_{vt} +$$

$$\text{C}_{ivt} + \text{C}_{hvt} + \text{C}_{vt}$$

Where,

$\text{Health}_{ivt}$  = individual health ( anger, sadness, smile)

$\text{Gini\_high\_visibility}$  = Village inequality for High cultural visible resources

$\text{Gini\_low\_visibility}$  = Village inequality for low cultural visible resources

C = Control Variables at individual level ( $\text{C}_{ivt}$ ), household level ( $\text{C}_{hvt}$ ) and village level ( $\text{C}_{vt}$ )

Table 2 contains the definition of the variables.

**Table 2:** Definition and summary statistics of outcome and explanatory variables for Tsimane' people of the Bolivian Amazon at age 16 and over from 2002 – 2006 annual panel data.

Name of variables	Definition	N	Mean	SD
<b>Outcome variable</b>				
<i>Anger</i>	How often did individual feel anger in last seven days? (0 = Never, 1 sometimes, 3 = always)	2537	0 = 70.67% 1 = 23.69% 2 = 5.64%	
<i>Sadness</i>	How often did individual feel sad in last seven days? (0 = Never, 1 sometimes, 3 = always)	2537	0 = 41.55% 1 = 36.97% 2 = 21.48%	
<i>Smile</i>	What is the degree of happiness of individual during the interview (0 = No smile; 1 = Smile; 2 = smile and laugh; 3 = guffaw) as evaluated by surveyor.	2537	0 = 10.88% 1 = 36.66% 2 = 41.35% 3 = 11.12%	
<b>Main explanatory variables of high cultural visible resources</b>				
<i>Gini coefficient of education*</i>	Village inequality of maximum level of education attained/year	78	0.59	0.05
<i>Gini coefficient of physical dominance*</i>	Village inequality of standing height in cm/year	78	0.14	0.01
<b>Main explanatory variables of low cultural visible resources</b>				
<i>Gini coefficient of monetary income*</i>	Village inequality of monetary income earned from sales and wages, in the two last week before interview in bolivianos/year	78	0.72	0.078
<i>Gini coefficient of expenditures*</i>	Village inequality of expenses in non visible consumption goods in bolivianos (maize, manioc, fish and rice)/year	78	0.39	0.10
<b>Control variables</b>				
<i>Age</i>	Age in whole years	2537	36.16	16.24
<i>Male</i>	Subject's sex; 1= male, 0 = Female	2537	0 = 50.97% 1 = 49.03%	
<i>Total area of forest cleared</i>	Total areas of forest cut (young and old) in a household	481	5.60	5.59
<i>Year</i>	Year of observation in panel study			
	2002	473	16.64%	
	2003	377	14.86%	
	2004	531	20.93%	
	2005	580	22.86%	
	2006	576	22.70%	
<i>Proximity to town</i>	Number of hours walking to get to town from village in dry season	2537	4.87	6.31

\*In the regression, I have converted these variables in natural logarithm.

**Table 3:** Variables used to calculate the Gini coefficient at village level/year: Summary outcome at individual level ( N = 2537)

<b>Name of Variables</b>	<b>Definition</b>	<b>Mean</b>	<b>SD</b>
<b><i>Explanatory variables with high cultural visibility</i></b>			
<i>Education</i>	Maximum level of education attained	1.94	2.30
<i>Physical dominance</i>	Standing height in cm	156.81	7.74
<b><i>Explanatory variables with low cultural visibility</i></b>			
<i>Income</i>	Monetary income earned from sales and wages in <u>bolivianos</u> the two last weeks before interview	94.60	185.93
<i>Expenditures</i>	Monetary value of consumption goods in <u>bolivianos</u> the two last week before the interview.	77.65	80.60

**Table 4:** Summary of panel ordered logit regressions: Results of effect of culturally visible inequality on psychological health, for Tsimane' People of Bolivian Amazon at age 16 and over, 2002 – 2006, annual panel data (N = 2537)

Explanatory variables	Dependent Variables						
	[I] Without control variables			[II] With control variables*			
	[A] = Anger	[B] = Sadness	[C] = Smile	[A] = Anger	[B] = Sadness	[C] = Smile	
	Low cultural visibility						
Log Gini coefficient of monetary income	5.252*** (1.018)	1.183 (0.951)	0.759 (0.873)	5.385** * (1.030)	0.670 (0.972)	1.772* (0.921)	
Log Gini coefficient of expenditures	0.880 (0.620)	1.990*** (0.462)	0.064 (0.493)	0.001 (0.646)	1.348** * (0.490)	0.958* (0.502)	
<b>High cultural visibility</b>							
Log Gini coefficient of education		9.007*** (1.742)	8.537*** (1.300)	-3.640*** (1.116)	9.694** * (1.694)	8.378** * (1.311)	- 4.155** * (1.113)
Log Gini coefficient of stature		13.421** (6.600)	3.906 (5.901)	-9.977 (6.157)	10.140 (6.639)	3.581 (5.953)	- 10.668* (6.264)

Standard errors in Parenthèses \*\*\* p=0.01, \*\* p=0.05, \* p=0.1. Constants not shown

\*Columns II : Controlling for age, sex, area of forest cleared by the household, year and proximity to town.

**Note:** Columns IA, IB, IC and IIA, IIB, IIC are from Table 5, columns 1 and 2.

**Table 5:** Main outputs of panel ordered logit regressions for culturally visible inequality on psychological health, for Tsimane People of Bolivian Amazon: age 16 and over from 2002 – 2006 annual panel data (N = 2537)

Explanatory Variables	Dependent variable					
	[A] = Anger		[B] = sadness		[C] = smile	
	[1]	[2]	[1]	[2]	[1]	[2]
<b>Low cultural visibility</b>						
Log Gini coefficient of monetary Income	5.252*** (1.018)	5.385*** (1.030)	1.183 (0.951)	0.670 (0.972)	0.759 (0.873)	1.772* (0.921)
Log Gini coefficient of consumption	0.880 (0.620)	0.001 (0.646)	1.990*** (0.462)	1.348*** (0.490)	0.064 (0.493)	0.958* (0.502)
<b>High cultural visibility</b>						
Log Gini coefficient of education	9.007*** (1.742)	9.694*** (1.694)	8.537*** (1.300)	8.378*** (1.311)	-3.640*** (1.116)	-4.155*** (1.113)
Log Gini coefficient of Stature	13.421* (6.600)	10.140 (6.639)	3.906 (5.901)	3.581 (5.953)	-9.977 (6.157)	-10.668* (6.264)
<b>Control Variables</b>						
Age	^	-0.004 (0.003)	^	0.015*** (0.003)	^	0.006* (0.003)
Male (gender)	^	-0.480*** (0.105)	^	-0.220** (0.092)	^	0.128 (0.094)
Level of education	^	0.031 (0.024)	^	-0.039* (0.021)	^	0.032* (0.018)
Area of fallow forest cleared	^	-0.003 (0.008)	^	0.002 (0.006)	^	-0.001 (0.006)
Year of survey	^	-0.282*** (0.033)	^	-0.197*** (0.029)	^	0.169*** (0.029)
Proximity to town	^	-0.015* (0.008)	^	0.002 (0.006)	^	-0.015*** (0.006)

Standard errors in parenthesis \*\*\* p=0.01, \*\* p=0.05, \* p=0.1. Constant not shown.  
^ = variables intentionally excluded

## 7- Main results

Table 4 contains the summary of the main regression's outputs. In columns [I], we exclude control variables such as age, sex, surface of area of forest cleared, and village attributes. Columns [II] integrate all these variables in the regression.

### *Hypothesis 1*

We find a confirmation of our first hypothesis: inequalities in resources or traits that have high cultural visibility have a stronger effect on psychological health than inequalities in resources with low cultural visibility.

Firstly, as hypothesized, village inequality in education bore a stronger positive association with individual anger and sadness than village inequality in income and village inequality in consumption. Village inequality in stature bore the same stronger positive association with negative emotions than village inequality in all resources with low cultural visibility. The results hold even after controlling (column II table 4) for age, sex, household and village

characteristics. The association with happiness (smile) has given mixed results. The effect of village inequalities, except for consumption, is stronger for anger than for sadness.

### ***7.1- Effect of inequality in education compared to inequality in low culturally visible resources***

The coefficient of village education inequality with anger as the dependent variable (column IA) is 9.01 ( $p = 0.0001$ ), almost 1.7 times as high as the coefficient of village income inequality (coefficient = 5.25,  $p = 0.001$ ); and 10 times as higher as the coefficient of village inequality in consumption (coefficient = 0.88,  $p = 0.1$ ). After control, the coefficient of village education inequality with anger as dependent variable (column IIA) is 9.69 ( $p = 0.001$ ), almost 1.8 times as high as the coefficient of village income inequality (coefficient = 5.38,  $p = 0.001$ ); and 9694 times as higher as the coefficient of village inequality in consumption (coefficient = 0.001,  $p = 0.1$ ). The coefficient of village education inequality with sadness as dependent variable (column IB) is 8.54 ( $p = 0.001$ ), almost 7.2 times as high as the coefficient of village income inequality (coefficient = 1.18,  $p = 0.1$ ); and 4.3 times as high as the coefficient of village inequality in consumption (coefficient = 1.99,  $p = 0.001$ ). After control (column IIB), the coefficient of village education inequality with sadness as dependent variable is 8.38 ( $p = 0.001$ ), almost 12.5 times as high as the coefficient of village income inequality (coefficient = 0.67,  $p = 0.1$ ); and 6.2 times as high as the coefficient of village inequality in consumption (coefficient = 1.35,  $p = 0.001$ ).

### ***7.2- Effect of inequality in stature compared to inequality in low culturally visible resources***

The coefficient of village stature inequality with anger as the dependent variable (column IA) is 13.421 ( $p = 0.05$ ), almost 2.55 as high as the coefficient of village income inequality (coefficient = 5.25,  $p = 0.001$ ); and 15.25 times as high as the coefficient of village inequality in consumption (coefficient = 0.88,  $p = 0.1$ ).

After adding control variables (column IIA), the coefficient of village stature inequality with anger as dependent variable is 10.14 ( $p = 0.1$ ), almost 1.88 as high as the coefficient of village income inequality (coefficient = 5.38,  $p = 0.001$ ); and 10140 times as high as the coefficient of village inequality in consumption (coefficient = 0.001,  $p = 0.1$ ).

The coefficient of village stature inequality with sadness as dependent variable (column IB) is 3.91 ( $p = 0.1$ ), almost 3.3 as high as the coefficient of village income inequality (coefficient = 1.18,  $p = 0.1$ ); and 5.6 times as high as the coefficient of village inequality in consumption (coefficient = 1.99,  $p = 0.001$ ). After control (column IIB), the coefficient of village stature inequality with sadness as dependent variable is 3.58 ( $p = 0.1$ ), almost 5.3 as high as the

coefficient of village income inequality (coefficient = 0.67,  $p = 0.1$ ); and 2.7 times as high as the coefficient of village inequality in consumption (coefficient = 1.35,  $p = 0.001$ ).

### *Hypothesis 2*

The results show a partial confirmation of hypothesis 2.

First, as hypothesized, all village inequalities bear a positive association with negative emotions such as anger and sadness (columns IA and IB). The results hold even after controlling for variables (columns IIA and IIB) such as age, sex, area of forest cleared, proximity to town and year of survey.

Second, village inequalities in resources with low cultural visibility bear a positive association with positive emotions (smile); as opposed to our hypothesis (column IC). The coefficient of the association is 0.76 for village inequality in income and 0.064 for village inequality in consumption. The results hold even after control (column IIC). The fact that inequality in low culturally visible resources bears a positive association with smile reinforces my hypothesis that they really have little cultural visibility and that is why these resources don't affect people positive emotions.

Third, village inequalities in high culturally visible resources bear the negative hypothesized association with happiness. The coefficient is -3.64 for village inequality in education and -9.98 for village inequality in stature. The results hold even after control.

### **8- Robustness**

To ensure robustness of the main results, I report only in Table 6, the coefficients and standard error for the additional regressions. The first column of Table 6 is column 2 of Table 5. The first row contains the summary of the change made to the regression of column 2 in Table 5 to produce Table 6. Four major findings appear.

First, I found that the main results hold after controlling for generosity (column 2), personal wealth (column 3), traditional personal wealth (4) and individual income level (5). For village inequalities in income, education and stature (with anger as outcome variable), the results hold by controlling for generosity (column 2), and change for village inequality in consumption.

Second, the integration into the model of village dummy variable (column 6) and of the sum of different variables such as generosity, personal wealth and village dummy variables (column 7) has attenuated the coefficient for inequality in education and inequality of stature

**Tables 6:** Changes in the main regression. Outputs of panel ordered logit regressions for culturally visible inequality on psychological health, for Tsimane People: age 16 and over from 2002 – 2006 annual panel data (N = 2537)

Dependent variable		<b>[A] = ANGER</b>					
Core model, column 2, table 5	Additional control variables to column [1]						
	Generosity	Total Wealth	Traditional Wealth	Income Level	Village dummy Variable	Generosity, total wealth & village dummy variables	
<b>Low culturally visible resources</b>							
log Gini of Income	5.385*** (1.030)	5.277*** (1.031)	5.365*** (1.029)	5.389*** (1.029)	5.443*** (1.035)	5.640*** (1.557)	5.582*** (1.564)
log Gini of consumption	0.001 (0.646)	-0.010 (0.653)	0.007 (0.646)	0.003 (0.646)	0.008 (0.646)	-1.845** (0.780)	-1.898** (0.789)
<b>High Culturally visibles resources</b>							
Log Gini of Education	9.694*** (1.694)	9.681*** (1.690)	9.833*** (1.681)	9.659*** (1.705)	9.827*** (1.699)	7.601*** (2.422)	7.686*** (2.424)
log Gini of stature	10.140 (6.639)	10.954* (6.623)	11.351* (6.702)	9.983 (6.696)	10.147 (6.641)	1.287 (8.449)	2.298 (8.502)

Dependent variable		<b>[B] = SADNESS</b>					
Core model, column 2, table 5	Additional control variables to column [1]						
	Generosity	Total Wealth	Traditional Wealth	Income Level	Village dummy Variable	Generosity, total wealth & village dummy variables	
<b>Low culturally visible resources</b>							
log Gini of Income	0.670 (0.972)	0.637 (0.974)	0.661 (0.977)	0.655 (0.973)	0.685 (0.977)	0.789 (1.350)	0.756 (1.352)
log Gini of consumption	1.348*** (0.490)	1.340*** (0.491)	1.372*** (0.489)	1.350*** (0.490)	1.350*** (0.489)	1.378** (0.537)	1.366** (0.539)
<b>High Culturally visibles resources</b>							
Log Gini of Education	8.378*** (1.311)	8.362*** (1.312)	8.655*** (1.318)	8.440*** (1.319)	8.418*** (1.318)	3.925* (2.091)	4.034* (2.119)
log Gini of stature	3.581 (5.953)	3.944 (5.952)	4.826 (5.952)	3.855 (5.935)	3.605 (5.951)	-10.237 (6.843)	-9.256 (6.851)

Dependent variable		<b>[C] = SMILE</b>					
Core model, column 2, table 5	Additional control variables to column [1]						
	Generosity	Total Wealth	Traditional Wealth	Income Level	Village dummy Variable	Generosity, total wealth & village dummy variables	
<b>Low culturally visible resources</b>							
log Gini of Income	1.772* (0.921)	1.727* (0.925)	1.773* (0.921)	1.769* (0.921)	1.794* (0.921)	5.839*** (1.310)	5.979*** (1.326)
log Gini of consumption	0.958* (0.502)	0.944* (0.498)	0.955* (0.503)	0.959* (0.502)	0.964* (0.502)	-1.029* (0.545)	-1.055* (0.544)
<b>High Culturally visibles resources</b>							
Log Gini of Education	-4.155*** (1.113)	-4.236*** (1.117)	-4.179*** (1.112)	-4.100*** (1.123)	-4.085*** (1.117)	-2.261 (2.349)	-2.481 (2.352)
log Gini of stature	-10.668* (6.264)	-9.614 (6.284)	-10.792* (6.266)	-10.409* (6.261)	-10.661* (6.261)	-7.297 (7.608)	-6.934 (7.587)

for all the outcomes. The results in column 7 have also shown that there is a change in the sign for the coefficient of inequality in consumption. However, the coefficients of inequality

in high culturally visible resources (education and stature) are bigger than the inequality in low cultural visible resources (income and consumption).

#### 8.1- **Wald test**

We test whether the coefficients for inequality in high cultural visible resources are statistically different to the coefficients of inequality in low culturally visible resources. The results are in appendix D.

The Wald test has been done for all coefficients from column 1 to column 7 in Table 6. (a) Each of the coefficients of inequality in education has been tested against each of the coefficients of income first and secondly against each of the coefficients of consumption. (b) Each of the coefficients of inequality in stature has been tested against each of the coefficients of income first and secondly against each of the coefficients of consumption.

We test whether the coefficients for inequality in high culturally visible resources are statistically different and superior to the coefficients of inequality in low culturally visible resources. The results are in the appendices (appendix D). Two main trends have been observed. The results for columns 6 and 7 (for all outcomes) show that there is no statistical difference between the coefficients of high cultural visibility and the coefficients of low cultural visibility except for the comparison between education and consumption. From columns 1 to 5, four main results appear from the Wald test:

First, the coefficients of inequality in education are superior to the coefficients of inequality in income. The results that these coefficients are different are statistically significant at 5% (for anger), 1% for sadness and happiness (smile).

Second the coefficients of inequality in education are superior to the coefficients of inequality in consumption. The results that these coefficients are different are statistically significant at 1% for all outcomes.

Third, the coefficients of inequality in stature are superior to the coefficients of inequality in income and to the coefficients of inequality in consumption; but, there is no statistical difference between these coefficients. The Wald test reveals a high probability that these coefficients are the same.

The Wald test partially confirms the results that inequality in high culturally visible resources might hurt an adult's psychological health more than inequality in low culturally visible resources.

## 9- **Discussion**

### ***Low culturally visible resources***

As mentioned earlier, the Tsimane is a pre-industrial rural setting where wealth sharing is an essential part of their community (Godoy et al. 2006), thus, the small effect of inequality in income and inequality in consumption on psychological health is not surprising and confirms my expectations. Though the variable income has the biggest mean of Gini (0.72 in Table 2), it is less harmful to health. Because of cross-cousin marriage that happens often in the community, people are willing to share their belongings earned from market activities. It is also important to stress the fact that income is culturally visible only if it has been used to buy goods that could be seen and valued by members of the community and there is a lack of generosity. When the money has been earned and is not used to buy visible goods, inequality in income will not likely hurt. In relation with happiness (smile), the results show that when inequality in income increases, people smile increases and the results have been consistent. The reasons evoked earlier might explain such results. Those who have more are willing to share.

The results obtained for inequality in consumption bear out my expectations. Consumption goods such as maize, manioc, fish and rice are common among Tsimane. Even though they are visible goods, each household probably has access to these goods since they have their own plot and they could grow such products. Also, these goods could be shared, and people are likely to not be affected by inequality in consumption goods. Even though the effect exists, it was low.

### ***High culturally visible resources***

Inequality in education has a higher and stronger effect on psychological health than inequality in income and inequality in consumption. The results bear out my hypothesis and remain strong even after controlling for different confounders such as generosity, wealth, income level, and village dummy variables. Therefore, inequality in education harms adult psychological health more than inequality in income and inequality in consumption. These results could be explained by two main factors.

First, education cannot be shared. Unlike income and consumption goods which, although possessed individually or at household level, can be shared among Tsimane's members, education cannot be shared even if there is a will to do so. Because of that, inequality in this resource really hurts psychological health.

Secondly, education in a rural setting gives an individual prestige and opportunities not available to everyone, prestige to be able to read and write in Spanish and therefore the ability to interact with outsiders and have a high social network, and opportunities to have access to leadership positions (dealing with international NGOs or political representatives) and access

to highly paid jobs outside the common job market available to most of the uneducated people. As stated earlier, 79.43% of adults in the sample have less than 4 years of education. Based on the link between supply of educated people (who are very few) and demand of people who are able to read and speak correctly in Spanish and conducted professional business, there are growing opportunities for the educated population and this will exacerbate jealousy, anger, and fear within the community.

There is not a straight one answer to evaluate if inequality in stature has a stronger effect than inequality in income and inequality in consumption. As the results have revealed, the effect of inequality in stature is very weak and wanes when controlling for some confounders. Although like education, stature cannot be shared (individual attribute), it does not have a consistent, statistically significant greater effect on psychological health than inequality in income and inequality in health. The Wald test has revealed that there is no statistically significant difference between the different coefficients of stature and the coefficients of income or consumption. Some factors could explain these results.

The mean of village Gini coefficient for stature is 0.14. This means that there is very little difference between the stature of people in the community. Also, stature is related to embodied capital which allows access to jobs only in the regular job market (hunting, ranchers, agriculture etc). There is little or no prestige associated with stature.

## **10- Conclusion**

This study examines the effect of culturally visible resources on psychological health. Two groups of culturally visible resources have been determined: high culturally visible resources and low culturally visible resources. The goal of the study is to test the hypothesis that the high culturally visible resources will have a greater and stronger impact on psychological health than the low culturally visible resources.

The study has considered as psychological health anger, smile and sadness and has estimated the effect of inequality on each of them. High culturally visible resources are individual level of education and individual height and low culturally visible resources are considered as income and monetary expenditures on food.

The results have partially confirmed our hypothesis. High culturally visible resources have a stronger effect on psychological health than low culturally visible resources. For stature the effect wanes after including other variables such as village dummy variable. The results for anger have been more consistent than for sadness and smile. The results have revealed that

coefficients in high culturally visible resources are greater than coefficients in low culturally visible resources based on their effect on psychological health. The Wald test has confirmed such results for education but reject it for stature.

The results that education has shown a constant and strong association with psychological health and have revealed a greater effect than income should bring the attention of policy makers that in a spirit of poverty reduction strategies, focus should be put on education.

In this rural setting, education has revealed a strong positive association with psychological health. The relationship has been stronger than the effect of income on psychological health. Therefore, policy decision makers have to put an emphasis on education and advocate for a large investment in education sector.

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## APPENDICES

### Appendix A

Table: Main outputs of panel ordered logit regressions for culturally visible inequality on anger, for Tsimane People of Bolivian Amazon: age 16 and over from 2002 – 2006 annual panel data (N = 2537)

Explanatory Variables  
Dependent variable

ANGER

I  
II  
III  
IV  
V

[a]  
[b]  
[a]

[b]  
[a]  
[b]  
[a]  
[b]  
[a]  
[b]

1  
Log Gini coefficient of monetary income

5.377\*\*\*  
5.726\*\*\*

5.252\*\*\*  
5.385\*\*\*

(1.015)  
(1.059)

(1.018)  
(1.030)

II  
Log Gini coefficient of consumption

1.117\*  
-0.138

0.880  
0.001

(0.626)  
(0.648)

(0.620)  
(0.646)

III  
Log Gini coefficient of education

8.833\*\*\*  
9.864\*\*\*

9.007\*\*\*  
9.694\*\*\*

(1.644)  
(1.594)

IV  
Log Gini coefficient of stature

(1.742)  
(1.694)

18.308\*\*\*  
15.788\*\*  
13.421\*\*  
10.140

Age

(6.866)  
(7.119)  
(6.600)  
(6.639)

-0.004  
-0.003  
-0.004  
-0.003  
-0.004

	(0.003)
	(0.003)
	(0.003)
	(0.003)
	(0.003)
Male (gender)	
	-0.470***
	-0.446***
	-0.457***
	-0.449***
	-0.480***
	(0.106)
	(0.106)
	(0.105)
	(0.106)
	(0.105)
Level of education	
	0.021
	0.022
	0.032
	0.023

	0.031
	(0.024)
	(0.024)
	(0.024)
	(0.025)
	(0.024)
Area of fallow forest cleared	
	0.003
	-0.002
	-0.008
	-0.003
	-0.003
	(0.008)
	(0.008)
	(0.008)
	(0.008)
	(0.008)
Year of survey	
	-0.272***
	-0.297***

-0.305\*\*\*

-0.292\*\*\*

-0.282\*\*\*

(0.031)

(0.032)

(0.031)

(0.032)

(0.033)

Proximity to town

-0.019\*\*

-0.002

-0.002

-0.001

-0.015\*

(0.008)

(0.008)

(0.007)

(0.007)

(0.008)

N

2537  
 2537  
 2537  
 2537  
 2537  
 2537  
 2537  
 2537  
 2537  
 2537

Standard errors in parenthesis \*\*\* p=0.01, \*\* p=0.05, \* p=0.1. Constant not shown.

*Appendix B*

Table: Main outputs of panel ordered logit regressions for culturally visible inequality on sadness, for Tsimane People of Bolivian Amazon: age 16 and over from 2002 – 2006 annual panel data (N = 2537)

Explanatory Variables	Ordered Logit Regressions									
	I	II	III	IV	V	VI	VII	VIII	IX	X
	[a]	[b]	[a]	[b]	[a]	[b]	[a]	[b]	[a]	[b]
Log Gini coefficient of monetary income	1.140								1.183	
	(0.967)								(0.951)	



	(0.003)	(0.003)	(0.003)	(0.003)	*) ( 0 .0 0 0 3 ) - 0 .2 2 0 * * ( 0 .0 9 2 ) - 0 .0 3 9 * ( 0 .0 2 1 ) 0 .0 0 2 ( 0 .0 0 0 6 )
Male (gender)	-0.215**	-0.212**	-0.216**	-0.213**	
	(0.093)	(0.094)	(0.092)	(0.093)	
Level of education	-0.045**	-0.046**	-0.037*	-0.044**	
	(0.020)	(0.020)	(0.021)	(0.020)	
Area of fallow forest cleared	0.007	0.007	0.001	0.006	
	(0.006)	(0.006)	(0.006)	(0.006)	

	2	5	7	9	10
Year of survey	-0.203***	-0.192***	-0.218***	-0.205***	
	(0.028)	(0.029)	(0.028)	(0.028)	
Proximity to town	0.003	0.004	0.006	0.007	
	(0.006)	(0.006)	(0.006)	(0.006)	
N	2537	2537	2537	2537	2537

Standard errors in parenthesis \*\*\* p=0.01, \*\* p=0.05, \* p=0.1. Constant not shown.

Appendix C

Table : Main outputs of panel ordered logit regressions for culturally visible inequality on smile, for Tsimane People of Bolivian Amazon: age 16 and over from 2002 – 2006 annual panel data (N = 2537)

	Explanatory Variables	Dependent variable									
		SMILE									
		I	II	III	IV	V					
	[a]	[b]	[a]	[b]	[a]	[b]	[a]	[b]	[a]	[b]	
I	<i>Log Gini coefficient of income</i>	0.570 (0.865)	1.376 (0.908)						0.759 (0.873)	1.772* (0.921)	
II	<i>Log Gini coefficient of consumption</i>			0.153 (0.489)	0.950* (0.505)				0.064 (0.493)	0.958* (0.502)	
III	<i>Log Gini coefficient of education</i>					-3.817*** (1.117)	-4.323*** (1.111)		-3.640*** (1.116)	-4.155*** (1.113)	
IV	<i>Log Gini coefficient of stature</i>							-11.654* (6.126)	-10.727* (6.178)	-9.977 (6.157)	-10.668* (6.264)
	Age		0.006* (0.003)		0.006* (0.003)		0.006** (0.003)		0.006* (0.003)	0.006* (0.003)	
	Male (gender)		0.129 (0.095)		0.134 (0.094)		0.133 (0.094)		0.136 (0.095)	0.128 (0.094)	
	Level of education		0.036** (0.018)		0.035* (0.018)		0.033* (0.018)		0.036** (0.018)	0.032* (0.018)	
	Area of fallow forest cleared		-0.004 (0.006)		-0.005 (0.006)		-0.003 (0.006)		-0.005 (0.006)	-0.001 (0.006)	
	Year of survey		0.149*** (0.028)		0.157*** (0.029)		0.154*** (0.028)		0.141*** (0.028)	0.169*** (0.029)	
	Proximity to town		-0.011** (0.006)		-0.010* (0.006)		-0.007 (0.006)		-0.009 (0.005)	-0.015*** (0.006)	
	N	2537	2537	2537	2537	2537	2537	2537	2537	2537	

Standard errors in parenthesis \*\*\* p=0.01, \*\* p=0.05, \* p=0.1. Constant not shown.

Appendix D

**Wal  
d  
Test**

**ANGER**

	<b>Core Model</b>	<b>Generosity</b>	<b>Total Wealth</b>	<b>Traditional Wealth</b>	<b>Income Level</b>	<b>Village Dummy Variable</b>	<b>Generosity, total wealth &amp; village dummy variables</b>	
Coefficient of Education=Coefficient of income	<b>Yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	
wald test: Coefficient of Education = Coefficient of income	chi2(1) = 4.58 Prob = chi2 = 0.0324	chi2(1) = 4.77 Prob = chi2 = 0.0289	chi2(1) = 4.99 chi2 = 0.0254	Prob = chi2 = 0.0348	chi2(1) = 4.45 Prob = chi2 = 0.0348	chi2(1) = 4.74 Prob = chi2 = 0.0294	chi2(1) = 0.36 Prob = chi2 = 0.5495	chi2(1) = 0.41 Prob = chi2 = 0.5217
Coefficient of Education=Coefficient of consumption	<b>Yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	
wald test: Coefficient of Education = Coefficient of consumption	chi2(1) = 29.52 Prob = chi2 = 0.0000	chi2(1) = 29.52 Prob = chi2 = 0.0000	chi2(1) = 30.75 Prob = chi2 = 0.0000	chi2(1) = 28.81 Prob = chi2 = 0.0000	chi2(1) = 30.09 Prob = chi2 = 0.0000	chi2(1) = 13.59 Prob = chi2 = 0.0002	chi2(1) = 13.86 Prob = chi2 = 0.0002	
Coefficient of stature= Coefficient of income	<b>Yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	<b>no</b>	<b>no</b>	
wald test: Coefficient of stature = Coefficient of income	chi2(1) = 0.50 Prob = chi2 = 0.4774	chi2(1) = 0.72 Prob = chi2 = 0.3956	chi2(1) = 0.79 chi2 = 37.49	Prob = chi2 = 0.4962	chi2(1) = 0.46 Prob = chi2 = 0.4962	chi2(1) = 0.49 Prob = chi2 = 0.4822	chi2(1) = 0.23 Prob = chi2 = 0.6287	chi2(1) = 0.13 Prob = chi2 = 0.7172
Coefficient of stature= Coefficient of consumption	<b>Yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	
wald test: Coefficient of stature = Coefficient of consumption	chi2(1) = 2.29 Prob = chi2 = 12.99	chi2(1) = 2.69 Prob = chi2 = 0.1010	chi2(1) = 2.82 chi2 = 0.0932	Prob = chi2 = 0.1397	chi2(1) = 2.18 Prob = chi2 = 0.1397	chi2(1) = 2.29 Prob = chi2 = 0.1300	chi2(1) = 0.13 Prob = chi2 = 0.7167	chi2(1) = 0.23 Prob = chi2 = 0.6295

**SADNESS**

	<b>Core Model</b>	<b>Generosity</b>	<b>Total Wealth</b>	<b>Traditional Wealth</b>	<b>Income Level</b>	<b>Village Dummy Variable</b>	<b>Generosity, total wealth &amp; village dummy variables</b>	
Coefficient of Education=Coefficient of income	<b>Yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	
wald test: Coefficient of Education = Coefficient of income	chi2(1) = 21.01 Prob = chi2 = 0.0000	chi2(1) = 21.09 Prob = chi2 = 0.0000	chi2(1) = 22.30 chi2 = 0.0000	Prob = chi2 = 0.0000	chi2(1) = 21.27 Prob = chi2 = 0.0000	chi2(1) = 21.18 Prob = chi2 = 0.0000	chi2(1) = 1.23 Prob = chi2 = 0.2671	chi2(1) = 1.32 Prob = chi2 = 0.2511
Coefficient of Education=Coefficient of consumption	<b>Yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	
wald test: Coefficient of Education = Coefficient of consumption	chi2(1) = 27.25 Prob = chi2 = 0.0000	chi2(1) = 27.15 Prob = chi2 = 0.0000	chi2(1) = 29.09 Prob = chi2 = 0.0000	chi2(1) = 27.44 Prob = chi2 = 0.0000	chi2(1) = 27.27 Prob = chi2 = 0.0000	chi2(1) = 1.51 Prob = chi2 = 0.2196	chi2(1) = 1.62 Prob = chi2 = 0.2037	
Coefficient of stature= Coefficient of income	<b>Yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	<b>yes</b>	<b>no</b>	<b>no</b>	

