Cultural Transmission of Diligence: Parenting and Worldviews

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Abstract

To uncover the mechanism of cultural transmission, this paper empirically analyzes the effects of parenting on child's diligence. We use study hours as a proxy of diligence. There can be a reverse causality problem because parents may change their parenting behaviors according to their children's characters and behaviors. In order to investigatecausality, we need to overcome thisendogeneity issue concerning parenting. We employ an instrumental variable method and a treatment-effect model. Our instrument is a parent's worldview about sufferingthat governs economic behavior. Our empirical results show, firstly, that, tough parenting tends to increase child's study hours. Secondly, aparent's worldview about suffering has an impact on child's study hours through the parent's discipline behavior. These results indicate that tough parenting by a parentwith a worldview that experiencing a hardship is helpful for the child's personal development tends to help the child grow to be diligent.

JEL classification: D10; J13; Z10

Keywords: Cultural transmission, Intergenerational altruism, Diligence, Parenting, Worldview.

1. Introduction

How is culture transmitted? Bisin and Verdier (2011) define "culture to represent those components of preferences, social norms, and ideological attitudes which *depend upon the capacity for learning and transmitting knowledge to succeeding generations*" and overview the economic research on cultural transmission and socialization.

Doepke and Zilibotti (2008), which is one of the studies of cultural transmission, focused on diligence as a preference prescribing economic behavior. They presented a theory of preference formation under financial market imperfections that can account for a socioeconomic transformation during the British Industrial Revolution. Their model explains a transformation whereby the landowning aristocracy was replaced by industrial capitalists rising from the middle classes as the economically dominant group. In their model, parents shape their children's preferences in response to economic incentives. Parental preferences are the rate of time preference (patience) and the taste for leisure (or, conversely, work ethic). While there exist some theoretical studies on cultural transmission of preferences e.g., . Bisin and Verdier, 2001; Akabayashi, 2006; Bhatt and Ogaki, 2012), empirical ones are scarce.[1]

Diligence is one kind of non-cognitive ability. Not only cognitive ability, non-cognitive ability is also a significant factor in determining performance at school such as test scores and work performance such as wage rates (Heckman and Rubinstein, 2001, Heckman, Stixrud, and Urzua, 2006). These results can be interpreted to imply that, as study hours of diligent children tend to be longer, they tend to show better performance at school and at work. Thus, diligence is a key quality that could

[1] A few exceptions are Kubota et al. (2012a), which examines the relationship between parental time preference and parenting, and Kubota et al. (2012b), which examines the relationship between parental worldviews and parenting.

affect individual and aggregate economic performance.

Diligence is important for determining measures of economic performance emphasized in traditional economics such as wages, but it may also be important for subjective well-being. For instance, Frey (2008, p.5) indicates that *Eudaimonia* as one concept of well-being. *Eudaimonia* is Aristotle's concept of happiness as a "good life" defined by the acquisition and use of virtue and ability[3]. Some empirical studies include eudaimonic measures of well-being (see, e.g., Ryff (1989), Clark and Senik (2011), Ishino, Kamesaka, Murai, and Ogaki (2013), and Benjanin, Heffetz, Kimball, and Szembrot (forthcoming)). Since diligence is a virtue, this paper's theme is related to how parents promoted their children's *eudaimonia*..[4]

In this paper, we are interested in studying how parental behaviors affect their children's diligence. For this purpose, it is important to consider the possible reverse causation since parenting and child's diligence have mutual relationship. Parents are likely to discipline their children more often if they observe that they are not diligent. Therefore, we use instrumental variable method to overcome this endogenous issue.

Our instrument is constructed from data on subjective probabilities parents attach to a worldview belief related to how they view suffering.. The word "worldview" has been used in philosophy since Kant's (1987) was originally published in 1790. However, the use of the word in anthlopolgy that started in the middle of the 20th century seems especially useful for studying culture in economics. Hiebert (2008, pp.

[3] For empirical studies that include eudaimonic measures of well-being, see, e.g., Ryff (1989), Clark and Senik (2011), Ishino, Kamesaka, Murai, and Ogaki (2013), and Benjanin, Heffetz, Kimball, and Szembrot (forthcoming)

[4] Patience is another virtue that seems important in economics.

25-26) defines "worldview" in anthropological terms as "the foundational cognitive, affective, and evaluative assumptions and frameworks a group of people makes about the nature of reality which they use to order their lives. " A worldview is behind each culture, and Hiebert considers explicit and implicit levels of a worldview as in Figure 1.. In the field of economics, Bhatt and Ogaki (2013) developed an intergenerational alturuism model with worldviews, and Kubota et al. (2013) and Ali et al. (2013) found empirical evidence that parental economic behavior is significantly affected by subjective probabilities attached to worldview beliefs.[6] p Thus, the instrumental variables based on subjective probabilitites attached to worldview beliefs satisfythe relevance condition. In our analysis, we assume that the worldview variables areexogenous since it generally takes a long time for worldviews to change and we use cross-sectional data. Therefore, parental worldview variables satisfy the two conditions for the validity of the instrumental variable. In addition, we can investigate not only the effect of parenting on child's diligence but also investigate the predictions from Bhatt and Ogaki's (2013) model that subjective probabilities attached to worldview beliefs affect intergenerational altruistic economic behaviors. .

The results of instrumental variable method show that tough parenting (measured by a dummy variable) increases child's study hours about one hour. Then, parental worldview about hardship has an impact on child's study hours through the tough parenting. These results indicate that strict parenting by parents with worldview that an experiencing hardship is helpful for bringing diligent child.

The rest of the paper is structured as follows. Section 2 provides the empirical

[6] Empirical investigations by these authors are about the belief system, which is the explicit level of the worldview, while investigations by Lee et al. (2013) are about the implicit level of the worldview.

model and estimation methods. Section 3 explains the survey and sample data used in our study. In Section 4, we report the empirical results. Section 7 concludes the paper.

2. Empirical Model

To find the causal effect of parenting on child's diligence, we need to overcome the endogenous issue of parenting since parents could decide how to parent their children owing to the degree of their children's diligence. If we ignore this issue and use OLS, we cannot investigate causal relationships. Thus, we employ an instrumental variable method.

We assume following linear model.

$$H_i = \beta_0 + \beta_1 P_i + X_i \beta_2 + u_i.$$

The dependent variable H_i is child's study hours that is proxy for child's diligence and i is household's index. P_i represents parenting dummy. Parenting which we focus on in this paper is whether parent gives their child tough parenting. X_i is vector of patents' and child's attributes. u_i is mean zero disturbance. In this model, we assume that tough parenting causes the child to develop diligence.However, if P_i correlate to u_ii, we do not obtain consistent estimates of β_1 by OLS.

We use varaibles about subjective probabilities parents attached to worldviews about hardship in order to construct instruments and estimate the effect of parenting on child's study hours by a treatment-effects model (TEM) and an instrumental variable method (IV). TEM is parametric model when dependent variable

is continuous and endogenous variable is indicator.[7] Similar to IV conditions, if it is assumed to use instruments W_i that correlates to P_i and is independent of u_i, we obtain consistent estimates of β_1 to estimate the following models by maximum likelihood.

$$H_i = \beta_0 + \beta_1 P_i + X_i \beta_2 + u_i$$
$$P_i^* = \gamma_0 + \gamma_1 W_i + e_i$$

Note that the observed decision P_i is

$$P_i = \begin{cases} 1, & if \quad P_i^* > 0 \\ 0, & if \quad otherwise \end{cases}$$

u_i and e_i are bivariate normal with mean zero and covariance matrix. ρ is correlation between u_i and e_i.

$$\begin{bmatrix} \sigma^2 & \rho\sigma \\ \rho\sigma & 1 \end{bmatrix}$$

The difference in expected child's study hours between the child who is disciplined tougher and the child who is not is

$$E(H_i|X_i, P_i = 1) - E(H_i|X_i, P_i = 0) = \beta_1 + \rho\sigma \frac{\phi(\gamma_0 + \gamma_1 W_i)}{\Phi(\gamma_0 + \gamma_1 W_i)[1 - \Phi(\gamma_0 + \gamma_1 W_i)]}$$

Where φ is the standard normal density and Φ is the standard normal cumulative

[7] Treatment-effect model is explained in Maddala (1983, p.120-122) and Greene (2007, p.889-891). We use *Stata* to estimate our models by TEM and its command is *treatreg*.

distribution function. If the correlation between the error terms, ρ, is zero, the problem reduces to one estimable by OLS and the difference is simply β_1.

Which of the two methods (TEM and IV) is more reliable re depend on the validity of the assumption of the disturbance of TEM. If disturbance is bivariate normal, the estimatorsby TEM are more efficient than those by IV. Otherwise, we cannot obtain consist estimates by TEM.

3. Data

We use two micro-data sets. The first is the 2nd wave of the *Japan Household Panel Survey* (JHPS) and the second is *Japan Child Panel Survey 1st wave* (JCPS) which is the supplementary survey of the JHPS for participating households' children. The JHPS hase started since 2009 for which households were interviewed once a year in January. The initial sample size is 4,000 and the sample households are selected randomly from across Japan using the Basic Residents Registration System. Thus, JHPS is a representative data of the total Japanese population. The detailed explanation about sampling method and characteristics of the sample is referred to Naoi and Yamamoto (2010).

The JCPS is a subsample of the JHPS. The targets of the JCPS are the JHPS respondents who have primary school or junior high school children and the children. The JCPS not only contains several questions about home environment toward parents but also conducts an achievement test toward children and asks the children their study hours and study circumstances. The detailed information about sampling method and characteristics of the sample is referred to Yamashita et al. (2011).

We evaluate the child's diligence by child's study hours that can be answered

from parent and child. The wording of the question is following:

"Excluding the period leading up to exams, how much time does your child (you) usually spend studying after he/she comes home from school? (Please include time spent in any kind of supplementary school/test preparation school or in private tutoring.)"

1 Almost none	4 About 2 hours	7 5 or more hours
2 About 30 minutes	5 About 3 hours	8 I don't know
3 About 1 hour	6 About 4 hours	

Note that the children going to an elementary school from 1st to 3rd grades are not asked for this question. To mitigate the measurement error and to keep sample size, we use the average child's study hours of parent and child responses. Table 1 provides the child's study hours by grades. The total sample size is 439, the sample of 3rd grades in elementary school is 60 that is largest of all grades, and that of 6th grades in elementary school is 37 that is smallest of all grades.[8] The both study hours responded by parent and child increase as upgrading. However, the study hours in last grades in elementary and junior high school decrease and its standard deviations are larger than other grades. These indicatethe possibility that the children who achieve higher test scores and plan to take entrance examinations for prestigious schools and their parents do not respond to the JCPS.

[8] The cooperation rates (= actual respondents of JCPS / potential respondents) tend to decline as children upgrades. We observe the drops of cooperation rate in last grades in elementary school and junior high school. Yamashita et al. (2011) discuss these points.

Our instruments for parenting are constructed from data about subjective probabilities parents attached to worldview beliefs about suffering. We use the following question for these subjective probablitgies.

"Circle the appropriate number for each of the following questions. Choose 0 if you totally disagree with the statement. Choose 50 if you partially agree with the statement (50%). Choose 100 if you completely agree with the statement."

If you are experiencing a hardship, such as if you had an accident, undergoing the hardship itself is helpful for character building.										
0	10	20	30	40	50	60	70	80	90	100

The distribution of the answer of this question (*Worldview*) is provided in Figure 1. The mode is 50 that represents hardship is helpful for character building at 50%. The proportion people who answer that hardship is not helpful at all is 12.27%. The statistics of *Worldview* show differences among individuals.

Then we introduce the question about parenting.

"Before they started elementary school, when your child threw a tantrum in a store and made a scene because they wanted toys/candy, what did you do? Please circle all items that apply."

1 Explain why what he/she did was wrong

2 Scold harshly

3 Spanking or other corporal punishment

4 Make your child help around the house

5 Ignore them for a little bit

6 Take away TV/video games or other fun things

7 Send your child outside of the house

8 My child rarely threw tantrums

9 Other (specifically:)

The distribution of answers of this question is shown in Figure 2. The fraction of the option, " 1 Explain why what he/she did was wrong", is 56.92%. Over half of parent explains why what their child does is wrong.

Bhatt and Ogaki (2013) extended Bhatt and Ogaki's (2012) tough love model by adding worldviews. In the tough love model, the parent thinks that he should not spoil the child so that the child will grow to be patient, but is tempted to spoil the child. When parents attach different subjective probabilities to different worldview beliefs, they face different degrees of temptations, which make their parenting behaviors different. Even though Bhatt and Ogaki's (2013) model does not include leisure, the similar ideas are applicable for this paper's theme: a parent thinks that he should rbe tough to his child so that the child will grow to be diligent, but is tempted to spoil the child.

Given these ideas, ¥ awe focus on the effect of *tough love parenting* on child's study hours. *Tough love parenting* is dummy variable which is one if the answer to the above question is option 1 or 2 and zero if otherwise. 17.65% of respondents are into one for *Tough love parenting*.

We should note that our measure on child's study hours includes time spent in any kind of supplementary school/test preparation school or in private tutoring. The children who go to a supplementary school increase with upgrading in school. The type of diligence for study would be difference between study in supplementary school and the other. To incorporate this point into our analysis, we add days that child go to any kind of supplementary school/test preparation school or in private tutoring for a week (*Days of supplementary school*) to our regression. Figure 3 shows the distribution of *days of supplementary school*, which indicates 73.10% of children do not go to any kind of supplementary school. This statistics is average responses of parent and child. Table 2 provides the statistics of *Days of supplementary school* by grades. We find that the averages of *Days of supplementary school* increases from 0.14 in 4^{th} grade in elementary school to 0.76 in 5^{th} grade. However the median of *Days of supplementary school* in 5^{th} grade is zero. This indicates that the children who have already been going to any kind of supplementary school increase the days to go to there moreover.

The descriptive statistics of attributes of parents and child are shown in Table 3. The average household's income is 503.89 million yen. The half of respondents is male. The average birth year is 1968. The fraction of respondents who graduate college or university or finish a graduate is 29%. The average household size is 4.57 and average number of child is 2.31.

4. Results

4.1. Parenting and Parental Worldview

We, firstly, provide the estimation results that correspond to the first stage results of IV to confirm the validity of instruments and the relationship between parenting and parental attributes.

Worldview could be divided into two groups. The first group consists of people who think hardship is not helpful for character building at all and the second consists of people who think hardship is helpful. The first group is the respondents who answer 0 toward *Worldview* and the second group is respondents who answer from 10 to 100. Furthermore, we split the second group into 4 groups: the first is from 10 to 40, the second is 50, the third is from 60 to 90, and the forth is 100. To consider nonlinear effects of parental worldview on parenting, we employ three patterns of instruments.

Table 4 provides the estimation results by probit model. Dependent variable is *Tough love parenting* that is dummy variable. Independent variables are *Worldview*, attributes of parents and child, and *Days of supplementary school*. The figures are marginal effects and the robust standard errors are in bracket. The first column of Table 2 is the results using *Worldview* that takes from 0 to 100. This assumes the linear effect of parental worldview on parenting. The coefficient of *Worldview* in first column is not significant. The parent who has the higher possibility that hardship is helpful does not give tough parenting. In second column, to take into account of nonlinear effects, we use four dummies of *Worldview*. The reference is people who answer 50. The coefficient of 0 dummy is −0.25 and that of 10−40 dummy is 0.11 and these are significant at 1% and 5% respectively. The third column shows the result using only 0 dummy. The coefficient of 0 dummy is −0.30 and significant at 1%. These result

confirm that the discrepancy in parenting between the parents who think hardship is not helpful for character building at all and the parents who think hardship is helpful from.

4.2. The effects of tough love parenting on child's study hours

Table 5 provides the estimation results of effects of parenting on child's study hours. Column (1) and (2) shows the results by TEM and column (3) and (4) shows the results by 2SLS and IV. Column (1) and (3) use four dummy variables and column (2) and (4) use only one dummy variable. Control variables are family income quartile dummies, male dummy, years of birth, college or more dummy, household size, number of children, child's male dummy, oldest child's dummy, *Days of supplementary school*, grade dummies, and scale dummies for regional population.

The results of TEM show that the coefficients of parenting are 1.08 and 1.07 and these coefficients are significant at 1%. The null hypothesis of Wald test is $\rho=0$ in covariance matrix in TEM. The rejection of this test indicates the possibility that parenting is not exogenous variable.

Then, we see the results by 2SLS and IV. The coefficient in column (3) is 1.02 and significant at 5%. We find that Hansen J test is not rejected. This result implies *Worldview* do not correlate to error term. Partial R square in column (3) show 0.04 that is larger than in (4). However, F statistics of excluded instruments in 1^{st} stage in column (3) is smaller than in column (4). Stock et al. (2002) recommend that the F statistics should be more than 10 to avoid the weak instrument problem. Thus, we put emphasis on the result in column (4).

In summary, we find that tough love parenting increases child's study hours by about 1 hour and parental worldview has an effect on child's study hours throughout

parenting.

4.3. Results by OLS

To evaluate the endogenous problem, we provide regression results by OLS. The result is shown in Table 6. We estimate three models that are different in control variables. The coefficients of tough love parenting in each model are not significant. These results indicate the endogenous problem is critical to estimate the causal effects of parenting. Adjusted R squared in column (3) is 0.33 that is larger than column (2) by 0.13, which indicates *Days of supplementary school* is indispensable variable for our model. The coefficient of 4^{th} quartile dummy of family income in column (2) is 0.23 and significant at 10%, while that in column (3) is 0.14 and insignificant. These results imply that higher family income increase child's study hours throughout *Days of supplementary school*.

5. Conclusion

To uncover the mechanism of cultural transmission, this paper empirically analyzes the effects of parenting on child's diligence. We use the proxy of child's diligence for study hours. Parents could change their parenting with children due to children's personality and behavior. To clarify the causality, we overcome the endogenous issue concerning on parenting. We employ instrumental variable method and treatment-effect model. Our instrument is parental worldview that governs economic behavior. The empirical results show that tough love parenting increases child's study hours about one hour in a day. In addition, parental worldview about hardship has an impact on child's study hours throughout parenting. These results indicate that tough love parenting by parents with

worldview that hardship is helpful for building of child's diligence.

Finally, we mention policy implications based on our results. Because our results are related to a virtue of diligence, they are related to recent discussions surrounding the role of virtue ethics for normative economics (see, e.g., Sandel (2009, 2013) and Bruno and Sugden (2013)). Bhatt, Ogaki, and Yaguchi (2013b) proposed an approach to balance considerations from welfarism and virtue ethics for normative analysis of economic models with endogenous preferences.[9] They use the tough love model to show that a policy that tries to maximize a social welfare function can result in a policy that affects patience of the child even when the government does not give any consideration to virtue ethics. They argue that a government should evaluate how their policies are affecting endogenous preferences, and then decide to consider whether or not promoting virtues is desirable.

According to our empirical results, any policy that affects tough parenting is not likely to be neutral with respect to endogenous preferences that affect diligence of children such as the time discount factor. For example, in Bhatt, Ogaki, and Yaguchi's (2013b) model, the bequest tax rate affects parenting because it changes temptation levels for parents to spoil children during their childhood. Another example given that worldviews affect parenting behaviors as indicated by our results is libertarian paternalistic policies that aim to affect social norms for pareting in order to promote diligence.

[9] Bhatt, Ogaki, and Yaguchi (2013a) applied this approach to an endogenous altruism model.

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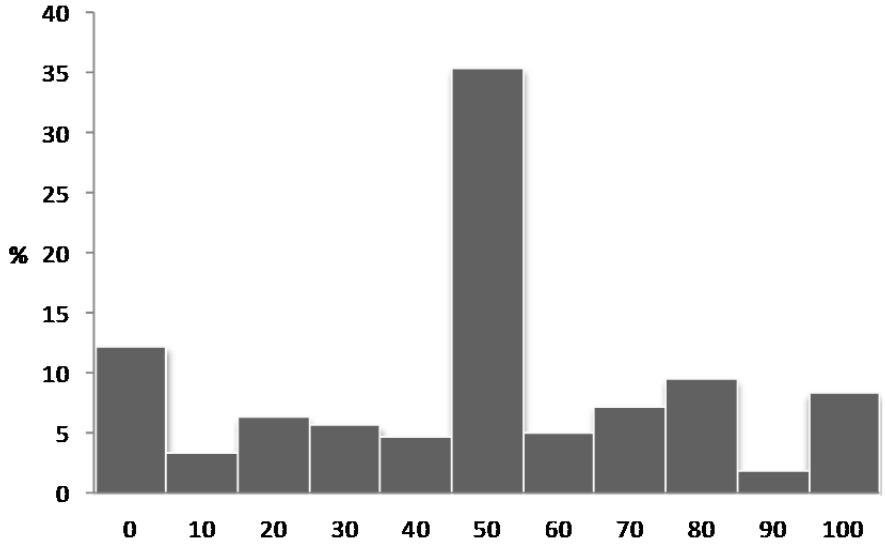
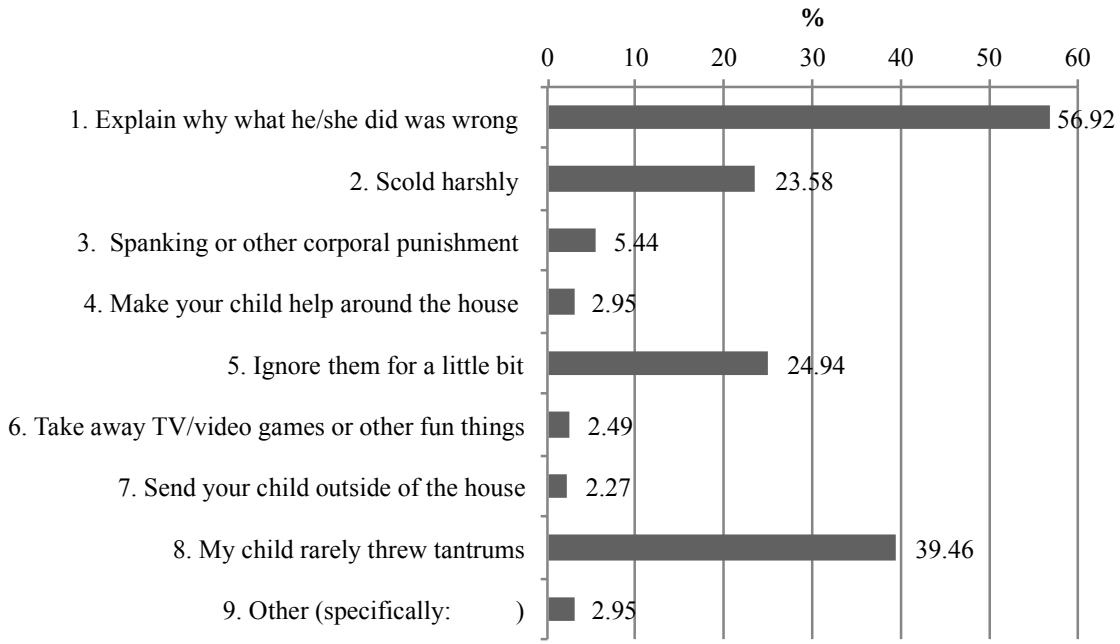
Figure 1. Parental worldview



"Circle the appropriate number for each of the following questions. Choose 0 if you totally disagree with the statement. Choose 50 if you partially agree with the statement (50%). Choose 100 if you completely agree with the statement."

If you are experiencing a hardship, such as if you had an accident, undergoing the hardship itself is helpful for character building.										
0	10	20	30	40	50	60	70	80	90	100

Figure 2. Parenting



"Before they started elementary school, when your child threw a tantrum in a store and made a scene because they wanted toys/candy, what did you do? Please circle all items that apply."

Figure 3. Days of supplementary school

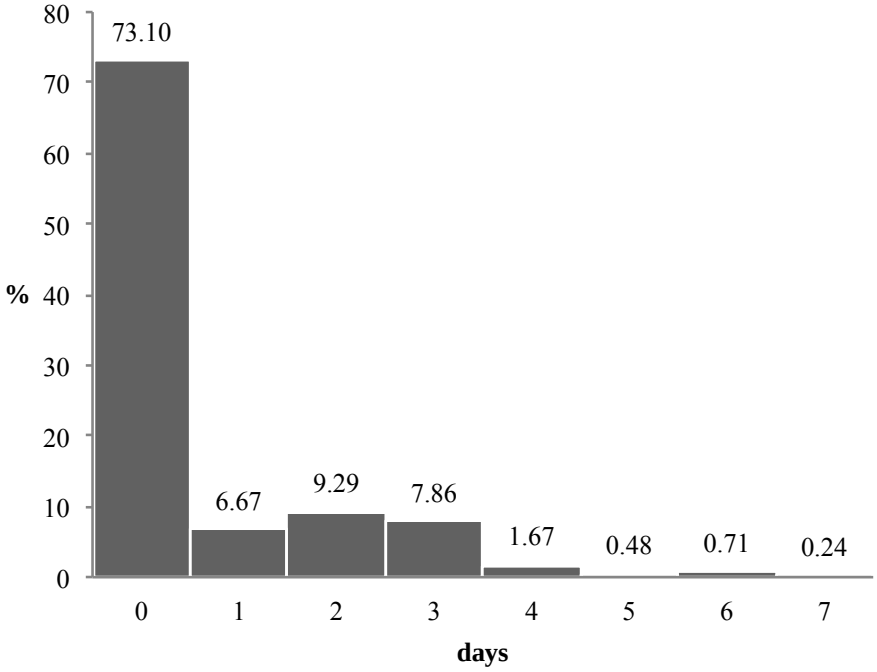


Table 1. Child's study hours by grades

Response by:	Parent			Child			Mean		
	Obs.	Mean	S.D.	Obs.	Mean	S.D.	Obs.	Mean	S.D.
Grade in an elementary school									
1st	58	0.61	0.33	0	-	-	58	0.61	0.33
2nd	43	0.69	0.46	0	-	-	43	0.69	0.46
3rd	60	0.71	0.42	0	-	-	60	0.71	0.42
4th	44	0.80	0.48	36	0.87	0.59	36	0.82	0.46
5th	57	1.17	0.80	49	1.31	1.05	49	1.23	0.89
6th	37	1.14	1.17	33	1.26	1.14	33	1.17	1.00
Grade in a junior high school									
1st	55	1.22	0.97	55	1.66	1.31	55	1.44	1.02
2nd	46	1.30	0.82	46	1.99	1.17	46	1.65	0.83
3rd	39	1.29	1.11	39	1.51	1.09	38	1.42	0.94
Total	439	0.98	0.80	258	1.47	1.15	418	1.06	0.82

Table 2. Days of supplementary school by grades

	Obs.	Mean	Min	Median	Max	S.D.
Grade in an elementary school						
1st	57	0.11	0.00	0.00	3.00	0.45
2nd	41	0.17	0.00	0.00	2.00	0.50
3rd	54	0.22	0.00	0.00	3.00	0.63
4th	43	0.14	0.00	0.00	2.00	0.47
5th	54	0.76	0.00	0.00	5.00	1.34
6th	34	0.85	0.00	0.00	7.00	1.62
Grade in a junior high school						
1st	53	0.72	0.00	0.00	3.00	1.10
2nd	46	1.35	0.00	1.00	4.00	1.32
3rd	38	1.76	0.00	1.00	6.00	1.91
Total	420	0.64	0.00	0.00	7.00	1.23

Table 3. Descriptive Statistics

	Obs.	Mean	S.D.	Min	Max
Parental attributes					
Family income	416	503.89	214.45	20	1400
Male dummy	441	0.50	0.50	0	1
Birth year / 100	441	19.68	0.06	19.44	19.84
College or more dummy	438	0.29	0.46	0	1
Household size	441	4.57	1.10	1	9
Number of children	441	2.31	0.74	1	5
Child attributes					
Child male dummy	441	0.51	0.50	0	1
Oldest child dummy	441	0.41	0.49	0	1

Table 4. Parental worldview and parenting

	(1)		(2)		(3)	
Parental worldview						
Suffer	0.05	[0.07]				
Suffer dummies (Reference is Suffer 50)						
Suffer 0			-0.25	[0.10]***	-0.30	[0.10]***
Suffer 10-40			0.11	[0.05]**		
Suffer 60-90			0.06	[0.05]		
Suffer 100			-0.05	[0.08]		
Parental attributes						
Family income (Reference is 1st quartile)						
2nd quartile	0.06	[0.06]	0.04	[0.06]	0.06	[0.06]
3rd quartile	0.06	[0.05]	0.03	[0.05]	0.06	[0.05]
4th quartile	0.06	[0.06]	0.04	[0.06]	0.06	[0.06]
Male dummy	0.01	[0.04]	0.03	[0.04]	0.04	[0.04]
Birth year / 100	1.17	[0.41]***	1.27	[0.40]***	1.28	[0.41]***
College or more dummy	0.00	[0.05]	0.00	[0.05]	0.00	[0.05]
Household size	0.00	[0.02]	0.00	[0.02]	0.00	[0.02]
Number of children	0.00	[0.03]	-0.01	[0.03]	0.00	[0.03]
Child attributes						
Child male dummy	0.09	[0.04]**	0.09	[0.04]**	0.08	[0.04]**
Oldest child dummy	-0.05	[0.04]	-0.05	[0.04]	-0.05	[0.04]
Private-tutoring school (Reference is zero in a week)						
Once	-0.02	[0.08]	-0.04	[0.07]	-0.03	[0.08]
Twice	-0.08	[0.07]	-0.09	[0.07]	-0.09	[0.07]
Three times	-0.18	[0.11]*	-0.19	[0.11]*	-0.17	[0.11]
More than four times	-0.08	[0.13]	-0.08	[0.13]	-0.09	[0.13]
Grade dummies (Reference is 1st grade in an elementary school)						
2nd	0.04	[0.07]	0.04	[0.07]	0.04	[0.07]
3rd	0.00	[0.07]	0.00	[0.07]	0.01	[0.07]
4th	0.06	[0.07]	0.08	[0.07]	0.07	[0.07]
5th	-0.10	[0.08]	-0.09	[0.08]	-0.09	[0.08]
6th	0.11	[0.08]	0.11	[0.08]	0.12	[0.08]
1st grade in a junior high school	0.09	[0.08]	0.08	[0.07]	0.09	[0.07]
2nd	-0.05	[0.09]	-0.05	[0.09]	-0.04	[0.09]
3rd	0.07	[0.09]	0.09	[0.09]	0.08	[0.09]
Scale dummies for regional population (Reference is small)						
Middle	0.05	[0.04]	0.04	[0.04]	0.04	[0.04]
Large	-0.15	[0.11]	-0.12	[0.11]	-0.14	[0.11]
Log of pseudo-likelihood	-154.80		-145.28		-149.01	

Note: Number of observations is 374. Dependent variable is *Tough love parenting*. Reported figures are marginal effects estimated using probit model and their standard errors in brackets are robust against heteroskedasticity.

Table 5. The effects of parenting on child's study hours

	TE	TE	2SLS	IV
	(1)	(2)	(3)	(4)
Tough love parenting	1.08***	1.07***	1.02**	1.38**
	[0.13]	[0.11]	[0.48]	[0.67]
Instruments				
Suffer 0	Yes	Yes	Yes	Yes
Suffer 10-40	Yes	-	Yes	-
Suffer 60-90	Yes	-	Yes	-
Suffer 100	Yes	-	Yes	-
Log of pseudo-likelihood	-512.1	-516.7		
Wald statistics	65.43	79.48		
[p-value]	[0.00]	[0.00]		
Partial R squared			0.04	0.02
F statistics			5.33	15.90
[p-value]			[0.00]	[0.00]
Hansen J statistics			2.87	
[p-value]			[0.41]	

Note: Dependent variable is *child's study hours*. All estimations are implemented with other controls same as Table 4. Number of observations is 374. The standard errors in brackets are robust against heteroskedasticity.

Table 6. The effects of parenting on child's study hours: OLS

	(1)		(2)		(3)	
Tough love parenting	-0.13	[0.09]	-0.12	[0.10]	-0.07	[0.09]
Parental attributes						
Family income (Reference is 1st quartile)						
2nd quartile			0.14	[0.14]	0.15	[0.13]
3rd quartile			0.11	[0.11]	0.06	[0.10]
4th quartile			0.23	[0.12]*	0.14	[0.11]
Male dummy			0.07	[0.08]	0.01	[0.07]
Birth year / 100			-0.23	[0.83]	-0.04	[0.75]
Callege or more dummy			-0.09	[0.08]	-0.09	[0.07]
Household size			0.01	[0.04]	0.05	[0.03]
Number of children			-0.08	[0.06]	-0.07	[0.06]
Child attributes						
Child male dummy			0.10	[0.08]	0.06	[0.07]
Oldest child dummy			0.03	[0.08]	0.02	[0.08]
Private-tutoring school (Reference is zero in a week)						
Once					0.27	[0.14]*
Twice					0.66	[0.15]***
Three times					0.79	[0.19]***
More than four times					1.27	[0.26]***
Grade dummies (Reference is 1st grade in an elementary school)						
2nd	0.08	[0.09]	0.08	[0.10]	0.06	[0.09]
3rd	0.10	[0.08]	0.10	[0.08]	0.06	[0.07]
4th	0.22	[0.10]**	0.24	[0.10]**	0.23	[0.10]**
5th	0.60	[0.15]***	0.60	[0.15]***	0.43	[0.12]***
6th	0.46	[0.15]***	0.45	[0.16]***	0.29	[0.14]**
1st in a junior high school	0.83	[0.15]***	0.82	[0.17]***	0.66	[0.16]***
2nd	1.03	[0.14]***	1.00	[0.15]***	0.67	[0.15]***
3rd	0.92	[0.17]***	0.90	[0.19]***	0.48	[0.21]**
Scale dummies for regional population (Reference is small)						
Middle			-0.05	[0.08]	-0.04	[0.07]
Large			-0.02	[0.16]	0.06	[0.15]
Constant	0.65	[0.05]***	5.13	[16.30]	1.29	[14.81]
Adjusted R squared	0.21		0.20		0.33	

Note: Dependent variable is *child's study hours*. Number of observations is 374. The standard errors in brackets are robust against heteroskedasticity.