From Rules to Hugs: The Impact of Parental Strictness and Warmth on Juvenile's Time Allocation*

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Abstract

In this paper, I study the effects of parental strictness and warmth on juvenile's time allocation and human capital formation. I build a structural model where a juvenile solves a time allocation problem by choosing how much time to spend on studying, delinquent leisure, and regular leisure. Her returns from studying and delinquent leisure depend on corresponding dimensions of human capital, namely educational capital and delinquent capital. I assume that parental strictness and warmth are capital inputs and use instrumental variables (IV) to estimate their impact on the corresponding measures of human capital. My estimates suggest that warmth has a strong positive impact on educational capital, whereas strictness has a strong negative impact on delinquent capital. Simulations reveal that although warmth does not discourage delinquent leisure as much as strictness does, it greatly incentivizes studying both through a direct effect on educational capital and through emerging time substitution patterns. At the same time, the strong decrease in delinquent leisure induced by strictness is compensated mostly by an increase in regular leisure rather than studying. The implications of these results for human capital formation are discussed.

Keywords: Juvenile Delinquency, Parental Strictness, Parental Warmth, Time Allocation.

JEL Codes: D1, D10, I20, J22

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1 Introduction

Crime incurs tremendous economic and social costs. However, most criminals that show consistent anti-social behavior start their criminal careers as juveniles. Parenting has a very important role in shaping patterns of behavior of adolescents: right parental decisions could potentially prevent juvenile from becoming an adult criminal. The question is, what is the right parental attitude to do so? In this paper, I study the impact of parental strictness and warmth on the lifestyle of a juvenile framed as an outcome of a time allocation problem.

The association between parenting styles and juvenile delinquency has been abundantly studied in the past (see, for instance, Hoeve et al. (2009) for an excellent meta-analysis). However, as seminal paper of Lochner (2004) indicates, the choice of whether to engage into criminal career as an adult depends on returns from criminal and non-criminal activities, which, in turn, depend on the corresponding dimensions of human capital. Thus, we cannot deduce how parenting affects the likelihood of a transition from juvenile to an adult criminal solely on the basis of temporary associations between delinquency and parental attitude. For instance, it is possible that some parenting measures, while being effective in preventing delinquency in the short run (or while parents are actively engaged into parental process), fail to stimulate accumulation of non-criminal human capital and thus do not alter (or even facilitate) the trajectory towards adult criminal career.

Focusing on the impact of parental attitude on lifestyle of a juvenile fixes the above issue, since it allows to see not only whether juvenile spends less time engaging into delinquent activities upon parental influence but also what activities does he choose to substitute it with in the free time. This creates a direct link between parental influence and human capital accumulation.

In order to estimate the impact of parental attitude on a lifestyle of a juvenile, I proceed as follows. First, I build a structural model where juvenile solves a time allocation problem. In particular, given fixed amount of free time, she allocates it between studying, delinquent leisure and non-delinquent leisure. Utility has a Cobb-Douglas shape with returns to studying and delinquent leisure being positively related to, respectively, juvenile's educational and delinquent capitals. Using this model, I estimate preference parameters. Then, I use instrumental variables to estimate the effect of parental strictness and parental warmth on juvenile's educational and delinquent capitals. After that, I simulate how would change in strictness and warmth affect juvenile's solution to the time allocation problem.

My IV approach reveals that parental warmth has a strong positive impact on educational capital and no significant impact on delinquent capital, whereas parental strictness has no significant impact on educational capital and strong negative impact on delinquent capital. Given preference parameters, simulation reveals that although warmth does not discourage juvenile from delinquent leisure as much as strictness, it leads to an increased time devoted to studying. At the same time, the strong negative effect of strictness on delinquent leisure leads to substitution of the latter with mostly regular leisure. With these results in mind, implications of parental attitude for human capital formation are discussed.

Data for the described above procedure comes from NLSY97 data set. In particular, I focus on juveniles (respondents in the age between 13 and 17 who have self-reported committing at least one delinquent activity) from two-parent households. To measure parental strictness and warmth, I use NLSY97 data and sum mother's and father's strictness and warmth indicators reported there. To estimate preference parameters I take information on daily average time allocated to studying, time allocated to leisure, delinquency score (proxy for delinquent capital) and GPA in 8th grade (proxy for educational capital). Unfortunately, there is no data on delinquent leisure. To get estimates of

delinquent leisure for each juvenile, I assume that it is proportional to relative delinquent intensity, which is a ratio of total number of reported delinquent activities to its Poisson fit on delinquent capital. In other words, upon assuming that commitment of delinquent actions follows a Poisson process depending on delinquent capital, relative delinquent intensity is expected time until juvenile commits the last of her reported delinquent deeds. By making delinquent leisure proportional to it, I capture two ideas: first, the more delinquent actions juvenile commits, the more time all else equal she spends on delinquent leisure; second, the larger is juvenile's delinquent capital, the less delinquent leisure time it takes until the occurrence of delinquent action. Proportionality coefficient is then estimated along with preference parameters via a standard GMM procedure.

My paper is organized as follows. Section 2 is devoted to related literature. In section 3 the data, timing of its collection and estimation of delinquent leisure are described. In section 4, I present the basic model, which is than estimated in section 5. In section 6, I use IV to back out the impact of parental strictness and warmth on my measures of educational and delinquent capital. Section 7 then contains simulation of the impact of parental strictness and warmth on juvenile time allocation, as well as the discussion of its results. Finally, section 8 concludes.

2 Place in the Literature

Current paper is related to the literature on the impact of parenting on juvenile delinquency. Previously mentioned Hoeve et al. (2009) meta-analysis goes over 161 paper and reports that parental strictness in terms of punishment is positively related to delinquency, whereas parental support has a strong negative influence. However, as is pointed by authors, majority of studies were cross-sectional (88 studies), whereas those studies that focus on longitudinal analysis neglect or leave unaddressed the possibility for reverse causality between parenting style and delinquency. Moreover, it stays unclear how persistent are the effects of parental attitudes on delinquency and thus we cant be sure how discovered connections affect the likelihood of becoming an adult criminal even if they are valid. A more recent meta-analysis by Flanagan et al.(2019) focuses on the effects of parental supervision on later offending. It analyzes 21 longitudinal studies and reports that both excessive and poor supervision leads to an increase of the odds of adult offending. Again, in contrast to my paper, none of the studies control for the unobserved reverse causality or address the mechanism through which parenting affects adult economic (criminal or legal) choices.

Also, my works contributes to economic modelling of criminal deterrence through the lenses of human capital (e.g., Lochner(2004, 2007), Imai and Krishna (2004), McCrary and Chalfin (2017), Arora (2023)). Similarly to Lochner (2004), choice between criminal (in my case, delinquent) and legal activities is made on the basis of returns depending on the corresponding dimensions of human capital. However, I view delinquency not as an instrument for monetary gain but rather as a random consequence of extracting utility from delinquent leisure. This perspective is consistent with causes of juvenile delinquency as reported by juveniles (e.g., Kraus (1977), Farnworth (1998)), which indicate that boredom and thrill seeking are much more common reasons than material incentives. With this being said, my paper is also the first to model juvenile delinquency structurally.

Finally, this paper is also related to the literature on the process of children capital formation as a result of parental upbringing (Del Boca et al. (2014), Verriest et al. (2023)). Similarly to these papers, I analyze how parental decisions affect human capital and, consequently, time allocation of a child. However, in contrast to them, I add a delinquency dimension to the problem.

3 Basic Model

Assume that a juvenile has TT hours of free time, which she allocates between studying (s), delinquent leisure (l_d) and non-delinquent leisure (l_{nd}). Her returns to each activity depend on educational capital (k_s), delinquent capital (k_d) and preference vector (α):

$$max_{s,l_d,l_{nd}} U(s, l_d, l_{nd}) = \alpha_1 k_d log(l_d) + \alpha_2 k_s log(l_s) + log(l_{nd})$$

$$\text{s.t. } s + l_d + l_{nd} = TT \tag{1}$$

Note that marginal return from non-delinquent leisure is wlog normalized to 1. Problem (1) leads to a simple closed-form solution:

$$\begin{cases} s^* = \frac{TT\alpha_2 k_s}{\alpha_1 k_d + \alpha_2 k_s + 1} \\ l_d^* = \frac{TT\alpha_1 k_d}{\alpha_1 k_d + \alpha_2 k_s + 1} \\ l_{nd}^* = \frac{TT}{\alpha_1 k_d + \alpha_2 k_s + 1} \end{cases} \tag{2}$$

To estimate preferences from the above model, information on $TT, s^*, l_d^*, l_{nd}^*, k_d$ and k_s for each agent is required.

4 Data for Basic Model Estimation

To conduct my analysis, I use the famous NLSY97 data set which presents a longitudinal survey of behavioral and educational experiences of 8984 respondents in the age from 12 to 18 as of 1997. Throughout, I focus on the first (1997) and second (1998) NLSY97 waves. Resulting sample consists of children from two-parent households who had self-reported committing at least one delinquent action in-between first the second waves of NLSY97 (which is reported in the second wave of survey). These delinquent actions include property crimes of three kinds (minor ($\leqslant$50\$), major (>50\$) and "other", which stands for possessing and selling stolen goods), attacking anyone to hurt or fight, selling drugs and intentional destruction of property. Due to the fact that data on studying and leisure is reported only for a fraction of original sample and because (1) implicitly assumes interior solution (every agent should choose positive amount of studying), this leaves me with 375 units in my final sample.

4.1 Getting k_d, k_s, s^*, l_{nd}^* and TT

To measure delinquent capital (k_d), I use "Delinquency Score Index" from the first wave, which captures self-reported delinquent experience with higher score indicating more incidents of delinquency in the past. The score ranges from 0 to 10, which, to avoid corner solutions, I normalize to be from 1 to 11.

To measure educational capital (k_s), I use self-reported "Grades received in the 8th grade" index from the first and second waves ranging from 1 ("Mostly below D's") to 8 ("Mostly A's").

To obtain data on optimal choices on studying (s^*) and non-delinquent leisure (l_{nd}^*), I also use the first wave of NLSY97.

For studying, I use information on how much time does respondent spend on homework on weekdays and weekends. I take sum of these answers with respective weights of 5/7 and 2/7 and use it as a measure of average time spent on studying.

As for non-delinquent leisure, I assume that it consists of watching TV, reading for pleasure, sport practicing and engaging into active leisure with family. Data on watching TV and reading comes directly from the NLSY97 in a form of self-reported time spent on these activities on weekdays and weekends. Similarly to studying, to obtain average I apply respective weights of 5/7 and 2/7.

To obtain daily time spent on active family leisure, data on frequency (number of days per week) of engaging in active family leisure (playing games, attending sports, etc.) reported in NLSY97 is used. I assume that average time of one session of active family leisure is 2 hours.

To obtain daily time spent on sport, data on frequency (number of days per week) of engaging in lengthy (30 minutes +) sport exercises is used. On the basis of Duncat et al. (2010), I assume that the average length of one exercise session is 70.02 minutes for males and 65.21 minutes for females. The data on exercising is available only for 14 year old respondents, so I simulate the results for the rest of my sample using sex, race, income, puberty and PUMA fixed effects as predictors.

One possible problem is that in reality overall studying may additionally include activities other than doing homework (e.g., studying for pleasure). Similarly, non-delinquent leisure may also additionally include activities that are different from the four leisure types considered above. To mitigate this issue, I allow for white noise in my measures of studying and non-delinquent leisure, thus assuming that on average studying is equal to time spent on homework and on average non-delinquent leisure is equal to time spent on watching TV, reading for pleasure, sport practicing and engaging into active leisure with family combined.

Finally, I calibrate total average free time TT. For that, I use Wight et al. (2009) which describes the time use of teenagers on the basis of American Time Use Survey (ATUS) data. Calibration yields TT equal to 9 hours for each adolescent: from 24 hours, I deduct 11 hours of personal care (sleep+meals+grooming) for each day and 5 hours spent on attending school for weekdays, which gives 9 hours on average after applying 5/7 and 2/7 weights.

4.2 Getting l_d^*

4.2.1 Definition of Delinquent Leisure

Before I describe the procedure of obtaining l_d^*, it is worth discussing how we define it. Previous works didn't frame juvenile delinquency as a consequence of time allocation choice and so the concept is new.

It is tempting to assume that delinquent leisure is just the time spent on committing illegal actions. However, under this intuitive definition three problems arise: first, even though NLSY97 has a rich self-reported data on the number of delinquent actions committed, adequate calibration of time spent on each particular type of reported delinquencies is a tough exercise; second, even upon the right calibration it is unlikely that commitment of delinquent actions per se takes a lot of time. As a result, my approach would fail to properly represent the taste of agents for delinquency (e.g., all juveniles would strongly prefer studying to delinquent leisure). Third, under this definition we are effectively assuming that adolescents who did not commit any delinquent actions are choosing not to engage into delinquent leisure at all. In turn, corner solution implies that adolescents who did not commit any delinquent actions have drastically different shape of preference from adolescents who did, which in reality is unlikely.

To avoid these issues, I define delinquent leisure as time spent on activities which imply moral deviation from the ethical system imposed on adolescent by society and/or parents. Since the specific system of morals imposed on adolescent is in principle unobservable and moral deviation is in many ways subjective, I assume that each adolescent decides by herself what specific forms her

delinquent leisure takes. However, to make delinquent leisure of two distinct juveniles comparable, I invoke two additional assumptions: I) The more delinquent actions (as defined by NLSY97) adolescent commits, the more time, all else equal, she spends on delinquent leisure; II) More delinquent adolescents (in terms of delinquent capital) need to spend less time on delinquent leisure before the occurrence of delinquent action. In other words, more delinquent adolescents get more illegal opportunities during their delinquent leisure.

To formalize this approach, I assume that self-reported delinquent actions are a consequence of Poisson process occurring during delinquent leisure and depending on delinquent capital. The procedure of obtaining estimates of delinquent leisure for each adolescent in my sample is described in the next subsection.

4.2.2 Estimating Delinquent Leisure

To obtain estimates of delinquent leisure for each child, I view delinquent actions (self-reported in the second wave of NLSY97) as a consequence of Poisson process occurring during delinquent leisure and depending on delinquent capital. To be more precise, I assume that delinquent leisure is proportional to relative delinquent intensity, which is a ratio of total weighted number of reported delinquent activities to its Poisson fit on delinquent capital. In this way, I'm able to capture assumptions I) and II) presented in the previous subsection. Formal procedure is described below:

1) I use self-reported information on commitment of delinquent activities in-between the first and second waves of NLSY97 (reported in the second wave) to obtain total weighted number of delinquent actions. Higher weights are attributed to more severe delinquencies: 1 for destruction of property, small and "other "property crimes, 2 for large property crimes and assault, 4 for selling drugs. This gives me a measure of total delinquency which accounts for severity of committed delinquent actions;

2) I assume that total delinquency, given for each juvenile as a total weighted number of delinquent actions, follows a Poisson process and depends on delinquent capital reported in the first wave of NLSY97. That is, $D_i \sim Pois(\lambda_0 + \lambda_1 k_{d,i})$. To retrieve these parameters, I run Poisson regression of the following form:

$$log(E(D_i|k_{d,i})) = \theta_0 + \theta_1 k_{d,i} \tag{3}$$

As a result, estimate of a Poisson parameter for juvenile i is than $exp\{\hat{\theta}_0 + \hat{\theta}_1 k_{d,i}\}$;

3) Given $D_i \sim Pois(\lambda_0 + \lambda_1 k_{d,i})$, for juvenile i waiting time until the first unit of delinquency has exponential distribution with parameter $\lambda_0 + \lambda_1 k_{d,i}$. Hence, waiting time (in years) until the D_i'th unit is a sum of D_i independent exponentially distributed variables, which has mean $\frac{D_i}{\lambda_0 + \lambda_1 k_{d,i}}$. That is, for juvenile i who has total weighted number of delinquent actions D_i, expected time before occurrence of the last unit is $\frac{D_i}{\lambda_0 + \lambda_1 k_{d,i}}$. I call the latter relative delinquent intensity. Note that we cant simply use relative delinquent intensity to be a measure of delinquent leisure since our Poisson process implicitly assumes that every child spent the same time on delinquent leisure (but with intensities depending on delinquent capital);

4) I assume that delinquent leisure is on average proportional to relative delinquent intensity, which implies that the order of delinquent leisure in the sample is assumed to be the same on average as the order of relative delinquent intensity. This allows to capture two ideas: first, the more there are instances of delinquent actions, the more time, all else fixed, is spent daily on delinquent leisure; second, the more delinquent capital a juvenile has, the more delinquent opportunities she gets: as a result, juveniles with higher delinquent capital are assumed to spend less leisure time before

occurrence of delinquent action.
Formally, I assume that there is a random mapping from relative delinquent intensity to the daily choice of delinquent leisure $l^*_{d,i}$:

$$l^*_{d,i} = \beta \frac{D_i}{\lambda_0 + \lambda_1 k_{d,i}} + \xi_i \tag{4}$$

In the above, ξ_i is some continuously distributed random variable with the assumption that $E(\xi_i | k_{d,i}, k_{s,i}) = 0$ and β is some unknown proportionality coefficient. This coefficient is later estimated along with preference parameters via the GMM procedure described in the next section.

4.2.3 Alternative Definition and Estimation

One alternative way to define l_d is to assume that it is just the time left after we deduct studying and regular leisure from total free time. In this case, estimation procedure is drastically simplified: for each juvenile, $l^*_{d,i} = TT - s^*_i - l^*_{nd,i}$. If we had perfect estimates of studying and regular leisure, that would've been a great solution.

However, due to the fact that my measures of studying and regular leisure do not encompass all the possible studying and regular leisure activities, this procedure does not yield good results. We are effectively mixing delinquent leisure with types of studying and regular leisure which are not accounted for in the data.

Since both ways of estimating delinquent leisure are artificial, the only way how we can compare quality of the two is to see how good they match stylized facts about delinquency known from the literature. In appendix, I compare gender and age patterns observed in the resulting arrays of artificial data and conclude that method described in the previous subsection fits stylized facts much better than the residual method proposed here.

4.3 Timing

One last concern to discuss in this section is the timing of collected data. Two waves of NLSY97 are used. The choice modelled by (2) is assumed to take place at the time of the first wave interview. However, while data on studying, non-delinquent leisure and delinquent capital (measured by delinquency score) do come from the first wave of NLSY97, data on educational capital (GPA in 8th grade) is obtained from the second wave for some of the respondents, whereas estimates of delinquent leisure exploit second wave data (on total number of delinquent actions committed) for the whole sample.

First, blending all this data together implicitly assumes educational capital invariance in a year interval around the first wave (some respondents had finished 8th grade a year before the first wave, while some finished it only by the second wave). Second, Poisson process used to obtain relative delinquent intensity (and, consequently, estimates of delinquent leisure) ignores the possible evolution of delinquent capital with the number of delinquent actions committed.

To solve the first issue, a milder assumption of average invariance of educational capital could be used. That is, $E(\Delta k'_s | k_s) = 0$, where difference is between the true (unknown) capital as of the first wave, k'_s, and capital actually used in my preference estimation, k_s. More details on why this assumption would suffice, as well as discussion of its reasonability, can be found in Appendix. In short, under the $E(\Delta k'_s | k_s) = 0$ assumption moment condition with the true capital is approximately equivalent to the moment condition with the reported capital. Moreover, $E(\Delta k'_s | k_s) = 0$ holds very well for the difference between high school GPA and 8th grade GPA, which suggests that

to assume the same for GPA as of the first wave, which is closer to 8th grade GPA, also would be reasonable.

To solve the second issue, we may also assume average delinquent capital invariance in-between the first and the second waves. Unfortunately, this assumption could not be tested since my measure of delinquent capital as of the first wave (delinquency score) is calculated differently in the second wave.

5 Model Estimation

5.1 Moment Condition

Recall that each adolescent solves time allocation problem given by (1), which, for adolescent i, yields the following solution:

$$\begin{cases} s_i^* = \frac{TT\alpha_1 k_{s,i}}{\alpha_1 k_{s,i}+\alpha_2 k_{d,i}+1} \\ l_{d,i}^* = \frac{TT\alpha_2 k_{d,i}}{\alpha_1 k_{s,i}+\alpha_2 k_{d,i}+1} \\ l_{nd,i}^* = \frac{TT}{\alpha_1 k_{s,i}+\alpha_2 k_{d,i}+1} \end{cases} \tag{5}$$

Upon plugging s_i^*, $l_{nd,i}^*$ and $l_{d,i}^*$ described in the previous section, (5) could be transformed into the following system of moments:

$$\begin{cases} E[s_i^* - \frac{TT\alpha_1 k_{s,i}}{\alpha_1 k_{s,i}+\alpha_2 k_{d,i}+1}] = 0 \\ E[\beta \frac{D_i}{exp\{\hat{\theta}_0+\hat{\theta}_1 k_{d,i}\}} - \frac{TT\alpha_2 k_{d,i}}{\alpha_1 k_{s,i}+\alpha_2 k_{d,i}+1}] = 0 \\ E[l_{nd,i}^* - \frac{TT}{\alpha_1 k_{s,i}+\alpha_2 k_{d,i}+1}] = 0 \end{cases} \tag{6}$$

The above system is exactly identified and I use regular GMM to obtain estimates of preference vector $\alpha = (\alpha_1, \alpha_2)$ and proportionality coefficient β.

5.2 Estimation Results

Estimation leads to $(\hat{\alpha}_1; \hat{\alpha}_2) = (0.033^{***}; 0.164^{*})$ and $\hat{\beta} = 2.32$. Proportionality coefficient is insignificant due to the large variance of relative delinquent intensity. Given $\hat{\alpha}$, mean returns from s and l_d are, respectively, 0.186 and 0.454.
Actual (estimated for $l_{d,i}^*$) and predicted (from utility maximization) time allocated to studying and delinquent leisure for different groups are presented in Table 1 below:

	mean s^*	mean $\hat{s}^*$	mean l_d^*	mean $\hat{l}_d^*$
Whole sample ($N = 375$)	1.04	1.04	2.34	2.34
Male ($N = 231$)	0.99	1.00	2.51	2.52
Female ($N = 144$)	1.13	1.10	2.07	2.05
Age $\leqslant 14$ ($N = 199$)	1.07	1.05	1.91	2.23
Age $\geqslant 15$ ($N = 176$)	1.01	1.03	2.82	2.46

Table 1: Actual and predicted (with a hat) time allocated to s and l_d (hours) by gender and age

Table 1 reveals that despite some restrictive assumptions previously imposed due to the data imperfections, my model fits reasonably well across different groups and matches some stylized facts about juvenile delinquency observed in the data.

The first row of Table 1 just shows mean values of studying and delinquent leisure across the sample. Perfect fit of predicted values here is expected and is a consequence of standard GMM routine.

Next two rows depict patterns of time allocation in male and female groups of the sample. As could be seen, model fits these patterns very well, which indicates that differences in male and female choices are well explained by their differences in delinquent and educational capitals. Also, note that both data and prediction reflects some frequently observed stylized facts about gender difference in educational habits and delinquent outcomes: first, girls spend more time on studying than boys (e.g., Witkow (2009)) and, second, boys are more delinquent than girls (e.g., Barnes et al. (2007)).

The last two rows show patterns of time allocation within the two age groups. Older juveniles tend to be more delinquent than younger ones, which is often explained in the literature by later puberty stages (e.g., Felson and Haynie (2002), Jackson (2012)). Also, this is congruent with Lochner (2004) predictions of substitution of regular human capital accumulation with criminal human capital accumulation on the path towards adult criminal career. The same is reflected by the model predictions, although less vividly due to the fact that GMM balances outliers.

6 Impact of Parental Strictness and Warmth on Juveniles' Capital

In order to estimate the impact of parental strictness and warmth on juveniles' time allocation, I need to incorporate them into the choice framework. Ideally, one would want to endogenise parental decisions regarding warmth and strictness within the structural model. However, this requires a much more detailed data on parental behavior which NLSY97 lacks. Therefore, I use alternative approach and assume that parental strictness and warmth are capital inputs for both educational capital and delinquent capital. Under this assumption, parental attitude is treated by juveniles as given. However, in Appendix I additionally report correlation matrix describing the relationship between parental attitude and parental characteristics (education, income).

Therefore, to simulate the impact of parental attitude on time allocation I need to obtain estimates of its influence on delinquency score and GPA, which are my measures of delinquent and educational capital. However, the problem mostly neglected by the previous studies is that we cant simply run OLS to do so due to the very likely presence of reverse causality. Parents may tend to be more strict and less warm towards adolescents with higher delinquency score and vice-versa towards adolescents with higher GPA. Solution that I employ is to use instruments.

This section proceeds as follows. First, I describe my measures of parental strictness and warmth. Next, I describe the instruments and controls used to solve aforementioned endogeneity problem. After that, I present and discuss the results of my IV routine.

6.1 Measures of Parental Strictness and Warmth

In the subsequent empirical analysis, I use measures of parental strictness and warmth provided by the first wave of NLSY97.

As a measure of parental strictness, I sum mother's and father's answers to the following question:

"In general, would you say your mother (father) is permissive or strict about making sure you did what you were supposed to do?" (Yes = 1; No = 0).

Similarly, as a measure of parental warmth, I sum mother's and father's answers to the question:

"When you think about how your mother (father) acts toward you, in general, would you say she (he) is very supportive, somewhat supportive, or not very supportive?"
(Very supportive = 1; Somewhat supportive/Not very supportive = 0).

It is worth noting that although above formulations were a standard for the literature at the time of NLSY97 first wave interview (e.g., used in a seminal paper on parenting styles by Baumrind (1991)), they leave a lot of room for interpretation. For instance, strictness formulated as above may be associated with either strictness of parental punishment or with intensity of parental monitoring. Although this work does not focus on the effects of specific dimensions of strictness and warmth, such generality of formulation should be kept in mind when IV results would be interpreted.

6.2 Instruments for Parental Strictness and Warmth

Due to the presence of reverse causality mentioned before, to conduct inference I need valid instruments for chosen measures of strictness and warmth. Both instruments should be independent of my measures of educational capital and delinquent capital, which are, respectively, delinquency score and GPA in 8th grade. I use existence of sister as a primary instrument for parental warmth and mother's age as a primary instrument for parental strictness. Since the assumptions of unconditional exclusion restriction of these instruments with respect to delinquency score and GPA most likely wouldn't hold, I make literature-based assumptions of their conditional exclusion restriction upon addition of certain controls described next.

6.2.1 Primary Instrument for Parental Warmth: Existence of Sister

As a primary instrument for parental warmth, I use a binary index indicating if considered adolescent has a sister.

We cannot argue for unconditional exclusion restriction of existence of sister with respect to delinquency score as it is well known that siblings may negatively influence each other. However, recent meta-analyses exploring relationships between siblings and delinquency (e.g., Walters (2022) and Maneiro et al. (2022), which cover more than 50 different studies combined) report that sex composition of siblings per se does not have impact on this influence: as is further reported by Walters (2022), what truly matters is the number of siblings and gender match between them. Thus, upon conditioning on the number of siblings and existence of gender match between juvenile and her siblings, I assume conditional exclusion restriction of existence of sister with respect to delinquency score.

Similar arguments are also applicable to the relationship between academic performance and existence of sister: to the best of my knowledge, most works that were studying the links between sibship and educational achievements report that sex composition of siblings per se does not have any significant influence upon accounting for the number of siblings and gender match (e.g., Hauser and Kuo (1998), Kaestner (1996)). One exception is Powell and Steelman (1990), which states that while the number of sisters does not affect GPA, number of brothers can. To account for this possibility, in addition to number of siblings and gender match, I control for existence of brothers.

6.2.2 Primary Instrument for Parental Strictness: Mother's Age

As a primary instrument for parental strictness, I use binary index indicating if juvenile's mother is over 45 years old, which corresponds to the upper quartile of the sample age distribution. To the best of my knowledge, there is no study that would link mother's age per se to delinquency or grades. However, mother's age could be associated with certain number of well-known risk factors, which include age at first birth, health issues, education and household income (e.g., Conseur et al. (1997), Van Vugt et al. (2016)). I control for all of the aforementioned risk factors and assume that conditional on that mother's age is independent of both delinquency score and GPA.

One could argue that even upon inclusion of said risk factors validity of mother's age as an instrument is still questionable. In contrast to the "existence of sister" instrument, validity of which is supported by a large body of literature, my reasoning here was indirect since it is nearly impossible to prove that all the possible risk factors are accounted for. To address this concern, in Appendix I also add father's age as a third instrument (additionally controlling for father's education) and conduct overidentifying restrictions test. As a result, on the basis of tests for delinquency score and GPA, we cannot reject the null hypothesis that chosen instruments are valid, which corroborates my previous argument.

6.3 Controls and Descriptive Statistics

In addition to the set of controls described in the last two subsections, I control for demographics (age, race, gender), father's age, physical risk index, enriching environment index, puberty index and PUMA fixed effects.

Physical environment index assesses physical risks in adolescent environment with higher values indicating more risk (e.g., bad neighborhood, absence of basic utilities, poor interior in the house, etc.). Enriching environment index assesses the quality of adolescents studying environment with higher values indicating higher quality (e.g., has quite place to study at home, has computer, has dictionary). Essentially, both these indexes provide me with dimensions of economic well-being not directly captured by household income, which is very important given the nature of my instruments.

For a more detailed description of controls I refer reader to the original NLSY97 Codebook. Descriptive statistics of all variables included in my regression analysis could be found in Table 2.

It is worth noting that puberty index ranging from 1 to 3 assesses puberty stage only for males and is coded as 0 for females. Also, the ratio of HH income to poverty level is not available for approximately 1/6 of adolescents in my sample. Since complete case analysis would even further trim the data and possibly create selection bias since people with low income are usually the ones who's reluctant to report it (Acock (2012)), I add indicator for the group with missing values and code their HH ratio to poverty level as 0. Such approach is known to be superior to other imputation techniques when values are not missing at random (Song et al. (2021)).

6.4 First Stage: Empirical Strategy and Results

On the first stage, I instrument parental strictness and warmth via mother's age and existence of sister. Both strictness and warmth take ordinal values ranging from 0 to 2. However, in order to obtain predicted values for the second stage, I still use OLS, which may raise some concerns regarding consistency since OLS is misspecified for categorical dependent variables. However, there is evidence that when predictors are binary such procedure still yields correct average marginal effects even in the presence of non-binary controls (e.g., Deke (2014), Battey et al. (2019)). To

	Mean	Std	Median	Min	Max
Delinquency score	2.77	1.65	2.00	1.00	10.00
GPA in 8th grade	5.55	1.69	6.00	1.00	8.00
Parental strictness	1.18	0.830	1.00	0.00	2.00
Parental warmth	1.33	0.733	2.00	0.00	2.00
Existence of sister	0.579	0.494	1.00	0.00	1.00
Existence of brother	0.608	0.489	1.00	0.00	1.00
Mother's age $\geqslant$ 45 y.o.	0.195	0.396	0.00	0.00	1.00
Father's age	43.00	5.96	42.00	29.00	70.00
Mother's health index	2.09	1.04	2.00	1.00	5.00
Father's health index	2.06	1.12	2.00	1.00	5.00
Mother's education	13.00	2.75	13.00	1.00	20.00
Father's education	13.26	3.21	13.00	3.00	20.00
Number of siblings	1.38	1.02	1.00	0.00	6.00
Gender match	0.581	0.494	1.00	0.00	1.00
Puberty index	2.02	0.577	2.00	1.00	3.00
Ratio of HH income to pov. level	3.64	2.31	3.21	0.03	16.3
Physical environment risk	1.08	1.21	1.00	0.00	6.00
Enriching environment index	1.93	0.73	2.00	0.00	3.00
Age (y.o.)	14.45	0.88	14.00	13.00	17.00
Sex (1 for male)	0.616	0.487	1.00	0.00	1.00
White	0.653	0.477	1.00	0.00	1.00
Black	0.136	0.343	0.00	0.00	1.00
Hispanic	0.205	0.404	0.00	0.00	1.00

Table 2: Descriptive Statistics

resolve any doubts, I additionally report Ordered Logit and Ordered Probit results which are very similar in terms of magnitude and significance. First stage estimates for parental strictness and warmth are presented in Tables 3 and 4.
As could be seen, first stage results indicate that mother's age over 45 y.o. has a strong positive effect on parental strictness, whereas existence of sister has a strong positive effect on parental warmth.

The positive impact of having a mother over 45 y.o. on strictness could be explained by the evolution of parenting styles trends in the second half of 20th century. During that time, authoritarian parenting characterized by strictness and absence of emotional support has seen a steady decline (Zilibotti (2017)). However, it is natural that older mothers were less prone to adopt progressive parenting techniques and frequently chose to maintain old-fashioned authoritarianism.

The positive impact of existence of sister on warmth is explored in more details in auxiliary reduced form analysis reported in Appendix. It reveals that both existence of brother and existence of sister increases warmth, whereas existence of both decreases it. Surprisingly, it is not the number of siblings what drives warmth down: if existences are substituted by the number of brothers and number of sisters, warmth is still positively related to both (albeit less strong for the number of brothers), while the raw number of siblings affects it negatively. One possible interpretation is that parents are more supportive towards adolescents who are gender minorities among their siblings

Table 3: Instrumenting Parental Strictness

Parental Strictness	OLS	Logit	Probit
Mother's age $\geqslant$ 45 y.o.	0.405***	1.005***	0.588***
	(0.133)	(0.318)	(0.191)
Has a sister	0.157	0.423	0.251
	(0.177)	(0.413)	(0.250)
Controls	Yes	Yes	Yes
Observations	375	375	375
F-stat (First Stage)	5.60	-	-

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Instrumenting Parental Warmth

Parental Warmth	OLS	Logit	Probit
Mother's age $\geqslant$ 45 y.o.	-0.247**	-0.600*	-0.371*
	(0.124)	(0.318)	(0.191)
Has a sister	0.377**	0.894**	0.566**
	(0.165)	(0.425)	(0.256)
Controls	Yes	Yes	Yes
Observations	375	375	375
F-stat (First Stage)	5.08	-	-

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

(e.g., all siblings are of opposite sex). In that case, stronger effect of sisters is explained by the fact that my sample has more male respondents than female.

One possible concern regarding my first stage is that existence of sister is not a particularly strong instrument. As a result my F-Statistic on both stages is only around 5, which is less than advised in literature on 2SLS methodology (e.g., Stock and Yogo (2005)). To address this issue, in Appendix I add a third instrument (father's age) and do LIML, which is known to be much less biased in a presence of many weak instruments (e.g., Bloomquist and Dahlberg (1999), Hahn and Hausman (2003)). Outlined procedure indicates that, first, addition of a third instrument does not qualitatively change any of my results and, second, LIML estimates are not too far off from the standard 2SLS.

6.5 Second Stage: Empirical Strategy and Results

In the second stage, I use instrumented strictness and warmth to estimate their impact on GPA in 8th grade and delinquency score, which are my measures of educational and delinquent capital. Both GPA and delinquency score are categorical variables but this time predictors are not binary. Hence, linear second stage might produce inconsistent results. In order to solve this issue, I utilize the well-known control function technique (Wooldridge (2015)) and bootstrap standard errors. In addition, I also report unadjusted 2SLS and LIML. Although LIML yields the same point-identification as 2SLS when the model is exactly identified, it could be more efficient under certain distributional

assumptions (Anderson et al. (1982)). Results of all three procedures may be found in Tables 5 and 6 below:

Table 5: Impact of Strictness and Warmth on k_d (Delinquency Score)

k_d	Ordered Logit	2SLS	LIML
Parental Strictness	-1.983**	-1.600*	-1.600**
	(0.959)	(0.882)	(0.727)
Parental Warmth	-0.897	-0.985	-0.985
	(1.070)	(0.968)	(0.874)
Controls	Yes	Yes	Yes
Observations	375	375	375
Standard Errors	Bootstrap (1000 rep.)	Analytic	Analytic

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Impact of Strictness and Warmth on k_s (GPA in 8th Grade)

k_s	Ordered Logit	2SLS	LIML
Parental Strictness	0.290	0.200	0.200
	(1.008)	(0.927)	(0.802)
Parental Warmth	2.333**	2.102**	2.102**
	(1.109)	(1.016)	(0.965)
Controls	Yes	Yes	Yes
Observations	375	375	375
Standard Errors	Bootstrap (1000 rep.)	Analytic	Analytic

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

As could be seen, in all three specifications parental strictness has a strong negative impact on delinquency score and no significant effect on GPA, whereas parental warmth has no significant effect on delinquency score and a strong positive impact on GPA. Although primary focus of my paper is the upcoming simulation of said effects on juveniles' time allocation, they are also interesting in their own right.

Positive impact of parental warmth on GPA is congruent with the results of other empirical works which studied this relationship (e.g., Pinquart (2016)). Its negative impact on delinquency score (albeit, in my case, non-significant) has also been discovered in numerous studies before (Hoeve et al. (2009)).

However, strong negative impact of parental strictness on delinquency score is contrasting with some of the previous empirical findings: previously mentioned meta-analysis by Hoeve reports that almost all dimensions of strictness are positively related to delinquency. However, as was noticed before, all of the studies examined in said meta-analysis suffer from endogeneity issue arising from reverse causality, which in my paper is addressed by using instruments. Thus, it is highly possible that strictness indeed has a negative impact on delinquency, at least in the short run.

Lastly, absence of any strong connection between parental strictness and academic achievements has also been previously reported by Pinquart (2016). However, in this case it can also be due to the vagueness of my strictness measure, which potentially includes multiple dimensions with some

having opposite effects on GPA (e.g., monitoring and physical punishment). In the future work, it would be interesting to decompose the impact of various forms of strictness (and warmth) on human capital.

7 Impact of Parental Attitude on Juveniles' Time Allocation

Given the estimates of preference vector obtained in section 5 and average marginal effects of parental strictness and warmth on capital obtained in section 6, in this section I simulate the impact of change in parental attitude on juveniles' time allocation. I use optimal time allocation predicted by utility maximization in 5.2 as a benchmark and compare it with time allocations resulting from a unit increase in my measures of parental strictness and warmth.

Below, I present Table 7 which contains estimates of a percent change in time allocation of juveniles in response to respective changes in parental strictness and warmth. Since non-significant effects of strictness and warmth on capital are congruent with the literature, I account for those too. In appendix, interested reader may find auxiliary table which presents more conservative analysis accounting only for significant effects, as well as strictness and warmth effects for different gender and age groups.

	s^*	l_d^*	l_{nd}^*
Benchmark	1.04	2.34	5.62
Δ Strictness	1.25 (+20.2%)	1.19 (-49.1%)	6.55 (+16.5%)
Δ Warmth	1.52 (+46.2%)	1.51 (-35.5%)	5.97 (+6.2%)

Table 7: Effects of parental attitude on time allocation (whole sample, hours). Percent change in time spent is relative to the benchmark case.

Table 7 reveals some insighting patterns. First, strictness greatly (-49.1%) decreases time spent on delinquent leisure, considerably outperforming warmth in that regard (-35.5%). However, in terms of studying its positive effect is more than two times smaller: as could be seen, in response to strictness juveniles tend to substitute delinquent leisure with regular leisure.

In contrast, although warmth has smaller negative effect on delinquent leisure, it also strongly incentivizes studying and as a result greater fraction of time previously spent on delinquent leisure is invested in education instead of regular leisure.

Analysis of age and gender groups shows that even upon accounting for smaller base females are more sensitive to both dimensions of parental attitude than males, while younger juveniles are more sensitive than older ones. In other words, less delinquent groups easier give up delinquent leisure and more substitute it with studying. This nicely captures the idea that the more delinquent is adolescent, the more effort it takes to change her habits.

In terms of capital formation, it is worth noting that strictness not only encourages studying less but also lacks strong direct impact on educational capital (Table 6). Hence, despite a massive decrease in delinquent leisure, juvenile's returns to studying are staying relatively small. As a result, assuming that skill attainment at one stage of the life cycle raises skill attainment at later stages of the life cycle (Cunha et al. (2006)), we may conclude that strictness, while efficiently dealing with delinquency in short run, can fail to stimulate accumulation of educational capital and hence to discourage juveniles from adult criminal career. This could explain the strong positive connection between strictness and adult delinquent outcomes frequently observed in longitudinal

studies. Similarly, while the effects of warmth on delinquent leisure may be less evident in the short run perspective, warmth leads to a massive increase of educational capital both through its direct effect and through time allocation substitution patterns. In turn, this explains negative connection between warmth and adult delinquent outcomes often discovered in empirical works.

8 Conclusion

In this work, I estimated the impact of parental strictness and warmth on juvenile's time allocation. My IV analysis revealed that strictness has a strong negative impact on delinquent capital and warmth has a strong positive impact on educational capital. Simulation of these effects on time allocation showed that although warmth discourages delinquent leisure less, it facilitates the accumulation of educational capital much more both through its direct affect and through substitution of delinquent leisure with studying. In contrast, strictness facilitates substitution of delinquent leisure with mostly regular leisure. These patterns offer another interpretation to conclusions of many empirical studies which focused on the relationship between parental attitude and adult delinquent choices.

Although my analysis has generated some interesting results, it has limitations. First and foremost, my structural model is static and hence it was not able to explicitly capture capital accumulation and possible transition from juvenile to adult criminal. Second, parents were modelled as exogenous actors, whereas it would've been more interesting to endogenise their decisions regarding strictness and warmth. Finally, I used quite general measures of parental attitude which do not account for the possibility that different dimensions of strictness and warmth may have different or even opposite effects on human capital. All these potential improvements are left for future studies.

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Appendix

Comparing the Two Approaches to l_d^* Estimation

In this section, I compare l_d^* obtained using relative delinquent intensity described in 4.2.2 with l_d^* obtained using residual method described in 4.3.3 across gender and age groups. As was mentioned

	l_d^* (4.2.2)	l_d^* (4.2.3)
Male ($N = 231$)	2.51	2.30
Female ($N = 144$)	2.07	2.41
Age $\leqslant 14$ ($N = 199$)	1.91	2.28
Age $\geqslant 15$ ($N = 176$)	2.82	2.41

Table 8: Comparison of delinquent leisure obtained using relative delinquent intensity and using residual method (mean hours)

before, since both data arrays are artificial, to compare quality of the two we compare how well they match stylized facts about delinquency known from the literature.

First, from literature we know that male adolescents tend to be more delinquent than female (e.g., Barnes et al. (2007). This is captured quite well by (4.2.2) approach and completely miscaptured by (4.2.3).

Second, older juveniles are more delinquent than young ones. In literature, this is often explained by puberty stage (e.g., Felson and Haynie (2002), Jackson (2012)). Another explanation is higher accumulated criminal capital (Lochner (2004)). The latter is also observed in my data: average delinquency score for younger ($\leqslant 14$) juveniles is 2.5, whereas for older ones ($\geqslant 15$) it is 3.1. However, as could be seen, difference between the two is very small for (4.2.3) and is quite substantial for (4.2.2).

On the basis of stylized facts, we may conclude that residual method described in (4.2.3) fails to capture stylized facts expected from the real data. For this reason, I used (4.2.2) approach in my analysis.

Solution to Timing Issue: Average Capital Invariance

Let s' be the time allocated to studying obtained from utility maximization with the true (unknown) educational capital k'_s as of the first wave. Similarly, let s be predicted time obtained from utility maximization with the actually used educational capital k_s (GPA in 8th grade). First order Taylor approximation yields:

$$E[s' - s] = E[\frac{\alpha_1 k'_s T}{\alpha_1 k'_s + \alpha_2 k_d + 1} - \frac{\alpha_1 k_s T}{\alpha_1 k_s + \alpha_2 k_d + 1}] = E[\frac{\alpha_2 k_d + 1}{(\alpha_1 k_s + \alpha_2 k_d + 1)^2} E[\Delta k'_s | k_s] + o(\Delta k'_s)]$$

Hence, upon assuming average capital invariance ($E[\Delta k'_s | k_s] = 0$), moment condition with s' is equivalent to moment condition with s up to $o(\Delta k'_s)$. The latter is negligible for small capital changes.

How strong is average capital invariance assumption? Although we dont know k', later waves of NLSY97 contain data on high school GPA. High school GPA is more distant from GPA in 8th grade than the unknown GPA at the time of first wave interview. Hence, if average capital invariance

would hold for high school GPA, it would make sense to assume the same for GPA's which are less distant in time.

Sample analogue of $E[k_s^{hs} - k_s | k_s]$, where k_s^{hs} denotes high school GPA, is approximately equal to 0.03 with 0.80 standard deviation, which is remarkably close to 0. Hence, the assumption of average capital invariance with respect to true educational capital as of the first wave is also reasonable.

Parental Attitude and Parental Characteristics: Correlation Analysis

	Parental Warmth	HH Income to Pov. Level	Mother's Education	Father's Education
Parental Strictness	-0.02	-0.05	-0.08	-0.07
HH Income to Pov. Level	0.07	1.00	0.49	0.49
Mother's Education	0.06	2.28	1.00	0.66
Father's Education	0.11	2.41	0.66	1.00

Table 9: Pearson correlation matrix between parental attitude and parental characteristics

Although in my paper parents are assumed to be exogenous actors, table below draws correlations between two considered dimensions of parental attitude and parental characteristics.

As could be seen, more poor and less educated parents tend to be stricter, whereas more rich and more educated parents are prone to be warmer.

Robustness Checks

In this part of the appendix, I conduct additional tests to address possible exclusion restriction and weak instrument concerns. To do so, I add a third instrument (father's age in years) to my regression analysis described in section 6. Inclusion of a third instrument allows me, first, to do overidentifying restrictions test and, second, to compare 2SLS performance with LIML, which is known to be more robust to biases arising from weak instruments when the system is overidentified.

Overidentifying restrictions test leads to Chi-square statistics of 1.25 and 0.002 for GPA and delinquency score, which corresponds to p-values of 0.264 and 0.964. Thus, in both cases hypothesis that all my instruments are valid and correctly excluded from the second stage could not be rejected at any reasonable significance level.

Next, below I report 2SLS and LIML results of regression analysis conducted in section 6 when father's age is added as a third instrument (upon additionally controlling for father's education).

Table 10: Instrumenting Parental Strictness

Parental Strictness	OLS	Logit	Probit
Mother's age $\geqslant$ 45 y.o.	0.404***	1.002***	0.588***
	(0.133)	(0.318)	(0.191)
Father's age	-0.018**	-0.043**	-0.026**
	(0.008)	(0.021)	(0.012)
Has a sister	0.170	0.446	0.271
	(0.178)	(0.415)	(0.252)
Controls	Yes	Yes	Yes
Observations	375	375	375
F-Static	4.83	-	-

Table 11: Instrumenting Parental Warmth

Parental Warmth	OLS	Logit	Probit
Mother's age $\geqslant$ 45 y.o.	-0.245**	-0.597*	-0.367*
	(0.124)	(0.318)	(0.191)
Father's age	-0.003	-0.007	-0.005
	(0.008)	(0.020)	(0.012)
Has a sister	0.350**	0.845**	0.529**
	(0.165)	(0.427)	(0.257)
Controls	Yes	Yes	Yes
Observations	375	375	375
F-Statictic	3.50	-	-

Table 12: Impact of Strictness and Warmth on k_d (Delinquency Score)

k_d	2SLS	LIML
Parental Strictness	-1.596**	-1.597***
	(0.806)	(0.608)
Parental Warmth	-0.972	-0.973
	(0.872)	(0.711)
Controls	Yes	Yes
Observations	375	375
Standard Errors	Analytic	Analytic

Table 13: Impact of Strictness and Warmth on k_s (GPA in 8th Grade)

k_s	2SLS	LIML
Parental Strictness	-0.189	-0.161
	(0.743)	(0.698)
Parental Warmth	1.516*	1.688**
	(0.803)	(0.818)
Controls	Yes	Yes
Observations	375	375
Standard Errors	Analytic	Analytic

As could be seen, inclusion of father's age as instrument does not qualitatively change my results and, what is more important, LIML estimates are not too far off from 2SLS. This indicates that despite the presence of weak instruments my results are fairly robust.

Impact of Existence of Sister on Parental Warmth: Auxiliary Analysis

Parental Warmth	OLS
Has a sister	0.350**
	(0.165)
Has a brother	0.303*
	(0.170)
Has both	-0.157
	(0.181)
Controls	Yes
Observations	375

Table 14: Impact of Gender Composition of Sibship on Parental Warmth

Parental Warmth	OLS
Number of sisters	0.165*
	(0.085)
Number of brothers	0.100
	(0.082)
Controls	Yes
Observations	375

Table 15: Impact of the Number of Brothers and Sisters on Parental Warmth

Parental Warmth	OLS
One sister	0.270**
	(0.123)
Two sisters	0.328*
	(0.180)
More than two sisters	0.405
	(0.323)
One brother	0.197
	(0.130)
Two brothers	0.333*
	(0.190)
More than two brothers	0.137
	(0.340)
Number of siblings	-0.123
	(0.080)
Controls	Yes
Observations	375

Table 16: Detailed Effects of Gender Composition of Sibship on Parental Warmth

Effects of Parental Attitude on Time Allocation by Gender and Age Groups

	Benchmark			Δ Strictness			Δ Warmth		
	s^*	l_d^*	l_{nd}^*	s^*	l_d^*	l_{nd}^*	s^*	l_d^*	l_{nd}^*
Whole Sample	1.04	2.34	5.62	1.25 (+20.2%)	1.19 (-49.1%)	6.55 (+16.5%)	1.52 (+46.2%)	1.51 (-35.5%)	5.97 (+6.2%)
Male	1.00	2.52	5.48	1.21 (+21.1%)	1.41 (-43.6%)	6.38 (+16.4%)	1.47 (+47.0%)	1.72 (-31.7%)	5.81 (+6.0%)
Female	1.10	2.05	5.85	1.32 (+20.0%)	0.839 (-59.1%)	6.84 (+16.9%)	1.61 (+46.3%)	1.17 (-42.9%)	6.22 (+6.3%)
Age $\leqslant$ 14	1.05	2.23	5.72	1.27 (+20.1%)	1.05 (-52.9%)	6.68 (+18.2%)	1.55 (+47.6%)	1.38 (-38.1%)	6.07 (+6.1%)
Age $\geqslant$ 15	1.03	2.46	5.51	1.23 (+19.4%)	1.35 (-45.1%)	6.42 (+16.5%)	1.50 (+45.6%)	1.65 (-32.9%)	5.85 (+6.2%)

Table 17: Effects of parental attitude on time allocation of different groups (hours). Percent change in time spent is relative to the benchmark case.

Conservative Effects of Parental Attitude on Time Allocation by Gender and Age Groups

	Benchmark			Δ Strictness			Δ Warmth		
	s^*	l_d^*	l_{nd}^*	s^*	l_d^*	l_{nd}^*	s^*	l_d^*	l_{nd}^*
Whole Sample	1.04	2.34	5.62	+17.3%	-48.7%	+17.2%	+31.7%	-4.2%	-4.3%
Male	1.00	2.52	5.48	+17%	-43.6%	+16.9%	+33.3%	-4.0%	-4.2%
Female	1.10	2.05	5.85	+17.2%	-58.8%	+17.4%	+30.9%	-3.9%	-4.4%
Age $\leqslant$ 14	1.05	2.23	5.72	+17.1%	-52.4%	+17.3%	+32.3%	-4.0%	-4.4%
Age $\geqslant$ 15	1.03	2.46	5.51	+16.5%	-44.7%	+19.2%	+31.1%	-3.6%	-4.2%

Table 18: Conservative effects of parental strictness and warmth on time allocation (hours). Percent change in time spent is relative to the benchmark case.