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ABSTRACT

Crime and Conformism*

We propose a simple conformism model that explains how parental education and peer pressure impact on criminal activities. We then test the model using the U.S. National Longitudinal Survey of Adolescent Health (AddHealth), which contains unique information on friendship relationships among delinquent teenagers. We find that conformity is very strong within groups of delinquents and that the higher the taste for conformity of an individual, the lower the deviation from the norm's group. These results suggest that, for teenagers, the decision to commit crimes is not a simple choice based primarily on individual considerations but is strongly affected by their environment and peers.

JEL Classification: A14, I21 and K42
Keywords: conformism, juvenile crime, parents' education and norms

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1 Introduction

Recent polls have shown that people regard crime as the number one social problem facing their nations. The fear of being a victim of violent crime, or having one's property violated far outweighs that of being unemployed or suffering a loss of income. Awareness of crime far outstrips inflation, the national trade deficit, or any other economic problem. A large literature has developed on the general causes of, and the impact of public policy on, crime. Yet, no consensus has emerged on quite basic issues, such as, for example, the effects of incentives, both positive and negative, on crime.

Juvenile crime is an important aspect of this debate and it has been observed that crime committed by younger people have higher degrees of social interaction (Glaeser et al., 1996). In the crime literature, the positive correlation between self-reported delinquency and the number of delinquent friends reported by adolescents has proven to be among the strongest and one of the most consistently reported findings (War, 1996 and Matsueda and Anderson, 1998).

There is a growing literature in economics suggesting that indeed peer effects are very strong in criminal decisions. Case and Katz (1991), using data from the 1989 NBER survey of youths living in low-income Boston neighborhoods, find that the behaviors of neighborhood peers appear to substantially affect criminal activities of youth behaviors. They find that the direct effect of moving a youth with given family and personal characteristics to a neighborhood where 10 percent more of the youths are involved in crime than in his or her initial neighborhood is to raise the probability the youth will become involved in crime by 2.3 percent. Ludwig et al. (2001) and Kling et al. (2005) explore this last result by using data from the Moving to Opportunity (MTO) experiment that relocates families from high- to low-poverty neighborhoods. They find that this policy reduces juvenile arrests for violent offences by 30 to 50 percent of the arrest rate for control groups. This also suggests very strong social interactions in crime behaviors. More recently, Calvó-Armengol et al. (2005) test whether the position and the centrality of each delinquent in a network of teenager friends has an impact on crime effort. They show that, after controlling for observable individual characteristics and unobservable network specific factors, the individual's position in a network is a key determinant of his/her level of criminal activity.

Peer effects are thus important to understand crime behavior, especially among young people. One aspect that we believe is important and that has

been neglected by the crime literature is conformism.[1] Conformism is the idea that the easiest and hence best life is attained by doing one's very best to blend in with one's surroundings, and to do nothing eccentric or out of the ordinary in any way. It may well be best expressed in the old saying, "When in Rome, do as the Romans do." The aim of the present paper is to evaluate the role of conformity in explaining juvenile criminal behavior. For that, we develop a simple conformism model and then test it using data from school teenagers in the United States.[2]

Our model is as follows. Each individual belongs to a group of best friends and derives utility from exerting crime effort but wants to minimize the social distance between his/her crime level and that of his/her reference group. Individuals differ ex ante by the human capital level of their parents and their taste for conformity. We derive the Nash equilibrium and, through a comparative statics analysis, we basically obtain four main results. First, the individual's crime level is negatively affected by the education level of his/her parents. Second, the individual's crime level is negatively affected by the average education level of the parents of his/her best friends. Third, the taste for conformity has a positive (negative) impact on i's crime effort if the latter exerts a crime effort which is below (above) the group's average crime effort. Fourth, the impact of the taste for conformity on crime is influenced by the parents' human capital (but the direction of the effect is ambiguous).

We test these results using the U.S. National Longitudinal Survey of Adolescent Health (AddHealth), which contains unique detailed information on friendship relationships among delinquent teenagers. The theoretical predictions mentioned above are confirmed by the empirical analysis. In particular, we find that conformity is very strong within groups of delinquent teenagers and that the higher the taste for conformity of an individual, the lower the

[1] There is however a growing literature on the social aspects of crime. See, in particular, Sah (1991), Glaeser et al. (1996), Calvó-Armengol and Zenou (2004), Silverman (2004), Calvó-Armengol et al. (2005).

[2] In economics, different aspects of conformism and social norms have been explored from a theoretical point of view. To name a few, (i) peer pressures and partnerships (Kandel and Lazear 1992) where peer pressure arises when individuals deviate from a well-established group norm, e.g., individuals are penalized for working less than the group norm, (ii) religion (Iannaccone 1992, Berman 2000) since praying is much more satisfying the more average participants there are, (iii) social status and social distance (Akerlof 1980 and 1997, Bernheim 1994, among others) where deviations from the social norm (average action) imply a loss of reputation and status. To the best of our knowledge, it does not seem that the crime aspect of conformism has been so far investigated, especially from an empirical perspective.

deviation from the norm's group. These results are affected by the education of the parents.

2 Theory

2.1 The basic model

There are N individuals/criminals in the economy. Each individual belongs to a group of best friends (a network) and groups are mutually exclusive, that is if individual i belongs to a group of best friends, he/she cannot belong to another one. There are K groups of best friends with $\sum_{k=1}^{k=K} N_k = N$.

Preferences We focus on juvenile crime and we denote by e_{ik} the crime effort level of criminal i belonging to group k. Each individual/criminal has a utility that depends on the difference between his/her behavior and that of his/her reference group k. To be more precise, each criminal selects an effort $e_{ik} \geq 0$ and obtains a payoff $u(e_{ik}, \overline{e}_k)$ given by the following utility function with $a, c > 0$:

$$u(e_{ik}, \overline{e}_k) = a + b(\delta_{ik})\, e_{ik} - c\, e_{ik}^2 - d_{ik}\, (e_{ik} - \overline{e}_{ik})^2 \tag{1}$$

where $\overline{e}_k$ denotes the average crime effort of the $N_k - 1$ best friends of i, which is given by:

$$\overline{e}_{ik} = \frac{1}{(N_k - 1)} \sum_{j=1, j \neq i}^{j=N_k-1} e_{jk} \tag{2}$$

and δ_{ik} is the level of education of individual i's parents.

The utility function (1) consists of two parts. The first one, $a + b(\delta_i)\, e_{ik} - c\, e_{ik}^2$, is the utility obtained by individual i from exerting crime effort e_{ik} when i's friends do not matter or more precisely when they do not have any impact on i's decision. We assume that $b'(\delta_{ik}) < 0$, i.e. the utility decreases with parental education δ_{ik} because the higher δ_{ik} the lower the gain of committing crime. Indeed, the higher the level of education of the parents, the more moral constraint is put on the child and the more reluctant is the latter to commit crime. So having parents with higher education level increases the disutility of committing crime.

The second part of this utility function captures the influence of friends' behavior on own action. It is such that each individual wants to minimize the social distance between him/herself and his/her reference group, where d_{ik} is

the parameter describing the taste for conformity of individual i in group k. Indeed, the individual loses utility $d_{ik}(e_{ik} - \overline{e}_k)^2$ from failing to conform to others. This is the standard way economists have been modelling conformity (see, among others, Akerlof, 1980, Ballester et al., 2005, Bernheim, 1994, Kandel and Lazear, 1992, Akerlof, 1997, Fershtman and Weiss, 1998). We can analyze the bilateral influences of this utility function. They are given by:

$$\frac{\partial^2 u(e_{ik}, \overline{e}_k)}{\partial e_{ik} \partial e_{jk}} = \frac{2d_{ik}}{N_k - 1} > 0$$

which means that an increase in effort from j triggers a downwards shift in i's response and thus efforts are strategic complements from i's perspective within the pair (i, j).

Observe that, contrary to the standard Becker model, the utility function (1) does not have the standard costs/benefits structure where the benefits are the proceeds from crime and the costs the probability to be caught times the penalty. First, as in Ballester et al. (2005), it is possible to reformulate this utility function in this way. Second, because we deal with juvenile crime committed by teenagers, we believe that what drives their behavior is more the conformity rather than the costs/benefits aspect.

2.2 A simple symmetric case

In this section, we assume that individuals/criminals in the same group have parents with similar background (in terms of education) and have the same taste for conformity, so that $\delta_{ik} = \delta_k$ and $d_{ik} = d_k$.[3]

We can calculate the Nash equilibrium of this game where each individual chooses e_i by taking as given the actions of the other players. We have the straightforward following result:[4]

Proposition 1 *Assume that $\delta_{ik} = \delta_k$ and $d_{ik} = d_k$. Then, the conformity game with payoffs (1) has a unique Nash equilibrium in pure strategies, which is given by:*

$$e^*_{ik} = \overline{e}^*_k = \frac{b(\delta_k)}{2c} \tag{3}$$

Also, the higher the level of education of parents, the lower the level of crime of teenagers within the same group of friends.

[3] We relax these assumptions in the next section.

[4] The uniqueness of equilibrium is guaranteed by the fact that the parameter for own-concavity is always high enough to counter the payoff complementarity.

This means that individuals will always conform to the group's norm so that their crime effort will always be equal to that of the average effort of their friends. If the group of friends has parents with a high level of human capital, they will tend to exert low crime effort because of the disutility each individual has in committing a crime and the group pressure.

So basically this conformist model shows that what is crucial to understand crime behavior among teenagers is their reference group and thus the friends they associate with. In this model, we do not model the choice of friends and thus of the reference group for each individual i. It is here taken as given. What we assume is that young individuals choose their friends within the same education group.

2.3 A more general model with dyads

We can extend our framework to the case when $\delta_{ik} \neq \delta_k$ and $d_{ik} \neq d_k$, so that individuals in the same group can have parents with different education levels and have different tastes for conformity. In that case, it is easy to verify that there cannot exist a symmetric Nash equilibrium in which $e^*_{ik} = \overline{e}^*_k$. Let us thus study the asymmetric case when the individual's effort differs from that of his/her reference group. In order to give some intuition of the results, let us solve the simplest case, which consists of dyads, i.e. each group is composed of two friends.[5] This implies that $N_1 = ... = N_k = ... = N_K = 2$. For notational convenience, denote $b(\delta_{ik}) \equiv b_{ik}$.

Proposition 2 *Assume that $\delta_{ik} \neq \delta_k$, $d_{ik} \neq d_k$, and consider only dyads. Then, at the unique Nash equilibrium in pure strategies, each individual i in group $k = 1, 2$ provides the following crime effort:*

$$e^*_{1k} = \frac{(c + d_{2k})\, b_{1k} + d_{1k} b_{2k}}{2c\,(c + d_{1k} + d_{2k})} \tag{4}$$

$$e^*_{2k} = \frac{d_{2k} b_{1k} + (c + d_{1k})\, b_{2k}}{2c\,(c + d_{1k} + d_{2k})} \tag{5}$$

which implies in particular that

$$e^*_{1k} - e^*_{2k} = \frac{b_{1k} - b_{2k}}{2\,(c + d_{1k} + d_{2k})} \tag{6}$$

From this proposition, we have:

[5] Most of the results can be generalized to the case of groups of k individuals with groups of different sizes. See the next section.

Proposition 3 *Assume that $\delta_{ik} \neq \delta_k$, $d_{ik} \neq d_k$, and consider only dyads. Then,*

$$\delta_{1k} \lesseqgtr \delta_{2k} \Leftrightarrow e^*_{1k} \gtreqless \overline{e}^*_k \gtreqless e^*_{2k} \tag{7}$$

Moreover, we have:

$$\frac{\partial e^*_{ik}}{\partial \delta_{ik}} < 0 \text{ , for } i = 1, 2, \qquad , \frac{\partial e^*_{ik}}{\partial \delta_{jk}} < 0 \text{ , for } i \neq j \tag{8}$$

$$\frac{\partial e^*_{ik}}{\partial d_{ik}} \gtreqless 0 \Leftrightarrow \delta_{ik} \gtreqless \delta_{jk} \text{ , } \qquad , \frac{\partial e^*_{ik}}{\partial d_{jk}} \gtreqless 0 \Leftrightarrow \delta_{ik} \lesseqgtr \delta_{jk} \text{ , for } i \neq j \tag{9}$$

$$\frac{\partial^2 e^*_{ik}}{\partial d_{ik} \partial \delta_{ik}} > 0 \text{ , for } i = 1, 2 \qquad , \frac{\partial^2 e^*_{ik}}{\partial d_{ik} \partial \delta_{jk}} < 0 \text{ , for } i \neq j \tag{10}$$

$$\frac{\partial \left(e^*_{1k} - e^*_{2k}\right)}{\partial d_{1k}} < 0 \qquad , \frac{\partial \left(e^*_{1k} - e^*_{2k}\right)}{\partial d_{2k}} < 0 \tag{11}$$

Not surprisingly, Proposition 2 shows that the only Nash equilibrium is asymmetric since each individual within a group provides a different crime effort. Second, it is easy to see in the two propositions that the human capital of the parents has a key impact on crime effort. First, the higher δ_i, the lower both the individual (e^*_{ik}) and group ($\overline{e}^*_k$) crime effort. Second, the higher the human capital of one individual in the group δ_i, the lower the crime effort of the other individual in the group. This result is due to group pressure. Indeed, because each individual is influenced by his/her peers, whenever one of her friends has a lower crime activity level (because of her parents' education level), then in order to conform to the group norm (remember that the individual loses utility $d(e_{ik} - \overline{e}_k)^2$ from failing to conform to others), he/she reduces his/her crime effort.

An other interesting result that did not exist when $\delta_{ik} = \delta_k$ and $d_{ik} = d_k$ is that the degree of conformity d matters and directly affects the effort of each criminal e^*_{ik}. In fact, the impact of d depends on the initial human capital level. If for example $\delta_1 > \delta_2$, then we know from (7) that it implies: $e^*_{1k} < \overline{e}^*_k < e^*_{2k}$ so that the other person 2 provides a higher crime effort. So when the degree of conformism d increases and even though the human capital of the individual 1's parent is high, individual 1 increases his/her crime effort to conform the group's norm (i.e. the higher effort of her best friend). As it is shown in (9), (10) and (11), two key elements affect crime effort: human capital of the parents δ and taste for conformity d (and the interactions with each other). What is important is both the absolute level of δ (the direct impact of δ on crime effort) and its relative value (i.e. the difference between own parents'

human capital and average human capital of best friends) and the taste for conformity. In the empirical analysis, we will focus on these three aspects.[6]

2.4 The general model

Let us generalize this theoretical model for the case of groups of k individuals with groups of different sizes. Let $\mathbf{I}_k$ be the N_k-square identity matrix, and $\mathbf{J}_k$ the N_k-square matrix of ones and $\mathbf{e}_k^*$ and $\mathbf{b}_k$ are the following vectors:

$$\underset{(N_k,1)}{\mathbf{e}_k^*} = \begin{pmatrix} e_{1k}^* \\ . \\ . \\ e_{N_k k}^* \end{pmatrix}, \underset{(N_k,1)}{\mathbf{b}_k} = \begin{pmatrix} b_{1k} \\ . \\ . \\ b_{N_k k} \end{pmatrix}$$

$$\underset{(N_k,N_k)}{\mathbf{C}_k} = \begin{pmatrix} c+d_{1k} & 0 & . & . & 0 \\ 0 & c+d_{2k} & 0 & . & 0 \\ . & . & . & 0 & . \\ . & . & 0 & . & . \\ 0 & 0 & . & . & c+d_{N_k k} \end{pmatrix}$$

$$\underset{(N_k,N_k)}{\mathbf{D}_k} = \begin{pmatrix} 0 & d_{1k} & . & . & d_{1k} \\ d_{2k} & 0 & d_{2k} & . & d_{2k} \\ . & . & . & . & . \\ . & . & . & . & . \\ d_{N_k k} & d_{N_k k} & . & d_{N_k k} & 0 \end{pmatrix}$$

where the matrix $\mathbf{C}_k$ has $c+d_{ik}$ on the diagonal for row i and 0s off diagonal while the matrix $\mathbf{D}_k$ has only 0s on the diagonal and, off diagonal, has d_{ik} in row i.

Then, the following proposition generalizes our previous results.

[6] As shown below, these results hold for larger groups of friends. For example, for triads, i.e. groups of three best friends, it can be shown that the optimal crime efforts are such that:

$$\left[\frac{2(c+d_{2k})}{d_{2k}}+1\right](e_{2k}^*-e_{3k}^*) = \frac{b_{2k}}{d_{2k}} - \frac{b_{3k}}{d_{3k}}$$

$$\left[\frac{2(c+d_{1k})}{d_3}+1\right](e_{1k}^*-e_{3k}^*) = \frac{b_{1k}}{d_{1k}} - \frac{b_{3k}}{d_{3k}}$$

$$\left[\frac{2(c+d_{1k})}{d_{1k}}+1\right](e_{1k}^*-e_{2k}^*) = \frac{b_{1k}}{d_{1k}} - \frac{b_{2k}}{d_{2k}}$$

This again shows the importance of parents' human capital both in absolute and relative levels and taste for conformity for explaining crime efforts.

Proposition 4 *Consider the general case when all teenagers are heterogenous in terms of the human capital of their parents ($\delta_{ik} \neq \delta_k$), have different taste for conformity ($d_{ik} \neq d_k$) and groups of best friends can have any size. Then we obtain:*

$$\begin{aligned} \mathbf{e}_k^* &= \left[\mathbf{C}_k - \frac{1}{(N_k - 1)}\mathbf{D}_k\right]^{-1} \frac{1}{2}\mathbf{b}_k \\ &= \mathbf{M}_k^{-1}\,\mathbf{b}_k \end{aligned} \tag{12}$$

where the matrix $\mathbf{M}_k$ has $c + d_{ik}$ on the diagonal for row i and, off diagonal, has d_{ik} in row i.

Proof. See Appendix 1.

We can now derive the following comparative statics results.

Proposition 5 *Consider the general case when all teenagers are heterogenous in terms of the human capital of their parents ($\delta_{ik} \neq \delta_k$), have different taste for conformity ($d_{ik} \neq d_k$) and groups of best friends can have any size. Then:*

(*i*) *The higher the education level of the parents of i, the lower i's crime effort, i.e.*

$$\frac{\partial e_{ik}^*}{\partial \delta_{ik}} < 0$$

(*ii*) *The higher the average education of the parents of i's best friends, the lower i's crime effort, i.e.*

$$\frac{\partial e_{ik}^*}{\partial \overline{\delta}_{ik}} < 0$$

(*iii*) *If the effort level of i is higher (lower) than the average effort level of i's best friends, then a higher taste for conformity of i leads to higher (lower) crime effort level, i.e.*

$$\frac{\partial e_{ik}^*}{\partial d_{ik}} \gtreqless 0 \Leftrightarrow e_{ik}^* \lesseqgtr \overline{e}_{ik}$$

(*iv*) *Increasing or decreasing the human capital of i's parents or the average human capital of the parents i's best friends has an ambiguous effect on the impact of taste for conformity on i's crime effort, i.e.*

$$\frac{\partial^2 e_{ik}^*}{\partial d_{ik} \partial \delta_{ik}} \gtreqless 0$$

$$\frac{\partial e_{ik}^*}{\partial d_{ik} \partial \overline{\delta}_{ik}} \gtreqless 0$$

Proof. See Appendix 1.

The results (i), (ii) and (iii) are again very intuitive and are similar to the dyad case. For example, for (iii), if i's crime effort is higher (lower) than that of the average of his/her best friends, then if i's becomes more conformist, he/she will increase (decrease) his/her crime level to adapt to the group's norm. These are exactly the same results as in the dyad case where the emphasis is now instead on average crime effort rather than on parent's education level, since the latter is highly (negatively) correlated to i's crime effort.

Result (iv) is more surprising but also interesting. Here is the intuition. Take the case when $e_{ik} < \overline{e}_{ik}$. When δ_{ik}, the human capital of i's parents increases, there are two opposite effects. On the one hand, because of higher δ_{ik}, individual i decreases his/her effort so that he/she is closer to the group's norm $\overline{e}_{ik}$. However, because δ_{ik} negatively affects $\overline{e}_{ik}$ (see (ii)), i's friends also decrease their effort and thus the group's norm $\overline{e}_{ik}$ decreases. The net effect on $\partial e_{ik}/\partial d_{ik}$ is thus ambiguous and depends on whether the distance between e_{ik} and $\overline{e}_{ik}$ has increased or decreased following an increase in δ_{ik}. The same reasoning holds when $e_{ik} > \overline{e}_{ik}$ or for $\overline{\delta}_{ik}$, the human capital of i's best friends' parents.

We would like now to test these results, which are summarized in Proposition 5. Basically, we have four main predictions. First, (i) we expect that the individual's crime level is negatively affected by the education level of his/her parents. Second, (ii) the individual's crime level is negatively affected by the average education level of the parents of his/her best friends. Third, (iii) we expect that the taste for conformity has a positive or negative impact on i's crime effort depending on the difference between i's crime effort and the average of his/her best friends' crime effort. Fourth, (iv) the impact of parents' human capital on $\partial e^*_{ik}/\partial d_{ik}$ is ambiguous. Assessing which sign prevails becomes a matter of empirical investigation.

3 Data and descriptive statistics

Our data source is the National Longitudinal Survey of Adolescent Health (AddHealth), containing detailed information on a nationally representative sample of 90,118 students in roughly 130 private and public schools, entering grades 7-12 in the 1994-1995 school year.[7] AddHealth contains unique

[7] For a detailed description of the survey and data, see the AddHealth website at: http://www.cpc.unc.edu/projects/addhealth.

information on friendship relationships, which is crucial for our analysis. The friendship information is based upon actual friends nominations. Pupils were asked to identify their best friends from a school roster (up to five males and five females). By matching the identification numbers of the friendship nominations to respondents' identification numbers, one can obtain information on the characteristics of nominated friends. We are thus able, for each individual i, to individualize her/his best friends, to calculate the average crime effort $\overline{e}_{ik}$ and the average education level of the parents $\overline{\delta}_{ik}$ of their best friends and so we know exactly the norm of the reference group k.

Besides information on family background, school quality and area of residence, the AddHealth contains also sensitive data on sexual behavior (contraception, pregnancy, AIDS risk perception), tobacco, alcohol, drugs and crime (ranging from light offenses to serious property and violent crime) of a subset of adolescents (roughly 20,000). We use these data to construct our dependent variable e_{ik}. Specifically, we measure the individual level of criminal activity, e_{ik}, by adopting the standard approach in the sociological literature, which uses an index of delinquency involvement based on self-reported adolescents' responses to a set of questions describing participation in a series of criminal activity. Addhealth contains an extensive set of questions on property and violent delinquency.[8] The survey asks students how often they participate in each of the different activities during the past year. Each response is coded using an ordinal scale ranging from 0 (i.e. never participate) to 1 (i.e. participate 1 or 2 times), 2 (participate 3 or 4 times) up to 3 (i.e. participate 5 or more times). On the basis on these scores, a summated index is calculated for each respondent. The mean is 1.57, with considerable variation around this value (the standard deviation is equal to 1.73). The Crombach$-\alpha$ measure is then used to assess the quality of the derived variable. In our case, we obtain an α equal to 0.80 ($0 \leq \alpha \leq 1$) indicating that the different items incorporated in the index have considerable internal consistency. Excluding the individuals

[8] Specifically, it contains information on 15 delinquency items. Namely, paint graffiti or signs on someone else's property or in a public place; deliberately damage property that didn't belong to you; lie to your parents or guardians about where you had been or whom you were with; take something from a store without paying for it; get into a serious physical fight; hurt someone badly enough to need bandages or care from a doctor or nurse; run away from home; drive a car without its owner's permission; steal something worth more than \$50; go into a house or building to steal something; use or threaten to use a weapon to get something from someone; sell marijuana or other drugs; steal something worth less than \$50; take part in a fight where a group of your friends was against another group; act loud, rowdy, or unruly in a public place.

that report never participating in any delinquent activity (roughly 40% of the total) and with missing or inadequate information, we obtain a final sample of 5,154 criminals.

The other key variable in the theoretical model is the individual level of conformism to the group of best friends, d_{ik}. The measurement of this variable is a quite difficult task. The absence of empirical work examining the importance of group conformism on individual behavior is mainly due to inadequate data availability. The information contained in the AddHealth data allows us to construct different proxies. The first one, d_{ik1}, is derived by exploiting the unique information on friendship association in the school provided by the AddHealth data set. As stated above, all pupils are asked to list their best friends (up to five for each sex) and to answer a set of questions about the strength of the interaction between best friends. Specifically, for each nominated friend (NF hereafter) the interviewer is asked the following questions: "Did you (a) go to NF's house during the past seven days, (b) meet NF after school to hang out or go somewhere during the past seven days, (c) spend time with NF during the past weekend, (d) talk to NF about a problem during the past seven days, (e) talk to NF on the telephone during the past seven days", all coded as 1=yes, 0=no. Similarly to the construction of the crime index, this information is used to derive for each respondent a composite score measuring the strength of interaction between best friends. The mean is 0.89 and the standard deviation is equal to 0.12. The value of the Crombach-α, which is equal to 0.84, points to the good quality of the derived indicator. This indicator captures the number of contacts with best friends, and thus it should closely proxy the level of conformism of each individual i to the group of best friends. Indeed, it is reasonable to assume that the higher the level of interactions with friends the more the individual is inclined to behave like her/his friends.

As an alternative proxy, d_{ik2}, we use the information derived from the question: "How much do you feel that your friends care about you?", with possible answers: "not at all", "very little", "somewhat", "quite a bit", "very much", coded 1 to 5. The conjecture in this case is that the higher the level of care (attachment) of best friends the more the teenager feels herself/himself a member of the group, thus following the group behavior. Finally, we also construct a more stringent measure of conformism, d_{ik3}, which says that individuals want to conform to the group if the level of friends attachment (involvement) is very high. Specifically, d_{ik3} is a dummy variable taking value one if the respondent

reports that he/she feels that his/her friends care very much about him/her (i.e. $d_{ik2} = 5$) and zero otherwise.

The last key variable in the theoretical model is parents' education, δ_{ik} and $\overline{\delta}_{ik}$. The AddHealth dataset contains information about the schooling level of the (biological or non-biological) parent who is living with the child, distinguishing between "never went to school", "not graduate from high school", "high school graduate", "graduated from college or a university", "professional training beyond a four-year college", coded as 1 to 5. We use this information, considering only the education of the father if both parents are in the household.

Comparing the level of parental education of each individual i with the average one of his/her best friends, we find that, on average, within each group the individual level of parental education is not statistically different from the average of the group. This provides evidence that networks of best friends have a similar level of parental education, which is the basis of the conformism model exposed in section 2. However, the mean values show a considerable dispersion around the average. This variation will be used in the empirical analysis for splitting the delinquents in different sub-samples.

4 Estimation and empirical results

4.1 Estimation

The empirical strategy is quite straightforward here. On the basis of our theoretical model and especially of Proposition 5, we estimate the following regression model:

$$e_{ik} = \alpha_0 d_{ikz} + \alpha_1 \delta_{ik} + \alpha_2 \overline{\delta}_{ik} + \alpha_3 d_{ikz}\delta_{ik} + \alpha_4 d_{ikz}\overline{\delta}_{ik} + \sum_{l=1}^{L} \beta_l x_{ik}^l + \varepsilon_{ik} \qquad (13)$$

for $i = 1, ..., N$; $k = 1, ..., N_k$; $z = 1, 2, 3$, where the dependent variable, e_{ik}, is the index of criminality of individual i, d_{ikz} is a variable indicating the level of conformism of individual i to the group k of best friends, which is measured using our three different proxies d_{ik1}, d_{ik2} and d_{ik3}; δ_{ik} is the education level of the parents of individual i; $\overline{\delta}_{ik}$ is the average education level of the parents of individual i's best friends; x_{ik}^l (for $l = 1, ..., L$) is a set of L control variables containing an extensive number of individual, family, school and residential neighborhood characteristics; ε_{ik} is a white noise error term. A precise

description of all the control variables is contained in Appendix 2. Table 1 collects the descriptive statistics of all variables.

[*Insert Table* 1 *here*]

We will test results (i), (ii) and (iv) of Proposition 5 by estimating equation (13) on the whole sample of criminals (5,154 criminals). In order to test result (iii) in Proposition 5, we will split our sample in two, between individuals whose crime effort is higher than the average crime effort of their best friends, i.e. $e_{ik} > \overline{e}_{ik}$, and individuals whose crime effort is such that $e_{ik} < \overline{e}_{ik}$. In that case, we obtain two sub-samples of 2,192 and 2, 962 delinquents, respectively. A successful test of the model would imply that, for the whole sample of criminals, the coefficient α_0 is not significant while the coefficients α_1, α_2, α_3 and α_4 are significantly different from zero and the signs of α_1 and α_2 should be negative while the signs of α_3 and α_4 would be determined by the empirical analysis. Concerning the regressions run on each sub-sample, a successful test of the model would imply that, for the subsample for which $e_{ik} > \overline{e}_{ik}$ ($e_{ik} < \overline{e}_{ik}$), the coefficient α_0 is significantly different from zero and has a negative (positive) sign. All the other coefficients, α_1, α_2, α_3 and α_4, should be significantly different from zero and have the same sign as for the whole sample.

4.2 Results

The estimation results of (13) for the full sample and the two sub-samples ($e_{ik} < \overline{e}_{ik}$ and $e_{ik} > \overline{e}_{ik}$) on our target coefficients, α_0, α_1, α_3 and α_4, are reported, respectively, in the second, third and fourth column of Table 2.[9] This evidence is obtained using our first proxy for taste for conformity, d_{ik1}.

Firstly, as predicted by results (i) and (ii) in Proposition 5, this table shows that both estimated coefficients α_1 and α_2 are highly statistically significant and with the expected negative sign in all columns, confirming the important role of parents' human capital on crime behavior. Measuring the magnitude of the effects in terms of standard deviations, it appears that the responsiveness of a teenager i's criminal activity to changes in his/her own parents' education is higher than to changes in the (average) education level of his/her peers, although the effects are comparable. For instance, considering the full sample (column 2), a one-standard deviation increase in individual i's parental

[9] The qualitative results on our target variables are robust to alternative sets of control variables. The complete lists of estimation results are available upon request.

education (δ_{ik}) reduces individual i's level of crime by about one fourth of a standard deviation, whereas a one-standard deviation increase in the average friends' parental education ($\overline{\delta}_{ik}$) translates roughly into a 0.18 percent decrease in standard deviations of individual i's criminal activity.

[*Insert Table 2 here*]

Secondly, looking at the impact of conformism (d_{ik1}) on crime behavior, the table shows that the estimated coefficient α_0 is *not* statistically different from zero when the full sample is considered (second column) whereas it acquires statistical significance when splitting the sample in two (third and fourth column). This evidence supports our theoretical framework predicting a crucial role of the difference between i's crime effort and the average of his/her best friends' crime effort (in particular if i's crime effort is higher or lower than the average) in shaping the impact of conformism on crime. In addition, the signs of the estimated effects are exactly conformed to the prediction of our theory (result (iii) in Proposition 5) since α_0 is positive when $e_{ik} < \overline{e}_{ik}$ and negative when $e_{ik} > \overline{e}_{ik}$. This shows that, for delinquents with lower (higher) crime effort than the average, being more conformist leads to a higher (lower) crime effort because they want to conform to the norm's group. It is interesting to notice that the magnitude of the effect is higher when $e_{ik} < \overline{e}_{ik}$ (this is also true for the impact on parents' human capital on crime effort) because conformism in crime is certainly stronger when people commit less crime than the average than more crime.

Thirdly, the last prediction of our model (result (iv) in Proposition 5) was that the following cross effects $\frac{\partial^2 e^*_{ik}}{\partial d_{ik}\partial \delta_{ik}}$ and $\frac{\partial e^*_{ik}}{\partial d_{ik}\partial \overline{\delta}_{ik}}$ were ambiguous. If one looks at the last two rows of Table 2 (the interaction terms), one can see that, the coefficients α_3 and α_4, are statistically different from zero and are positive and negative. Let us interpret these results. They imply that

$$\frac{\partial^2 e_{ik}}{\partial d_{ik}\partial \delta_{ik}} = \widehat{\alpha}_3 > 0 \text{ and } \frac{\partial^2 e_{ik}}{\partial d_{ik}\partial \overline{\delta}_{ik}} = \widehat{\alpha}_4 < 0$$

What does it mean? Both for $e_{ik} < \overline{e}_{ik}$ and $e_{ik} > \overline{e}_{ik}$, the magnitude of the conformity effect increases the higher the level of own parental education and decreases the higher the level of friends' parental education. Here is the intuition. Take the case when $e_{ik} < \overline{e}_{ik}$. When δ_{ik}, the human capital of i's parents increases, both e_{ik} and $\overline{e}_{ik}$ decrease so that the distance to the norm $|e_{ik} - \overline{e}_{ik}|$ can be smaller or higher. But, given that we observe that the higher the human capital of own parents, the higher the impact of d_{ik} on e_{ik}, it means

that, *on average*, the distance $|e_{ik} - \overline{e}_{ik}|$ has increased following an increase in δ_{ik}. When $e_{ik} > \overline{e}_{ik}$, we have the opposite result and the distance $|e_{ik} - \overline{e}_{ik}|$ has also increased following an increase in δ_{ik}. Similar interpretation can be given for an increase in $\overline{\delta}_{ik}$ with the difference that the distance $|e_{ik} - \overline{e}_{ik}|$ has decreased.

To better understand these results, let us calculate $\partial e_{ik}/\partial d_{ik}$ taking into account the interaction terms for the different levels of parental education separately. From model (13), we obtain from the estimation that:

$$\frac{\partial e_{ik}}{\partial d_{ik}} = \widehat{\alpha}_0 + \widehat{\alpha}_3 \delta_{ik} + \widehat{\alpha}_4 \overline{\delta}_{ik} \tag{14}$$

where $\widehat{\alpha}_0$, $\widehat{\alpha}_3$ and $\widehat{\alpha}_4$ are the estimated coefficients of α_0, α_3 and α_4.

The results of this exercise are reported in Table 3 (second column for d_{ik1}). Specifically, we calculate $\partial e_{ik}/\partial d_{ik}$ for each of the five levels of parental education, which are coded from 1 to 5. For example, to calculate $\partial e_{ik}/\partial d_{ik}$ for the category "Never went to school" (code equal to 1), we replace $\widehat{\alpha}_0$, $\widehat{\alpha}_3$ and $\widehat{\alpha}_4$ by the values obtained in the estimation of model (13) and set $\delta_{ik} = \overline{\delta}_{ik} = 1$, that is $\frac{\partial e_{ik}}{\partial d_{ik}} = \widehat{\alpha}_0 + \widehat{\alpha}_3 + \widehat{\alpha}_4$. We find that, as before, the coefficients change sign in the right direction when switching from $e_{ik} < \overline{e}_{ik}$ to $e_{ik} > \overline{e}_{ik}$. What is striking is that now we always find that the higher own parental education and best friends' parental education, the lower the impact of conformism on own crime effort. In other words, this evidence suggests that the influence of parental education mitigates the effect of taste for conformism (peers effect) on crime effort. The interpretation of this result in light of the theoretical model is that the joint effect of an increase in own parental education and best friends' parental education reduces the difference from the group's norm. This indicates that, when $e_{ik} > \overline{e}_{ik}$, the decrease of i's crime effort following an increase of the human capital of i's parents is bigger than the decrease of the average crime of best friends, whereas when $e_{ik} < \overline{e}_{ik}$ the decrease of i's crime effort following an increase of the human capital of i's parents is smaller than the decrease of the average crime of best friends. As it was argued before, this may be due to the fact that peer pressure in crime is stronger for people committing less crime than the average than more crime.

[*Insert Table* 3 *here*]

For robustness checks, Table 4 reports the estimation results on our target variables when using alternative proxies of conformism, i.e. d_{ik2} and d_{ik3}, as defined above in the data section. The estimated coefficients on α_1 and α_2

remain largely unchanged. Concerning α_0, α_3 and α_4, when using d_{ik2}, the estimated coefficients in both sub-samples are not statistically different from zero, although preserving the expected signs. However, looking at the estimation results for the dummy d_{ik3}, which is constructed using the information on d_{ik2} by considering only high levels of friends' attachment, the estimated coefficients on α_0, α_3 and α_4 turn back to be statistically significant, maintaining the expected signs across sub-samples. These results are qualitatively the same as those obtained using the proxy d_{ik1}, and also the magnitude of the effects is comparable. Indeed, if we calculate $\partial e_{ik}/\partial d_{ik}$ also for this proxy d_{ik3}, following expression (14), we find the same effects. The results are reported in the third column of Table 3. For instance, for individuals having own parents and best friends' parents graduated from high school ($\delta_{ik} = \overline{\delta}_{ik} = 3$), and for whom $e_i < \overline{e}_{ik}$, a one-standard deviation increase in individual i's conformism to the group raises individual i's level of crime by 0.03 of a standard deviation when conformism is measured using d_{ik1} and by 0.05 when conformism is measured using d_{ik3}. The effects are similar (but with the opposite sign) for individuals with $e_i < \overline{e}_{-i}$.

[*Insert Table* 4 *here*]

Taking the empirical analysis as a whole, these results provide some evidence of the importance of conformism in shaping students' criminal activity in a manner consistent with the theoretical model, as well as shedding some insights about the possibility that the strength of peers pressure has to be high enough to induce individual behavior to deviate towards peers' group average behavior.

5 Concluding remarks

Conformity is key to understand economic outcomes that involve interaction with peers. In education, crime, smoking, teenage pregnancy, school dropout, etc. economists has pointed out the importance of peer effects in explaining these outcomes (for a survey see e.g. Durlauf, 2004). To the best of our knowledge, few papers have tested whether conformity plays an important role in these activities, especially in crime.

In the present paper, we propose a simple model of conformity that explains how parental education and group pressure impact on criminal activities. In particular, we find significant cross effects between parental education and degree of conformity of individuals belonging to the same group of friends. We

then test the model using the U.S. National Longitudinal Survey of Adolescent Health (AddHealth), which contains unique detailed information on friendship relationships among delinquent teenagers. We find that conformity is very strong within groups of delinquents and that the higher the taste for conformity of an individual, the lower the deviation from the norm's group.

These results suggest that, for teenagers, the decision to commit crimes is not a simple choice based primarily on individual considerations but is strongly affected by their environment and peers because of externalities involved in social-decision making. In terms of policy implications, as Akerlof (1997) put it: "Because group interactions are an important influence on individual decisions, the analysis of social programs must include an evaluation of an intervention's impact on group interactions and not just the direct effects of the program." For our analysis, this suggests that one should adopt a community-wide, multiple solution approach to the teenager-crime problem rather than a purely individualistic approach. In other words, an effective policy should not only be measured by the possible crime reduction it implies but also by the group interactions they engender.

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Appendix 1: Proofs of propositions

Proof of Proposition 4. An interior Nash equilibrium in pure strategies $\mathbf{e}^* \in \mathbb{R}_+^n$ is such that $\partial u/\partial e_{ik}(\mathbf{e}^*) = 0$ and $e_{ik}^* > 0$, for all $i = 1, ..., N_k$ and $k = 1, ..., K$. The first order condition can be written for each ik as

$$b_{ik} - 2(c + d_{ik})e_{ik} + 2d_{ik}\overline{e}_{ik} = 0$$

or by using (2) we obtain

$$2(c + d_{ik})e_{ik} - \frac{d_{ik}}{(N_k - 1)}\left(\sum_{j \neq i, j=1}^{N_k - 1} e_{jk}\right) = b_{ik}$$

By writing this first order condition in matrix form, we obtain (12), where

$$\underset{(N_k, N_k)}{\mathbf{M}_k} =$$

$$2\begin{pmatrix} c + d_{1k} & -d_{1k}/(N_k - 1) & . & . & -d_{1k}/(N_k - 1) \\ -d_{2k}/(N_k - 1) & c + d_{2k} & -d_{2k}/(N_k - 1) & . & d_{2k} \\ . & . & . & . & . \\ . & . & . & . & . \\ -d_{N_k k}/(N_k - 1) & . & . & -d_{N_k k}/(N_k - 1) & c + d_{N_k k} \end{pmatrix}$$

∎

Proof of Proposition 5. For the comparative statics results (i) and (ii), which correspond to (8), since $\mathbf{M}_k$ is independent of b_{ik}, $\forall i, \forall k$, the results are immediate by noting that $b(\delta_{ik}) \equiv b_{ik}$ and $b'(\delta_{ik}) < 0$.

Now consider (iii). In the general case, the first condition of any individual i belonging to group k can be written as:

$$e_{ik}^* = \frac{b_{ik}}{2(c + d_{ik})} + \frac{d_{ik}}{c + d_{ik}}\overline{e}_{ik} \tag{15}$$

where

$$\overline{e}_{ik} = \frac{1}{(N_k - 1)}\sum_{j=1, j \neq i}^{j = N_k - 1} e_{jk}$$

From this first order condition (15), it is straightforward to show that:

$$\frac{\partial e_{ik}^*}{\partial \overline{e}_{ik}} = \frac{d_{ik}}{c + d_{ik}} > 0 \tag{16}$$

and

$$\frac{\partial^2 e_{ik}^*}{\partial \overline{e}_{ik} \partial d_{ik}} = \frac{c}{(c + d_{ik})^2} > 0 \tag{17}$$

Also, for a given group effort $\overline{e}_{ik}$, we have:

$$\frac{\partial e_{ik}^*}{\partial d_{ik}} = \frac{2c\overline{e}_{ik} - b_{ik}}{2\,(c + d_{ik})^2}$$

By using (15), this can be written as

$$\frac{\partial e_{ik}^*}{\partial d_{ik}} = -\frac{(e_{ik} - \overline{e}_{ik})}{c + d_{ik}}$$

which implies that, for a given group effort $\overline{e}_{ik}$,

$$\frac{\partial e_{ik}^*}{\partial d_{ik}} \gtreqless 0 \Leftrightarrow e_{ik}^* \lesseqgtr \overline{e}_{ik} \tag{18}$$

Finally, we have:

$$\frac{\partial^2 e_{ik}^*}{\partial d_{ik} \partial \delta_{ik}} = -\frac{1}{c + d_{ik}} \left(\frac{\partial e_{ik}}{\partial \delta_{ik}} - \frac{\partial \overline{e}_{ik}}{\partial \delta_{ik}} \right) \gtreqless 0 \tag{19}$$

$$\frac{\partial e_{ik}^*}{\partial d_{ik} \partial \overline{\delta}_{ik}} = -\frac{1}{c + d_{ik}} \left(\frac{\partial e_{ik}}{\partial \overline{\delta}_{ik}} - \frac{\partial \overline{e}_{ik}}{\partial \overline{\delta}_{ik}} \right) \gtreqless 0 \tag{20}$$

∎

Appendix 2: Description of control variables

Individual socio-demographic variables

female: dummy variable taking value one if the respondent is female.

age: respondents' age measured in years.

health status: response to the question "In the last month, how often did a health or emotional problem cause you to miss a day of school", coded as 0= never, 1=just a few times, 2= about once a week, 3= almost every day, 4= every day.

religion practice: response to the question: "In the past 12 months, how often did you attend religious services", coded as 0= not applicable, 1= never, 2= less than once a month, 3= once a month or more, but less than once a week, 4= once a week or more.

school attendance: number or years the respondent has been a student at the school.

student grade: grade of student in the current year.

mathematics score: score in mathematics at the most recent grading period, coded as1= D or lower, 2= C, 3=B, 4=A.

organized social participation: dummy taking value one if the respondent participate in any clubs, organizations, or teams at school in the school year.

motivation in education: dummy taking value one if the respondent reports to try very hard to do his/her school work well, coded as 1=I never try at all, 2=I don't try very hard, 3=I try hard enough, but not as hard as I could, 4=I try very hard to do my best.

self esteem: response to the question: "Compared with other people your age, how intelligent are you", coded 1as = moderately below average, 2= slightly below average, 3= about average, 4= slightly above average, 5= moderately above average, 6= extremely above average.

physical development: response to the question: "How advanced is your physical development compared to other boys your age", coded as 1= I look younger than most, 2= I look younger than some, 3= I look about average, 4= I look older than some, 5= I look older than most.

Family background variables

household size: number of people living in the household.

public assistance: dummy taking value one if either the father or the mother receives public assistance, such as welfare.

mother working: dummy taking value one if the mother works for pay.

two married parent family: dummy taking value one if the respondent lives in a household with two parents (both biological and non biological) that are married.

single parent family: dummy taking value one if the respondent lives in a household with only one parents (both biological and non biological).

parents age: mean value of the age of the parents (biological or non-biological) living with the child.

parent occupation dummies: closest description of the job of (biological or non-biological) parent that is living with the child, coded as 6-category dummies (doesn't work without being disables, the reference group, manager, professional or technical, office or sales worker, manual, military or security, farm or fishery, retired, other). If both parents are in the household, the occupation of the father is considered.

Protective factors

parental care: dummy taking value one if the respondent reports that the (biological or non-biological) parent that is living with her/him or at least one of the parents if both are in the household cares very much about her/him.

relationship with teachers: dummy taking value one if the respondent reports to have trouble getting along with teachers at least about once a week, since the beginning of the school year.

school attachment: composite score of three items derived from the questions: "How much do you agree or disagree that: (a) You feel close to people at your school, (b) you feel like you are part of your school, (c) you are happy to be at your school", all coded as 1= strongly agree, 2= agree, 3=neither agree nor disagree, 4= disagree, 5= strongly disagree. (Crombach-alpha =0.75).

social exclusion: response to the question: "How much do you feel that adults care about you, coded as 1= very much, 2= quite a bit, 3= somewhat, 4= very little, 5= not at all".

Residential neighborhood variables

neighborhood quality: interviewer response to the question "How well kept are most of the buildings on the street", coded as 1= very poorly kept (needs major repairs), 2= poorly kept (needs minor repairs), 3= fairly well kept (needs cosmetic work), 4= very well kept.

residential building quality: interviewer response to the question "How well kept is the building in which the respondent lives", coded as 1= very poorly kept (needs major repairs), 2= poorly kept (needs minor repairs), 3= fairly well kept (needs cosmetic work), 4= very well kept.

neighborhood safety: dummy variable taking value if the interviewer felt concerned for his/her safety when he/she went to the respondent's home.

residential area type: interviewer's description of the immediate area or street (one block, both sides) where the respondent lives, coded as 5-category dummies (rural, the reference group, suburban, urban - residential only, 3 or more commercial properties - mostly retail, 3 or more commercial properties - mostly wholesale or industrial, other).

School variables

teachers quality: percentage of full-time classroom teachers holding Master's degree of higher.

school quality: ratio between full-time classroom teachers and average class size.

school type dummies: catholic or other private with religious affiliation, private with no religious affiliation, public (reference group), other.

students quality: number of students retained in the same grade for the next academic year (averaged on all grades and total amount of students held back if the school is ungraded).

strictness of school anti-crime regulations: composite score of the items derived from the questions: "In your school, what happens to a student who is caught: (a) injuring another student, (b) possessing alcohol, (c) possessing an illegal drug, (d) possessing a weapon, (e) drinking alcohol at school, (f) using an illegal drug at school, (g) verbally abusing a teacher, (h) physically injuring a teacher, (i) stealing school property", coded as 1= no policy, verbal warning or minor actions, 2= in-school suspension (the student does not attend classes, but comes to school), 3= out-of-school suspension (the student must stay out of school for a time), 4= expulsion (the student must withdraw permanently). (Crombach-alpha 0.74).

TABLE 1: DESCRIPTIVE STATISTICS (5,154 criminals)

	Mean	St.dev	Min	Max
Index of delinquency	1.57	1.73	0	3
Index of conformism (d_{ik1})	0.89	0.12	0	1
Index of conformism (d_{ik2})	3.31	2.19	1	5
Index of conformism (d_{ik3})	0.45	0.47	0	1
parent education (δ_{ik})	3.19	1.66	1	5
parent education ($\overline{\delta}_{ik}$)	2.99	1.10	1	5
female	0.23	0.30	0	1
age	14.82	1.69	10	19
health status	2.10	1.61	0	4
religion practice	1.51	0.71	0	4
black or African American	0.24	0.35	0	1
other races	0.05	0.06	0	1
school attendance	2.99	1.26	1	6
student grade	8.51	1.84	6	13
mathematics score	1.18	1.29	1	4
organized social participation	0.67	0.26	0	1
motivation in education:	1.87	0.77	1	4
relationship with teachers:	0.29	0.41	0	1
social exclusion:	3.37	1.72	1	5
school attachment	3.85	1.21	1	5
parental care	0.41	0.45	0	1
household size	4.52	1.16	1	6
two married parent family	0.30	0.35	0	1
single parent family	0.32	0.36	0	1
public assistance:	0.25	0.31	0	1
Mother working	0.54	0.44	0	1
parents age	42.31	7.81	33	75
parent occupation manager	0.09	0.11	0	1
parent occupation professional or technical	0.11	0.16	0	1
parent occupation office or sales worker	0.17	0.19	0	1
parent occupation manual	0.32	0.40	0	1
parent occupation military or security	0.06	0.07	0	1
parent occupation farm or fishery	0.01	0.02	0	1
parent occupation retired	0.04	0.08	0	1
parent occupation other	0.09	0.10	0	1
neighborhood quality	1.95	2.41	1	4
residential building quality	1.57	1.77	1	4
neighborhood safety	0.45	0.57	0	1
residential area type suburban	0.27	0.30	0	1
residential area type urban - residential only	0.10	0.12	0	1
residential area type 3 or more commercial properties - mostly retail	0.15	0.17	0	1
residential area type 3 or more commercial properties - mostly wholesale or industrial	0.20	0.28	0	1
residential area type other	0.18	0.23	0	1
physical development	3.06	2.34	1	5
self esteem	3.81	1.18	1	6
school catholic or other private, religious affiliation	0.09	0.17	0	1
school private, no religious affiliation	0.02	0.14	0	1
school quality	2.25	3.32	0.7	4.78
students quality	491.13	205.01	142.43	856.64
teachers quality	49.29	24.41	0	100
strictness of school anti-crime regulations	2.11	1.75	1	4

Table 2: Estimation results on key variables
dependent variable: delinquency index

Variable	Model (13) Full sample	Model (13) $e_{ik} < \overline{e}_{ik}$	Model (13) $e_{ik} > \overline{e}_{ik}$
parental education (δ_i)	-0.2518^{***} (0.0527)	-0.3295^{***} (0.1038)	-0.2352^{***} (0.0753)
friends' parental education ($\overline{\delta}_{ik}$)	-0.2821^{***} (0.0165)	-0.3777^{***} (0.0999)	-0.2610^{***} (0.0441)
conformism (d_{ik1})	-0.6129 (0.4325)	0.6598^{**} (0.3250)	-0.6018^{**} (0.2749)
conformism $\times$ parental education ($d_{ik1} \times \delta_{ik}$)	0.0047 (0.0036)	0.0010^{**} (0.0005)	0.0069^{**} (0.0032)
conformism $\times$ friends' parental education ($d_{ik1} \times \overline{\delta}_{ik}$)	-0.0083 (0.0099)	-0.0094^{**} (0.0047)	-0.0064^{**} (0.0042)
n.obs.	5,154	2,192	2,962
R^2	0.73	0.69	0.71

Notes:
- White-robust standard errors adjusted for clustering at the group level are reported in parentheses
- Two, three asterisks indicate statistical significance at the 5 and 1 percent level respectively
- Regressions are weighted to population proportions

Table 3: Effect of conformity by parental education level dependent variable: delinquency index

parental education $(\delta_{ik}, \overline{\delta}_{ik})$	d_{ik1}		d_{ik3}	
	$e_{ik} < \overline{e}_{ik}$	$e_{ik} > \overline{e}_{ik}$	$e_{ik} < \overline{e}_{ik}$	$e_{ik} > \overline{e}_{ik}$
"Never went to school"	0.6514*** (0.2091)	−0.6013*** (0.1675)	0.1950*** (0.0919)	−0.1886*** (0.0678)
"Not graduate from high school"	0.6430*** (0.1898)	−0.6008*** (0.1609)	0.1879*** (0.0855)	−0.1884*** (0.0650)
"High-school graduate"	0.6346*** (0.1801)	−0.6003*** (0.1603)	0.1808*** (0.0795)	−0.1882*** (0.0604)
"Graduated from college or university"	0.6262*** (0.1765)	−0.5998*** (0.1600)	0.1737*** (0.0612)	−0.1880*** (0.0600)
"Professional training beyond a four-year college"	0.6178*** (0.1677)	−0.5993*** (0.1579)	0.1666*** (0.0556)	−0.1878*** (0.0600)

Notes:
- Standard errors calculated using the Delta-Method (i.e., the covariances between estimators are taken into consideration when calculating the sum of the variances) are reported in parentheses
- Three asterisks indicate statistical significance at the 1 percent level

Table 4: Estimation results on key variables
dependent variable: delinquency index

Variable	Model (13) Full sample	Model (13) $e_{ik} < \overline{e}_{ik}$	Model (13) $e_{ik} > \overline{e}_{ik}$
parental education (δ_i)	-0.2930^{***} (0.0912)	-0.3527^{***} (0.1223)	-0.2751^{***} (0.1059)
friends' parental education ($\overline{\delta}_{ik}$)	-0.324^{***} (0.0858)	-0.3822^{***} (0.0985)	-0.2982^{***} (0.0663)
conformism (d_{ik2})	-0.0295 (0.0217)	0.0295 (0.0255)	-0.0198 (0.0201)
conformism $\times$ parental education ($d_{ik2} \times \delta_{ik}$)	0.0006 (0.0005)	0.0013 (0.0009)	0.0007 (0.0006)
conformism $\times$ friends' parental education ($d_{ik2} \times \overline{\delta}_{ik}$)	-0.0022 (0.0020)	-0.0052 (0.0024)	-0.0004 (0.0014)
n. obs	5,154	2,192	2,962
R^2	0.70	0.66	0.68
parental education (δ_i)	-0.2355^{***} (0.0666)	-0.2999^{***} (0.1013)	-0.2203^{***} (0.0744)
friends' parental education ($\overline{\delta}_{ik}$)	-0.2668^{***} (0.0441)	-0.3478^{***} (0.0878)	-0.2755^{***} (0.0645)
conformism (d_{ik3})	-0.2129 (0.2305)	0.2021^{**} (0.0988)	-0.1888^{**} (0.0888)
conformism $\times$ parental education ($d_{ik3} \times \delta_{ik}$)	0.0046 (0.041)	0.0011^{**} (0.0005)	0.0059^{**} (0.0032)
conformism $\times$ friends' parental education ($d_{ik3} \times \overline{\delta}_{ik}$)	-0.0078 (0.0069)	-0.0082^{**} (0.0040)	-0.0061^{**} (0.0031)
n. obs	5,154	2,192	2,962
R^2	0.75	0.69	0.73

Notes:
- White-robust standard errors adjusted for clustering at the group level are reported in parentheses
- Two, three asterisks indicate statistical significance at the 5 and 1 percent level respectively
- Regressions are weighted to population proportions