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Prodigal Sons, Values and Investment in Human Capital

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Abstract

(Adult) children are sometimes "prodigal" with the capital they are endowed with by their parents. In particular, they might waste the money they have been given. However, they can also be prodigal in their use of their human capital. When, for instance, an individual gets addicted to a drug, she is likely miss out on labor market opportunities, essentially "wasting" her human capital. Or he might join a sect, take up heavy drinking or even commit suicide. Such choices are often described as instances of "self-destruction" (a moniker which is literal in the case of suicide). If the parent foresees such self-destructive acts, she will invest less in the child's human capital. As optimal contracting between the parent and the child is not feasible, parents will spend time and energy to teach the child "values" to live by. Value-investments can increase the well-being of both the parent and the child by enabling efficient investment in human capital.

1 Introduction

Why do parents spend a lot of effort in trying to persuade their children not to engage in self-destructive activities? At first such a question might seem strange. Yet, if we believe both that parents want the best for their children and those children, at least if they are competent adults, generally know what is good for them better than someone else, then it can in fact be a puzzle why parents try to e.g. dissuade their children from using drugs, or even from committing suicide.

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This paper offers a possible explanation with various interesting empirical implications: self-destructive individuals "waste" much of their human capital, in that they often do not work or engage in other "meaningful" activities, or they have a lower productivity per unit of human capital.

In the past roughly half a century, the characteristics (skills, knowledge, traits, habits and values) of individuals have come to play a much larger role in economics, due to the emergence of the literature on human capital. Much of the human capital literature has focused on labor market outcomes, such as earnings, but as Becker (1964) have stressed, human capital is also valuable in household production, including leisure. There has also been increases recognition of the fact, than non-cognitive skills also influence individual outcomes and they can also be analyzed as human capital (see the seminal work of e.g. Cunha and Heckman, 2007). Likewise, individuals invest in their health in order to gain life years, better productivity and better quality leisure time. In this essay we build on different strains of the human capital literature, such as the notion of rational addiction (Becker and Murphy, 1988), and the related notion of learning by doing and consumption capital (see also Becker, 1996).

Throughout history, different concepts of "good moral character" have been proposed. In the *Republic*, Plato speaks of the four virtues that are later to be called the "cardinal" virtues: fortitude (courage or bravery), prudence, temperance and justice. Plato thought that temperance was primarily found in the producing class, prudence among the rulers (who need to "manage" things), while fortitude is particularly needed among the warrior classes. The four cardinal virtues also had an important role in medieval Christianity. Pope Gregory VII. also provided a "list" of important virtues. he identified seven virtues that help resisting the temptation of the "seven deadly sins". Clearly, what virtues are productive and for whom has changed over the course of history. Deirdre McCloskey (2006) documents changes in what virtues were commended by society. In particular, during the 17th century, aristocratic virtues has given way to "bourgeois virtues" such as temperance, thrift and honesty.

Both the classical and the early neoclassical economists (such as Marshall (see e.g. Caldari, 2004)) has been much preoccupied with the notion of moral progress. However, as economics has become more specialized, such concerns have been "banished" from economics. Economists have mostly treated individuals and their preferences as given. However, the theory of human capital provides us with a toolkit to study both changes in people's productive capacities and changes in their preferences or their non-cognitive (personality) traits. Becker (1996) and Becker and Murphy (1988, 2000) successfully applied the human capital framework to study "changing preferences" as well as the influence of the social environment on individuals' choices. In this chapter we essentially take the same approach.

Our essay complements studies by e.g. Cunha and Heckman (2007), who build and empirically test models of cognitive and non-cognitive skill formation in early childhood and beyond. We are especially indebted to Heckman and others stressing the importance of non-cognitive human capital. A number of non-cognitive skills have been shown to be important in employment, earnings, school behavior, health and other aspects of life outcomes. We concentrate especially on non-cognitive traits that traditionally has been dubbed as "virtues", and while the literature on non-cognitive human capital concentrates on predicting the social rate of returns as well as the production functions of these skills, we focus on individual maximization. Thus, our approach naturally complements other approaches in this literature. Moreover, our focus is on the complementarity between cognitive and non-cognitive skills in contexts that have not been examined so far. Within the literature on non-cognitive skills, much work has been done on the effects of "big five" personality traits, such as conscientiousness, agreeableness, openness to experience, extroversion and neuroticism. Conscientiousness, agreeableness, extroversion and emotional stability are usually linked to better outcomes, including in later school performance, adult earnings or (lack of) criminal and other disruptive behavior. One of the chief insight of the economics of non-cognitive traits is that these traits are not fixed at the beginning of life, rather, they can be thought of as forms of human capital: investments can be made in order to build "better personalities" and other desirable character traits and non-cognitive skills. This paper does not have much to add to the literature on the importance of personality traits in general, however, there is much to be done to examine the incentives to invest in such traits in particular settings. Note that when we talk of investing in non-cognitive human capital, partly we talk about preference formation. One result relevant to our research is Becker and Mulligan (1993)'s work on the endogenous formation of time preference. In their model, individuals can invest in "imagination capital" which makes them less present-oriented. Higher expected future wages provide incentives for such investment. In our analysis investments in patience will play a role both in individuals' consumption decisions and their decisions concerning criminal activity. Greater patience demonstrably reduce criminal and other "reckless" behavior as well as engagement in harmful addictions.

Following in the footsteps of Becker and others Bisin and Verdier (2001) consider the transmission of cultural traits and the evolution of preferences across generations. Importantly, their model assumes a form of "myopic" altruism where the parent will be "biased" to mold the values and other cultural traits of the child in a direction that resembles the parent's own values and preferences. In both Becker and Bisin and Verdier parents can face a free-riding incentive as children can also learn values from their peers, whose values are influenced by their parents. So parents can, to some extent, free-ride in each other's investments.

One interpretation of this paper's undertaking is that it is endogenizing individual preferences. Yet, as e.g. Mulligan (1997) argues, another interpretation can be that investing in certain "values" is complementary to certain behavior. Essentially we can take a household production (Becker, 1965) approach, in which being more "virtuous" increases productivity in "virtuous" acts, while decreases productivity in unvirtuous behavior. The key element in our approach is that whether or not we are talking about changes in preferences, such changes are not sudden and exogenous, but rather they are the results of investment decisions done by parents in their children. Still, individuals choosing e.g. their preferences related to work or drug use might run into problems, as we cannot always easily construct a meta-utility function based on which desirable values are chosen. This presents a general problem with modeling investments in non-cognitive skills: individuals might choose to be more conscientious, but based on what meta-preferences do they decide how much to invest in that trait? We take this problem seriously, and develop ways to solve it. First, we assume that it is parents who invest in their children's trait. They may do so partly due to paternalism, but also because non-cognitive skills increase the productivity of investing in cognitive human capital. But parents can also have selfish reasons to shape their children's attitudes. As mentioned before, Becker (1993) presents an example of such parental conduct. We extend his approach in showing that parents may alter their offspring's attitude toward drugs or crime partly in order to decrease their transfers to "broke" adult children. By increasing the hours worked or the wage earned by the adult child, investing in virtues also increases the return to human capital.

Virtue capital investment can be undertaken in various ways. One way in which parents can influence their children's conduct in the future is by setting an example. A parent may, for instance, enjoy smoking but nevertheless refrains from smoking in order to set a good example to her child. A parent can also simply teach the child or tell stories that have the "right" moral message. It has been established that reading regularly to the child contributes to cognitive as well as non-cognitive development. Virtue can also be accumulated through "learning by doing": doing virtuous acts makes one more virtuous by the force of habit.

1.1 Preference-formation within the family

Parents have an enormous effect on the skills, knowledge, preferences and values of their children. Most parents invest a lot of time and effort teaching their offspring "how to behave" in certain situations. Parents instill values or virtues in their children for various reasons. They may believe that having these values will benefit their child. Alternatively, parents may "indoctrinate" their child for more selfish reasons. Becker et al. (2016) show that parents might create "guilt" in their child which would induce the adult child to care for his elderly parent.

Perhaps paradoxically, this can also help the child, as the parent., knowing that the child will transfer some of his adult income to them, will invest more in the child's human capital. Guilt or altruism can thus act as a commitment tool in lieu of a formal contract between the parent and the child. In this paper we also introduce a situation where the child would benefit from committing to certain adult behavior but, obviously, cannot write a contract with the parent. The child might hypothetically promise the parent not to take drugs or engage in criminal activity in exchange for greater investment by their parent in their human capital. The parent will invest less in the child if she expects the child to be a heavy drug user as using drugs often leads to work absenteeism and a general loss in ability to do quality work. This reduces the return on human capital. Of course, having more human capital usually causes one to engage less in self-destructive activities, however, even high human capital individuals engage sometimes in such behavior. All that matters for the validity of our model is that both the parent and the child can be made better off by the child abstaining from drugs in exchange for more investment in the child by the parent. We provide three examples of parents discouraging self-destructive behavior: one is taking harmfully addictive drugs. The other is engaging in crime. And a third one is suicide. Out of the three suicide is the one in which self-destruction is literal. But the other analyzed choices also often decrease the time spent on productive activities, and may also shorten one's life. In a number of other settings it is not much of a mystery why parents might have an incentive to invest in their children's values and preferences. Parents may, for example, exert effort to make their child more honest. This would make the adult child, provided he can demonstrate or signal his honesty, a more reliable business or marriage partner, which increases the adult child's utility, and thus the utility of an altruistic parent, too. But why would a non-parternalistically altruistic parent care if her child takes drugs, drinks lots of alcohol, or commit suicide? If we take these as examples of rational behavior, then if taking drugs is a good idea from the adult child's perspective, it could also be a good idea from the altruistic parent's perspective. However, the child faces a time inconsistency problem. He would like the parent to invest more in his human capital, yet he cannot promise not to "waste" his human capital in his adult life by engaging in self-destructive behavior. Hence, investment in human capital will be inefficiently low, compared to a case of full commitment. Furthermore, if the parent is fully altruistic, she will transfer resources to her child when the child engages in self-destruction, given that this lowers the income and utility level of the adult child. The parent may be able to commit not to engage in this kind of compensatory behavior by limiting her altruism. Alternatively, she can commit the child to not engaging in self-destruction by instilling values in her child. In this paper we consider three motivations for investing in children's values or preferences. First, and

this is the "easy case", we allow parents to be paternalistic toward their children. Second, parents are partly selfish and may want to decrease the amount of resources transferred to a "broke" adult child. And third, and this is in our view the most interesting and novel aspect, parents wish to "insure" their human capital investments against their child possibly "wasting" their human capital.

There is a fourth possible motivation that is important but we do not formally consider here: Becker, Murphy and Grossman (2004) make the observation that drug use is very often the result of peer pressure, and this is a reason why even fully altruistic parents would discourage drug use among their offspring. We believe it is an important motivation, but the hypothesis is not without limitations. The child, for instance, can avoid harmful peer pressure by associating with different peers. Of course, adolescents are not necessarily in a position to "rationally" choose their peer group, but then this is another instance of parental paternalism. The explanation this paper focuses on considers a case when parents are not paternalistic at all, not because we do not believe paternalism is important, but because we wish to show that even fully non-paternalistic and altruistic parents may care about the consumption and other choices of their children.

2 The case of drugs

First, we consider the case of a paternalist parent. We start from and extend the rational addiction model of Becker and Murphy (1988). We analyze three periods. In period one the parent invests in virtue or moral character for her only child, and in the second and third period the adult child makes consumption choices. The return on virtue has multiple dimensions: first, we allow for the possibility that virtue effects adult utility directly, either in a positive or negative way (being virtuous might bring with itself a sense of pride but occasionally also a sense of guilt). Second, virtue decreases the marginal utility of consuming "harmful" or "immoral" goods, which in turn depletes the consumption capital resulting from consuming the harmfully addictive good, and through this, increases adult utility (indirectly). Third, as consumption of harmfully addictive goods can also lower earnings, virtue can have the additional benefit of indirectly increasing the wealth of the adult child.

2.1 Substance abuse and productivity

There is ample evidence that one aspect of harmful addictions is their negative effect on productivity and hence wages. However, the link between the productivity of human capital and drug abuse is less clear. A higher level of human capital can partially offset the negative effects of substance abuse on productivity. Al-

ternatively, drug abuse could decrease the productivity *per unit of human capital*. We believe that the evidence points to this latter one being the dominant effect. Drugs can cause both absenteeism as well as "presenteeism". Drug use can, for instance affect concentration, can redirect attention and can also cause illness which contributes to absence from work. According to ? addicts miss two weeks more time from work than non-addicts. Also, unemployment rate among substance abusers is around 30%, substantially higher than the general unemployment rate. The direction of causality is, however, not obvious. Arguably, drug use can lead to unemployment, but unemployment can also lead to substance abuse given the hardship experienced by the unemployed. A review of the evidence suggests that there is at least some degree of causality running from heavy drug use to a higher probability of unemployment. The effects of different drugs on unemployment and in general the utilization rate of human capital is quite heterogeneous. Bray (2005) studied the effect of alcohol use on human capital accumulation and wages and did not find a significant relationship. "Heavier" drugs have been found to have a much more pronounced effect on productivity. All of this suggests that at least certain drugs effect the utilization rate of human capital. Our theory suggests that parents will spend more resources trying to dissuade their offspring from the use of say heroine than from the use of alcoholic beverages, not only because heroine is more harmful in the long run for the child, but also because in the case of the latter the contracting problem between parent and child is more severe as hard drugs affect the human capital utilization rate more strongly.

2.2 The Model

Assume a utility function with the form $U(x, y, S, V)$, where x is a composite good, y is a good or activity with certain "harmful" properties, S is the stock of past consumption of y , while V is the stock of virtue capital. We establish the following relationships. S affects the marginal utility from consuming or doing y ($U_{yS} > 0$), while the stock of virtue capital decreases its marginal utility ($U_{yV} < 0$). The individual maximizes her utility subject to the constraint $p_x x + p_y y + p_g g + wt = W(y, V)$, where W is the individual's "full wage" (including both the wage rate as well as hours worked). Crucially, the wage is also a function of y and V . Consider alcohol or drug abuse. Both will have an affect on the ability to perform work diligently. V also has a direct effect, as people with a higher stock of virtue capital can presumably perform better at work. Virtue may effect total utility positively ($U'(S) > 0$) or negatively ($U'(S) < 0$). For instance, virtue might cause guilt when engaging in "bad" activities. This lowers the marginal utility from "vices" but the guilt could be present even if one does not engage in such activities (see for example the concept of "Catholic guilt" or "Jewish guilt"). Alternatively, being virtuous can feel good, and while one feels guilty when engaging in unvirtuous

acts, she feels good otherwise. Notably, even when virtue decreases utility, it can still increase the indirect utility function through its effects on y .

Virtue is produced according to a production function $V(v)$ where v is the amount of time or material resources spent on producing virtue. In the real world, virtue is sometimes accumulated through explicit learning (such as a parent teaching her child about the virtues of honesty and self-control) and sometimes through learning-by-doing. To capture the former we could treat virtue-enhancing activities as being addictive. A good example of such activities is religious practice and the resulting religious capital, which has been studied extensively by Iannaccone and others. Including learning-by-doing in our model would not, however, lead to different results, hence we focus on a more simple production process.

We solve the model using backward induction, and hence start with the adult child's consumption choices. In doing so we derive the following first-order conditions:

$$U'(x) = \lambda p_x, \tag{1}$$

and

$$U'(y) + \frac{\partial U}{\partial S} \frac{\partial S}{\partial y} = \lambda p_y + \int_0^t e^{-\rho t} p_y. \tag{2}$$

These first-order conditions establish an optimal x and y , x^* and y^* . The consumption of the numeraire is a function of the lifetime wealth, while the consumption of y is a function of the income, the price of y , the stock of consumption capital S and the stock of virtue V . We assume that in period I. the parent can solve the maximization problem of the future adult child, so she takes the optimal consumptions as given. She maximizes the utility function

$$V_p = U(C_p) + aV_c(x^*(W_c(S)), y^*(W_c(S), p_y, S, V, \beta(V))). \tag{3}$$

The first order conditions in the steady state are

$$U'(C_p) = \lambda \tag{4}$$

and

$$a \frac{\partial V}{\partial v} \left(\frac{\partial x^*}{\partial W_c} \frac{\partial W_c}{\partial S} \frac{\partial S}{\partial y} \frac{\partial y}{\partial V} + \frac{\partial V_c}{\partial y^*} \frac{\partial y^*}{\partial V} + \frac{\partial V_c}{\partial S} \frac{\partial S}{\partial y} \left(\frac{\partial y}{\partial V} + \frac{\partial y}{\partial \beta} \frac{\partial \beta}{\partial V} \right) \right) = \lambda. \tag{5}$$

The first term within the main parenthesis is the increase in consumption due to a greater amount of virtue. The second term is negative, given that $\frac{\partial y^*}{\partial V} < 0$. Marginal utility stemming from the consumption of y decreases as V increases. The third term captures the gain from a lower harmful consumption stock S , and has two parts: the first is a decrease in the consumption stock stemming from the

direct effect of V on the consumption of y , while the second one is a decrease due to greater patience. We can conceptualize the effect of V on the consumption of the harmful substance as the parent providing a substitute good for the substance. In the standard rational addiction framework, with a consumption schedule $c(S)$ and a constant depreciation schedule $c = \delta S$, an increase in V , by decreasing consumption at any period t , shifts the consumption schedule downwards, and leads to a lower steady-state consumption level. If the consumption problem has two steady states, and the lower one is an unstable one, the socialization effort could result in the adult child consuming zero units of the harmful substance, or if the child is already a drug addict (moral character building takes place at an older age), this downward shift can cause the (adult) child to stop consuming the harmful substance altogether. This scenario is especially likely in the case of very strong addictions. Hence, the stronger a likely addiction is, the greater is the incentive to influence the adult child's behavior through instilling values or virtues in the child.

Note that the parent maximizes, to the extent of her altruism, the child's lifetime utility without discounting across life periods. This lies behind the parent's incentive to invest in virtuous conduct. For that reason, "good conduct" here is a merit good: if it were entirely up to the (adult) child, he would consume a (perhaps much) greater amount of the harmful addictive good. Note also how our setup and predictions relating to the discount rate differ from that of Becker and Mulligan. In the Becker-Mulligan model, it is individuals themselves, not their parents, who invests in imagination capital, and so, if they are already addicted to e.g. harmful drugs, it means that their future utility level is lower, while their present utility level is greater than it otherwise would be, and hence, they will invest less in their imagination capital. In our model, it is the parent who makes the choice about investing in patience capital. The parent will take into account the fact that if the adult child becomes addicted to a harmful substance, it will lower her lifetime utility. Increasing the child's patience lowers the chances of the child developing a harmful addiction, and hence, the parent will invest more in imagination capital when the chances of harmful addiction are greater.

2.3 Fully altruistic model with transfers and human capital investments

A merit good or paternalistic approach can at least partially explain why parents invest in "virtues". Parents interested in their child's consumption of merit goods can, as Becker (1981/1991) observes, partially offset the effect of "too much altruism": parents transferring resources to their adult child, which then incentivizes the adult child to be more "careless" and possibly to become addicted to harmful

substances, not saving enough money etc. The merit good or paternalism assumptions might, however, seem "ad hoc". In this subsection, instead of postulating that parents do not want their children to become addicted to harmful substances, we derive this "preference" from more basic assumptions. We also introduce the possibility of the parent investing in the child's human capital (mainly: education and health) as well as allowing for the possibility that the parent may transfer resources to her adult child.

The model consists of three periods. In period I the parent raises and socializes the child, and invests in the child's human capital. In period II. the child is a young adult and makes consumption choices, while earning an income. In period III. the adult child is older and "reaps" the (positive and negative) returns of consumption capital.

We assume that the parent is alive throughout the three periods. In period I she is "young", in period II. she is "middle aged", while in period III. she is "old". Analytically, we first solve for the optimal amount of human capital investment and parental transfers in the third period, conditional on the amount of virtue and other variables. Then we solve for the optimal amount of virtue. The marginal benefit of investing in virtue depends on its effect on the marginal return on human capital investment.

2.3.1 Parental transfers

In the last period, the parent obviously does not make any investment decisions, however, she may choose to transfer resources (t) to the middle-aged child. The parent maximizes the lifetime utility function

$$V_p^y(C_p^y) + V_p^m(C_p^m) + V_p^o(C_p^o) + a(V_c^y + V_c^m), \quad (6)$$

subject to the intertemporal budget constraint

$$c_p^y + \frac{c_p^m}{1+r} + \frac{c_p^o}{(1+r)^2} + \frac{t}{(1+r)^2} + h + v = m_p^y + \frac{m_p^m}{1+r} + \frac{m_p^o}{(1+r)^2}. \quad (7)$$

We use the intertemporal budget constraint as the parent might transfer the resource in the last period at the expense of consumption of earlier periods. The first-order conditions yield

$$a \frac{\partial V_c^m}{\partial t} = \lambda \quad (8)$$

and

$$V_p^{y'}(C_p^y) + V_p^{m'}(C_p^m) + V_p^{o'}(C_p^o) = \lambda, \quad (9)$$

which implies

$$a \frac{\partial V_c^m}{\partial t} = V_p^{y'}(C_p^y) + V_p^{m'}(C_p^m) + V_p^{o'}(C_p^o). \quad (10)$$

Due to the concavity of the parent's preferences regarding her own and the adult child's consumption, if harmful addiction lowers the child's full income, the marginal utility of transferring resources to the child increases. This, in turn, decreases parental consumption, while at the same time increases the consumption of the harmfully addictive good by the child as he does not bear the full cost of consumption. This problem has at least two possible "solutions": one is that, as in Becker (1981/1991), parental altruism decreases if the child expected to behave ways the parent disapproves of (the merit good case). Alternatively, the parent can spend resources early on to dissuade the child from consuming harmful substances and possibly also to consume goods that are beneficially addictive.

2.3.2 Investment in human capital and in virtue

Apart from possibly transferring resources to the adult child, the parent will also invest in the child's human capital. In period I. the parent decides how much to invest in the child's human capital, while she also decides on how much to invest in his virtue. Resources spent on investing in human capital are notated by h . There is complementarity between the two investments via two channels: first, a greater level of virtue induces the child to avoid harmful addictions which results in a higher lifetime income, which in turn increases the return on (general) human capital. Second, investments in virtue reduces the optimal amount of parental transfers to middle-aged children, which, in turn, increases the optimal amount spent on human capital investment. As before, the child can consumer goods x and y , where x is the harmfully addictive goods. As in Becker and Murphy (1988), the consumption dynamics can be illustrated by a consumption schedule $C(S)$, where S is the stock of past consumption of S and a depreciation line δS . Note that in steady state $C = \delta S$. The consumption schedule is positively inclined if and only if $U_{XS} > 0$ and the individual discounts the future harm of taking the substance strongly enough. We sidestep the detailed modeling of the consumption choice: this can be found in e.g. Becker and Murphy (1988). The child maximizes his lifetime utility and in each period he compares the current marginal utility of consuming x with the long.term (harmful) consequences. By consuming x the adult child accumulates consumption capital which increases in each period the marginal utility of consuming more x . We divide the lifetime of the individual to a childhood period, where the parent makes investments in the child, and an adult period which contains multiple "subperiods", through which the adult child accumulates consumption capital. The virtue investments of the parent influences the child's steady state consumption level from the harmfully addictive substance by lowering the adult child's consumption path curve, which then intersects the depreciation line at a lower steady state consumption level. Even a small investment in virtue can radically alter the consumption fo the adult child as in the case of addictive

substances there are often unstable steady-states. A small increase in consumption can lead to a substantially larger steady-state consumption level, while a decrease in consumption and hence endogenous depreciation of the consumption stock can quickly move steady-state consumption to a very low level, in some cases even down to zero. The first-order condition with respect to human capital investment (in period I.) is

$$a \frac{\partial V_c}{\partial H_c} \frac{\partial H_c}{\partial h} = \lambda, \quad (11)$$

while the FOC with respect to own consumption is

$$V_p^{y'}(C_p^y) + V_p^{m'}(C_p^m) + V_p^{o'}(C_p^o) = \lambda. \quad (12)$$

This implies

$$a \frac{\partial V_c}{\partial H_c} \frac{\partial H_c}{\partial h} = V_p^{y'}(C_p^y) + V_p^{m'}(C_p^m) + V_p^{o'}(C_p^o). \quad (13)$$

The condition establishes an optimal level of human capital which depends on h , which in turn depends on the adult wage, and indirectly on the consumption capital stock. Notice that a larger stock of virtue increases the marginal return on human capital. The first-order condition for investing in moral character is

$$\begin{aligned} a \frac{\partial V}{\partial v} \left(\beta \frac{\partial x^*}{\partial W_c} \frac{\partial W_c}{\partial S} \frac{\partial S}{\partial y} \frac{\partial y}{\partial V} + \frac{\partial V_c}{\partial y^*} \frac{\partial y^*}{\partial V} + \beta \frac{\partial V_c}{\partial S} \frac{\partial S}{\partial y} \left(\frac{\partial y}{\partial V} + \beta \frac{\partial y}{\partial \beta} \frac{\partial \beta}{\partial V} \right) \right) + \\ V_p^{y'}(C_p^y) + V_p^{m'}(C_p^m) + \frac{\partial C_c^m}{\partial t} \frac{\partial t}{\partial V} \left(V_p^{o'}(C_p^o) \frac{\partial C_p^y}{\partial V_c} \frac{\partial V_c}{\partial t} \frac{\partial t}{\partial V} \right) - \\ a \frac{\partial V_c}{\partial t} \frac{\partial t}{\partial V} + a \frac{\partial V_c}{\partial W_c} \frac{\partial W_c}{\partial H_c} \frac{\partial H_c}{\partial h} \frac{\partial h}{\partial^2 V} = \lambda. \end{aligned} \quad (14)$$

The parent considers three effects of investing in moral character: spending on V induces the adult child to earn more in adulthood directly as well as through incentivizing human capital investments on the parent's part. This in turn decreases the amount of money transferred by the parent to the adult child. This directly increases the consumption of the parent but decreases the utility of the child.

To see the parent's problem more clearly, consider a special case, with $W(H_c) = RH_c$, that is, the adult child's total wage depends linearly on his human capital. Let the human capital production function be $H_c = A\sqrt{h}$ where A is the ability, family endowments or other advantages of the child. Let us also specify the effect of addiction on adult wages. Suppose that consumption capital S decreases the adult child's last period "full" wage (that is, hourly wage times hours worked) by a fraction γ . Let the utility function of the parent be written as

$$V_p = v(C_p) + a(1 - \gamma(S))RH_c, \quad (15)$$

subject to

$$C_p + h + v = W_p, \quad (16)$$

that is, the parent simply maximizes the utility from her own consumption and the the income of her adult child. We can interpret this relationship either by regarding R as a "full" rental price, containing also the hours worked, and considering that harmful addictions tend to decrease time spent at work, or alternatively, by assuming that the consumption of harmful substances decreases not only hours worked but also productivity per hour and per units of human capital. The first-order condition with respect to investment in human capital is

$$\frac{a(1 - \gamma(S))AR}{2\sqrt{h}} = \lambda, \quad (17)$$

while the FOC with respect to parental consumption is

$$v'(C_p) = \lambda. \quad (18)$$

By combining the two first-order conditions we can express h in closed form as

$$h = \left(\frac{a(1 - \gamma(S))AR}{2v'(C_p)} \right)^2. \quad (19)$$

Notice that there are feedback effects between the amount of human capital and the consumption of the harmful substance. An increase in the consumption of x leads to a lower human capital utilization rate, which then leads to lower investment in human capital. This, however, decreases the adult child's wage which makes him more prone to consume harmful addictive drugs. This then again has an effect on the human capital utilization rate and the process continues until, in a long run equilibrium, we will have a relatively low level of human capital and a relatively high level of drug consumption. Neither of these values will be equal to zero or infinite if Inada-type conditions hold.

We then consider the parent's decision to invest in virtue. The parent maximizes

$$V_p = v(C_p) + a(1 - \gamma(S))A \left(\frac{a(1 - \gamma(S))AR}{2v'(C_p)} \right)^2 R \quad (20)$$

subject to

$$C_p + h + v = W_p. \quad (21)$$

The FOC with respect to v is

$$-\frac{\partial \gamma}{\partial S} \frac{\partial S}{\partial x} \frac{\partial x}{\partial v} \frac{3a^3 A^3 R^3 (1 - \gamma(S))^2 \gamma(S)}{4v'(C(p))^2} = \lambda. \quad (22)$$

The incentive to invest in "indoctrination" increases in the per unit return on human capital (R), in parental altruism (a) and in ability/endowments (A). Especially interesting is the complementarity between virtue and ability or endowments. Greater endowments/ability increases the return on human capital linearly, so any effect that leads to more investment in human capital is magnified by higher ability or better family background. Thus higher endowed families have greater incentive to invest not only in human capital but also on persuading their children not to become drug users, as this allows them to invest efficiently in human capital. Now we turn to investment in moral character. Notice that in the absence of parental indoctrination there would be a contracting problem between the parent and the child. The child would optimally promise the parent to be diligent and not to be a drug-addict in adulthood in exchange for a greater investment in him, however, the child cannot commit to such a deal given that the parent cannot write a contract with the child. A similar problem has been analyzed by Becker: in his model the parent's return on her human capital investments are guaranteed by indoctrinating the child into supporting the parent in old age. A common feature in our model and Becker's is that parents may invest in the socialization or "indoctrination" of their child fully or partly for selfish reasons, which may harm the adult child, however, the child may still benefit on the whole if parental socialization leads to sufficiently higher level of human capital investment. A careful leader might ask, why does an increase in the marginal return on investing in human capital increase the marginal return of investing in virtue capital? After all, according to the envelope theorem, such complementarity should not necessarily be relevant. The reason it is relevant is that without investment in virtue investment in the child's human capital would be *inefficiently* low. Investing in virtue allows the parent to invest efficiently in human capital. Thus, an increase in the return on human capital investments does increase the return on investing in virtue capital. Note that this implies that families which are especially productive in investing in human capital, for instance due to themselves possessing a higher level of human capital, will invest more in their children's virtue.

Note that in the case of unstable consumption steady-states, even a small amount of indoctrination can substantially lower adult consumption from the harmfully addictive substance, by shifting the dynamic consumption schedule downwards. This is very similar to how taking part in a rehabilitation program can substantially alter subsequent consumption choices. This means that it may be enough to engage only a little in parental indoctrination as further efforts are not needed to keep the adult child's consumption level permanently low. However, we need to take into account two clarifications: first, there may be uncertainty about the consumption schedule of the adult child. Under such uncertainty, the parent can always, up to a point, lower the *expected* adult consumption of the child by

spending on persuasion. Second, virtue capital depreciates over time, and thus the parent need to accumulate a lot of such capital so that future depreciation would not push the adult child's consumption back to the higher steady state.

The next question to consider is whether children benefit from indoctrination. In Becker (1992), they *may* benefit from parental indoctrination. In our model they *necessarily* benefit from it *if* the parent invests in human capital solely for altruistic reason. This is because then the parent internalizes to the same extent both the benefits and the costs for the child stemming from indoctrination. If the parent invests in human capital partly for selfish reasons (e.g. in anticipation of old-age transfers from the adult child), then the adult child can both benefit and lose on net from indoctrination. In such a case, in general, parents generally "overcommit" the child: the child may, as an adult, end up with guilt or other unpleasant feelings about self-destructive behavior, without being fully compensated for it.

2.3.3 Poor and rich parents

There might be a difference in how relatively poor and wealthy parents dissuade their child from (heavy) drug use. Poor parents often do not have access to high quality mental health services, so they will tend to rely more on creating guilt in their child about drug use. Such parents will, for instance, more often preach traditional religious teachings that condemn suicide as an immoral choice. More precisely, it is relatively poor parents with high ability children who are most likely to do so. Wealthier parents of talented children, on the other hand, will rely more on investing in the child's mental health or creating opportunities for the child that serve as a substitute for drug use.

2.4 The Persistence of Poverty

Our model has several implications for the persistence of poverty. "Bad choices", such as engaging in hard drug use or had drinking, can lead to poor life outcomes. Likewise, poor life outcomes can lead one to engage in self-destructive behavior. Our model suggests that the causality runs in both directions, and there is also intergenerational persistence of both poverty and self-destructive behavior. A standard model of intergenerational mobility (Becker and Tomes, 1986) posits that at least one potential reason for the persistence of an "underclass" is credit market imperfections in the market for human capital. If household technologies for investing in human capital are uniform across families the poor have a higher rate of return in equilibrium, a source of inefficiency, as they are unable to borrow against future human capital. In our model, when credit constraints are binding and there is no financial aid available to poor families through which they could finance their human capital investments, the equilibrium level of human capital is

lower than $\left(\frac{a(1-\gamma(S))AR}{2v'(C_p)}\right)^2$. Then a prospective decrease in drug use (through a lower γ) will not have a direct effect on human capital accumulation, so its effect on the return on virtue capital will also be smaller. Poverty will be persistent both because poorer families will invest less in human capital and also because they will not inoculate their children from self-destructive habits. However, if either the credit constraint is not binding or poor families receive financial aid or scholarship for human capital investments, the poor will also invest the efficient amount in human capital, and they will have an incentive, and in fact, if the marginal utility of income is decreasing, an even stronger incentive, to invest in good habits for their children. However, as Becker et al. (2018) show, poverty persistence can result even if there are no credit market imperfections due to differences in household technology. Namely, parents' human capital is an input in the production of children's human capital. The same can be said about investments in "virtue". Addiction very often "runs in the family", either due to genetic influences or due to the "bad example" set by the parent. If the poor are less virtuous on average, perhaps because they expect a lower return on their human capital and therefore also a lower return on investing in character traits complementary to human capital, then poor families will have a worse household production technology for investing in virtue.

Our treatment of the persistence of poverty can potentially solve an important conundrum. Many believe that the poor are poor because they make a lot of bad choices. Others counter that they make bad choices because they are poor (and those choices are rational under adverse circumstances). Our answer is that both of these statements are true. Consider investing in patience. Greater patience will produce more income as it makes the individual invest more in human and physical capital. However, it is also true that if one has worse life prospects, she will rationally invest less in patience.

3 The case of suicide

The most literal form of self-destruction is suicide. In modern societies, suicide is not generally regarded as a rational act, yet the ancient Greeks and Romans had ideas of suicide that bears some similarities with a rational choice framework. Even more "economistic" was David Hume's posthumously published essay on suicide. In Hume's account, only individuals whose life is so miserable that they believe they are better off dead than alive commit suicide. Hamermesh, Cutler et al, as well as Becker and Posner (2004) provide a similar, but formal accounts of suicidal behavior. From an economic perspective, individuals commit suicide if they (subjective) expected net lifetime utility is negative, provided that their utility in the current period is negative (for, if it would be positive, they could increase their utility by living a bit longer, until their utility turns negative). Formally, an

individual commits suicide at time t if and only if

$$\sum_i \beta^{i-t} u(i) \leq 0 \quad (23)$$

, for all $A = t, t + 1, \dots, T$. We could extend this simple model by assuming that individuals can have different capacities to "enjoy life". Some individuals can produce utility more efficiently than others. We also know that individuals can affect their capacity of enjoyment, for instance by undergoing therapy and other interventions. Lifetime utility can also be enhanced by investments in education, general health and other human capital. These investments, and this is important for our analysis, are partly undertaken not directly by the affected individual, but by her parents. Let human capital influence instantaneous utility at any time t . Human capital is complementary to both market income and time spent in the household. We can write utility in period t $u(t)$ as a difference between total "pleasure" and total "pain", $u_t = B_t(H) - D_t$, where $B'_t(H) > 0$. Total net lifetime utility is then $\sum_t (B_t(H) - D_t)$. The human capital investment problem can be written as

$$\max_h v(C_p + \sum_t (B_t(H) - D_t)) \quad (24)$$

subject to

$$C_p + h = T \quad (25)$$

and

$$H = f(h). \quad (26)$$

The first-order condition with respect to h is

$$\sum_t \frac{\partial B_t(H)}{\partial H} \frac{dH}{dh} = \lambda \quad (27)$$

while with respect to C_p it is

$$v'(C_p) = \lambda, \quad (28)$$

implying

$$\sum_t \frac{\partial B_t(H)}{\partial H} \frac{dH}{dh} = v'(C_p). \quad (29)$$

4 Crime and prison

Our basic model of "self-destruction" can be applied to the case of engaging in crime. In youth, individuals often make "mistakes" that result in less labor market, marriage market and other opportunities in the remaining of their adult life. Forward-looking parents will take this into account when deciding on how much they invest in their children's human capital. Individuals who discount the future more and/or do not feel remorse when committing a crime will engage more in crime and this decreases the utilization of their human capital: when punishment takes the form of imprisonment, they will spend substantial time away from the labor market, provided they get caught. Even if the punishment is not a prison sentence, the stigma associated with being a criminal can last long and prevent success in the labor, marriage and other markets. We can write the adult child's utility as a function of crime level x in the following way:

$$V_c = B(x) + (T - pt)\beta^{T-t}RH_c - G(x, v) \quad (30)$$

that is, the child gets utility from engaging in crime in the first period, but loses out on his market wages in subsequent t periods due to imprisonment, weighted by the probability she will get caught. From this we obtain the first order condition

$$B'(x) = pt'(x)RH_c + G'(x). \quad (31)$$

The decision to commit crime depends negatively on the level of human capital: more highly educated individuals will engage less in crime. However, even a highly educated young person might commit crime if she is impatient enough (a low β). The level of crime also decreases in the amount of guilt the individuals feels when committing a crime. The indirect utility function of the child can be expressed as

$$B(x^*(B, \beta, t, W_c, H_c, v)) + (T - pt(x^*(B, \beta, t, W_c, H_c, v)))\beta^{T-t}RH_c. \quad (32)$$

Now let us turn to the parent's decision to invest in human capital. The parent maximizes

$$v(C_p) + a(B(x^*(B, \beta, t, W_c, H_c, v)) + (T - pt(x^*(B, \beta, t, W_c, H_c, v)))\beta^{T-t}RH_c) \quad (33)$$

with respect to

$$C_p + h = W_p. \quad (34)$$

Let, as before, $H_c = A\sqrt{h}$. We can then solve for h :

$$h = a \left(\frac{(T - pt(x^*(B, \beta, t, W_c, H_c, v)))\beta^{T-t}AR}{2v'(C_p)} \right)^2 \quad (35)$$

We can also solve for the first-order condition for investing in virtue, whether in terms of providing substitute for crime or increasing the patience of the child. It can be written as

$$R \frac{\partial H}{\partial h} \frac{\partial h}{\partial t} (-p) \frac{\partial t}{\partial x^*} \frac{\partial x^*}{\partial v} = \lambda. \quad (36)$$

The optimal amount of human capital investment decreases in the length of the prison sentence t . As in the case of drugs and suicide, the parent does not simply invest marginally less in human capital, as there are self-reinforcing feedback effects: if the parent expects the child to commit a crime with some probability, she optimally invests less in human capital. The best response of the child to that is, however, to engage more in crime, which then agains would prompt the parent to invest less in the child. Investing in virtue helps avoid this "vicious circle". We also have a "virtuous circle" in the other direction. More investment in virtue decreases crime which allows for more investment in human capital, which in turn further decreases crime and so on. Thus there are multiple equilibria: one with low investment in human capital and virtue and high crime and one with a high level of human capital and virtue and low level of crime.

An interesting comparative statics result concerns the effect of an increase in prison sentences on value investments. Here the effect depends on the elasticity with respect to punishment. It can be shown easily that if the elasticity is greater than one in absolute value, total expected punishment decreases as t increases. Thus, an increase in t *increases* the utilization rate of human capital, which in turn lowers investment in virtue. The effect is the opposite in the more frequent case when the elasticity is lower than one.

5 General comparative statics

Our model has a number of interesting and testable predictions. First, highly educated parents, who can invest in human capital more productively, should be more willing to inoculate their child against suicide. However, it can still be the case, as casual empirics seems to suggest, that among the highly educated the stigma of suicide is not that great. This can be the case because wealthier parents can afford to invest more in their child's mental health, thus they do not have to rely on guilt-creation. On the other hand, poor individuals with high-ability children will rely more heavily on the creation of guilt. In general, "insurance" against self-destructive behavior becomes more important as human capital becomes important. Arguably in the middle ages such considerations were relatively unimportant. The strict prohibition against suicide in Catholicism was probably due to the fact, that Catholicism promised a happy afterlife after a life full of

suffering, and this in itself would have created a strong incentive to commit suicide. When it comes to harmfully addictive substances, prohibition of marijuana and other "light" drugs has spread in the 1970s, in an era where human capital emerged as one of the most important element of individual and aggregate well-being. It has been argued by Becker, Murphy and Grossman that drug prohibition was mainly driven by middle class parents using the state to dissuade their children from using drugs. Our model adds more support to this conjecture: children of bright but potentially "impulsive" children can save money and other resources by "outsourcing" the task of dissuading their children from drug use to the state's apparatus. Such outsourcing could be socially efficient if the government is able to prevent addictions at a lower cost than are parents. Such a conclusion, however, does not seem to find support considering the high social costs of the "war on drugs". Furthermore, drug prohibition is not the only, and likely not the most efficient way of dissuading people from using drugs. One alternative is taxing drugs. Our model implies that if the cost of taxing drugs is lower than parents' cost of persuading their offspring not to use drugs, the optimal tax on drugs is likely to be higher than previously thought, as, apart from internalizing externalities (or perhaps, "internalities") taxes can also solve a contracting problem between parents and children, possibly (although not necessarily) leading to a Pareto-improvement. The government can also spend on persuasion. Persuasion by the government, perhaps through schools and mass communication, can sometimes be more cost-effective than parental persuasion, given economies of scale in persuading many children. On the other hand, the emotional closeness between parent and child *ceteris paribus* creates a comparative advantage for families to be the main scene of "indoctrination". Our model predicts that parents will dissuade their children from the consumption of harmful substances especially when they are addictive, and in particular, when there is an unstable consumption steady state. Spending a little on persuading the child not to take drugs might, for instance, change the consumption trajectory of the adult child so that she ends up consuming a *much* lower quantity of the harmfully addictive substance. Obviously, one alternative to our model of suicide and investment in children's values is that parents may know what is best for their child better than the child himself. That is, as in the case of drug use, we could construct a paternalistic model. However, such model, even if it has some truth value, does not yield clear comparative statics predictions. Our framework also helps explain why attitudes toward drugs such as marijuana are often harder than attitudes toward alcohol, even though marijuana is not necessarily more harmful than alcohol. Our model suggests this "double standard" may be due to the fact that alcohol, mostly when consumed "in moderation", decreases the utilization rate of human capital less than marijuana and especially harder drugs, leading to a less severe contracting problem between parent and child.

6 Conclusion

Our paper aimed to shed light on the reasons parents invest in certain values for their children. Although parents do so for various reasons, including paternalism, one reason we focus on is that self-destructive choices lower the utilization rate of human capital, leading to a suboptimal level of investment. Parents and children may both benefit if the parent inoculates the child against self-destruction as it leads the parent to invest more in the child's human capital. Examples include discouraging children from drug use, overeating, crime or suicide. Focusing on the above motive we can derive a number of comparative statics predictions. Parents of better endowed children will spend more on driving their child away from self-destruction. Poor parents will do so less when they face credit constraints in financing their human capital investments. A general increase in the rental price of human capital increases value investments in all families except credit constrained ones. Poorer and richer families might invest differently in "virtue". Better endowed parents may spend more on their child's mental health, while poorer families rely more on guilt.

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