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Abstract

Intergenerational correlations of risky health behaviors such as tobacco consumption are well established. However, there is still limited empirical evidence about the underlying process through which the transmission is driven. This paper aims at analyzing parental time discounting and its role in the intergenerational transmission of smoking. The analysis is based on longitudinal data from the German Socio-Economic Panel (SOEP) for the years 2006, 2008 and 2010. We use a linear panel regression model to estimate the child's likelihood of being a current smoker. The SOEP contains a great many of socio-economic characteristics and also meaningful measures of individual discounting behavior, namely, general patience and impulsivity. This enables us to distinguish between time preference and self-control, respectively. We find significant effects of time preference for both, mothers and fathers. That is, an increasing level of patience of parents is associated with a lower smoking probability of the child. Regarding self-control, only father's impulsivity has a similar decreasing impact. Stratifying the sample by gender reveals substantial mother-daughter, mother-son and father-son effects. Additionally, we estimate the influence of health-related mediating factors such as parental smoking and alcohol consumption. It turns out that role modeling as well as time discounting of the parents are highly relevant in this transmission process.

Keywords: Family economics, intergenerational transmission, smoking, time discounting, time preference, patience, self-control, impulsivity.

JEL classification numbers: D9 · D10 · I12 · J13

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1 Introduction

Catchy phrases such as "The apple doesn't fall far from the tree." or "Like father, like son." are commonly used when analyzing the structure and characteristics of families. Fundamental attitudes and behavior patterns are most likely to be passed on from parents to their children. Besides the well-known biological transmission of parental genetics, parents are usually the primary caregiver and typically role model for their children. Bisin and Verdier (2000, 2001), for instance, argue that mothers and fathers exert vertical socialization efforts through which the child adopts parental traits. Obviously, after birth, a child's preference structure is only loosely framed. Hence, parents act as children's first teacher. By doing so, the parental preferences adopted by the child are likely to last a lifetime. This may explain why family patterns and habits persist over generations.

Empirical evidence for preference and trait transmission can be found in many respects. Dohmen et al. (2012) show that risk and trust attitudes are passed on from one generation to the next.[1] Furthermore, significant correlations exist with respect to intertemporal discounting behavior. Hence, parental time preferences are positively mirrored in the levels of patience and impulsivity stated by the child (e.g. Brown and van der Pol 2015, Hübler and Kucher 2015). Instead of using direct survey measures such as self-assessed patience or impulsivity, some studies proxy a person's time preference rate by focusing on saving decisions (Knowles and Postlewaite 2005; Webley and Nyhus 2006). Indicating future orientation, a child's pension participation choice is also positively associated with the father's pension participation (Gouskova et al. 2010). Conducting an experiment, Kosse and Pfeiffer (2012, 2013) show that especially the mother's short-run patience is significantly related to the preschool child's ability to delay gratification.

Some authors capture the transmission of preferences across generations by investigating preferences for distinct activities. For instance, similarities in preference structures are detected for a number of leisure time activities like doing sports, watching TV, going to the cinema or theater, food consumption, or socializing (Volland 2013). Hence, similarities in preferences are supposed to result in the intergenerational transmission of specific behavior patterns. Thereby, the transmission of (adverse) health behaviors such as smoking is no exception. In the context of tobacco consumption, substantial evidence is provided for the strong relationship between parental smoking habits and the smoking status of the offspring.[2,3] Children in families with at least one smoking parent are at

[1] Amongst others, additional evidence for the intergenerational transmission of risk is provided by Arrondel (2013); De Paola (2013); and Necker and Voskert (2014).

[2] See, for example, Melchior et al. (2010); Chassin et al. (2008); Powell and Chaloupka (2005); Shenassa et al. (2003); Bantle and Haisken-DeNew (2002); Wickrama et al. (1999).

[3] The intergenerational transmission of risky health behaviors is not restricted to smoking. For

increased risk of becoming a smoker. The effect gets even stronger when both parents smoke (for example Bantle and Haisken-DeNew 2002). Using a discrete time hazard model, Göhlmann et al. (2010) explicitly focus on smoking initiation taking Germany as an example. The results indicate that parental smoking significantly increases the child's probability of starting with tobacco consumption. Loureiro et al. (2010) go one step further. They show that the well-established association mentioned above is indeed a causal one. To identify the causal effect, they use an instrumental variable approach in order to manage the potential endogeneity of parental smoking. The socioeconomic status of the children's grandparents is used as instrument. The results provide further evidence for the transmission of smoking and highlight the importance of both mother and father. Whereas daughters are primarily influenced by their mothers, father's smoking behavior is more relevant for sons. While the vast majority of the corresponding literature focuses on the transfer of smoking across two generations, Vandewater et al. (2014) analyze the transmission link across multiple generations. In fact, they show that smoking behavior is transmitted from the grandparents to their grandchildren. Thus, the parental generation acts as mediating factor. However, by identifying a transmission link across three generations, they also validate previous findings regarding the analysis of two generations.

In general, a person can improve his health by positively investing in its health capital (Grossman 1972). Here, by contrast, the consumption of cigarettes or other tobacco products represents a highly unfavorable health investment. Instead of increasing one's health stock, smoking deteriorates health gradually. Moreover, smoking is one of those health behaviors which involves intertemporal decision making. Hence, a person's time discounting matters. A trade-off has to be made between a sooner, smaller reward (pleasure of smoking a cigarette) and a larger, later reward (good health). Many empirical studies show that time preference and impulsivity are firmly correlated with smoking behavior.[4] In this *intra*personal context, individuals with lower discount factors smoke more than others. For instance, smokers discount future outcomes more steeply than non-smokers (e.g., Friedel et al. 2014). Beyond that, discounting also influences smoking cessation.[5] Specifically, quitting smoking involves both short-term costs like suffering from cigarette cravings as well as long-term benefits such as improvements in lung function. Those exhibiting relatively high levels of future orientation are more likely to stop smoking successfully and keep abstaining from it afterwards. Consequently, a high discount rate impairs one's attempt to forgo tobacco consumption.

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instance, Schmidt and Tauchmann (2011) show that parental drinking has a significant influence on children's alcohol consumption.

[4]See, for example, Kang and Ikeda (2014); Ida (2014); Scharff and Viscusi (2011); Harrison et al. (2010); Ida and Goto (2009b); Khwaja et al. (2007); Reynolds et al. (2004); Ohmura et al. (2005); Baker et al. (2003); Odum et al. (2002); Mitchell (1999); and Bickel et al. (1999).

[5]See Adams (2009); Goto et al. (2009); and Ida and Goto (2009b).

Inevitably, this raises the question whether time discounting also matters in the *inter*-personal context of health behavior transmission? Thus, the purpose of our paper is to examine the intergenerational transmission of smoking in more detail considering the time discounting of both, the child and the parents. In particular, we are interested in the presence of a link between parental discounting and the child's probability of being a smoker. However, in addition to this, we argue that parental impulsivity and patience are likely to result in certain behavior patterns which for their part could affect a child's (health) behavior. According to Baron and Kenny (1986), we assume the existence of multiple mediating factors. Hence, possible mediating factors of parental time discounting on the smoking status of the child are taken into account. Primarily, we focus on relevant health behaviors of the parents that might be influenced by their time discounting. For instance, the smoking status of the parents is likely to be affected by their own attitudes upon intertemporal choice. Controlling for the smoking status is expected to have a direct positive effect on our dependent variable. In this way, we highlight the underlying mechanism of time discounting in the intergenerational transmission of smoking. Moreover, if parental health behaviors are true mediators, we would expect a considerable reduction of the coefficient estimates of our (parental) discounting variables.

Unfortunately, our analysis of possible mediating influences is a partial one. Whereas we can control for individual heterogeneity and some parental attitudes towards health, we are not able to properly observe the influence of other potentially relevant factors with our data. For example, one could think about the role of parenting style exerted by the mother and the father as well as their engagement in health promotion and education within the family. Here, communication about (future) health risks and consequences of tobacco consumption seems to be crucial[6]. Similarly, the impact of peer effects at young age remains undiscovered.

The study contributes to the literature in several ways. First, our study analyzes the role of parental time discounting on child's smoking behavior while highlighting the impact of possible mediating channels.

Second, we disentangle different aspects of intertemporal discounting. We explicitly distinguish between self-control and time preference. Exploiting rich survey data, we use measures of impulsivity and patience as proxies for both dimensions, respectively.[7]

[6]For instance, Kucher et al. (2014) investigate the role of familial communication in another health risk, namely weight misperception.

[7]For the sake of illustration, both dimensions of time can best be represented by a quasi-hyperbolic discounted utility function the form $U(x_0, ..., x_t) = u_0 + \beta \sum_{t=1}^{T} \delta^t u(x_t)$. It assumes that an individual places higher weight on present payoffs relative to future ones. Hence, β corresponds to present-biased preferences ($\beta < 1$) whereas δ represents the long-run discount factor (see, e.g., Laibson 1997). The relevance of the β-δ-framework has been validated by neuroeconomics. Relying on findings from McClure et al. (2004, 2007) and Tanaka et al. (2004), the parameter β is associated with the limbic brain system

Whereas impulsivity primarily refers to fundamental self-control abilities such as the ability to delay instant gratification, a person's general patience is linked with today's decisions that are followed by consequences in the future (see, e.g., Peretti-Watel et al. 2013).[8]

Third, we analyze the impact of both mother and father. This allows us to investigate potential gender-specific differences. Apart from that, merely focusing on one parent, the potential influence of the other parent would be neglected. This may result in a biased estimation of the influence of the parent who enters the analysis, regardless of whether it is the mother or the father. Especially in this context, for example, excluding the father would be highly questionable. Although the overall prevalence of smoking has declined at a moderate pace during the last decades, almost one quarter of the German population smokes nowadays (24.5%). The share of occasional and regular male smokers is still higher than the share of the female counterparts. According to the 2013 Census data, 20.3% of the female and 29.0% of the male population in Germany smokes (Statistisches Bundesamt 2015).[9]

Forth, when it comes to economic preferences, measurement is always an issue. In particular, dealing with survey data based on individual questionnaires, it is not always easy to identify high quality indicators for individual preferences. However, the survey measure of a person's general patience we rely on is explicitly validated with an experiment (Vischer et al. 2013). Within the scope of this experiment, the question regarding impulsivity is validated indirectly. Moreover, it forms part of common impulsivity scales such as the famous Barratt Impulsiveness Scale (BIS) (Barratt 1959). Hence, patience and impulsivity represent meaningful proxies for both components of intertemporal decision-making, respectively.

Finally, we control for other confounding preference types related to discounting decisions and adverse health behavior. Above all, we argue that personal risk attitudes might be potentially influencing this process as well. In fact, time and risk preferences measure different economic aspects but are highly and inherently intertwined (Andreoni and Sprengler 2012). Whereas the present is known the future is apparently risky. As already mentioned, tobacco consumption is one of the classic examples regarding in-

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which focuses on immediate outcomes and instant rewards. In contrast, the δ-component is strongly linked to the lateral prefrontal and parietal brain area which is responsible for the planning and making of far-sighted decisions. See Kalenscher and Pennartz (2008) for an extensive review. Throughout the paper, we relate the short-run and long-run components of this fairly realistic approach to impulsivity and patience, respectively.

[8]Except for those who try it for the first time, smoking a cigarette is accompanied by immediate pleasure in the short run. Instead, smokers normally hazard the adverse health consequences later in life due to regular tobacco consumption (long-run outlook).

[9]For more information, please visit www.gbe-bund.de. The homepage of the Information System of the Federal Health Monitoring (*Gesundheitsberichterstattung des Bundes*) offers abundant health data of the German population.

tertemporal trade-offs. But, in addition, it is also evident that smoking puts someone's health at considerable risk, e.g. substantially increases the probability of suffering lung cancer. For example, Ida and Goto (2009a, b) show that the likelihood of active smoking participation is associated with both a higher time preference rate (lower level of patience) and a lower degree of risk aversion. Thus, taking individual risk attitudes into account is necessary to state more precisely the influence of the time preference parameters in the transmission process of smoking. Omitting risk is likely to bias the effects of (parental) patience and/or impulsivity upwards.

In line with the literature, we show that children who are more impulsive and/or less patient have a higher likelihood of being a smoker than more future-oriented ones. In addition, risk loving is associated with an increasing smoking probability. But, most importantly, our results show significant direct effects of mother's as well as father's time preference. Overall, a one standard deviation increase in the level of patience reduces the child's probability of smoking by 8% and 7%, respectively. A one standard deviation increase in father's impulsivity reduces the smoking probability by roughly 6%. The effect of maternal impulsivity is not statistically significant. Controlling for the parental smoking status, we further confirm the positive transmission of smoking habits from parents to their children through role modeling. While the inclusion of these outcome variables may raise econometric concerns, our relevant preference parameters remain highly robust. We conclude that parental time preferences play an important role in the transmission process of smoking. Hence, taking (time) preferences into account when dealing with health behavior formation should be highly considered by researchers as well as public health authorities.

The remainder of the paper is the following. Section 2 provides a short overview of the related literature. In Section 3 and 4, we discuss the data and the empirical strategy. Results are presented in Section 5. The final section concludes with a discussion of the main findings.

2 Previous literature

To the best of our knowledge, there has been only one empirical study examining the role of parental time preference in the intergenerational transmission of smoking. Brown and van der Pol (2014) rely on data from the Household Income Labour Dynamics of Australia (HILDA). They focus on mothers and their children aged 16 to 25 years old.[10] Five waves are selected which include information on both smoking indicators and time preference. A question about the financial planning horizon is used to proxy (long-term) time preference. A dummy variable "longer planning horizon" is constructed. It equals one if time periods of one year or more are most important to the respondent and zero

[10] All children share the same household with their mother.

otherwise. Basic offspring, mother and household characteristics are controlled for.[11] Compiling an unbalanced panel, the final sample consists of 1901 mothers and 3167 children.

Estimating a pooled probit model, they do not find any direct effects of maternal time preference on young adult smoking. After constructing interaction terms of maternal time preference and her smoking behavior, they find significant indirect effects. Hence, sons (daughters) of mothers who smoke and have a shorter planning horizon are 6% (7%) more likely to smoke than if their mother had a longer planning horizon.

3 Data

3.1 Survey data and sample selection

We use data from the German Socio-Economic Panel (SOEP) which is an annual panel survey conducted since 1984. Each wave contains information on more than 22,000 individuals of the adult population living in approximatly 12,000 households. The SOEP provides both general household information as well as rich socio-economic data about each household member (Wagner et al. 2007). We exploit the panel structure of the survey and focus on data from waves 2006, 2008 and 2010. Whereas information on smoking status is available every other year,[12] questions regarding personal impulsivity and patience do not represent an inherent part of the individual questionnaire. Up to now, the 2008 wave is the only one containing precise and comparable measures for the parents' and childrens' discounting and smoking behavior. As was demonstrated by Meier and Sprenger (2015), time preferences are rather stable over time. Assuming that this holds true for the German case, we use the 2008 time discounting parameters for the waves 2006 and 2010 allowing us to analyze three waves.[13]

We select parents and their biological children who are still living together with them in the same household and those children who have already moved out and live in their own household at the time of the interview.[14] Our analysis sample contains 5908 observations on children and their parents. All children are aged 18 years and above at the time of the interview.[15] Despite the non-availability of appropriate information of

[11]Despite availability, no controls for other preference types such as risk are added to the analysis. For more details on the additional control variables, please see Appendix C of Brown and van der Pol (2014).

[12]The question on smoking behavior was introduced in 2002.

[13]See Chuang and Schechter (2015) for a literature review on the stability of time preferences. The authors also examine the stability of risk attitudes and other social preferences such as altruism.

[14]Other family circumstances or living conditions such as foster parents or the child living in a children's home are not considered.

[15]Strictly speaking, only persons under the age of 18 are children. However, throughout the paper, daughters and sons are commonly entitled as offspring or children, independent of their rather advanced

younger individuals, the circumstance we have to deal with is neither a disadvantage nor problematic. We argue that at these stages of life the intergenerational transmission of personality traits as well as smoking has already taken place. In Germany, for instance, the mean age of smoking initiation is around 18 (Statistisches Bundesamt 2014).[16] This is not surprising since many young people try smoking, but only some of them convert into daily smokers during adulthood. Therefore, if public health authorities are willing and able to keep the youth tobacco free until they turn 18 years old, the vast majority of them will never start smoking.

3.2 Smoking

Based on the question "Do you currently smoke, be it cigarettes, a pipe or cigars?" we construct a binary variable ("current smoker") to measure the smoking status of each individual. It equals one if the respondent indicates any level of tobacco consumption and equals zero otherwise. According to this specification, 29% of the children in our sample smoke. The share of mothers and fathers who currently smoke is 21% and 27%, respectively. The parent-child smoking correlation is 0.13 (p-value 0.000) for fathers and 0.14 (p-value 0.000) for mothers. The correlation between maternal and paternal smoking status is also positive and highly significant ($\rho = 0.29$, p-value 0.000). However, a limitation of this variable is that it ignores any parental smoking activity in the past. The average age of the parents in our sample is about 55 years. According to the 2013 Census data, we know that overall smoking participation considerably decreases after reaching the age of 50 years (Statistisches Bundesamt 2015). The disadvantage of the variable "current smoker" is that the smoking history is ignored. Hence, especially parental ex-smoker are captured more precisely when we choose "ever-smoker" over "current smoker".

To solidly proxy parental smoking behavior, we apply a second dummy variable. It takes on the value 1 if the individual has smoked more than 100 cigarettes or other tobacco products in his/her life and 0 otherwise.[17] 58% of all mothers have answered this question with "yes". The share of fathers who indicated being an ever-smoker is even larger and adds up to 77%. This is important since it can be assumed that intergenerational transmission has already taken place at earlier stages in life.

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age. 50% of the sample are not older than 25 years. 75% are not older than 31 years.

[16] According to the latest Surgeon General's Report, similar results are reported for the United States (U.S. Department of Health and Human Services 2014).

[17] The exact wording of the question is as follows: "Have you ever smoked? In other words, have you smoked more than 100 cigarettes or other tobacco products in your life?" We retrieve this retrospective information from wave 2012.

3.3 Time discounting

The 2008 questionnaire contains two variables which enable us to elicit individual time discounting. In order to identify different dimensions of intertemporal decision-making, we explicitly distinguish between (short-run) self-control/present bias and (long-run) patience (see, e.g., Peretti-Watel et al. 2013). Overall, a maximum of comparability is guaranteed since parents as well as their children independently answer exactly the same questions. First, each respondent has to rate his or her personal level of patience according to a 11-point scale. The exact wording of the corresponding question is as follows: "How would you describe yourself: Are you generally an impatient person, or someone who always shows great patience? Please tick a box on the scale, where the value 0 means: "very impatient" and the value 10 means: "very patient". You can use the values in between to make your estimate." Hence, self-reported patience is used to proxy individual time preference.

Additionally, our second variable refers to a person's self-control abilities. The respondent has to indicate his or her general level of impulsivity. Here, the wording of the question is the following: "How would you describe yourself: Do you generally think things over for a long time before acting – in other words, are you not impulsive at all? Or do you generally act without thinking things over for long time – in other words, are you very impulsive? Please tick a box on the scale, where the value 0 means: "not at all impulsive" and the value 10 means: "very impulsive". You can use the values in between to make your estimate."

The behavioral relevance of our time preference measure has been explicitly validated. Vischer et al. (2013) conducted an incentivized experiment with 977 participants forming a representative sub-sample of the adult population to the 2006 wave of the SOEP. Subjects were asked to indicate their preferences in a choice over a 12-month time horizon.[18] The results show that those who rank themselves as 'more impatient' in the survey in 2008 also exhibit a higher degree of impatience in the experiment in 2006. Hence, this simple and ultra-short survey measure of patience turns out to be a meaningful proxy for time preference. The findings remain robust even after controlling for impulsivity.[19] Further, this demonstrates that, indeed, both questions related

[18] In the experiment, choice tables with the typical price list decision format were used. The participants had to declare their preferences by choosing between an immediate (left column) or delayed payment (right column). The immediate payment was continuously fixed (€200). However, the delayed payment varied in each of the 20 choice situations and increased by 2.5 percentage points (compounded semi-annually) from row to row. Switching from left to right (and sticking to the delayed payment in all subsequent rows) indicates the bounds of the discount rate the respondent claims in order to wait for pay-out an additional time period of 12 months. Before the start of the experiment, the participants were informed that one of their choices would be randomly selected for payment. In the second random step one out of nine participants were actually paid by cheque according to the previous choice.

[19] In addition to impulsivity, including a control variable for personal risk attitudes does not affect the results either.

to time discounting measure different aspects of intertemporal choice. Thus, a respondent's misinterpretation of the more future-oriented (long-term) aspects underlying the general question about patience can be ruled out. The wording of the question on personal impulsiveness is an inherent part of the most common scales used to measure this particular personality trait.[20] Therefore, we reasonably assume that the survey question eliciting impulsivity represents a true and rigorous measure of present bias and self-control, respectively.

The raw *intra*personal correlation of time preference and self-control is -0.17, -0.18 and -0.17 for the offspring, mother and father, respectively. Each correlation coefficient is highly significant (p-value 0.000). Considering the *inter*generational correlation of these variables, the raw correlation in parent-child impulsivity is 0.11 (p-value 0.000) for the mother and 0.14 (p-value 0.000) for the father. The corresponding coefficients for patience are smaller in size: 0.06 (p-value 0.001) for the mother and 0.09 (p-value 0.000) for the father.

3.4 Parental and offspring characteristics

The SOEP provides rich information on the socioeconomic status and other individual and household characteristics. We adjust for individual heterogeneity by adding a number of controls for the parents and their children. Summary statistics are shown in Table 1. Offspring characteristics include basic biological information about age[21] and gender. Moreover, we add information about the migration background and construct a variable that indicates if the child still lives together in the same household with at least one parent. We further consider the educational attainment (highest school degree achieved) and the log annual net income as indicators of socioeconomic status. Furthermore, we include variables for the mother and the father like age and migration background. Controlling for both highest school degree achieved and log annual net income of the parental household, serves as proxy for family wealth and socioeconomic status. This covers possible education and income paths of parental time discounting on child smoking.

As already mentioned above, we recognize the importance of personal risk attitudes while analyzing the influence of time discounting in this particular context of smoking. Individual risk is highly correlated with impulsivity. For the offspring, mother and father we find a significant correlation of about 0.40 (p-value 0.000), respectively. Hence,

[20] Examples of common impulsivity scales are the Barratt Impulsiveness Scale: see, e.g., Barratt (1959), Patton et al. (1995), Stanford et al. (2009), Steinberg (2013) and Coutlee (2014); the Eysenck Impulsiveness Scale: see, e.g., Eysenck (1985); the Dickman Impulsivity Inventory: see, e.g., Dickman (1990) and Boutwell and Beaver (2010); and the UPPS Impulsive Behavior Scale: see, e.g., Whiteside and Lynam (2001).

[21] Age squared is also included in the regression analysis.

parental and child risk attitudes are included as additional controls.[22] To rule out that the effects of parental risk and/or time discounting are (partly) confounded with the impact of other preferences, we add parents' altruism. It is pretty obvious that altruistic attitudes of the parents are a key element within the interaction process of a family. Therefore, our proxy equals one if a parent has indicated that it is very important to him/her to "be there for others" and zero otherwise. Above all, maternal altruism is significantly correlated with her patience ($\rho = 0.11$). The correlation between paternal altruism and patience is slightly lower ($\rho = 0.08$), but also highly significant (p-value 0.000).[23]

To account for regional differences, we control for the 16 federal states (*Bundesländer*) in Germany. This contributes to a more detailed geographical segmentation of Germany and accounts for regional confounders. Another variable is used to tell if the child resides in the same state as the parents or not. In addition, we control for time trends by adding year dummies. All in all, this allows us to capture general trends behind changes in smoking participation. In the past, rising health consciousness and steadily increased taxes on cigarettes are supposed to be two factors that have contributed to an overall reduction in tobacco consumption in Germany. By adding states as well as time dummies, we further control for the implementation or expansion of different anti-tobacco policies (e.g. smoking bans) that vary across states and over time.

In order to explain the influence of parental time preference and impulsivity as best as possible, it is essential to look at relevant behaviors of the parents which might act as mediating factors between their time discounting and the smoking status of the child. For this analysis, we focus on a set of parental health behaviors. On the one hand, we have a look at adverse health behaviors such as parental smoking status (see Section 3.2) and alcohol consumption. The latter equals one if a parent drinks any kind of alcohol (e.g., beer, wine, spirits or mixed drinks) on a regular basis and zero otherwise. On the other hand, we analyse two positive health investments. First, we pick information on a person's healthy lifestyle. The variable is set to a value of 1 if a mother or a father follows a health-conscious diet "very much" or "much" and zero otherwise. Second, we construct a binary variable representing physical activity. It equals one if the individual takes part in active sport "daily" or "at least once a week". Finally, we consider the self-assessed health status of the parents which can be seen as a rough outcome of the previously mentioned behavior patterns. It takes on the value 1 if the parent is in a

[22]The original wording of the survey question to elicit personal risk attitudes is as follows: "How would you describe yourself: Are you generally willing to take risks, or do you try to avoid risks? Please tick a box on the scale, where the value 0 means: "risk averse" and the value 10 means: "fully prepared to take risks". You can use the values in between to make your estimate."

[23]Equally to the implementation of our time discounting variables, information on risk preference and parental altruism is retrieved from wave 2008. Data from this wave is also used for the years 2006 and 2010.

"good" or "very good" health condition.

4 Empirical strategy

The empirical analysis is based on three steps. First, we estimate a linear probability model (LPM) with random effects. This model focuses on the direct effects of parental impulsivity and patience on child's smoking status. In step 2, we identify possible mechanisms through which parental discounting might affect the smoking behavior of the child by regressing a set of parental health behaviors on their discounting variables and other controls. Finally, in step 3, we add these health behaviors to the regression run in step 1 to identify potential mediating factors.

4.1 Random effects LPM

The main regression equation looks as follows:

$$S_{it} = \beta_0 + \beta_1 I_{it} + \beta_2 P_{it} + \beta_3 I_{it}^p + \beta_4 P_{it}^p + \beta_5 X_{it}^{'} + \lambda_t + \alpha_i + u_{it} \tag{1}$$

where i represents the child and t the year of observation. The superscript p indexes the parents. S_{it} is equal to 1 if the child smokes and zero otherwise. I_{it} indicates the child's impulsivity and P_{it} represents the child's patience. I_{it}^p includes information on mother's and father's general level of impulsivity, whereas P_{it}^p covers their level of patience. $X_{it}^{'}$ includes additional offspring and parental characteristics (see Section 3.4). Additionally, we include year dummies (λ_t). The child-specific effect is represented by α_i and u_{it} is an individual-specific error term.

We set up a LPM using generalized least squares (GLS) with random effects to estimate the direct effects of parental impulsivity and patience on child's likelihood of being a smoker.[24] All time discounting and risk preference variables that enter Equation (1) are standardized.[25] Standard errors are clustered at the family level. The vectors of parameters β_3 and β_4 are of particular interest. They measure how a mother's and father's self-control and time preference influence the smoking status of the child.

[24]Considering the well-known limitations of the LPM, we compare the results to Panel Probit estimates. However, we find no substantial differences in the estimated marginal effects or significance levels.

[25]To check the robustness of our results, we re-estimate the model using dichotomous versions of the original time as well as risk preference measures. Individuals are classified as being patient, impulsive and willing to take risks if they respond a value greater than the median (or mean) of the relevant survey question, respectively. The regression estimates for both classifications yield qualitatively similar results.

4.2 Mediating factors

At first sight, excluding parental health behaviors such as the smoking status seems to be little convincing. Previous literature has shown that a positive and robust transmission of smoking habits from parents to their offspring exists (e.g., Loureiro 2010). According to Angrist and Pischke (2009), however, controlling for variables (e.g., parental smoking status) that could easily be an outcome of the variable(s) of interest (here, parental impulsivity and patience) could lead to a so-called bad control problem. Next to smoking, this might also be true for other health behaviors such as parental alcohol consumption or positive investments in a healthy lifestyle. To account for this issue, for now, Equation (1) does not contain such potentially problematic control variables.

For instance, we do control for educational attainment for both parents and the child. Higher education is declared to be a powerful determinant of positive investments in health capital. It is obvious that a person with relatively high future orientation will invest more in educational attainment and, by doing so, cumulates more years in school than someone who is more present-oriented. Thus, the latter is likely to leave school earlier. Even if (parental) time preference has a beneficial effect on educational attainment during one's school career, school is finished for all individuals we observe in our sample. Controlling for education, we consider the correlations between (parental) time discounting and educational attainment.

In contrast, time preference and/or impulsivity are likely to influence current (health) behaviors (e.g., consumption of tobacco products). Therefore, in step 2, we analyze current parental health patterns that might be influenced by their intertemporal preferences. We select four plausibe mechanisms through which parental impulsivity and patience could affect the smoking behavior of the child: parental smoking status, regular alcohol consumption, health-conscious lifestyle, and regular physical activity. We argue, for example, that a parent who is future-oriented and aware of the adverse health effects of smoking will be less likely to smoke. Hence, in case of a non-smoker, it is likely that the same pattern is transmitted to the offspring who will neither turn into a smoker (parental role model) (see Section 1). The same argument can be applied to regular alcohol consumption and living a healthy lifestyle. Discount rates are positively associated with frequent alcohol consumption (see, e.g., Rossow 2008). Using a person's BMI which can easily interpreted as proxy for a healthy lifestyle and physical activity, relationships between obesity and high time preference rates or even hyperbolic discounting can be found (see Komlos et al. 2004 and Scharff 2009).

As consequence of all these variables, we apply the overall health status of the parents (see lower section of 3.4). In order to proxy parental smoking status, we preferably rely on the dummy variable that indicates if the parent has ever smoked more than 100 cigarettes in life (see Section 3.2). We estimate equations of the following form:

$$H_{jt} = \beta_0 + \beta_1 I_{jt} + \beta_2 P_{jt} + \beta_3 X_{jt}^{'} + \delta_t + \gamma_j + \epsilon_{jt} \tag{2}$$

where j represents the mother or the father and t the year of observation. H_{jt} are the set of parental health variables from above.[26] I_{jt} and P_{jt} represent self-control and time preference, respectively. The vector $X_{jt}^{'}$ contains information about risk attitudes, altruism, age, migration background, educational attainment, log annual household income and federal states. δ_t are year dummies, while γ_j denotes the individual-specific effect. Robust standard errors are applied.

In our final step, we include these parental health behaviors and outcome variables in Equation (1) to see how this affects the time discounting coefficients of the parents. Hence, the regression equation is slightly modified and takes the form:

$$S_{it} = \beta_0 + \beta_1 I_{it} + \beta_2 P_{it} + \beta_3 I_{it}^{p} + \beta_4 P_{it}^{p} + \beta_5 H_{it}^{p} + \beta_6 X_{it}^{'} + \lambda_t + \alpha_i + u_{it} \tag{3}$$

where H_{it}^{p} denotes the set of additional health indicators of the parents. Apart from that, the remaining parameters of Equation (3) are the same as in Equation (1).

In fact, we are interested in how the coefficients of parental time discounting vary after the inclusion of these designated mediating factors. Of particular interest for us is what happens after including parental smoking which is supposed to be a major determinant of child smoking anyhow. On the one hand, this could result in a significant mechanism which leads to a (considerable) reduction or even elimination of the significance of parental impulsivity and/or patience. In this case, we would have identified a *true* mediator according to Baron and Kenny (1986). So, we could infer that parental time discounting has an influence on child's health/smoking behavior (mainly) through one or even more parental health patterns. On the other hand, although a parental health pattern shows a significant effect, the coefficients of interest could remain basically the same. In this case, we would see no reason not to control for these variables. Thus, we would have identified a meaningful influence on child's smoking status that does not 'vaporise' our previously estimated time discounting effects of the parents. Hence, our suspected control problem will *not* turn out to be a *bad* one.

[26] Here, the panel data approach is true except for one health behavior. With respect to the dependent variable "ever-smoker", we run a cross-section analysis.

5 Results

5.1 Effects of parental time discounting on child smoking

Results from Equation (1) are presented in column 1 of Table 2.[27] At first glance, we confirm the findings of previous studies regarding the association between individual time discounting and smoking (*intra*personal context). A one standard deviation increase in child's impulsivity leads to a 2.9 percentage points or 10% increase (according to the mean) in the likelihood of smoking. Conversely, a one standard deviation increase in patience is associated with an average decrease of 1.9 percentage points or roughly 7% in the probability of being a smoker. Hence, as expected, a person that in general exhibits more future orientation and acts less impulsive is significantly more likely to abstain from smoking than someone who is (very) impatient and impulsive.

Above all, we find direct effects of parental time discounting on the offspring's probability of being a smoker. For mothers, the level of impulsivity lacks statistical significance, while patience has a preventative effect. A one standard deviation increase in maternal patience reduces the likelihood of smoking by 2.3 percentage points. This amounts to a reduction of almost 8%. Regarding the father, both components of time discounting are significant. A one unit increase in paternal impulsivity has a negative impact of 1.8 percentage points. With respect to his long-term time preference, we find a positive effect. It is similar to the effect obtained for the mother. If his patience level increases by one standard deviation the likelihood of smoking decreases by 2.0 percentage points. Economically, both effects are substantial since they imply a reduction of approximately 6-7%, respectively.

[Insert Table 2 about here.]

Hence, these results suggest that especially parental future orientation is able to prevent the offspring from exerting adverse health behaviors such as smoking (prevention effect). In contrast, the effect of father's impulsivity might not be that intuitive at first sight and, therefore, needs some additional remarks. By default, expecting the same sign as in the *intra*personal context might by delusive. The intrapersonal impact of impulsivity does not necessarily imply getting the same result when turning to the *inter*personal context. One could think about the interaction between impulsivity and

[27] To underpin our choice of a random effect model, we test for random effects. Since we deal with an unbalanced panel, we apply the modified Breusch-Pagan Lagrange multiplier (LM) test for random effects (Baltagi and Li, 1990). The null hypothesis is that variances across individuals are zero. Thus, there is no panel effect since no significant differences across individuals exist. We can reject the null hypothesis since $Prob > chi2 = 0.0000$. Hence, random effects are appropriate. Alternatively, we apply the one-sided test. This supports our findings from the two-sided test. This test is conducted for all regressions, if necessary and where appropriate. In each case, random effects is preferred over the pooled OLS regression. Unfortunately, we cannot test fixed effects versus random effects. Using a fixed effects model is not appropriate in this case since we rely on time discounting parameters that are assumed to be time-invariant over the observation periods.

human relations. In our family context there could be uncertainty about parental behavior which might explain why the coefficient of paternal impulsivity has a negative sign. We argue that decision making and actions taken by impulsive parents might be extremely difficult to anticipate for the offspring. Therefore, children of parents with relatively low self-control are likely to think twice before doing something (e.g., smoking) that might cause trouble at home. They want to avoid negative attention since practicing such a lifestyle is likely to provoke immediate as well as ambiguous *reactions* of the parent(s). We call this finding regarding the influence of parental impulsivity the 'slap-effect'.

As pointing out the possible role of risk preference at the outset, we present these coefficients as well. With respect to the influence of individual risk attitudes, we find a significant intrapersonal effect. Hence, a one standard deviation increase in child's risk attitude increases the likelihood of smoking by 2.3 percentage points (8%). However, the corresponding coefficents of the parents are not statistically significant.

In order to identify possible gender differences, we estimate Equation (1) separately for daughters and sons. Results are shown in columns 2 and 3 of Table 2.[28] The overall effects of child's time discounting and risk preference are primarily driven by women.[29] For men, the point estimates are generally smaller in size and statistically insignificant but show the same signs. Regarding the influence of parental time discounting, we identify significant same-sex as well as cross-sex effects. A one standard deviation increase in mother's patience lowers the likelihood of smoking by 2.6 percentage points for daughters and by 2.4 percentage points for sons. Again, maternal impulsivity is not significant. The time discounting variables of the father influence the smoking behavior of male offspring only. A one standard deviation increase of paternal impulsivity (patience) reduces the likelihood of smoking for men by 3.2 (2.6) percentage points. Once more, this highlights the important role of the father in this context.

5.2 Mediating factors: Parental time discounting and health

In the upcoming analysis, we present the results of the channels through which parental time discounting could potentially affect child's smoking status. Given the survey data we have, we focus on health indicators of the parents that are potentially influenced by their time discounting. Regressions are run separately for mothers and fathers. We start off with the analysis of the general health status of the parents. It can be interpreted as an overall outcome measure of all investments made in the personal health stock. Results are reported in Table 3. Impulsivity is not significant for either parent. But, patience has a highly significant effect for both, mothers and fathers. The likelihood

[28] In our final sample, roughly 26% of women and 32% of men are smokers.

[29] The estimated coefficient of female patience (-0.019) has a p-value of 0.11.

of being in good or very good health increases by roughly 4-6 percentage points when patience changes by one standard deviation, respectively. Thus, future orientation seems to encourage people to invest in their health capital.

[Insert Table 3 about here.]

In the following, we refine the analysis by taking a closer look at selective health behaviors of the parents. Findings are shown in Table 4. Parental smoking status and alcohol consumption are both examples of negative health investments which result in a rather unhealthy lifestyle. Once more, we are able to confirm the well-known relationship between personal discounting behavior and smoking participation (Table 4). The results mirror the overall *intra*personal findings obtained for child's impulsivity and patience in Equation (1). The relevant coefficients show the expected signs and three out of four are statistically significant. A one standard deviation increase in mother's impulsivity increases her likelihood of having ever smoked by 3.7 percentage points. Increasing patience reduces the probability by 3.5 percentage points. Regarding the impact of father's impulsivity, a one standard deviation increase leads to a 2.3 percentage points higher likelihood of being an ever-smoker.

Closely related to tobacco consumption is the consumption of alcohol. Here, we get mixed results. Maternal impulsivity increases the probability of consuming alcoholic beverages regularly by 1.1 percentage points. Her level of patience, however, is not statistically different from zero. Regarding the father, it is the reverse. The effect of impulsivity is not statistically different from zero, whereas a one unit increase in his patience level is associated with a reduction of 1.7 percentage points.

The appraisal of healthy nutrition and engagement in regular physical activity act as proxies for beneficial investments in health capital. The attitude towards a healthy diet is supposed to capture healthy eating habits in general. Thus, a person who puts weight on healthy nutrition is unlikely to (excessively) consume unhealthy food such as junk food or soft drinks. Interestingly, the only coefficients that show significance are mother's and father's patience. Hence, a standard deviation increase in patience rises the probability that the parent follows a healthy died "much" or "very much" by roughly 2 percentage points. Although the coefficients of parental impulsivity show the expected signs, they are not significant. With respect to physical activity, time discounting has no influence at all. Whereas risk preference plays a negligible role so far, it is worth mentioning that risk seeking has a significant positive impact on regular active sport participation for both parents.

[Insert Table 4 about here.]

It can be observed that, in general, more impulsive or less patient individuals are more likely to indulge in adverse health investments than people who are more con-

cerned about the future health consequences of such negative health investments. If living in good future health is personally important for current decision-making, such an individual will live a relatively healthy lifestyle. As opposed to low self-control, future orientation is a key component for beneficial investments in one's (future) health capital.

5.3 Role of health mechanisms

Next, we add the mechanisms to the original Equation (1). Thus, we estimate Equation (3) and analyze how this changes our coefficients of interest. Similar to the previous step, we begin to estimate the likelihood of child smoking by additionally controlling for the overall health status of the parents. Results are presented in Table 5. Column 1 replicates the results from Equation (1). In comparison to these *basic* results, the time discounting variables of the parents remain stable after the inclusion of this parental health indicator (see column 2). Hence, general health of the parents seems to have no impact on child's smoking status. Although the signs point towards the expected direction, being in good or very good shape does not represent a true mediator through which parental time discounting affects the smoking behavior of the child.

[Insert Table 5 about here.]

Table 6 shows the results after adding the parental health behaviors to the initial equation. For each health investment, we run a separate regression. After that, we conduct another regression that jointly controls for all health investments. Again, column 1 replicates the results from Equation (1). First, we focus on the impact of parental smoking (see column 2). In line with previous findings regarding the intergenerational transmission of smoking behavior, we find a positive as well as highly significant relationship between parental smoking habits and child's smoking status. If the mother has smoked more than 100 cigarettes in her life, the likelihood of child smoking increases by 8.2 percentage points. With respect to the father, the size of the coefficient is even larger. In this case, offspring's probability of being a current smoker increases by 8.4 percentage points. These are sizable effects since it implies an average increase of roughly 30%, respectively.[30] Looking at relevant coefficient changes, we see rather tiny deviations from the results in column 1. In each case, with one exception, the difference in coefficient size relative to the *basic* regression is negligible. The highest coefficient change is observed for mother's patience. The coefficient decreases from 0.023 to 0.018 and significance drops from the 5% significance level to the 10% significance level. This might be interpreted as a signal for the existence of a weak or partial mediator. However, we treat this with caution since changes are generally not considerable but very small.

[30]Replacing ever-smoker with the current smoking status of the parents yields the same results.

In fact, they are not enough to infer that parental smoking is a dominant mediator of parental time discounting in this context. However, another valuable insight is that the previously addressed bad control problem is in fact not a serious issue.

According to column 3, parental alcohol consumption has no significant effect on the likelihood of smoking.[31] The coefficients we are primarily concerned with do not change. The same picture emerges for the positive health investments (see columns 4 and 5). Except the influence of father's healthy diet, the remaining proxies for healthy nutrition and sport activity are insignificant. If the father practices a healthy lifestyle, child's smoking probability decreases by 2.2 percentage points. However, the coefficients of interest are highly robust. Even when controlling for all health behaviors simultaneously, parental smoking status is by far the most influential variable (see column 6). Still, the other health variables play a minor role. Thus, it is not surprising that the results from column 6 are nearly identical to those from column 2.[32] We conclude that parental smoking status, although not representing a fully convincing mediator, is definitely a meaningful determinant of child's smoking status. Hence, especially for parental smoking should be controlled for. Overall, the results confirm the findings from the first specification. Coefficients change only marginally in size. No matter if parental smoking alone or all health investments together are incorporated, mother's patience is estimated to reduce child smoking by around 6%. Paternal impulsivity reduces the likelihood of smoking by 7%. His patience shows a diminishing effect of about 6%.

[Insert Table 6 about here.]

6 Conclusion

The main purpose of the paper is to analyze the role of parental time discounting in the intergenerational transmission of smoking. We use self-assessed impulsivity and patience as meaningful proxies for self-control and long-run time preference, respectively. First, we confirm existing findings regarding the association between individual time discounting and smoking (*intra*personal context), that is, individuals with lower impulsivity and/or higher levels of patience are less likely to smoke.

More importantly, our results show that time discounting variables - especially parental time preference - have significant direct effects on the likelihood of child smoking. Increasing patience of mothers as well as fathers reduces the likelihood of smoking by around 6-7%. Hence, future orientation of parents has a preventive effect on the

[31] The estimated coefficient of father's regular alcohol consumption (0.018) is close to show at least weak significance (p-value 0.10).

[32] Putting aside all endogeneity concerns, we run the regression from column 6 additionally controlling for child's regular alcohol consumption, healthy diet and regular physical activity. Previous findings remain basically the same. Results are available upon request.

child's decision to engage in risky health behaviors such as smoking. Parents with a high level of future orientation are likely to know about the adverse health effects of smoking. Therefore, they might have an influence on child's smoking status by pointing out the adverse health consequences of smoking.

With respect to father's self-control, increasing impulsivity reduces the likelihood of smoking by roughly 7%, too. Interpreting this influence is not straightforward. We argue that it is hard for children with impulsive parents to properly anticipate their reactions after they have learned about specific child behaviors. Another explanation for this negative effect is that an impulsive parent is likely to impose threats on the offspring which for their part might inhibit the consumption of health deteriorating goods such as cigarettes.

The direct effects of parental time discounting do not vanish after including potential mediating factors regarding their health. Controlling for parental smoking, our findings are in line with results from previous literature concerning the transmission of smoking habits from parents to their children. Hence, we confirm this well known strong positive relationship. However, the main results obtained from the *basic* regression remain firmly stable.

Our findings provide further evidence that the influence of the father is substantial in this context and should not be ignored. Hence, focusing on mothers only (see Brown and van der Pol (2014)) may result in potentially misleading inference. Stratifying by gender, effects of (parental) time discounting differ in sex. Whereas maternal patience shows an effect for both daughters and sons, father's discounting variables seems to be relevant only for sons.

Since we have data on relatively old children up to age 58 and additionally control for offspring that either still live with at least one biological parent or live in an own household, our findings are thoroughly generalizable to the population level. Moreover, our findings should encourage future studies to include both risk preference as well as time discounting (if available) when analyzing the transmission of health (behaviors) from one generation to the other.

As already mentioned above, our mediating factor analysis is only a partial one. We focus on health behaviors through which parental time preference or impulsivity might affect our dependent variable. In fact, we are not able to identify such a mediator. But, once more, this highlights and supports the persistence of the direct influence of parental time discounting on child smoking. However, there may exist other unknown channels through which the direct effects of parental discounting could be absorbed and passed through. We suggest that parenting style might be such a candidate variable. Children of parents that care about good (child) health are unlikely to smoke since their parents are likely to properly invest in their children's health capital. This might work especially through appropriate (health) education and communication within the

family. Unfortunately, we are not able to fully address this issue with our data.

Undoubtedly, smoking is (still) one of the public health priorities for avoidable health risks these days. Hence, our findings provide further valuable insights for public health authorities concerning the prevalence of smoking. Individual time discounting matters for the decision to smoke or not to smoke. In addition, parental impulsivity as well as time preference influence child's smoking decision in the intergenerational transmission process of smoking. So it is important to illustrate parents their influence both as role model and in health education. Overall, this information is crucial if public health service intends to prevent (young) people from starting to smoke or to help them to quit tobacco consumption. Supporting cessation attempts from young adults (then next parental generation) is another step. Improving self-control techniques might help individuals to abstain from smoking. Especially future orientation seems to be a key to break up the vicious cycle of adverse health behaviors that are passed from generation to generation. Nevertheless, more research is needed to fully explore the role of time discounting and risk preference in the intergenerational transmission of health (behaviors) to provide more precise conclusions for public health.

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Tables in text

Table 1: Summary statistics: child and parents (N=5908)

	Child		Mother		Father	
Variable	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**
Smoker (currently)[1,2]	0.290	0.454	0.206	0.404	0.273	0.446
Smoker (ever)[1,3]	0.651	0.477	0.564	0.496	0.759	0.427
Regular alcohol consumption[1]	0.143	0.35	0.106	0.308	0.307	0.461
Nutrition[1]	0.383	0.486	0.602	0.490	0.412	0.492
Sport[1,4]	0.541	0.498	0.411	0.492	0.33	0.470
Self-assessed health[1]	0.736	0.441	0.394	0.489	0.384	0.486
Impulsivity[5]	5.209	2.105	5.031	2.149	4.854	2.122
Patience[5]	5.890	2.231	6.368	2.127	5.998	2.232
Risk[5]	4.934	2.180	3.835	2.138	4.656	2.249
Altruism[1,5]			0.285	0.451	0.175	0.38
Gender[1]	0.480	0.500				
Age	27.835	7.655	54.529	8.396	57.425	8.885
Hauptschule[1]	0.161	0.368	0.353	0.478	0.386	0.487
Realschule[1]	0.322	0.467	0.369	0.483	0.272	0.445
Fachhochschule[1]	0.069	0.254	0.026	0.159	0.036	0.186
Abitur[1]	0.335	0.472	0.132	0.338	0.185	0.389
Other degree[1]	0.016	0.126	0.077	0.267	0.088	0.283
Leave with no degree[1]	0.012	0.107	0.044	0.204	0.033	0.178
Not yet finished[1]	0.085	0.278				
Household income[4] (Log)	10.485	0.676	10.600	0.551	10.605	0.559
German[1]	0.945	0.229	0.918	0.274	0.918	0.274
Living with parent(s)[1]	0.501	0.500				
Schleswig Holstein[1]	0.023	0.149				
Hamburg[1]	0.012	0.110				
Lower Saxony[1]	0.086	0.281				
Bremen[1]	0.004	0.061				
Northrhine-Westphalia[1]	0.199	0.399				
Hesse[1]	0.066	0.247				
Rhineland Palatinate[1]	0.046	0.209				
Baden-Württemberg[1]	0.137	0.344				
Bavaria[1]	0.147	0.354				
Saarland[1]	0.009	0.093				
Berlin[1]	0.031	0.175				
Brandenburg[1]	0.035	0.184				
Mecklenburg Western Pomerania[1]	0.021	0.143				
Saxony[1]	0.081	0.272				
Saxony-Anhalt[1]	0.052	0.221				
Thuringia[1]	0.052	0.223				
Same region[1]	0.910	0.286				
Year 2006[1]	0.310	0.463				
Year 2008[1]	0.392	0.488				
Year 2010[1]	0.298	0.457				

Notes: [1] coded as binary variable; [2] smoker (currently): maternal (N=5849) and paternal (N=5831); [3] information from wave 2012; [4] lagged variable; [5] information from wave 2008.

Table 2: Parental time discounting and child's likelihood of smoking

		Dep. var.: child's smoking status					
		All		Daughters		Sons	
Child	Impulsivity	0.029***	(0.010)	0.041***	(0.013)	0.022	(0.014)
	Patience	-0.019**	(0.008)	-0.019	(0.012)	-0.016	(0.012)
	Risk	0.023**	(0.010)	0.029**	(0.013)	0.013	(0.014)
Mother	Impulsivity	0.002	(0.009)	0.015	(0.013)	-0.012	(0.013)
	Patience	-0.023**	(0.010)	-0.026**	(0.013)	-0.024*	(0.014)
	Risk	-0.000	(0.010)	-0.004	(0.014)	0.004	(0.015)
Father	Impulsivity	-0.018*	(0.010)	-0.003	(0.014)	-0.032**	(0.013)
	Patience	-0.020**	(0.009)	-0.012	(0.012)	-0.026**	(0.013)
	Risk	0.005	(0.010)	0.004	(0.013)	0.004	(0.013)
	N	5908		2838		3070	

Notes: Random effects GLS regressions. Impulsivity, patience and risk are measured in standard deviations. Cluster-robust standard errors at the family level in parentheses. Significance: *p<0.1, **p<0.05, ***p<0.01.

Table 3: Mediating factors: parental health outcome

Dep. var.: self-assessed health (SAH)				
	Mother		Father	
Impulsivity	0.015	(0.010)	0.017	(0.010)
Patience	0.043***	(0.010)	0.056***	(0.009)
Risk	0.016	(0.010)	0.010	(0.010)
N	5187		5103	

Notes: Random effects GLS regressions with heteroskedasticity-robust standard errors in parentheses. Impulsivity, patience and risk are measured in standard deviations. Significance: *p<0.1, **p<0.05, ***p<0.01.

Table 4: Mediating factors: parental health behaviors

Dep. var.: ever-smoker				
	Mother		Father	
Impulsivity	0.037***	(0.013)	0.023**	(0.011)
Patience	-0.035***	(0.012)	-0.007	(0.010)
Risk	0.010	(0.013)	0.001	(0.012)
N	1814		1823	

Dep. var.: regular alcohol consumption				
	Mother		Father	
Impulsivity	0.011*	(0.006)	0.000	(0.010)
Patience	-0.008	(0.006)	-0.017*	(0.009)
Risk	0.007	(0.007)	0.002	(0.010)
N	5115		5103	

Dep. var.: health-conscious nutrition				
	Mother		Father	
Impulsivity	-0.015	(0.010)	-0.017	(0.010)
Patience	0.019*	(0.010)	0.021**	(0.009)
Risk	0.017	(0.011)	0.004	(0.011)
N	5118		5095	

Dep. var.: regular physical activity				
	Mother		Father	
Impulsivity	0.009	(0.010)	0.008	(0.011)
Patience	0.013	(0.010)	-0.011	(0.009)
Risk	0.040***	(0.011)	0.018*	(0.010)
N	5115		5103	

Notes: Dependent variables are all binary variables. Except one (OLS for "ever-smoker"), random effects GLS regressions with heteroskedasticity-robust standard errors in parentheses. Impulsivity, patience and risk are measured in standard deviations. Significance: *p<0.1, **p<0.05, ***p<0.01.

Table 5: Role of health mechanisms: parental self-assessed health (SAH)

		Dep. var.: child's smoking status	
		(1)	(2)
Child	Impulsivity	0.029*** (0.010)	0.029*** (0.010)
	Patience	-0.019** (0.008)	-0.019** (0.008)
	Risk	0.023** (0.010)	0.023** (0.010)
Mother	Impulsivity	0.002 (0.009)	0.002 (0.009)
	Patience	-0.023** (0.010)	-0.022** (0.010)
	Risk	-0.000 (0.010)	0.001 (0.010)
	SAH		-0.015 (0.010)
Father	Impulsivity	-0.018** (0.010)	-0.018** (0.010)
	Patience	-0.020** (0.009)	-0.019** (0.009)
	Risk	0.005 (0.010)	0.005 (0.010)
	SAH		-0.015 (0.010)
N		5908	5908

Notes: Random effects GLS regressions. Impulsivity, patience and risk are measured in standard deviations. Cluster-robust standard errors at the family level in parentheses. Significance: *p<0.1, **p<0.05, ***p<0.01.

Table 6: Role of health mechanisms: parental health behaviors

		Dep. var.: child's smoking status					
		(1)	(2)	(3)	(4)	(5)	(6)
Child	Impulsivity	0.029*** (0.010)	0.027*** (0.009)	0.029*** (0.010)	0.029*** (0.010)	0.029*** (0.010)	0.026*** (0.009)
	Patience	-0.019** (0.008)	-0.017** (0.008)	-0.019** (0.008)	-0.018** (0.008)	-0.019** (0.008)	-0.016** (0.008)
	Risk	0.023** (0.010)	0.020** (0.010)	0.023** (0.010)	0.023** (0.010)	0.023** (0.010)	0.020** (0.010)
Mother	Impulsivity	0.004 (0.009)	-0.002 (0.009)	0.002 (0.009)	0.001 (0.009)	0.002 (0.009)	-0.004 (0.009)
	Patience	-0.023** (0.010)	-0.018* (0.010)	-0.022** (0.010)	-0.022** (0.010)	-0.022** (0.010)	-0.016* (0.010)
	Risk	-0.000 (0.010)	0.001 (0.010)	0.000 (0.010)	0.001 (0.010)	0.001 (0.010)	0.001 (0.010)
	Smoker		0.082*** (0.018)				0.083*** (0.018)
	Alcohol			0.010 (0.016)			0.007 (0.018)
	Nutrition				0.005 (0.010)		-0.003 (0.010)
	Sport					-0.009 (0.011)	-0.005 (0.011)
Father	Impulsivity	-0.018** (0.010)	-0.020** (0.009)	-0.018** (0.010)	-0.019** (0.010)	-0.018** (0.010)	-0.020** (0.009)
	Patience	-0.020** (0.009)	-0.018** (0.009)	-0.020** (0.009)	-0.019** (0.009)	-0.021** (0.009)	-0.016* (0.009)
	Risk	0.005 (0.010)	0.005 (0.009)	0.005 (0.010)	0.005 (0.010)	0.005 (0.010)	0.005 (0.009)
	Smoker		0.084*** (0.019)				0.080*** (0.019)
	Alcohol			0.018 (0.011)			0.017 (0.011)
	Nutrition				-0.022** (0.010)		-0.020** (0.010)
	Sport					-0.015 (0.011)	-0.014 (0.011)
N		5908	5908	5908	5807	5908	5807

Notes: Random effects GLS regressions. Impulsivity, patience and risk are measured in standard deviations. Cluster-robust standard errors at the family level in parentheses. Column 1 replicates the overall results from Table 2. In columns 2-5, we control separately for parental smoking, alcohol consumption, healthy diet, and physical activity (all binary variables). In column 6, we control jointly for all mediating factors. Significance: *p<0.1, **p<0.05, ***p<0.01.