

CREATIVITY AND HAPPINESS

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Abstract

There is a broad consensus among economists that freedom of choice is the route to self-realization and happiness: on the assumption that preferences are either exogenous or endogenously determined through optimal plans, it is argued that policy-makers should seek to create institutions that enhance economic freedom. By the same reasoning, economists should refrain from investigating the psychological and physiological mechanisms that govern the formation of preferences.

The “happiness paradox” is a clear sign that this position could be wrong. Satisfaction with life has a good deal to do with people’s actual access to work and consumption opportunities that match their preferences and skills. This paper models the endogenous evolution of preferences and argues that economic freedom can generate happiness insofar as people have the appropriate cognitive and non-cognitive skills to be active workers and consumers.

We show that individuals may be rationed in purchasing creative goods – those that can deliver greater lifetime happiness – mostly by lack of cognitive and non-cognitive abilities. We suggest that, owing to the essential role played by education during childhood in the acquisition of abilities, appropriate education policies can help people to discover their talents and to improve the skills they need later in life to exploit them, thus also reducing the probability of experiencing regret in life.

Our preliminary empirical results support this view and show that, in Italy, the income-elasticity of happiness could be lower than the education-elasticity of happiness. Moreover, access to creative environments appears to have a positive impact on happiness. Finally, since the creativity index adopted is also based on the local endowment of human capital, it appears that, in addition to high private returns, there are also substantial social-happiness returns to investment in education.

Building on the latter empirical evidence, our model and recent contributions on the role of education policies (Heckman and Jacobs, 2006; Cuhna and Heckman, 2007) we argue that compressing economic freedom to finance education policy is happiness-improving.

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1. Introduction

There is a broad consensus among economists that economic freedom is the route to self-realization and happiness: under the assumption that preferences are either exogenous or endogenously determined through optimal plans, it is argued that policy-makers have the aim of creating institutions that enhance economic freedom. By this reasoning, economists should refrain from investigating the psychological and physiological mechanisms governing the formation of preferences.

The *happiness paradox* is a clear symptom that this position could be wrong. Satisfaction with life has a lot to do with the extent to which people's actual access to working and consumption opportunities matches their preferences and skills¹. In this paper, we take this point and argue that economic freedom can generate happiness only to the extent that people have the cognitive and non-cognitive abilities needed to be active consumers. On these grounds, we suggest that preferences cannot be treated as separate and apart from the acquired skills that are required to express them, and that, correspondingly, income and preferences are not the only economically relevant constraints that bind choices.

The capabilities approach (Sen, 1985) with its distinction between positive and negative freedom, is a suitable theoretical framework for our analysis: in our analytical context, negative freedom is a condition where people are free to choose among consumption options but do not necessarily possess the skills to express their preferences; conversely, positive freedom is a condition in which people have both the freedom to choose and the abilities needed to enjoy the choices they make.

The supporting empirical evidence on the impact of cognitive and non-cognitive skills on an individual life is impressive. As far as cognitive skills are concerned, the list of characteristics of an individual that are correlated with the standard measurement tests is long (Kuncel, Hezzlet and Ones, 2004; Ree and Carretta, 2002): abilities (analytical style, memory, reaction time, reading), creativity (craftwork, musical ability), health and fitness, interests (breadth and depth of interests, sports participation), morality (delinquency, lie scores, racial prejudice, values), perceptual (ability to perceive brief stimuli, field-independence, myopia), personality (achievement motivation, altruism, dogmatism), practical skills (practical knowledge, social skills). The socioeconomic outcomes that appear to depend on these cognitive abilities include almost all the factors that have been found to affect, directly or indirectly, happiness: educational achievement, occupational status, income, delinquency and criminal behaviour, poverty, divorce, having an illegitimate child, being on welfare, having an underweight baby (Schmidt, 2002; p.200).

A standard assumption in economics is that the evolution of preferences is a smooth process governed by innate tendencies and perfect foresight (e.g. Becker and Murphy, 1988). Building on this assumption, the evolution of individual preferences is derived, for given innate traits, as a *one-move game* at the start of life. Psychology and the neurosciences suggest that this is not a correct description and even a good approximation of what happens in reality. Leaving aside the assumption of perfect foresight, they suggest that most of cognitive and non-cognitive skills behind preferences and governing choices are acquired on past age 20, when the prefrontal cortex is still malleable. As such, they are acquired early in life, but they do

¹ "Abilities", and "skills" are used interchangeably.

not depend solely on genes but rather they are determined by choices that are made by other individuals, i.e. the parents, and that are significantly influenced by the environment children live in. Hence, when positing self-determination as the basis for methodological individualism, one should recognize: a) the impossibility of choosing one's parents; b) the inability of parents to borrow against their children's future income to invest in them; c) the inability of parents to borrow against their own income to finance investments in their children (Cunha and Heckman, 2007, p.1) and, finally, d) the inability of a child to choose her/his social environment. These arguments are not trivial, considering that particularly strong feelings of unhappiness, stemming from such outcomes as unemployment and divorce, are at least in part grounded on childhood experiences choices.

Leaving such specific socioeconomic outcomes aside, psychological studies suggest in any case that the acquisition of cognitive and non-cognitive abilities in childhood helps determine the evolution of preferences during adulthood. Hence, unless we consider points (a) to (d) above unimportant from an economic viewpoint, economic models of choice with endogenous preferences need to take the impact of childhood on adult behaviour into account.

Consumption analyses that neglect the endogenous process of skills formation are problematic, in particular, when consumption (a) requires abilities that can be acquired during childhood through education, training and exposure to consumption; and (b) the associated hedonic experience stemming from the consumption of these goods activates idiosyncratic learning processes and generates psychological feedback from consumption to preferences. These characteristics of consumption are traditionally associated with artistic, cultural, recreational and entertainment activities, though many functional goods also have such creative dimensions. Moreover, within the group of advanced countries, the importance of such creative forms of consumption is steadily increasing as a share of household consumption.

In this paper, we take these points and explore the main consequences of adopting a restricted notion of learning for the analysis of consumption and the interpretation of the *happiness paradox*. Building on the economic and psychological literature on the origins and the impact of cognitive and non-cognitive skills (Cunha and Heckman, 2007; Kuncel, Hezzlet and Ones, 2004), we develop a model based on the following assumptions:

- a) cognitive and non-cognitive abilities are acquired in childhood;
- b) cognitive and non-cognitive abilities are essential inputs in consumption activities;
- c) the efficacy of acquired cognitive and non-cognitive abilities in delivering happiness depends on how they match innate talents (i.e. genes);
- d) during adulthood, the feedback from consumption exposure to preferences is local, i.e. idiosyncratic. That is to say, the physiological and psychological mechanisms activated through consumption are assumed to be specific both to the goods consumed and to the individuals;
- e) the happiness delivered by creative consumption results from the interaction between the subjective characteristics of individuals, i.e. their cognitive and non-cognitive abilities, and the objective creative content of the consumption goods.

In the empirical part of the paper, we test the hypothesis that satisfaction with life depends on consumption skills acquired through education and by the extent to which people have actual access to creative consumption opportunities. We use data drawn from the Survey on Household Income and Wealth (SHIW), conducted by the Bank of Italy (2004) and, in order to account for the role of environmental factors in shaping consumption opportunities, we include province-level data, on creativity taken from Florida and Tinaglia (2005) and other socioeconomic factors from the Atlante database (Unioncamere, 2006). The statistical results lends support to our hypotheses since they show that, in Italy, happiness is much more responsive to education than to income. Moreover, access to a creative environments has a strong positive impact on people's happiness: since the creativity index adopted is related to the local endowment of human capital, it appears that, in addition to high private returns, there are also substantial social-happiness returns to investment in education.

The model, with the insights it suggests and the preliminary empirical evidence provided here, carries important policy implications relating to the "economics of happiness". For instance, the absence of a clear link between income and happiness (Layard, 2003) could be because much of society is locked in consumption styles that lack subjective creative content.

Building on the idea that learning is idiosyncratic, we suggest that wide-ranging early-exposure to creative activities and education improves the opportunities for creative consumption and can help people to escape from the *tyranny of habituation* later in life. Specifically, we argue that an appropriate mix of specific and general human capital, provided it matches individual's innate talents, reduces the cost of buying more creative preferences and consumption styles².

The advantage of this kind of early investment in education is that it does not imply any resources trade off (Heckman and Jacobs, 2006).

Until now, the idea that government should support education has been broadly accepted because human capital was seen as essential to technical progress and productivity growth. This instrumental view of education was justified when the priority was material happiness; but it now needs a revision: in highly advanced countries the income-elasticity of happiness is quite low, and education can improve well being mostly by allowing access to superior consumption technologies. Most important, given this low income-elasticity, the cost of compressing economic freedom to finance educational programs would be largely offset by the effects on happiness of an improved socioeconomic performance.

The paper is organized as follows. In Section 2, we discuss a model of the *formation* and *evolution* of preferences characterized by idiosyncratic learning based on Di Giacinto and Ferrante (2007). In Section 3 we discuss our empirical strategy and results. Section 4 discuss the policy implications and Section 5 draws the main conclusions.

² The expressions "consumption styles" and "consumption sets" are used interchangeably.

2. The formation and the evolution of preferences and consumption skills.

At the heart of consumer theory, and especially of models of rational habit formation, lies the idea that preferences are exogenous, complete and based on reliable information: "The economist's traditional picture of the economy resembles nothing so much as a Chinese restaurant with its long menu. Customers choose from what is on the menu and are assumed always to have chosen what most pleases them. That assumption is unrealistic, not only of an economy, but of Chinese restaurant. Most of us are unfamiliar with nine-tenths of the *entrées* listed; we seem invariably to order either the wrong dishes or the same old ones. Only on occasions when an expert does the ordering do we realize how badly we do on our own and what good things we miss. The trouble we have with the economy's menu stems not only from our lack of skills in ordering, but also from our lack of skill in consuming, from the impossibility of making substitutions[...]. The traditional theory of the consumer's behavior fails to recognize his need for novelty and variety, his need of consumption skills to enjoy certain forms of consumption, and habit as a force which can prevent satisfaction or rational choice." (Scitovsky, 1992, p. 149-150).

Our skills in consuming are heavily influenced by cognitive and non-cognitive abilities acquired during childhood, which determine preferences and govern choices during adulthood. Moreover, the veil of ignorance about our likes and dislikes is not symmetrically distributed across the consumption possibilities open to us but is either thin or thick, depending on our stock of consumption experience. Accordingly, the information generated by experience is local, i.e. is confined to those goods that are object of hedonic/affective exposure and that personal experience cannot be substituted for by information provided by others, i.e. one cannot de-codify the hedonic and affective experiences of other individuals³.

The interpretative framework presented here does not pretend to give a full account of the factors affecting consumers' choices. Or to describe a full-fledged dynamic model of learning. Our more limited aim here is to provide a coherent account of the implications of the hypotheses that (a) preferences and consumption skills are formed in childhood and (b) in adulthood, the evolution of preferences depends on the idiosyncratic accumulation of consumption human capital. Building on this, we identify the main factors that affect learning and the resulting patterns of accumulation of consumption experience. To simplify our arguments, we do not consider explicitly⁴ the role of social interaction as a source of learning.

In the analysis of the endogenous change of preferences we distinguish between:

- a) the *formation* of preferences, which we assume to take place between birth and adulthood (conventionally fixed at 20 years), during which time individuals also acquire their cognitive and non-cognitive abilities (Heckman and Cunha, 2006; 2007);
- b) the *evolution* of preferences, after childhood, when preferences develop according to the effects of hedonic exposure.

³ Psychobiology lends strong support to the idea that learning processes generated by consumption experience is idiosyncratic and cannot be codified. Emotional and affective mechanisms activating consumption learning work through chemical transformations of the cerebral cells and the nature of this process is specific to individuals and to the type of consumption experiences.

⁴ The idea that personal consumption experience can be codified and de-codified in a very imperfect way is an implicit assumption that social interaction is a poor device to share information about consumption opportunities.

We posit that, of course, the *formation* of preferences is governed by innate factors but that it is also strongly affected by education and by experiences within the family and at school.

As far as the evolution of preferences, we assume that consumption exposure activate three different feedback mechanisms from consumption to preferences (Di Giacinto and Ferrante, 2007). The first works through *hedonic and affective experience*, i.e. the physiological and psychological forces that are stimulated by exposure to consumption; for example, the drinking of a glass of Barolo wine generates physiological and psychological stimuli that may affect consumption capital and the future perception and appreciation of Barolo (and of other red wines with similar characteristics⁵).

The second mechanism operates through the *learning processes* activated from consumption. Depending on the nature and complexity of a good (e.g. number and potential combinations of characteristics that generate hedonic stimuli), the capacity to enjoy consumption may require a training process based on exposure. Mountain climbing, skiing swimming, piano playing are clear examples.

The third feedback mechanism concerns the *generation of information* about one's preferences and, therefore, the expansion of the information set available to make choices. Owing to the local nature of learning, this information is also local. This assumption does not imply consumers' myopia in the strong form assumed in the literature on habit formation. Notably, we posit that, under certain conditions, individuals recognize the impact of current choices on future preferences, that is, they learn from their choices. The contention is that the opportunities for this learning process are restricted to an appropriate neighbourhood of the actual consumption choices, so that the *unfamiliar* choices are partially excluded from the learning process and do not generate information on preferences.

Of course, the idea that familiarity with consumption affects choices is not new in the psychological literature and is consistent, in particular, with the idea that utility from consumption depends not only on direct experience but also on the memory of past and the anticipation of future consumption⁶: "The impact of memory and anticipation on current utility leads to a type of triple counting of experience. A single event can influence utility first through anticipation, then through direct experience, and finally through memory" (Elster and Loewenstein, 1992, p. 214).

The consumption of creative goods fits this idea very well in that it requires skills and the utility it delivers is significantly affected first by consumption exposure and then by the pattern of accumulation of consumption human capital. For instance, the appreciation of jazz, of a Impressionist painting or of mountain climbing are forms of creative consumption affected both by memory and by anticipation of past hedonic/affective experience.

⁵ E.g. structure, taste, appearance and bouquet.

⁶ "The role played by past consumption experience in determining future choices is crucial in that unlike the future, the past cannot be altered, so that its effects on the present are largely determined by prior decision. Our current selves are largely at the mercy of past selves, although we have some limited capacity to direct our thoughts toward or away from the past or even to represent the past as we wish. But if past selves have endowed us with an overly rich or lean stock of memories, there are limits to our capacity to cognitively amend them without lapsing into autism" (Elster and Loewenstein 1992, p. 214).

2.1. The technology of skills/preferences formation

Economists are used to distinguishing preferences from skills, but this distinction appears inappropriate insofar people like most what they are best able to appreciate, so that skills are essential to express preferences. In fact, this reasoning applies to all human activities.

In our analysis of consumption choices we posit that (a) the appreciation of creative goods requires appropriate non-cognitive and cognitive skills and (b) people can extract the objective creativity content of different goods, provided they are endowed with the appropriate level of subjective creativity.

Let us define a *matching function* $\psi = \psi(D, X, I)$, $0 \leq \psi \leq 1$, describing the extent to which the level and quality of *education* D and the variety and quality level of *experiences* X “match” innate preferences I , and a function $F : D \times X \rightarrow [0, +\infty)$ strictly increasing and strictly concave in both its arguments that describes the extent to which education D and experience X can enhance cognitive and non-cognitive skills.

Following Cuhna and Heckman (2007), we suppose that, during childhood, innate preferences/taste I , education D and exposure to consumption X determine the amount K of acquired cognitive and non-cognitive skills, i.e. *human capital*, according to a technology $K = K(D, X, I)$ that is defined as follows:

$$K(D, X, I) := \psi(D, X) \cdot F(D, X). \quad (1)$$

So the effective amount of skills acquired during childhood that can be deployed during adulthood depends on the interaction among innate propensities, education and experiences.

2.2. The technology of skills/preferences evolution with local learning

The mechanisms leading to the local evolution of preferences can be fruitfully set forth through the analysis of choices in the space of goods’ characteristics (Lancaster 1971) by observing that the individuals are exposed only to the set, combinations and intensity of the characteristics that are present in the goods they consume. Leaving functional goods aside and building on Di Giacinto and Ferrante (2007), let us assume that happiness is defined over *consumption sets* and that the latter are identified by groups of creative goods combining N characteristics in different manners (e.g. comfort, quality of design). Of course, one should expect N to be very large and consumption sets to differ not only in combinations of the same characteristics but also in the actual characteristics they present. In this scenario, consumers’ choices concern alternative creative consumption sets defined over a vector of characteristics that may contain some zeros. Hence, for simplification, we abstract from goods and suppose that in choosing consumers combine sets of characteristics in fixed proportions. This assumption preserves the idea that consumers can combine goods to obtain variety but posits that there is a limit to the process. Where standard consumer theory stresses the freedom to combine as a main ingredient of choice, we stress the idiosyncratic nature of choice as a process of selection among sets of alternatives.

Let us assume that a consumption set m , $m = 1, 2, \dots, M$, is identified by a set of characteristics. At adulthood the happiness delivered by consumption set m is assumed to be represented by the function⁷:

$$h_t^{(m)} = h^{(m)}(s_t^{(m)}, x_t^{(m)}) \quad (2)$$

where:

- t , $t \geq 0$, is the time variable;
- $s^{(m)} : [0, +\infty) \rightarrow (0, +\infty)$ is the stock of specific consumption human capital conditional on actual exposure at time t , which we call *hedonic learning function*;
- $x^{(m)} : [0, +\infty) \rightarrow [0, +\infty)$ is consumption of set m .

The function $h^{(m)}$ has to be twice differentiable and strictly increasing and strictly concave in both variables $s^{(m)}$ and $x^{(m)}$.

In particular, we argue that consumption human capital changes only for those creative goods that are objects of consumption above a minimum exposure threshold $\bar{x}^{(m)}$ at least once, i.e. if there exists $\bar{t}^{(m)}$ such that $x_{\bar{t}^{(m)}}^{(m)} \geq \bar{x}^{(m)}$, and that the pattern of accumulation of consumption human capital is specific to an individual and a set. As far as creativity is concerned, we posit that the objective creativity content of a given set is increasing in its complexity, the latter being given by the number of characteristics and by their potential combinations⁸.

A reasonable representation of the evolution of $s^{(m)}$ builds on the idea of a life-cycle pattern in the consumption. Early, until a time $t_{\max}^{(m)}$, $t_{\max}^{(m)} > 0$, the exploration of new creative consumption opportunities generates increasing returns over time. Individuals learn how to enjoy the stimuli generated by the specific combinations of characteristics provided by a given set. These consumption skills improve over time as individuals learn to explore creative consumption opportunities. At a later stage, owing to the acquisition of skills and the depletion of the stock of novelty, repetition of consumption drives returns from positive to negative values.

The shape of the curve $s^{(m)}$ that describes the life-cycle of specific consumption human capital depends both on objective characteristics of the set m , i.e. how creative a good is in terms of number and complexity of its characteristics, and on subjective characteristics of individuals, i.e. their aptitude to exploit the creative potential of the consumption set. Therefore, objective properties of goods and subjective characteristics of individuals interact in determining the actual content of creativity and the evolution of preferences through the accumulation of consumption human capital.

A very good example is jigsaw puzzles. Appreciation of this activity depends on an individual's innate taste and ability to do puzzles, on ability to do puzzles acquired through experience and, finally, on the objective difficulty of the puzzle (number of pieces and complexity of the pattern).

⁷ We believe that, when dealing with learning, "utility" should be replaced by "well-being" or "happiness" (see Frey and Stutzer, 1999).

⁸ Of course, combinations should be meaningful to the individual, i.e. they should provide positive stimuli.

Indeed, individuals show different attitudes towards newness in consumption, aptitude to learn from exposure. Some may love newness as such, and then become quickly bored; others may be less concerned for novelty and less bored by repetition. Moreover, the opportunities to learn from exposure may vary greatly from one individual to another depending on how actively they are involved in consumption. Going to a pop concert or to opera could be a very creative activity, yielding high returns for some individuals, and a pretty boring one for others.

Building on our arguments, we suppose that the feedback from consumption to preferences may be positive or negative and lead either to accumulation or depletion of human capital depending on:

- (a2) the specific stage within the life-cycle of a given consumption set;
- (b2) an individual's type;
- (c2) the nature of the creative set.

A suitable mathematical representation of the hedonic learning function is:

$$s_t^{(m)} := \begin{cases} s_0^{(m)} + \left(\frac{t - \bar{t}^{(m)}}{2} \right)^{\gamma^{(m)}} e^{-\frac{t - \bar{t}^{(m)}}{\beta^{(m)}}}, & \text{if } \exists \bar{t}^{(m)} \text{ such that } x_{\bar{t}^{(m)}}^{(m)} \geq \bar{x}^{(m)} \\ s_0^{(m)}, & \text{otherwise} \end{cases} \quad (3)$$

where:

- $s_0^{(m)} = s_0^{(m)}(I, K)$ is a function concerning set m that depends on *innate taste* I and on *human capital* K acquired during childhood. We assume that it is twice differentiable in both variable;
- $\bar{t}^{(m)}$ is the *arrival time* of set m , i.e. the first time, if it exists, such that $x_{\bar{t}^{(m)}}^{(m)} \geq \bar{x}^{(m)}$.
- the quantity $\left(\frac{t - \bar{t}^{(m)}}{2} \right)^{\gamma^{(m)}} e^{-\frac{t - \bar{t}^{(m)}}{\beta^{(m)}(K)}}$ describes at any time the *accumulation of consumption human capital*;
- the parameter $\gamma^{(m)}$, $1 \leq \gamma^{(m)} < +\infty$, represents the objective creativity of consumption set m . In particular, $\gamma^{(m)} = 1$ is the value of ordinary functional goods, and the higher the value of the parameter, the greater its creativity (see point (c2) above);
- the parameter $\beta^{(m)} = \beta^{(m)}(K)$, $1 \leq \beta^{(m)} < +\infty$, describes the subjective creativity concerning the consumption of set m ; the higher subjective creativity, the larger the value of $\beta^{(m)}$ (see point (b2) above). Note that this parameter depends on the acquired human capital.

A life-cycle is defined over the time interval $[0, T^{(m)}]$, where $t = 0$ is the starting period of consumption and $t = T^{(m)}$, $T^{(m)} > 0$, is such that $s_{T^{(m)}}^{(m)} = s_0^{(m)} + \varepsilon$, where ε is arbitrarily small.

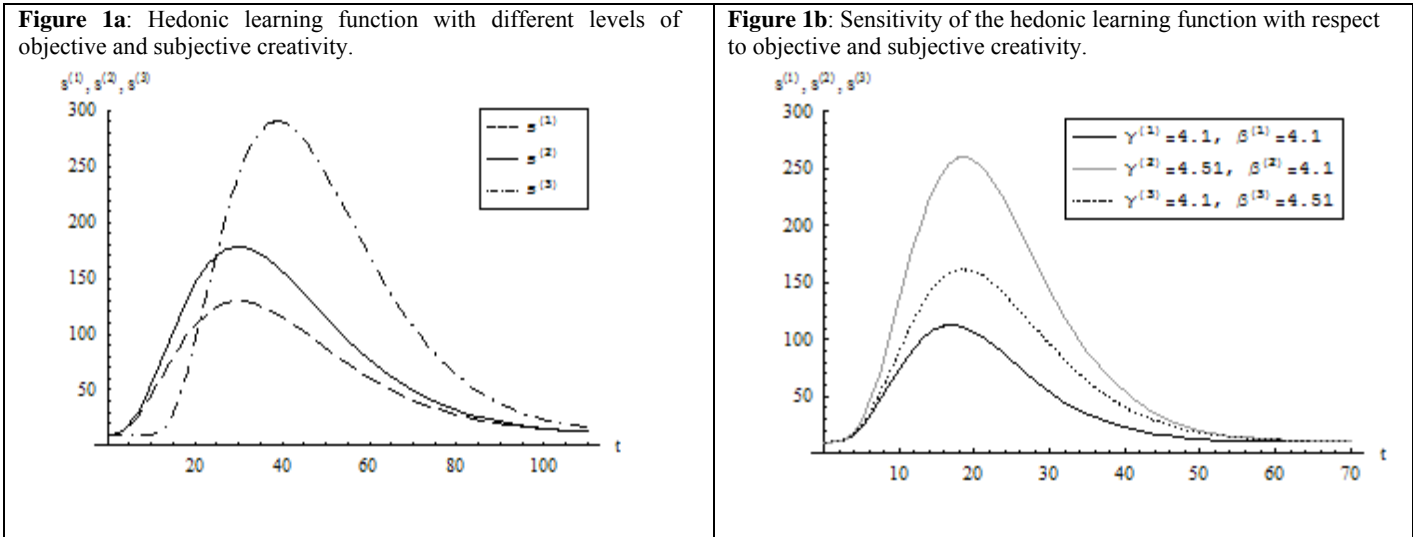
Hence, with zero exposure, the amount of happiness delivered by set m depends on $s_0^{(m)}$. So, as a matter of analytical simplicity, we assume that information about appreciation without exposure is unbiased.

From (3) one can verify that as soon as demand for a consumption set reaches the minimum exposure threshold, which is not known in advance to consumer, learning no longer depends on consumption level.

We can notice that the larger $\gamma^{(m)}$ or $\beta^{(m)}$ is the higher the value of the hedonic learning function $s^{(m)}$. Moreover one can easily verify that $s^{(m)}$ reaches its absolute peak at $t_{\max}^{(m)} = \gamma^{(m)} \cdot \beta^{(m)} + \bar{t}^{(m)}$ with maximum value $s_{t_{\max}^{(m)}}^{(m)} = s_0^{(m)} + \left(\frac{\gamma^{(m)} \cdot \beta^{(m)}}{2 \cdot e} \right)^{\gamma^{(m)}}$. Both are increasing in parameters $\gamma^{(m)}$ and $\beta^{(m)}$, so the time required for the consumer to reach maximum hedonic exposure increases with objective and subjective creativity, and the global maximum value of the hedonic learning also increases.

One can draw different shapes of $s^{(m)}$, over an individual lifetime, on the basis of the tastes of the individual and the characteristics of the set, i.e. $\gamma^{(m)}$ and $\beta^{(m)}$. Figures 1a and 1b show three hedonic functions with different shapes⁹.

In figure 1b we test the sensitivity of the hedonic learning function with respect to objective and subjective creativity¹⁰. Other things being equal, it is more sensitive to changes in objective than in subjective creativity.



⁹ In Figure 1a we assume that $s_0^{(1)} = s_0^{(2)} = s_0^{(3)} = 10$ while $\bar{t}^{(1)} = \bar{t}^{(2)} = 0$ and $\bar{t}^{(3)} = 9$. Moreover we consider different values for objective and subjective creativity but we impose that $\gamma^{(1)} \cdot \beta^{(1)} = \gamma^{(2)} \cdot \beta^{(2)} = \gamma^{(3)} \cdot \beta^{(3)} = 30$, hence the global maxima are respectively at $t_{\max}^{(1)} = t_{\max}^{(2)} = 30$ and $t_{\max}^{(3)} = 39$. In particular, we set $\gamma^{(1)} = 2.8$, $\gamma^{(2)} = 3$, $\gamma^{(3)} = 3.3$ and therefore $\beta^{(1)} = \frac{75}{7}$, $\beta^{(2)} = 10$, $\beta^{(3)} = \frac{100}{11}$.

¹⁰ We set $s_0^{(1)} = s_0^{(2)} = s_0^{(3)} = 10$ and $\bar{t}^{(1)} = \bar{t}^{(2)} = \bar{t}^{(3)} = 0$. The function $s^{(1)}$ has the same values of objective and subjective creativity $\gamma^{(1)} = \beta^{(1)} = 4.1$. In $s^{(2)}$ the parameter $\gamma^{(2)}$ increases of 10%, i.e. $\gamma^{(2)} = 4.51$ and $\beta^{(2)} = 4.1$. Finally in function $s^{(3)}$ the objective creativity $\gamma^{(3)}$ is unchanged respect to that of $s^{(1)}$ while the subjective creativity $\beta^{(3)}$ is augmented of 10%, i.e. $\gamma^{(3)} = 4.1$ and $\beta^{(3)} = 4.51$.

In the construction of the consumption space without exposure, building on our notion of creative consumption and idiosyncratic learning, we posit that the following conditions are satisfied:

- (a3) for a given level of creativity, the productivity of exposure in generating initial appreciation $s_0^{(m)}$ is increasing in human capital;
- (b3) given innate preferences, appreciation without exposure $s_0^{(m)}$ depends on how familiar the characteristics of a set are with respect to the nature of one's human capital: if set n is more familiar than set m , then $\eta_{s_0^{(n)}}(K) > \eta_{s_0^{(m)}}(K)$, where $\eta_{s_0^{(n)}}(K)$ and $\eta_{s_0^{(m)}}(K)$ are respectively the elasticity of $s_0^{(n)}$ and $s_0^{(m)}$ with respect to variable K , i.e. $\eta_{s_0^{(n)}}(K) := \frac{\partial s_0^{(n)}}{\partial K} \cdot \frac{K}{s_0^{(n)}}$ and $\eta_{s_0^{(m)}}(K) := \frac{\partial s_0^{(m)}}{\partial K} \cdot \frac{K}{s_0^{(m)}}$;
- (c3) K affects the appreciation of more creative consumption goods more strongly; i.e. if set n is more creative than set m , then $\eta_{s_0^{(n)}}(K) > \eta_{s_0^{(m)}}(K)$;
- (d3) given innate preferences, appreciation without exposure $s_0^{(m)}$ depends on the specificity of human capital; the more specific K , the more (less) effective it is in affecting the appreciation of more (less) familiar consumption sets.

The previous conditions seem quite reasonable. The appreciation of any creative activity without exposure depends on the amount of human capital we possess, and in particular on the amount of specific skills we can deploy. For instance, the appreciation of mountain climbing without experience depends on our human capital, and specifically on that necessary to enjoy climbing. If we have practiced mountain hiking before, we will appreciate climbing more rather than less. On the other hand, the appreciation of jazz depends more heavily on human capital than does the appreciation of pop music, as require certain skills. Of course, this does not imply that listening to jazz would provide more happiness than listening to pop music for any given individual.

2.2.1. The extension of the learning region and idiosyncratic accumulation of human capital

Building on our previous assumptions and with income exogenous, subsequent choices depend on the endogenous change in appreciation of the available consumption sets. This change stems from consumption exposure and the cultivation of taste. Let us define at time t , $t \geq 0$, the set of learning-generating sets L_t in the following way:

$$L_t := \left\{ n \in \mathcal{M} \mid \exists \bar{t}^{(n)} > 0 \mid x_{\bar{t}^{(n)}}^* \geq \bar{x}^{(n)}, \bar{t}^{(n)} < t \right\}, \quad (4)$$

where \mathcal{M} is the set of all available consumption sets, i.e. $\mathcal{M} = \{1, 2, \dots, M\}$ and $x_{\bar{t}^{(n)}}^*$ is the amount of the optimal consumption set n , and indicate by L_t^c the residual set, i.e. $L_t^c := \mathcal{M} - L_t$. Taste can be cultivated either directly, for sets consumed above the learning threshold, or indirectly, for sets that, though consumed below that threshold, enjoy the spillovers generated by the other.

We would expect different individuals and consumption sets to be characterized by varying opportunities for spillovers. For example, one would expect large spillovers between different forms of visual art consumption or sports requiring the same skills but virtually none between the two groups. To describe these situations we introduce a function $\theta: C \times C \rightarrow [0, +\infty)$ that represents a suitable measure of *familiarity*, i.e. the distance among consumption sets in the space of characteristics C^{11} and a *spillover function* $\varphi^{(m,n)} = \varphi^{(m,n)}(\theta, K)$, $0 \leq \varphi^{(m,n)} \leq 1$, describing the transferability of hedonic learning from consumption set n to set m , which we posit as monotonically decreasing in its first variable and strictly increasing in its second variable. In particular we reasonably assume that if $\theta = 0$ then $\varphi^{(m,n)}(0, \cdot) = 1$ and spillovers are complete, and when $\theta \rightarrow +\infty$ then $\lim_{\theta \rightarrow +\infty} \varphi^{(m,n)}(\theta, \cdot) = 0$ and there are no spillovers; moreover, $\frac{\partial \varphi^{(m,n)}}{\partial K} > 0$, i.e. human capital increases potential spillovers;

Let us hypothesize that at time t , $t \geq 0$, the creative set m is consumed below $\bar{x}^{(m)}$, i.e. $m \in L_t^C$, and that there exists at least one consumption set n consumed above $\bar{x}^{(n)}$, i.e. $n \in L_t$. Building on the previous formulation, we posit that the appreciation at time t of set m , in this case, is represented by the following function:

$$s_t^{(m)} := s_0^{(m)} + \left(\frac{t - \tau^{(m)}}{2} \right)^{\gamma^{(m)}} \cdot e^{-\frac{t - \tau^{(m)}}{\beta^{(m)}}} \cdot \max_{n \in L_t} \{ \varphi^{(m,n)} \} \quad (5)$$

where $\tau^{(m)} := \min \{ \bar{t}^{(n)} \geq 0 \mid \varphi^{(m,n)} > 0 \}$, i.e. $\tau^{(m)}$ is the first point in time at which the accumulation of consumption human capital begins to increase either indirectly via spillover or directly because set m begins to be consumed above the minimum exposure threshold $\bar{x}^{(m)}$.

We remark here that if there exists more than one consumption set, at time t , $t \geq 0$, consumed above the minimum exposure threshold, spillovers are generated by the closest set n to set m within the set of all available consumption sets \mathcal{M} . Therefore, in the presence of spillovers, the hedonic learning function, can be described as follows¹²:

¹¹ For instance, one may adopt the Euclidian distance in the space of characteristics C or a normalized measure of the distance between $C^{(m)}$ and $C^{(n)}$.

¹² We observe that this hedonic learning function can have a finite number of discontinuity points (no more than $M - 1$) which, according to our economic discussion, represent jumps of the hedonic learning function that can be generated in two different scenarios:

- (a4) when set m is consumed below the minimum exposure threshold $\bar{x}^{(m)}$ and (i) at the same time there is at least one set n consumed above the minimum threshold that generates incomplete spillovers, (ii) there exists a time $\bar{t}^{(p)}$, $\bar{t}^{(p)} > \bar{t}^{(n)}$, such that the consumer starts to consume another set p above the exposure threshold $\bar{x}^{(p)}$ and the latter generates more spillovers than set n ;
- (b4) when set m is consumed below the minimum exposure threshold $\bar{x}^{(m)}$ and (i) at the same time there is at least one set n consumed above the minimum threshold that generates incomplete spillovers, (ii) there exists a time $\bar{t}^{(m)}$, $\bar{t}^{(m)} > \bar{t}^{(n)}$, such that consumption $x^{(m)}$ reaches the threshold $\bar{x}^{(m)}$.

At these points of discontinuity, we conventionally assume that $\frac{\partial s^{(m)}}{\partial t} = +\infty$.

$$s_t^{(m)} := \begin{cases} s_0^{(m)}, & \text{if } L_t = \emptyset \\ s_0^{(m)} + \left(\frac{t - \tau^{(m)}}{2} \right)^{\gamma^{(m)}} \cdot e^{-\frac{t - \tau^{(m)}}{\beta^{(m)}}} \cdot \max_{n \in L_t} \{\varphi^{(m,n)}\}, & \text{if } L_t \neq \emptyset \end{cases} \quad (6)$$

We notice that the function in (6) is a more general case of the function defined in (3). As a matter of fact when $\tau^{(m)} = \bar{t}^{(m)}$, since $n = m$, then $\theta = 0$ and $\varphi^{(m,m)}(0) = 1$.

The intuition that learning from consumption exposure is local and that the accumulation of consumption human capital is specific finds support - e.g. the consumption of music - in the empirical evidence provided by Kurabayashi and Ito (1992) which show a positive correlation of demand between different types of music within genres and a negative one between genres.

The reasoning behind the idea that the distance in the space of characteristics is a good proxy for familiarity in consumption is that, through the accumulation of consumption human capital, individuals get to know the specific set and the combinations of characteristics of the goods they consume most; and that taste acquired through cultivation can be transferred only to those goods with similar sets and combinations of characteristics. An important implication of this is that, at least in the case of most creative goods, for preference formation information is a highly imperfect substitute for personal consumption exposure. Note that the idea of diminishing consumption spillovers, as portrayed here, has its counterpart in the property of diminishing sensitivity discussed by Kahneman and Tversky (1979) in their analysis of reference-dependent preferences: “The impact of a difference [between two consumption bundles, measured on a given dimension] is attenuated when both options are remote from the reference point for the relevant dimension” (Tversky and Kahneman 1990, p. 1040).

An interesting question is whether spillovers should be assumed symmetric i.e. $\varphi^{(m,n)} = \varphi^{(n,m)}$, or if, instead, they should be assumed to depend on the characteristics of sets and, specifically, on creativity. We contend that more creative sets generate larger spillovers, e.g. if set n is more creative than m , then $\varphi^{(m,n)} > \varphi^{(n,m)}$.

A suitable representation of a spillover function, embodying the previous properties, is the following:

$$\varphi^{(m,n)}(\theta, K) := \frac{1}{(1 + \lambda^{(m,n)}(K))^\theta} \quad (7)$$

where $\lambda^{(m,n)} = \lambda^{(m,n)}(K)$, $0 \leq \lambda^{(m,n)} \leq 1$, is a parameter that we suppose depending on the human capital K and measuring the capacity of consumption set n to generate spillovers in favour of set m . Building on the previous arguments, $\lambda^{(m,n)}$ is assumed to relate negatively to human capital and to the creativity of n , and positively to the specificity of human capital with respect to the characteristics of n .

2.2.3. Local learning and inter-temporal choices

It is now possible to predict the evolution of preferences conditional on initial choices and the associated hedonic learning regimes. Determining the characteristics of the initial process of selection is

essential in a world where consumption history matters¹³. It is worth repeating again that in our model freedom of choice does not imply that people can affect the learning process by redistributing consumption over time. Given the initial consumption choices, learning is generated autonomously above a given consumption thresholds.

The evolution of preferences is determined by two basic factors, the shape of the hedonic learning function of each consumption set and, in addition, the shape of the spillover function associated with each set belonging to L_t . In short, the information needed to generate and investigate the inter-temporal decision-making scenario is the set of functions $s^{(m)}$, $\forall m \in L$, and the set of spillover functions $\varphi^{(m,n)}$, $\forall m \in L_t$ and $\forall n \in L_t^C$.

Idiosyncratic learning also concerns the private information that is generated by consumption exposure and used to re-optimize the decision process over time. The latter information is necessary to up-date preferences. If one assumes local perfect foresight—than the maximization of happiness over the entire life requires marginal happiness to be equated across time. Hence, consumption must be redistributed over time to allocate efficiently¹⁴ the expected gains from creative consumption generated by the set of functions $s^{(m)}$, $\forall m \in L$. As one would expect, local perfect forecast yields locally optimal consumption profiles that are also globally optimal if one considers as given, income, prices and the ex ante endowment of consumption human capital.

Unfortunately, empirical evidence about people's ability to predict future preferences is quite discouraging for the supporters of perfect foresight and endures some sort of myopia (Lowenstein and Adler, 1995). This is not surprising if one considers that the object of cognitive learning is not an external entity such as, for example, the price of cars, but the physiological and psychological mechanisms internal to individuals. Experimental evidence on drugs consumption provides even stronger results. Individuals may take instantaneous decisions affecting their consumption history that are driven by their emotional sphere and that contrast with their rational perception of what is good for them (Bernheim and Rangel, 2004).

Here we assume that individuals have a perfect instantaneous perception of the building-up of such mechanisms but that they are unable to make forecast about the future evolution of the latter. This assumption allows us to adopt a static analytical setting.

We suppose that the choice at the beginning of adulthood, among consumption sets is determined through an optimization process based on full knowledge of consumption appreciation $s_0^{(m)}$ without exposure but no information on the future evolution of preferences. This process results in choosing the level of consumption of different sets, $x_0^{(m)}$ at time $t = 0$, that maximises a suitable *happiness function*. Similarly, at time $t > 0$ we posit that the consumption sets is generated by an optimization program of the *happiness function* based on full knowledge of the more general consumption appreciation $s_t^{(m)}$, too. Of course, in this last case it

¹³ The act of choosing has a positive component, the selection of something, but also a negative component, the exclusion of everything else! The consequences of the exclusion are, generally speaking, neglected in economics.

¹⁴ Of course, in the absence of liquidity constraints.

could be consumption exposure delivered either by the direct consumption of the M available sets either by spillovers.

The solution of the optimisation process leads in choosing the level of consumption of different sets $\{x_t^{*(1)}, x_t^{*(2)}, \dots, x_t^{*(M)}\}$ at time $t \geq 0$ that maximises the *happiness function*

$H_t = H(s_t^{(1)}, \dots, s_0^{(M)}, x_0^{(1)}, \dots, x_0^{(M)})$ defined as follows:

$$H(s_t^{(1)}, \dots, s_0^{(M)}, x_0^{(1)}, \dots, x_0^{(M)}) := \sum_{m=1}^M h^{(m)}(s_t^{(m)}, x_t^{(m)}). \quad (8)$$

Thus an individual selects consumption $\{x_t^{*(1)}, x_t^{*(2)}, \dots, x_t^{*(M)}\}$ at $t \geq 0$ given the M prices¹⁵ $p^{(1)}, p^{(2)}, \dots, p^{(M)}$ of all the available consumption sets and the exogenous income Y_c devoted to creative consumption that solves the following optimization program

$$\max_{x_0^{(1)}, x_0^{(2)}, \dots, x_0^{(M)}} \sum_{m=1}^M h^{(m)}(s_t^{(m)}, x_t^{(m)}) \quad \text{s.t.} \quad \begin{cases} x_t^{(1)} p^{(1)} + x_t^{(2)} p^{(2)} + \dots + x_t^{(M)} p^{(M)} = Y_c \\ x_t^{(m)} \geq 0, \quad m = 1, 2, \dots, M \end{cases} \quad (9)$$

Let us take $h_0^{(m)} = [s_0^{(m)} \cdot x_0^{(m)}]^\alpha$, $0 < \alpha < 1$, and for simplicity assume $M = 2$. Solving the optimisation problem (9) at time $t \geq 0$ with a zero time discount rate, we obtain the following standard demand functions:¹⁶

$$\begin{cases} x_t^{*(1)} = Y_c \frac{(p^{(2)} \cdot s_t^{(1)})^{\frac{\alpha}{1-\alpha}}}{p^{(1)} \left[(p^{(1)} \cdot s_t^{(2)})^{\frac{\alpha}{1-\alpha}} + (p^{(2)} \cdot s_t^{(1)})^{\frac{\alpha}{1-\alpha}} \right]} \\ x_t^{*(2)} = Y_c \frac{(p^{(1)} \cdot s_t^{(2)})^{\frac{\alpha}{1-\alpha}}}{p^{(2)} \left[(p^{(1)} \cdot s_t^{(2)})^{\frac{\alpha}{1-\alpha}} + (p^{(2)} \cdot s_t^{(1)})^{\frac{\alpha}{1-\alpha}} \right]} \end{cases} \quad (10)$$

Of course, the solution to the static optimisation problem does not correspond to the solution of the dynamic one. But, if one considers our assumptions as a more plausible story, i.e. a story more consistent with experimental evidence, the resulting equilibrium behaviour is not deprived of optimality properties. Indeed, it corresponds to the best one can do given the assumptions about the nature of information underlying idiosyncratic learning.

Here we can draw several insights into the expected behaviour in the initial stage of the individual life-cycle in the purchase of objective creativity¹⁷. First of all, we observe that hedonic learning is constrained by

¹⁵ The price of a set is a composite price of the goods embodied in the set.

¹⁶ Demand functions $x^{*(1)}$ and $x^{*(2)}$ could have a finite number of discontinuity points corresponding to the jumps in the hedonic learning functions. We conventionally assume that at those points $\frac{\partial x^{*(1)}}{\partial t} = +\infty$ and $\frac{\partial x^{*(2)}}{\partial t} = -\infty$ if the jumps concern function $s^{(1)}$, while $\frac{\partial x^{*(1)}}{\partial t} = -\infty$ and $\frac{\partial x^{*(2)}}{\partial t} = +\infty$ if the jumps concern function $s^{(2)}$.

¹⁷ Of course, the two-set case can be easily generalised.

income: given the solution of the optimisation problem (9), it can be easily verified that learning through consumption of set 1 and set 2 is allowed if and only if respectively:

$$Y_c \geq \bar{x}^{(1)} p^{(1)} \left[\left(\frac{p^{(1)} s_t^{(2)}}{p^{(2)} s_t^{(1)}} \right)^{\frac{\alpha}{1-\alpha}} + 1 \right] \quad (11)$$

and

$$Y_c \geq \bar{x}^{(2)} p^{(2)} \left[\left(\frac{p^{(2)} s_t^{(1)}}{p^{(1)} s_t^{(2)}} \right)^{\frac{\alpha}{1-\alpha}} + 1 \right]. \quad (12)$$

Now rank consumption sets by increasing objective creativity, so that if $n > m$ than set n is more creative than set m . It is reasonable to hold that, *ceteris paribus*, more creative sets must be consumed in larger quantities to generate hedonic learning, i.e. the minimum exposure thresholds are such that $\bar{x}^{(n)} > \bar{x}^{(m)}$. Furthermore we consider reasonable that $s_t^{(n)} \leq s_t^{(m)}$ and $p^{(n)} \geq p^{(m)}$, i.e. the value of the initial appreciation without exposure and the price of the more creative set n are respectively lower and higher than those of set m . In the case of $M = 2$, even in the borderline case in which $s_t^{(2)} = s_t^{(1)}$ and $p^{(2)} = p^{(1)}$, it can straight verified from (11) and (12) that the consumption set with greater objective creativity, set 2, requires more income to generate hedonic learning.

Second, due to the essential contribution of human capital to the appreciation of the more creative consumption sets at time $t = 0$, *ceteris paribus*¹⁸, individuals with inadequate K will be relatively more stringently rationed in purchasing of objective creativity and, thereby, a reduction (increase) in human capital K involves a reduction (increase) in demand for the more creative set 2 and an increase (a reduction) in demand for set 1. As a matter of fact it can be proved that¹⁹ $\frac{\partial x_0^{*(2)}}{\partial K} > 0$, and consequently $\frac{\partial x_0^{*(1)}}{\partial K} < 0$, if and only if $\eta_{s_t^{(2)}}(K) > \eta_{s_t^{(1)}}(K)$, and the latter inequality always holds if set 2 is more creative then set 1 by assumption (c3) in § 2.2. Hence, the more creative sets are likelier to be excluded from hedonic learning opportunities by income and human capital constraints.

In the general case, a non-trivial scenario is one where, at time $t = 0$, at least one set is consumed below and at least another one above the learning-generating threshold and spillovers are not complete, i.e. the spillover function assumes positive values less than 1.

In view of the characteristics of individuals and sets and their impact on the shape of, respectively, the hedonic and the spillover functions, the number of possible scenarios is large. The question one may wish to address is how the endogenous change in taste and other, exogenous, changes affect the opportunities for

¹⁸ That is, positing equal familiarity, with respect to human capital, of set 1 and set 2 (see point (b3) in § 2.2).

¹⁹ $\frac{\partial x_0^{*(2)}}{\partial K} = \frac{\partial x_0^{(2)}}{\partial s_0^{(2)}} \cdot \frac{\partial s_0^{(2)}}{\partial K} + \frac{\partial x_0^{(2)}}{\partial s_0^{(1)}} \cdot \frac{\partial s_0^{(1)}}{\partial K}$ and $\frac{\partial x_0^{*(1)}}{\partial K} = \frac{\partial x_0^{(1)}}{\partial s_0^{(1)}} \cdot \frac{\partial s_0^{(1)}}{\partial K} + \frac{\partial x_0^{(1)}}{\partial s_0^{(2)}} \cdot \frac{\partial s_0^{(2)}}{\partial K}$.

creative consumption and happiness over time. Several potential sources of change deserve to be investigated:

- (a5) endogenous changes, brought about by the simple passage of time, involving a pre-existing set of creative goods.
- (b5) exogenous change due to income or relative price changes;
- (c5) exogenous consumption innovations involving newly introduced creative goods that expand the opportunities to generate new consumption sets.

Given the specific aim of this paper, we leave out (c5) and discuss (a5) and (b5).

As far as endogenous changes are concerned, the consumption of creative sets and the corresponding happiness change through time according to the endogenous evolution of preferences determined by the hedonic functions. Individuals enjoy the fruits of hedonic learning and exploit differences in the rate of accumulation and depletion of consumption human capital by substituting one set for another. Such substitution is governed by changes in the marginal rates of substitution between sets within the spillover region. Demand for and happiness delivered by a set increase when consumption human capital accumulates and *vice versa*. Demand and happiness may show jumps and individuals suddenly start to enjoy the fruits of creative consumption.

Hence, happiness can follow different patterns depending on (i) the rates at which consumption human capital accumulates and depletes for different sets and individuals and (ii) the actual generation of spillovers. The resulting shape of the hedonic functions determines the shape of the happiness function, which may be either monotonically or non-monotonically increasing with respect to time. Notably, happiness may be steadily increasing, or it may have several peaks depending on the distribution of the gains from the accumulation of consumption human capital over time. Given subjective creativity, total life happiness is determined by the total amount of objective creativity available and accessible through the life-cycle to an individual.

Income changes bring about both standard and non-standard demand effects. The standard effect stems from the positive relation between demand and income: when income rises, so does demand for all goods. The non-standard effect occurs when, the increase in demand for set n , previously consumed below the learning threshold, activates hedonic learning for that set. In this case, as income rises, demand for set m may either increase or decrease, depending on how strong the hedonic learning effect is. Changing prices may lead to the same threshold effect.

What about the link between income and happiness over time? Of course, at each point in time, income has a positive effect on happiness in that it increases consumption and can activate hedonic learning. Conversely, over an individual life-cycle, constant income growth could prove insufficient to sustain non-decreasing happiness if the rates of depletion of consumption human capital are relatively high. When income rises at a constant rate, the condition for non-decreasing happiness can be easily derived by calculating the time derivative of the happiness function. Of course, one should expect that decreasing

happiness in the presence of increasing income will more likely occur at the later stages in individual life and in scarcely innovative environments.

Whenever income and price changes activate hedonic learning mechanisms sufficiently stronger than those experienced in the past, individuals may feel a particular form of regret²⁰ for previous choices and reverse his/her revealed preference. In fact, they may realize that more creative and feasible creative consumption sets were available in the past i.e., consumption sets yielding higher well being - even if valued at old income and relative price - than those actually experienced.

A large body of empirical evidence in different fields indicates that the satisfaction people derive from their experiences is influenced by their perception of what would have occurred had they made different choices. Even if our action was optimal given the information available *ex ante*, we nevertheless experience regret when we later discover that some other action would have made us better off (Kraahmer and Stone, 2005).

We assume that whenever regret occurs, happiness is reduced by an amount positively related to the perceived loss of well being²¹. The consumer can be likened to a mountain climber who, on his/her way towards the peak, surveys the landscape below and realizes that he/she could have chosen an easier way. Of course, owing to the informative constraints binding individuals and given their human capital K , nor regret neither preference reversal imply inefficient or inconsistent inter-temporal choices.

The model and the previous discussion provide useful insights about the characteristics of individuals and goods, that should be factored in empirical analysis of creative consumption. Although, an articulated discussion of the implications of the model for empirical analysis is behind the scope of this paper, nevertheless, it is worth stressing here that the type of education of consumers, their age and their parents' education, the type of good and their degree of objective novelty are important elements to be taken into account.

3. Positive economic freedom and happiness.

Leaving aside the psychological cost of regret, there is no reason to worry about the ability of people to choose in a free market economy. Given the endogenous *formation* and *evolution* of preferences, choices are always optimal. Hence, we would expect income and happiness to be positively correlated since there would be no reason to earn more if this brought about less happiness. After controlling for the effects on income, however, education will have a positive effect on happiness to the extent that (a) it allows people to make better choices in non-work activities and (b) people are free to choose among many activities and consumption options.

Unfortunately, as far as the impact of education on non-working activities is concerned, the story is not so simple. If we examine the distinction between the formation and evolution of preferences more closely, considering the powerful role of families in educational choices and in exposure to life experiences

²⁰ In this certainty context "regret" is used in a non-technical way.

²¹ It is worth emphasising here that the availability of a superior consumption life-style is not due to the new income/set of prices: the new income/set of prices allow to the consumers to recognizing this lost opportunity.

during childhood and adolescence, problems arise. Given their genes, individuals may acquire an *inefficient* level and type of education and may be exposed to *inappropriate* experiences, reducing their subjective creativity and, at later stages of life, their potential for creative consumption styles.

The strong intergenerational path dependence of educational choices is very well documented, suggesting that individual preferences are heavily affected by the preferences and socioeconomic constraints of their parents (Cuhna and Heckman, 2007; Heckman, Stixrud and Urzua, 2006), even more than by genetic factors. Empirical studies show that socioeconomic background is a strong predictor of the socioeconomic performance of individuals (work status, income, health, education, participation in crime etc.) and, therefore, of their happiness. Such conditioning mechanisms work through various channels, notably, the family income constraint, parents' expectations, parents' social networks and parents' education and life experience.

The single most important determinant of an individual's performance is the educational attainment of the parents, which affects the acquisition of those cognitive and non-cognitive skills that are responsible for socioeconomic performance both directly and indirectly. On the other hand, cognitive and non-cognitive abilities can be better exploited when individuals are freer to choose among available options, there are more options available, or both.

On these premises, we should find that happiness is affected, in a positive way, both by measured freedom and by educational attainment. The empirical evidence on the effects on happiness of various measures of freedom is mixed and suggests that countries' culture and economic development are major determinants (Veenhoven, 2000; Ovaska and Takashima, 2006). Economic freedom, i.e. the opportunity for exchange of goods and services, is the only freedom that is positively and strongly related with happiness.

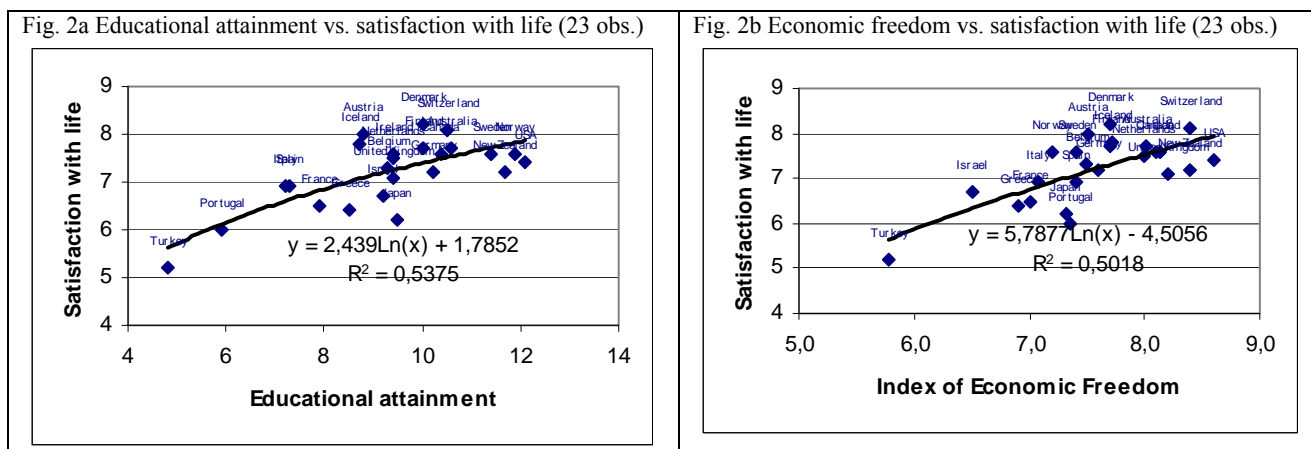
The data on the most advanced OECD countries, i.e. those affected by the *happiness paradox*, suggest that both economic freedom and education are important ingredients of satisfaction with life (Figures 2a and 2b; Data Sources: Educational attainment, OECD web site; Index of Economic Freedom, Fraser Institute's²² web site; Satisfaction with life, Veenhoven web's site).

Empirical studies indicate that the impact of education on happiness is not very clear and in some cases they imply that education reduces happiness. This may be due to cultural and institutional factors affecting educational choices and their connections with other dimensions of an individual's life (e.g. social status, social value of culture etc.). On statistical grounds, the weak or negative impact of education on happiness may conceal the fact that the socioeconomic performance indicators included in the models estimated (employment status, marital status, etc.) have already captured most of the impact of education, thus also implying problems for the reliability of the of the estimation techniques.

Our hypothesis is that education affects happiness to the extent that the skills that it provides (a) match an individual's genetic propensities and (b) are those required to exploit environmental opportunities. That

²² The index is based on measures of security of money, barrier to entrepreneurship, freedom from excess taxes, and freedom of money transfer.

is, the efficacy of education in delivering happiness depends on its efficacy in transforming potential options in actual consumption opportunities, i.e. in generating positive freedom.



We estimate a model of the determinants of happiness that includes, in addition to the standard controls (age, sex, education, income), environmental factors such as an index of creativity at province level, an index of socioeconomic infrastructure, per capita income and unemployment also at province level. We also added family background factors such as parent’s educational attainment, the assumption being that environmental creativity, socioeconomic infrastructure and income affect the options available to consumers and that, as Cuhna and Heckman (2007), the educational attainment of parents is an important predictor of abilities .

We believe that in this area of investigation, national data are better suited than international to empirical analysis, in that with the latter one cannot control for the cultural factors that affect individual attitudes and behaviour at national level.

3.1. The empirical strategy

The questions we want to answer are: does education really affect the ability to choose and, thereby, happiness in Italy and how does access to creative environments affect happiness?

Data are drawn from the Survey on Household Income and Wealth (SHIW), conducted by the Bank of Italy. The Survey began in the 1960s originally gathering data on the incomes and savings of Italian households. The scope broadened over the years to include wealth and other aspects of households' economic and financial behaviour and, since 2004, even a question on satisfaction with life. The sample in the most recent surveys comprises about 8,000 households distributed in 300 Italian municipalities and 103 provinces. Data on environmental factors are taken, respectively, from Florida and Tinaglia (2005) and from the Atlante database of Unioncamere (2006). To limit noise, in particular on income data, we extracted only data on employees.

Happiness is defined as, *the degree to which respondent rates positively, on a scale of 1 to 10, the overall quality of his or her present “life as a whole”*.

The model estimated is:

$$Happiness_{ij} = aX_i + bY_{ji} + cZ_i + \varepsilon_i \quad (13)$$

where happiness of individual “i” depends on a vector X_i of socio-demographic factors, a vector Z_i of family characteristics, a vector Y_i of environmental factors related province “j”, and ε_i is *normally and independently distributed*. The list of variables is:

A) Socio-demographic, subjective factors

- 1) Gender: the standard result is that women are happier than men.
- 2) Educational attainment: we include it as a proxy for both cognitive and non-cognitive abilities (Heckman, Stixrud and Urzua, 2006); the evidence on the effect of education is not clear.
- 3) Age: the available evidence suggests that happiness is U-shaped with a minimum in one’s forties.
- 4) Marital status: the standard result is that being married is much better than being single or divorced/separated/widow/widower.
- 5) Income: disposable income is a standard proxy for consumption opportunities.
- 6) Household size: in addition to allowing to control for disposable per capita family income, it should capture the existence of a direct effect of family size, as a form of consumption, on happiness.

B) Environmental factors

- 1) Creativity index at province level: is a composite index computed by Florida and Tinaglia (2005) based on three measures: Talent, Technology and Tolerance (table 1). Locations with higher scores on this indicator are expected to be both more attractive to “talented” people and also to offer advantages in terms of availability on new ideas, exchanges and information flows.

Table 1 –The Italian Creativity Index (Florida and Tinaglia, 2005)

Talent	<i>Creative class index</i>
	<i>Human capital index</i>
	<i>Number of researchers index</i>
Technology	<i>High-tech index</i>
	<i>Innovation index</i>
	<i>High-tech connectivity index</i>
Tolerance	<i>Diversity index</i>
	<i>Integration index</i>
	<i>Gay-tolerance index</i>

- 2) Local (province level) unemployment rate.
- 3) Local (province level) per capita disposable income.
- 4) Area: Nord, Centre, South and Islands.

We ordered probit model and OLS and they yield very similar results. In our discussion, we have selected the model with the best fit (Tables 3 and 4).

Table 2 Descriptive Statistics

	Mean	Std. Deviation	N
Happiness	7,21	1,644	1240
Age	44,49	9,242	1240
Incombe	16975,81	8224,577	1240
Creativity Index	,38960	,160868	1240
Single	,1565	,36343	1240
Divorced	,1105	,31362	1240
Widow/widower	,0387	,19298	1240
Female	,3089	,46221	1240
Elementary	,0879	,28327	1240
Primari	,3290	,47005	1240
Secondary	,4403	,49663	1240
Tertiary	,1387	,34578	1240
Creativity Index*schooling	4,1926	2,23299	1240

Table 3. Ordered Probit - Parameter Estimates

	Estimate	Std. Error	Wald	df	Sig.
[Happiness = 1]	-1,534	,540	8,066	1	,005
[Happiness = 2]	-1,313	,535	6,010	1	,014
[Happiness = 3]	-1,028	,532	3,727	1	,054
[Happiness = 4]	-,692	,531	1,698	1	,193
[Happiness = 5]	-,083	,530	,025	1	,875
[Happiness = 6]	,443	,530	,699	1	,403
[Happiness = 7]	1,183	,530	4,975	1	,026
[Happiness = 8]	2,017	,531	14,414	1	,000
[Happiness = 9]	2,540	,533	22,752	1	,000
Age	-,012	,003	12,655	1	,000
Income	1,46E-005	,000	12,235	1	,000
Creativity Index (ICI)	1,349	,628	4,609	1	,032
SchoolingICI	-,163	,054	9,212	1	,002
Single	-,455	,087	27,442	1	,000
Divorced/separated	-,605	,101	35,968	1	,000
Widow/widower	-,736	,162	20,776	1	,000
Female	,129	,073	3,143	1	,076
Elementary	,876	,473	3,432	1	,064
Primary	1,218	,478	6,484	1	,011
Secondary	1,724	,513	11,290	1	,001
Tertiary	1,799	,539	11,115	1	,001
Centre	,215	,092	5,470	1	,019
Nord	,230	,080	8,386	1	,004

Table 3a - Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	4571,718			
Final	4431,625	140,093	14	,000

Table 3b - Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	12312,454	11083	,000
Deviance	4423,307	11083	1,000

Table 3c - Pseudo R-Square

Cox and Snell	,107
Nagelkerke	,110
McFadden	,031

Table 4- OLS - Parameter estimates

	<i>Unstandardized coefficients</i>	<i>Std. error</i>	<i>Standardized coefficients</i>	<i>T</i>	<i>Sig.</i>
(Constant)	5,579	,809		6,894	,000
Age	-,018	,005	-,102	-3,428	,001
Income	2,37E-005	,000	,119	3,758	,000
Creativity Index (ICl)	2,015	,957	,197	2,106	,035
SchoolingICl	-,245	,082	-,333	-2,991	,003
Single	-,661	,132	-,146	-5,022	,000
Divorced/separated	-,907	,153	-,173	-5,929	,000
Widow/widower	-1,216	,246	-,143	-4,946	,000
Female	,201	,111	,057	1,813	,070
Elementary	1,309	,723	,226	1,810	,071
Primary	1,830	,731	,523	2,504	,012
Secondary	2,589	,783	,782	3,307	,001
Tertiary	2,669	,823	,561	3,244	,001
Centre	,295	,140	,077	2,108	,035
Nord	,333	,121	,101	2,751	,006

Table 4a - Anova

	Sum of Squares	df	Mean Square	F	Sig.
Regression	360,814	14	25,772	10,567	,000
Residual	2987,828	1225	2,439		
Total	3348,642	1239			

The coefficients are all highly significant (excepting “gender” and “elementary school”) and the signs are those expected (excepting “creativity*schooling”). Leaving aside the standard results on the effects of gender, age and marital status, the estimated impact of income on happiness is very low, in particular if compared to the impact of education. The creative consumption model may explain the negative monotonic relationship between happiness and age, as a result of an early exhaustion of consumption opportunities, a sign of the *tyranny of habituation* in older people. As expected, living in environments offering richer consumption opportunities has a large positive impact on happiness. Since the creativity index is related also

to the local endowment of human capital, it appears that, in addition to high private returns, there are also strong social returns to education in terms of happiness. Finally, the interpretation of the negative sign of the interaction between creativity and education is not clear: a plausible explanation of the latter outcome, consistent with the model, is that educational choices of more educated people are more oriented to exploit work than consumption opportunities.

4. Education policy and happiness.

Economists have traditionally been suspicious of endogenous tastes. But, in dealing with creative-goods this position appears untenable. A long time ago Harsanyi (1954, p. 213) wrote: "[...]to-day the *Economic Problem* of a community - whether of a highly industrialized community or of an unindustrialized backward one - does not consist merely in finding the best uses for its scarce resources so as to gratify people's actual wants to the highest possible degree. Rather, it includes also the question of how these scarce resources should be divided between productive operations for satisfying people's actual wants and measures for changing these wants. It must be decided again and again whether a given amount of resources benefits the consumers more if it is used for gratifying their present tastes in food, in housing, in music etc. - or it is used for educating these consumers' tastes, for altering their irrational likes and dislikes (whether these result from primitive superstitions or from 'civilized' prejudices), and for habituating them to new consumption goods".

In the language of the model of idiosyncratic learning, Harsanyi's *irrational likes* are the inferior ("bad") preferences that an individual may develop because of lack of appropriate cognitive and non-cognitive skills and hedonic exposure.

While in economics, inquiry into the origins of innate tastes is not legitimate, analysis of the acquisition of cognitive and non-cognitive abilities does fall within the discipline since it is affected by economic factors. In our present analytical setting such abilities play a central role in that they affect choices and hedonic learning mechanism. Education, in particular, affects:

- (a6) the skills that determine subjective creativity (the amount of skills and their matching with innate tastes);
- (c6) the generation of spillovers²³.

Education affects subjective creativity in two ways: (1) it improves the skills required to enjoying more creative consumption packages, i.e. packages characterized by more complex combinations of characteristics, and (2) it extends the set of characteristics one cares about as a consumer and that would otherwise be ignored. So education can modify tastes in favour of consumption packages that require more skills to be fully appreciated.

²³ From an analytical standpoint, in our model, statement (a6) means that education affects the value of $s_0^{(m)}$, and statement (b6) means that education affects the shape of the hedonic functions of respectively, (i) those packages consumed above the exposure threshold $x^{(m)}$, through the value assigned to the parameter $\beta^{(m)}$, and (ii) those packages consumed below the minimum exposure threshold $x^{(m)}$, through the values assigned to the parameters $\beta^{(m)}$ and $\lambda^{(m,n)}$.

As far as specificity of education is concerned, we would expect that:

(a7) more specific education determines higher rates of accumulation of consumption human capital in activities that require that specific type of education (this situation is obtained by assigning higher values to $\beta^{(m)}(K)$);

(b7) more specific education determines more localized spillovers (this effect can be obtained by assigning larger values to $\lambda^{(m,n)}(K)$)

Intuitively, there is an important trade-off for the individual between general and specific education, which the model accounts for. A more specific education increases the productivity of hedonic exposure in some directions, and hence it improves the subjective contribution to creativity, but at the cost of compressing future consumption flexibility²⁴, hence an individual's ability to enjoy the potential creativity of other packages. Conversely, general education, in addition to giving access to the appreciation of more creative goods, may reduce the risk of lock-in by extending the spillover region, i.e. the potential number of packages that can be affected by spillovers. For instance, ability to write and to read, acquired through primary education, is an essential general skill that is necessary to most human activities; by contrast, the ability to climb mountains is a specific skill that has only limited applications.

Another significant aspect of the trade-off is that general human capital, while generating larger spillovers, destroys part of the creativity of the packages that are consumed below the threshold and that benefit from spillovers. So, if at a later stage these packages come to be consumed above the threshold, a fraction of their potential creativity is irreversibly lost (see eq. 3).

The actual matching of education/skills with genetic endowment is an important feature of our model; notably, education should be designed to help people discover and develop their innate talents.

In conclusion, our model suggests that since an adequate endowment of education reduces the cost of buying superior preferences and happiness, the quantity and quality of education should be a major concern of economists and governments alike.

The model of idiosyncratic learning and the resulting taxonomy of agents/goods provide a simple framework for the analysis of education policies in a liberal society in the direction originally envisaged by Harsanyi (1954) and subsequently by Scitovsky (1992) and Layard (2003). The basic intuition is that, in the absence of appropriate actions, given local learning, individuals may come to want what they get from their environments rather than to get what they really would like. Moreover, they will tend to choose consumption patterns where the individual contribution as active consumer is small and repetition and habituation accordingly is more common (Layard, 2003).

In a liberal perspective, the rationale for policy action is that individuals - and their tastes - do not exist separate and apart from the education they receive. Unfortunately, young people - and the families making the relevant decisions - do not know which types of consumption skills and experiences they need in order to discover their *best* tastes, i.e. those long-run tastes that will maximize their happiness. Lacking such a knowledge, the most efficient strategy is to educate people to be active consumers. This means expanding

²⁴ On the flexibility of future preferences, see e.g. Koopmans, 1964.

the individual's opportunities to learn what she/he may like or, alternatively, to reduce the probability of excluding, at an early stage in life, something he/she may like very much in the future. Indeed, this should be the central purpose of a liberal approach to education centring on individuals.

In the past, the idea that the government should support education has been broadly accepted in economics in connection with the view that human capital is fundamental to technical progress and productivity growth. During the last two centuries or so, access to primary and secondary education has been promoted as a means to enhancing the opportunities of individuals as producers not consumers. This view of the social purpose of school curricula and of education, is discussed in general by Bowles, Gintis and Osborne (2001). They argue that education is designed to generate the kind of incentive-enhancing preferences that are required in work. This instrumental view may have been justified when the priority was material happiness. Today, however, it needs revision in the light of the fact that in the advanced countries, education can improve welfare mostly by providing access to superior consumption technologies and other socioeconomic outcomes.

From a policy perspective, the problem can be described as follows. Inferior preferences cost less in that they are intensive in relatively cheap characteristics, i.e. they do not require much investment in education; conversely, the superior preferences required to enjoy creative consumption are costly (intensive in relatively expensive characteristics whose price can be reduced only by investing in education).

Actually, given their innate tastes, individuals would prefer consumption styles characterized by the widest opportunities for creativity over those based on moderate creativity and habituation. This is due to the fact that, given innate tastes, total life happiness is monotonically increasing in the amount of creativity we enjoy, whereas it may turn out not to be increasing in income if not much creativity is available²⁵. There are two main questions one should address in this context:

- (i) How can people's bias against acquiring the skills needed to consume creative goods and to be more flexible in consumption, i.e. to enjoy a better quality of life, be rational?
- (ii) How can government help people to obtain a better quality of life without adopting a paternalistic attitude?

The rational bias against the acquisition of superior consumption skills (Scitovsky, 1992) can be explained by lack of economic incentives. While the costs of acquiring skills, in terms of time and effort, are known with certainty, the benefits are uncertain. Moreover, individuals prefer to invest in the specific skills necessary in the labour market, which have a more certain return but that may be not suitable for consumption activities: "Going to school to acquire a skill, whether the process itself is pleasant or unpleasant, is an investment which yields a return - additional income in the case of production skills, the better enjoyment of life in the case of consumption skills. Estimates of the return on investment in professional and vocational training can be made and are available; nothing even remotely comparable is possible with respect to consumption skills. One cannot attach a dollar value to the skill of enjoying a concert or a ballet, even less can one estimate the time needed for or the chance of ever turning a neophyte into an

²⁵ Hence, the model suggests that age and, therefore, the demographic composition of a population are fundamental explanatory variables of measured happiness.

enthusiastic melomane or balletomane through training and practice." (Scitovsky, 1992, p. 231). This may explain why, in the past, aristocracy living on rents had greater incentives to acquire consumption skills than the new business aristocracies of the advanced market economies. Consequently, the emerging propensity to focus school curricula to short-term labour market should be reconsidered and a less instrumental approach to education adopted²⁶.

Another reason to expect a rational bias against investing in consumption skills is myopia and risk aversion: the higher is the rate of time preference/risk aversion, the smaller the incentive to acquire skills whose returns occur far into the future and are uncertain.

The room for welfare-improving actions is evident and regards all those measures that may reduce the cost of buying superior preferences requiring consumption skills. Indeed, these measures should focus mainly on the large group of individuals who are most lacking in the opportunities to develop dynamically superior preferences because:

(a8) they lack the skills for enjoying creative consumption, i.e. they lack the opportunity to acquire the necessary skills;

(b8) they lack experience, i.e. they have little opportunity to be *exposed* to creative consumption;

(c8) they are impatient, i.e. they have high rates of time preference.

The potential dynamic gains of such policies, which are deeply rooted in a liberal approach, are very large and would appear to compensate for the distortions that might be induced by policy action²⁷, i.e. to raise revenues to finance educational policies. Advocates of economic freedom would argue that policy actions could be happiness-decreasing given the trade-off between economic freedom and positive freedom. However, if education-elasticity of happiness is higher than its income-elasticity, taxing people to finance early education would appear to be an efficient measure, at least in Italy. On more general grounds, economic analysis suggests that when policy measures to improve cognitive and non-cognitive abilities are implemented very early in life there are no resource trade-offs (Heckman and Jacobs, 2006).

Let us emphasize in this context policies should not aim to impose the acquisition of very specific skills. Conversely, given that innate tastes are distributed homogeneously across individuals belonging to different social and economic groups but that the opportunities²⁸ to acquire skills or be acquainted with different types of consumption are not so evenly distributed, education policy should aim to expand the opportunities of all individuals to choose the dynamically superior life-style and to amend consumption mistakes²⁹. In particular, redistribution based on progressive taxation should aim to favour education-rationed families by providing cultural goods and education.

²⁶ On more general grounds, an important by-product of education is that, by inducing behavioural flexibility, it reduces the private as well as the social cost of uncertainty. The advantages of a more flexible society are not confined to consumption activity and closely concern the production as well. In particular, the labour market would benefit from more flexible individuals.

²⁷ Scitovsky (1992 p. 105) seems to address this issue when he suggests: "The performance of an economy cannot be judged by the size, growth and distribution of the national product alone. As important, or perhaps, more important, is the economy's ability to produce the economic product with a maximum of beneficial and a minimum of harmful accompanying side effects": within the set of Scitovsky's *beneficial side effects*, one should include the increasing returns stemming from the consumption of creative goods.

²⁸ The lack of opportunities is not necessarily associated with low incomes.

²⁹ As such, they are mainly destined to the new generations of individuals rather than to adults who have already developed their psychological identity and preferences.

Although a detailed analysis of the policy tools is not within the scope of this paper - it would require separate treatment - nevertheless, policy guidelines and criteria that emerge from the model, can be discussed here. First of all, different policy instruments should be designed to improve the acquisition of the skills required and also to provide opportunities for direct exposure to creative consumption. A mix based of education, direct provision of creative goods, and selective price incentives could be an effective means to improve the decision making process of the individuals involved, i.e. young people and their families. And, education policy should be the core of this mix. In particular, education policy should not only aim at the acquisition of the abilities required to process information autonomously and to communicate efficiently in a complex society but also at the development of the basic skills in liberal arts, i.e. aesthetic education and other creative consumption activities requiring specific skills.

Second, the acquisition of these skills is a necessary condition for the consumption of creative goods: the direct provision of the latter or the provision of economic incentives that reduce their market price could easily be ineffective, and may result in a waste of public money, failing adequate investment in consumption skills. Third, appropriate mix between general and specific skills is a critical issue in that specific skills may generate excessive rigidity³⁰ while general skills could result in excessively quick consumption of the available stock of novelty.

5. Summary and conclusions

A standard assumption of economics is that the evolution of preferences is a smooth process governed by innate preferences and perfect foresight (e.g. Becker and Murphy, 1988). This hypothesis stresses the role of economic freedom as a condition for happiness. However, in arguing for self-determination as the basis for methodological individualism one cannot ignore: a) the impossibility of choosing one's parents; b) the inability of parents to borrow against their children's future income to invest in them; c) the inability of parents to borrow against their own income to finance investments in their children (Cunha and Heckman, 2007, p.1) and, finally, d) the inability of a child to choose social environment.

Psychology and neurosciences suggest that most of the cognitive and non-cognitive skills behind preferences and choices are acquired by the age of 20, or so, when the prefrontal cortex is still malleable. Thus, they do not depend only on genetic endowment but they are determined by choices made mostly by other individuals, i.e. parents, and are influenced by the environment in which the child grows up.

On these premises, we show that individuals may involuntarily under-develop preferences that require high consumption skills, which are needed to appreciate more creative consumption styles, mostly due to skill and income constraints.

Owing to the essential role played by education and exposure to consumption, during childhood, in the formation of preferences and the acquisition of skills, we argue that appropriate education policies may increase the potential for creative consumption. Within such a policy framework, the most desirable property of any practical measure is efficacy in helping people to discover their talents.

³⁰ As we noted in passing, this is relevant to the design of appropriate school curricula for the job market as well.

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