

“Cultural Transmission:” Alberto Bisin and Thierry Verdier

The economic literature analyses cultural transmission as the result of interactions between purposeful socialization decisions inside the family (‘direct vertical socialization’) and indirect socialization processes like social imitation and learning (‘oblique and horizontal socialization’). This article reviews the main contribution of these models from theoretical and empirical perspectives. It presents the implications regarding the long-run population dynamics of cultural traits, and discusses the links with other approaches to cultural evolution in the social sciences as well as in evolutionary biology. Applications to economic problems are also briefly surveyed.

Preferences, beliefs, and norms that govern human behaviour are partly formed as the result of genetic evolution, and partly transmitted through generations and acquired by learning and other forms of social interaction. The transmission of preferences, beliefs and norms of behaviour which is the result of social interactions across and within generations is called *cultural transmission*. Cultural transmission is therefore distinct from, but interacts with, genetic evolution.

Cultural transmission is an object of study of several social sciences, such as evolutionary anthropology, sociology, social psychology, and economics, as well as of evolutionary biology. The theoretical contributions of Cavalli-Sforza and Feldman (1981) and Boyd and Richerson (1985), who apply models of evolutionary biology to the transmission of cultural traits, as well as the empirical study of cultural socialization in American schools by Coleman (1988), had a great multidisciplinary impact. Recently, economists have also studied the determination and the dynamics of preferences, beliefs, norms and, more generally, cultural and cognitive attitudes.

Cultural transmission arguably plays an important role in the determination of many fundamental preference traits, like discounting, risk aversion and altruism. It plays a central role in the formation of cultural traits and norms, like attitudes towards the family and fertility practices, and in the job market. It is, however, the pervasive evidence of the resilience of ethnic and religious traits across generations that motivates a large fraction of the theoretical and empirical literature on cultural transmission. For instance, the fast assimilation of immigrants into a ‘melting pot’, which many social scientists predicted until the 1960s (see, for example, Gleason,

1980, for a survey), simply did not materialize. Moreover, the persistence of ‘ethnic capital’ in second- and third-generation immigrants has been documented by Borjas (1992), and recently also by Fernandez and Fogli (2004) and Giuliano (2005) for norms of behaviour regarding, respectively, fertility practices and living arrangements. Orthodox Jewish communities in the United States constitute another example of the strong resilience of culture (see Mayer, 1979, and the discussion of a ‘cultural renaissance’ rather than the complete assimilation of Jewish communities in New York in the 1970s). Outside the United States, Basques, Catalans, Corsicans, and Irish Catholics in Europe, Quebecois in Canada, and Jews of the diaspora have all remained strongly attached to their languages and cultural traits even through the formation of political states which did not recognize their ethnic and religious diversity.

Models of cultural transmission have implications regarding the determinants of the persistence of cultural traits and more generally regarding the population dynamics of cultural traits. In the economic literature in particular, cultural transmission is modelled as the result of purposeful socialization decisions inside the family (‘direct vertical socialization’) as well as of indirect socialization processes like social imitation and learning (‘oblique and horizontal socialization’). Therefore, the persistence of cultural traits or, conversely, the cultural assimilation of minorities is determined by the costs and benefits of various family decisions pertaining to the socialization of children in specific socio-economic environments, which in turn determine the children’s opportunities for social imitation and learning.

Evolutionary biology models

L. Cavalli-Sforza and M. Feldman are the first to formally study the transmission of cultural traits. Their formal models are adopted from evolutionary biology. In a baseline version of these models, they obtain a simple differential equation which describes the population dynamics of cultural traits. Consider the dynamics of a dichotomous cultural trait in the population; formally, a fraction q^i of the population has trait i , and a fraction $q^j = 1 - q^i$ has trait j . Families are composed of one parent and a child, and hence reproduction is asexual. All children are born without defined preferences or cultural traits, and are each first exposed to their parent’s trait, which they adopt with probability d^i . If a child from a family with trait i is not directly

socialized, which occurs with probability $1-d^i$, he or she picks the trait of a role model chosen randomly in the population (that is, he or she picks trait i with probability q^i and trait j with probability $1-q^i$). Therefore, the probability that the child of parents of trait i will also have trait i is $\Pi^{ii} = d^i + (1-d^i)q^i$; while the probability that he or she will have trait j is $\Pi^{ij} = (1-d^i)(1-q^i)$. It follows that the dynamics of the fraction of the population with trait i , in the continuous time limit, is characterized by:

$$\dot{q}^i = (d^i - d^j)q^i(1-q^i) \quad (1)$$

The dynamics that equation (1) describes implies that the distribution of cultural traits in the population converges to a degenerate distribution concentrated on trait i whenever $d^i > d^j$ (and on trait j when $d^i < d^j$), while any initial distribution is stationary in the knife-edge case in which $d^i = d^j$. This model therefore predicts the complete assimilation of the trait with weaker direct vertical socialization. Moreover, it predicts faster assimilation for smaller minorities. Both predictions are at odds with the documented strong resilience of cultural traits discussed above. Cavalli-Sforza and Feldman show how these extreme predictions can be relaxed by considering other effects like mutations, migrations and horizontal cultural transmission among peers. Boyd and Richerson (1985) in turn extend the analysis of Cavalli-Sforza and Feldman (1981) by considering forms of direct vertical socialization called *frequency dependent* biased transmission, which depend on the distribution of the population by cultural trait. Formally, they allow d^i to be a function of q^i .

Bisin and Verdier (2001a) study the same differential equation for the population dynamics of cultural traits, with the objective of characterizing the conditions which give rise to culturally heterogeneous stationary distributions, that is, limit population with a positive fraction of either cultural trait, $0 < q^i < 1$. They show that the crucial determinant of the composition of the stationary distribution consists in whether the socio-economic environment (oblique socialization) acts as a substitute or as a complement to direct vertical socialization. More precisely, when direct vertical socialization and oblique transmission are *cultural substitutes*, parents by definition socialize their children less the more widely dominant are their cultural traits in the population. In such a case, $d^i(q^i)$ is a strictly decreasing function in q^i , and in the long run a non-degenerate stable stationary distribution exists. It is characterized by a

q^i such that the direct vertical socialization of the two cultural types are equalized (that is, $d^i(q^i) = d^j(1 - q^i)$). Intuitively, when family and society are substitutes in the transmission mechanism, in fact families socialize children more intensely whenever the set of cultural traits they wish to transmit is common only to a minority of the population. Conversely, families which belong to a cultural majority spend fewer resources directly socializing their children, since their children adopt or imitate with high probability the predominant cultural trait in society at large, which is the one their parents desire for them. *Cultural substitutability* tends to preserve cultural heterogeneity in the population because in this case minorities directly socialize their children more than majorities. The other typical situation is the opposite one in which direct vertical transmission is a *cultural complement* to oblique transmission; that is, when parents socialize their children more intensely the more widely dominant is their cultural trait in the population. In such a case, $d^i(q^i)$ is a strictly increasing function in q^i and in the long run the dynamics converges to a culturally homogeneous cultural population (with either $q^i = 0$ or $q^i = 1$ depending on the initial distribution).

Economic models of cultural transmission

Economic models of cultural transmission induce testable restrictions on the form of the function $d^i(q^i)$. In their baseline specification, for instance, Bisin and Verdier (2001a) assume that parents are altruistic towards their children and hence might want to socialize them to a specific cultural model if they think this will increase their children's welfare. If we let V^{ij} denote the utility to a type i parent of a type j child, $i, j \in \{a, b\}$, the formal assumption is

$$\text{for all } i, j \text{ with } i \neq j, V^{ii} > V^{ij}$$

This assumption, called *imperfect empathy*, can be interpreted as a form of myopic or paternalistic altruism. Parents are aware of the different traits children can adopt and are able to anticipate the socio-economic choices a child with trait i will make in his or her lifetime. However, parents can evaluate these choices only through the filter of their own subjective evaluations and cannot 'perfectly empathize' with their children. As a consequence of imperfect empathy, parents, while altruistic, tend to prefer children with their own cultural trait and hence attempt to socialize them to this trait. (Some justifications of imperfect empathy from an evolutionary perspective are

provided by Bisin and Verdier, 2001b. The assumption can be relaxed, as for example in Sáez-Martí and Sjögren, 2005.) Assume socialization is costly and let costs be denoted by $C(d^i)$. Parents of type i then choose d^i to maximize:

$$-C(d^i) + (\Pi^i V^i + \Pi^j V^j) \quad (2)$$

$$s.t. \Pi^i = d^i + (1 - d^i)q^i, \quad \Pi^j = (1 - d^i)(1 - q^i) \quad (3)$$

Under standard assumptions, the solution to this problem provides a continuous map $d^i = d(q^i, \Delta V^i)$, where $\Delta V^i = V^i - V^j$ is the subjective utility gain of having a child with trait i . It reflects the degree of ‘cultural intolerance’ of type i ’s parents with respect to cultural deviations from their own trait. Given imperfect empathy on the part of parents, $\Delta V^i > 0$. The dynamics of the fraction of the population with cultural trait i is then determined by equation (1) evaluated at $d^i(q^i) = d(q^i, \Delta V^i)$. It is straightforward to demonstrate that this class of socialization mechanisms generates cultural substitutability and therefore the preservation of cultural heterogeneity. Other micro-founded specifications and examples are provided in Bisin and Verdier (2001a), some of which illustrate the contrary possibility of cultural complementarity and the tendency of cultural homogenization over time.

Direct socialization mechanisms and socio-economic interactions.

Several specific choices contribute to direct family socialization and hence to cultural transmission. Prominent examples are education decision, family location decisions, and marriage choices. While education choices have been studied by Cohen-Zada (2004), and marriage choices by Bisin and Verdier (2000), the literature has to date shown little interest in the socialization effects of location choices, for instance, the socialization effects of urban agglomeration by ethnic or religious trait.

The simple analysis of the economic model of cultural transmission of Bisin and Verdier depends crucially on the assumption that the utility to a type i parent of a type j child, V^j is independent of the distribution of the population by cultural trait, that is, independent of q^i . Many interesting analyses of cultural transmission require this assumption to be relaxed. In many instances the adoption of the cultural trait of the majority in fact favours children, for example in the labour market; a typical example is language adoption. In this case altruistic parents, even if paternalistic, might favour (or discourage less intensely) the cultural assimilation of their children. If we allow

for interesting socio-economic effects interacting with the socialization choices of parents, the basic cultural transmission model of Bisin and Verdier has been applied to several different environments and cultural traits and social norms of behaviour, from preferences for social status (Bisin and Verdier, 1998) to corruption (Hauk and Sáez-Martí, 2002), hold-up problems (Olcina and Penarubbia, 2004), development and social capital (François, 2002), inter-generational altruism (Jellal and Wolf, 2002), labour market discrimination (Sáez-Martí and Zenou, 2005), globalization and cultural identities (Olivier, Thoenig and Verdier, 2005), and work ethics (Bisin and Verdier, 2005).

Empirical analysis of cultural transmission models

While an interesting literature has documented the relevance of cultural factors in several socio-economic choices, much less is known about cultural transmission per se. Nonetheless, several important questions are beginning to be answered. First of all, several important correlations have been documented in sociology, in particular with regard to the role of marriage in socialization (see, for instance, Hayes and Pittelkow, 1993; Ozorak, 1989; Heaton, 1986). The literature in economics has instead concentrated more specifically on the direct empirical validation of the economic approach to cultural transmission surveyed above, thereby estimating the relative importance of direct and oblique socialization for different specific traits and the prevalence of cultural substitution or complementarity in specific socio-economic environments. Patacchini and Zenou (2004) find evidence of cultural complementarity in education in the United Kingdom. Cohen-Zada (2004) finds instead for the United States that the demand for private religious schooling decreases with the share of the religious minority in the population, in accord with cultural substitution. Fernandez, Fogli and Ottaviani (2003) find evidence of an important role for mothers in the transmission to their sons of attitudes favouring the participation of women in the labour force and acquisition of higher education. Finally, Bisin, Topa and Verdier (2004a), using the General Social Survey data for the United States over the period 1972–96, estimate for religious traits the structural parameters of the model of marriage and child socialization in Bisin and Verdier (2000). They find that observed intermarriage and socialization rates are consistent with Protestants, Catholics and Jews having a strong preference for children who identify with their own religious beliefs, and taking costly decisions to influence their children's religious beliefs. The

estimated ‘relative intolerance’ parameters are high and asymmetric across religious traits, suggesting an interestingly rich representation of ‘cultural distance’.

Genetic and cultural evolution

Cultural transmission possibly has a role also in the determination of fundamental preference parameters, such as time discounting, risk aversion, altruism, and interdependent preferences. Purely evolutionary models have been complemented by alternative models of cultural transmission and genetic and cultural co-evolution. The wealth of different approaches proposed is best exemplified by the study of preferences for cooperation. The observation that humans often adhere to collectively beneficial actions which are not in their private interest (or which are not rationalizable as strategic equilibria) has led to a theoretical literature explaining how psychological ‘preferences for cooperation’ can be sustained in the context of genetic and/or cultural evolution (this is called the *puzzle of pro-sociality* by Gintis, 2003a). For instance, in the context of the Prisoner’s Dilemma, Becker and Madrigal (1995) exploit the ability of habits to induce preferences; Guttman (2003), Stark (1995), and Bisin, Topa and Verdier (2004b) show how cooperation can be sustained by different modes of cultural evolution; Gintis (2003b) shows that a general capacity to internalize fitness-enhancing norms of behaviour can be genetically adaptive, and hence that cooperation can also be internalized by ‘hitchhiking’ on this general capacity.

The empirical evidence on the nature–nurture debate (see Ceci and Williams, 1999, for a review) has not yet been systematically taken to the point of distinguishing the genetic from the cultural factors in the determination of fundamental preference parameters. Similarly, the empirical evidence distinguishing the different cultural transmission models of fundamental preference traits is almost non-existent. The only exception is by Jellal and Wolff (2002), who study the implication of the pattern of *inter vivos* transfers within the family in France for the transmission of inter-generational altruism. They argue that the evidence is more consistent with a cultural transmission model such as that of Bisin and Verdier (2001a) rather than with a ‘demonstration effect’ model, as in Stark (1995), where parents take care of their elders in order to elicit similar behaviour in their children.

See also culture, economics and; identity; social interaction, empirics of

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