

Cultural Transmission

Prepared for the *New Palgrave Dictionary of Economics*, Second Edition

Alberto Bisin
NYU
alberto.bisin@nyu.edu

Thierry Verdier
PSE and CEPR
verdier@pse.ens.fr

June 2005

Abstract

The economic literature analyzes 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 paper reviews the main contribution of these models from a theoretical and empirical perspective. 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.

Introduction. Preferences, beliefs, and norms that govern human behavior are formed partly as a the result of genetic evolution, and partly they are transmitted through generations and acquired by learning and other forms of social interactions. The transmission of preferences, beliefs, and norms of behavior 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, e.g., evolutionary anthropology, sociology, social psychology, economics, as well as of evolutionary biology. The theoretical contributions of Cavalli Sforza-Feldman (1981) and Boyd-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 multi-disciplinary 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, towards 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 1960's (see e.g. 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 (1995); and recently by Fernandez-Fogli (2004) and Giuliano (2005) for norms of behavior regarding, respectively, fertility practices and living arrangements. Orthodox Jewish communities in the U.S. 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 NY in the 70s). Outside the U.S., Basques, Catalans, Corsicans, Irish Catholics, in Europe, Quebecois in Canada, 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, on the contrary, 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 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/she picks the trait of a role model chosen randomly in the population (i.e., he/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/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 which we discussed in the Introduction. Cavalli Sforza and Feldman show how these extreme predictions can be relaxed considering other effects like mutations, migrations and horizontal cultural transmission among peers. Boyd-Richerson (1985) in turn extend the analysis of Cavalli Sforza-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-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 consist in whether the socio-economic environment (oblique socialization) acts as a substitute or as a complement to direct vertical socialization. More precisely, direct vertical socialization is viewed as a *cultural substitute* to oblique transmission whenever parents socialize less their children the more widely dominant are their cultural trait 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 (i.e., $d^i(q^i) = d^j(1 - q^i)$). 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. On the contrary, families which belong to a cultural majority spend less resources directly socializing their children, since their children adopt or imitate with high probability the cultural trait most predominant 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 on the contrary, is one in which direct vertical transmission is a *cultural complement* to oblique transmission, namely when parents socialize their children more intensely the more widely dominant 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-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. Letting 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-economics choices a child with trait i will make in his /her lifetime. However parents can only evaluate these choices 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 at socializing them to this trait.¹ Assume socialization is costly and let costs be denoted by $C(d^i)$. Parents of type i then choose d^i to maximize :

$$-C(d^i) + (P^{ii}V^{ii} + P^{ij}V^{ij}) \quad (2)$$

$$s.t \quad \Pi^{ii} = d^i + (1 - d^i)q^i, \quad \Pi^{ij} = (1 - d^i)(1 - q^i) \quad (3)$$

Under standard Assumptions, the solution to this problem provides a continuous map $d^i = d(q^i, \Delta V^i)$, where $\Delta V^i = V^{ii} - V^{ij}$ is the subjective utility gain of having a child

¹Some justifications of imperfect empathy from an evolutionary perspective is provided by Bisin-Verdier (2001b). The assumption can be relaxed, as e.g., in Saez Marti'-Sjogren (2005).

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 long cultural heterogeneity. Other micro-founded specifications and examples are provided in Bisin-Verdier (2001a), some of which illustrating on the contrary the possibility of cultural complementarity and the tendency for cultural homogenization overtime.

Direct socialization mechanisms and socio-economic interactions.

Several specific choices contribute to direct family socialization and hence to cultural transmission. Prominent examples are e.g., education decision, family location decisions, and marriage choices. While education choices have been studied by Cohen-Zada (2004), and marriage choices by Bisin-Verdier (2000), the literature has shown to date little interest for the socialization effects of location choices, that is, for instance, for 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^{ij} is independent of the distribution of the population by cultural trait, that is, independent of q^i . Many interesting analysis of cultural transmission require that this assumption be relaxed. In many instances the adoption of the cultural trait of the majority in fact favors children, e.g., in the labor market; a typical example is language adoption. In this case altruistic parents, even if paternalistic, might favor (or discourage less intensely) the cultural assimilation of their children. Allowing 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 behavior, from preferences for social status (Bisin-Verdier, 1998), to corruption (Hauk-Saez Marti, 2002), hold up problems (Olcina-Penarubbia, 2004), development and social capital (François, 2002), intergenerational altruism (Jellal-Wolf, 2002), labor market discrimination (Saez Marti-Zenou, 2004), globalization and cultural identities (Olivier-Thoenig-Verdier, 2005), work-ethics (Bisin-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 on cultural transmission per se. Nonetheless, several important questions are beginning to be answered. First or all, several important correlations have been documented in Sociology, in particular with regard to the role of marriage in socialization (see for instance Hayes-Pittelkow (1993), Ozorak (1989) and Heaton (1986)). The literature in Economics has instead concentrated more specif-

ically 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-Zenou (2005) find evidence of cultural complementarity in education in the U.K. Cohen-Zada (2004) finds instead for the U.S. that the demand for private religious schooling decreases with the share of the religious minority in the population, accordingly with cultural substitution. Fernandez-Fogli-Ottaviani (2003) find evidence of an important role of mothers in the transmission to their sons of attitudes favoring the participation of women in the labor force and acquisition of higher education. Finally, Bisin-Topa-Verdier (2004a), using the GSS survey data for the US over the period 1972-1996, estimate for religious traits the structural parameters of the model of marriage and child socialization in Bisin-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 has possibly a role also in the determination of fundamental preference parameters like e.g., time discounting, risk aversion, altruism, 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-Madrighal (1995) exploit the ability of habits to induce preferences; Guttman (2003) Stark (1995), and Bisin-Topa-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 behavior 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-Williams, 1999 for a review) has not yet been systematically taken to attempt distinguishing the genetic from the cultural factors in the determination of fundamental preference parameters. Similarly, the empirical evidence aiming at distinguishing the different cultural transmission models of fundamental preference traits is almost non-existent. The only exception is Jellel-Wolff (2002), which study the implication of the pattern of inter-vivos transfers

within the family in France for the transmission of inter-general altruism. They argue that the evidence is more consistent with a cultural transmission model as Bisin-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 behavior in their children.

References

1. G. Becker and V. Madrigal (1995), “On Cooperation and Addiction,” mimeo, University of Chicago, 1995.
2. Bisin A and T. Verdier, (1998), ‘On the Cultural Transmission of Preferences for Social Status’, *Journal of Public Economics* 70, 75-97.
3. Bisin A. and T. Verdier, (2000), ‘Beyond the melting pot: cultural transmission, marriage and the evolution of ethnic and religious traits, *Quarterly Journal of Economics*, CXV, 955-88.
4. Bisin, A. and T. Verdier (2001a): ‘The Economics of Cultural Transmission and the Dynamics of Preferences,’ *Journal of Economic Theory*, 97, 298-319.
5. Bisin A. and T. Verdier, (2001b), ‘Agents with imperfect empathy might survive natural selection,’ *Economics Letters*, 2, 277-85
6. Bisin A., G. Topa and T. Verdier (2004a), ‘Religious Inter-marriage and Socialization in the United States,’ *Journal of Political Economy*, 112, 3, 615-664.
7. Bisin A., G. Topa and T. Verdier (2004b), ‘Cooperation as a Transmitted Cultural Trait,’ *Rationality and Society*, 16: 477-507.
8. Bisin A. and T. Verdier (2005), ‘Work Ethic and Redistribution: A Cultural Transmission Model of the Welfare State,’ mimeo, NYU.
9. Borjas, G. (1992): ‘Ethnic Capital and Intergenerational Income Mobility,’ *Quarterly Journal of Economics*, 57, 123-50.
10. Boyd, R. and P. Richerson (1985): *Culture and the Evolutionary Process*, Chicago, University of Chicago Press.
11. Cavalli-Sforza, L. and M. Feldman (1981): *Cultural Transmission and Evolution: A Quantitative Approach*, Princeton, Princeton University Press.
12. Ceci S. and W. Williams, (1999), *The Nature-Nurture Debate: The Essential Readings*, Oxford, Blackwell.

13. Cohen-Zada, D. (2004), 'Preserving Religious Identity Through Education: Economic Analysis and Evidence from the U.S.,' mimeo, Ben-Gurion University.
14. Coleman J., (1988), 'Social Capital in the Creation of Human Capital,' *American Journal of Sociology*, 94, S95-S120.
15. Fernandez, R. and A. Fogli (2004), 'Culture: An Empirical Investigation of Beliefs, Work, and Fertility,' NBER working paper 11268.
16. Fernandez, R., A. Fogli, and C. Ottaviani (2003), 'Marrying Your Mom: Preference Transmission and Women's Labor and Education Choices,' forthcoming, *QJE*.
17. François P., (2002), *Social Capital and Economic Development*, New York, Routledge.
18. Gintis H. (2003a), 'Solving the Puzzle of Prosociality,' *Rationality and Society*, 15-2.
19. Gintis H.(2003b), 'The Hithhiker's Guide to Altruism: Genes, Culture and the Internalization of Norms,' *Journal of Theoretical Biology*, 220-4, 407-418.
20. Giuliano, P. (2005): 'On the Determinants of Living Arrangements in Western Europe: Does Cultural Origin Matter?,' mimeo, IMF.
21. Gleason, P., (1980), 'American Identity and Americanization,' in *Harvard Encyclopedia of American Ethnic Groups*, Thernstrom A. Stephan, Orlov Ann, Handlin Oscar (eds.), Cambridge, Harvard University Press.
22. Guttman J. (2003), 'Repeated Interaction and the Evolution of Preferences for Reciprocity,' *Economic Journal*, 113, 631-56.
23. Hayes B. and Y.Pittelkow, (1993), 'Religious Belief, Transmission, and the Family: An Australian Study,' *Journal of Marriage and the Family*, LV, 755-66.
24. Heaton T., (1986), 'How Does Religion Influence Fertility ? The Case of Mormons,' *Journal for the Scientific Study of Religion*, XXVIII, 283-99.
25. Hauk E. and M. Saez-Martí (2002), 'On the Cultural Transmission of Corruption,' *Journal of Economic Theory* 107(2), 311-335
26. Jellal, M. and F.C. Wolff (2002), 'Cultural Evolutionary Altruism: Theory and Evidence,' *European Journal of Political Economy*, 18, 241-62.
27. Mayer, E., (1979), *From Suburb to Shetl: The Jews of Boro Park*, Philadelphia, Temple University Press.

28. Olcina G. and C. Penarrubia (2004), 'Hold-Up and Intergenerational Transmission of Preferences,' *Journal of Economic Behavior and Organization*, 54, 1, 111-132
29. Olivier J., M. Thoenig and T. Verdier (2005), 'Globalization and The Dynamics of Cultural Identity,' mimeo, PSE.
30. Ozorak, E., (1989), 'Social and Cognitive Influences on the Development of Religious Beliefs and Commitment in Adolescence,' *Journal for the Scientific Study of Religion*, XXVIII, 448-63.
31. Patacchini, E. and Y. Zenou (2005), 'Intergenerational Education Transmission: Neighborhood Quality and/or Parents' Involment?,' mimeo, IUI.
32. Saez Marti' M. and A. Sjogren (2005): 'Peers and Culture,' mimeo, IUI.
33. Saez Marti' M. and Y. Zenou (2004): 'Cultural Transmission and Discrimination,' mimeo, IUI.
34. Stark, O. (1995): *Altruism and Beyond*, Cambridge University Press.