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journal homepage: www.elsevier.com/locate/jeboTeaching by example and induced beliefs in a model of cultural transmission[☆]Fabrizio Adriani^{a,*}, Jesse A. Matheson^a, Silvia Sonderegger^b^a University of Leicester, Department of Economics, University road, Leicester LE17RH, UK^b University of Nottingham and CeDEx, UK

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ABSTRACT

We augment standard models of cultural transmission with an explicit account of social learning, grounded in the information transmission literature. Youngsters observe the behavioral trait of a role model and form beliefs about the desirability of that trait. Adults have better information about each trait and have a paternalistic attitude toward their children. This makes them reluctant to adopt myopic behavior to avoid setting a negative example to their children. This signaling distortion increases in the influence parents have over their offspring. We extend the model to allow parental influence to depend on the population frequency of each trait and show that cultural complementarity does not imply convergence to a homogeneous population. We find empirical support for a positive relationship between parental influence and propensity to exert self-restraint by looking at alcohol and tobacco consumption.

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1. Introduction

The cultural transmission literature has roots in the pioneering work of socio-biologists such as Cavalli-Sforza and Feldman (1981) and Boyd and Richerson (1985). Starting from Bisin and Verdier (1998, 2001a), a literature on this topic has also recently emerged in economics (see Bisin and Verdier, 2011, for a survey of contributions). These works have augmented the early socio-biology models with key elements of economic theory like strategic behavior and optimization, thus firmly setting cultural transmission within the boundaries of standard economics. The core features of most existing models, however, are still to a large extent borrowed from models of genetic transmission. Cultural transmission is seen as a sort of “black box”. Young individuals typically acquire their cultural traits from role models (who may be their parent or another adult), but the way in which this socialization process works is not explicitly spelled out. We argue that this is unnecessary. Economists have long worked with models of information transmission and (Bayesian) social learning that have proved useful in understanding important socio-cultural phenomena (see e.g. Banerjee, 1992, and Bikhchandani et al., 1992).

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The idea that social learning may matter for cultural transmission is of course not new (see e.g. Bandura and Walters, 1963). Many existing models of cultural transmission acknowledge the importance of social learning and often justify their assumptions by invoking it.¹ However, there is almost an implicit belief that augmenting existing models with a worked-out account of social learning would add little, if anything at all. This implicit understanding has not been properly scrutinized, though.

This paper aims at filling this gap. We build a simple model, where agents are heterogeneous in their tastes and can adopt one of two alternative behavioral traits (e.g. self-gratification or abstinence). In our model, there is thus a conceptual distinction between tastes (that agents take as given) and behavioral traits (that agents can intentionally adopt). We then use this setup to pit the predictions of standard mechanisms of cultural transmission against those of a more sophisticated mechanism which also includes social learning. In standard models, the process of cultural transmission takes the form of children passively inheriting their preferences from a role model of the older generation. The social learning model augments this mechanism by allowing also for information transmission: Children observe the behavior of their role model and update their beliefs about the desirability of the observed behavioral trait.

We find that explicitly accounting for the role of social learning generates novel effects. The key observation is that the adults' behavior conveys information to children, thus generating an information externality. Moreover, informed parents are aware that their own behavior sets relevant "examples" to their children, and may thus modify it strategically. This feature is absent from standard models, since the children's behavior is usually entirely determined by their inherited preference trait.

In principle, information transmission need not by itself affect outcomes. However, it becomes relevant when parents have a paternalistic attitude towards their offspring, so that their objectives are imperfectly aligned with those of their children. In this case, information transmission leaves a signature in the form of a "signaling distortion" in parental behavior. To see how this works, consider for instance a parent concerned that her child may take up smoking. Acknowledging that this may be setting a "bad example" to the child (e.g., by suggesting that smoking is not harmful, or that it is the socially acceptable thing to do), she may refrain from smoking herself. What's more, her incentive to quit smoking will be larger the larger her influence (in the sense described above) over the child. Hence, the social learning model predicts a positive relationship between parental influence and *the parents'* propensity to exert self-restraint. We argue that this "disciplining effect" can be used to empirically validate the role of information transmission in socialization.²

Recent experimental and field evidence is consistent with the hypothesis that parents do modify their behavior when observed by their children. In a coin-toss experiment, Lindbeck and Nyberg (2006) find that parents are more reluctant to cheat when their child is in the room. Similarly, Ben-Ner et al. (2015) report that parents increase their contributions in the dictator game when these will be shown to their children.

In a dynamic extension, we also look at the implications of the disciplining effect for the long run distribution of traits in the population. In their seminal contribution, Bisin and Verdier (2001a) analyze the forces that may generate the persistence of the high degree of cultural heterogeneity observed in modern societies. They identify *cultural substitutability* as a key factor.³ Under cultural substitutability, as a cultural trait becomes rarer, the influence of parents displaying the rare trait must increase relative to that of parents displaying the alternative trait. We show that social learning generates richer dynamics and that some form of heterogeneity may persist even in the presence of cultural complementarity. The intuition is as follows. Suppose that, as a behavioral trait involving abstinence spreads among the population, the influence of adults displaying the alternative trait (e.g. smoking) is reduced; i.e. smoking adults become relatively less likely to transmit their trait to the next generation. This type of cultural complementarity might for instance arise if the signals sent by parents become less salient when they do not conform to prevailing behavior in society. Under standard cultural evolution, if the initial share of adults choosing abstinence is large enough, abstinence would then spread all the way and the alternative trait would vanish in the long run. With social learning, in contrast, the behavioral trait adopted by parents is endogenous with respect to parental influence. As the influence of parental smoking fades, adults who like smoking become less concerned about the example set to their children. Some of those who would choose abstinence for signaling reasons may thus conclude that it is safe to switch to smoking. This effect clearly works as a counterweight to the spread of abstinence, thus allowing for the persistence of some degree of heterogeneity.

A secondary benefit of explicitly distinguishing between intrinsic tastes and behavioral traits is that the model is sufficiently rich to also accommodate the social rewards from conforming to the behavior of peers or to the norms of society at

¹ For instance, (Bisin and Topa, 2003). mention *indirect socialization*, whereby "...children... imitate or learn from their parents' or siblings' behavior", as an important aspect of socialization. Moreover, social learning is, together with genetic inheritance, one of the pillars of the dual inheritance theory (see Cavalli-Sforza and Feldman, 1981, Boyd and Richerson, 1985).

² In standard models, the cultural transmission mechanism exclusively works at a deeper level, in the domain of *preferences*. As a result, there is no incentive to distort one's behavior in order to strategically manipulate information transmission. Of course, one could always postulate that children's preferences are shaped by the *behavior* of their role models (as opposed to their preferences), thus replicating the main feature of the social learning model. However, we argue that such a theory would be more parsimoniously captured by a model of social learning where agents behave *as if* they were strategically sending (and receiving) information about the actual consequences of a particular behavior.

³ See also Panebianco and Verdier (2015) for how cultural substitutability preserves heterogeneity even when the transmission network is biased toward a specific trait.

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