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Resisting Education

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Abstract

Educational institutions not only build human capital; they also shape culture. We present a model of cultural dynamics produced by cultural transmission through the education system. Groups that are culturally marginalized are also economically disadvantaged and exhibit various forms of resistance to education. First, individuals may *drop out* of education to avoid its cultural content. Second, individuals may invest in other forms of socialization to *tune out* the cultural content of education. Finally, cultural communities may collectively resist mainstream education by *turning out* to change curricula or establish their own schools. We show that resistance to education can make it impossible for a policymaker to eliminate alternative cultural traits from the population. In fact, a policymaker may have to moderate the cultural content of education or else face a backlash which increases the spread of alternative cultural traits. Our analysis unifies a growing body of work on the effects of cultural policies and makes new predictions regarding the effect of socializing institutions on cultural dynamics.

Key words: Education; cultural transmission; ideology; cultural resistance.

JEL classification: I2; Z1; D10; D71

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We don't need no education
We don't need no thought control...
Hey teacher, leave them kids alone

Pink Floyd, *Another Brick in the Wall (Part II)*

1 Introduction

Cultural dynamics are shaped both by top-down interventions by policymakers and the bottom-up choices of individuals. In this paper, we examine the interaction between these forces in the context of education. Economists have increasingly recognized that modeling education purely as an investment in human capital neglects its social aspects, including its role in shaping cultural beliefs, values, and habits ([Akerlof and Kranton, 2002](#); [Fouka, 2019](#)). This is the first paper to model the cultural dynamics produced by cultural transmission through the education system in the face of various forms of resistance to education. This enables us to address a number of questions at the intersection of the economics of education and cultural transmission: To what extent can a policymaker spread a cultural trait through a population using the education system? Which forms of resistance at the individual level amplify or dampen educational inequality across groups? Which forms of resistance reduce or even reverse the effect of cultural interventions in the education system?

Policymakers often attempt to shape society through the cultural content of education (e.g. ideology), by setting curricula or establishing the bounds of acceptable inquiry, and through the behavioral norms observed in schools. Individuals, however, are not passive recipients of cultural information ([Bisin and Verdier, 2000, 2001](#)). They have their own preferences over cultural traits and can resist attempts at cultural control. Hence, use of the education system to transmit certain values can backfire. In this paper, we identify the conditions under which this occurs. We also examine the effects of cultural intervention and resistance on educational attainment, parental socialization, and school choice among different groups. In doing so, our analysis unifies a growing body of work by economists and political scientists on the consequences of cultural policies, and provides a new model of socializing institutions and their effect on cultural dynamics.

The idea that education involves the transmission of ideology or cultural values is not new. When compulsory education was first introduced on a large-scale across Europe in the 19th

century, its express purpose was to forge a national culture and identity in newly created, secular states (Reisner, 1922; Langsom, 1950; Weber, 1976; Green, 1990; Alesina et al., 2021). As demonstrated by Aghion et al. (2019), it was often motivated by the threat of war. Consider the French case documented by Weber (1976). The French system of centralized state education originated in a law passed in 1833 designed to foster social order and “increase the sense of unity under French nationhood” (Weber, 1976, p. 331). Secular education was seen as an instrument of socialization and cultural homogenization: school “had to teach children national and patriotic sentiments, explain what the state did for them and why it exacted taxes and military service and show them their true interest in the fatherland” (Weber, 1976, p. 332). In the 1880s, the Republican government decided that a “vast program of indoctrination was plainly called for to persuade people that the fatherland extended beyond its evident limits to something vast and intangible called France” (Weber, 1976). Weber notes that:

“At the very start of school, children were taught that their first duty was to defend their country as soldiers . . . Commencement speeches recalled this sacred duty in ritual terms—our boys will defend the soil of the fatherland. The whole school program turned on expanding the theme. Gymnastics were meant ‘to develop in the child the idea of discipline, and prepare him . . . to be a good soldier and a good Frenchman’ . . . Teachers taught or were expected to teach ‘not just for the love of art or science . . . but for the love of France’” (Weber, 1976, pp. 334-336).

This cultural program met with resistance outside the urban centers and the Paris basin, where identities were mainly local rather than national: Breton, Basque, Gascon, or Provençal, rather than French. French was not the first language for either pupils or instructors and they had little sense of the geography or history of France. The teaching of the French language was seen for what it was, an attempt to widely instill a metropolitan French national culture. Weber quotes a teacher in Loire in 1864: “[i]n the villages, anyone who tried to speak French wouldn’t escape the jeers of his neighbors . . . He would be turned to ridicule” (p. 312). In the southwest of the country, he notes that “Many Pyreneans seem to have stubbornly resisted this ‘emancipation’ from their local speech” (Weber, 1976, p. 313).

Ultimately, the French program was successful, instilling a national culture and identity even in peripheral regions. The French experience was repeated across the world. As countries de-

veloped, many invested in a centralized system of education that promoted a shared national culture or “imagined community” (Anderson, 1983). Kaiser Wilhelm II declared that “it will fall upon the school in its various grades to lay the foundations of a healthy conception of political and social relations, through the cultivation of fear of God and love of country” (quoted in Langsom, 1950). Communist governments used the education system and other institutions to undermine religiosity (Barro and McCleary, 2005; McCleary and Barro, 2006). Likewise, contemporary nondemocratic governments invest in public education to shape cultural attitudes and create loyalty to the state (Lott, 1990; Testa, 2018). Saint-Paul (2010) builds a model in which the public education system transmits anti-market values and these beliefs become self-fulfilling by making the economy more sclerotic. Alesina et al. (2021) show how non-democratic rulers might use education as an homogenizing technology when they face the threat of democratization. Cantoni et al. (2017) examine the impact of a new high school curriculum introduced by the Chinese Communist Party between 2004 and 2010. Treated students reported viewing China as more democratic than they had previously and being more skeptical of unconstrained (Western) democracy and free markets.

At the same time, there is a growing research documenting cultural resistance to education. Reviewing this literature, we develop a taxonomy that categorizes the various forms of resisting education as follows: (i) dropping out; (ii) tuning out, and (iii) turning out. Then we examine the effect of each type of resistance on cultural dynamics at the population level.

- (i) *Dropping out* occurs when individuals underinvest in education in order to avoid the cultural traits being transmitted by the education system. By transmitting mainstream cultural values, education poses a cultural threat to individuals with alternative/minority traits. Hence these groups underinvest in education (either for themselves or for their children) relative to mainstream types and relative to the benchmark case in which education has no effect on culture. That is, they “drop out”.
- (ii) *Tuning out* occurs when parents or individuals themselves invest in alternative forms of socialization to offset (or “tune out”) the cultural content of education. Examples include teaching alternative cultural values at home, religious education outside of school, joining ethnic/religious associations at college, consuming alternative forms of media, and joining online groups formed around alternative ideologies.
- (iii) *Turning out* occurs when individuals organize to collectively resist education. Whereas

dropping out and tuning out take place predominantly at the individual level, turning out refers to collective action by alternative/minority groups that reduces the spread of mainstream cultural traits, including changes in curricula and creation of their own schools.

Resistance to education means that the cultural content of education has potentially large effects on human capital formation and, through human capital formation, on the distribution of resources in society. In our model, mainstream and alternative types are identical in terms of economic productivity. However, human capital becomes concentrated among mainstream types, as alternative types drop out of education to protect their cultural values. Thus, cultural marginalization can lead to economic disadvantage.

By distinguishing between different ways of resisting education, our model generates a variety of predictions concerning cultural dynamics.

Dropping out has little impact on the evolution of cultural traits in the population. A policymaker can completely eliminate the alternative trait from the population, no matter how weakly they transmit the mainstream trait through the education system.

By contrast, when tuning out is added, it becomes impossible for the policymaker to eliminate the alternative trait. Nevertheless, the policymaker can always design an intervention that raises the population share of the mainstream trait above the level achieved when education is culturally neutral (the no-intervention benchmark). In the presence of tuning out, however, a policymaker can overreach. Under certain conditions, strengthening the transmission of the mainstream trait through the education system can *reduce* the steady state share of the mainstream trait in the population, as alternative types socialize (i.e. tune out) more intensively. Following Fouka (2019), we call this phenomenon “backlash.”

Finally, collective resistance to education (turning out) can further constrain cultural transmission through the education system via a stronger form of backlash in which increasing the strength of institutional transmission induces alternative types to switch from mainstream to alternative schooling. This provides a unified explanation for some of the examples of cultural resistance recently documented by economists and political scientists, many of which we review in this paper (e.g. Fouka, 2019; Bazzi et al., 2020). An early example of such an analysis is Carvalho (2013), which treats veiling by Muslim women as a form of cultural resistance and shows how bans on veiling can increase the spread of religious values.

Several well known examples of resisting education come from the United States, including falling enrollment rates among US conservatives, attempts to ban the teaching of evolution and incorporate creationism in school curricula, the homeschooling movement, and the independent schools established by religious minorities.

Like France, the US education system had a cultural mission, being “notoriously geared to turning a heterogeneous immigrant population into an ethnically homogeneous one, with the warm concurrence of the population so processed” (Gellner, 1983, 109).¹ However, public schooling in the United States was established at the state level and hence was less centralized than in France. In addition, the success of the high school movement in increasing enrollments in the early 20th century was largely due to individuals voluntarily acquiring education rather than state compulsion (see Goldin and Katz, 2008).

Resisting education is, however, a far more general phenomenon than the distinctive US experience. We show how our model applies to class-based attitudes to education in the UK, resistance to secular education in Turkey and France, Islamic schooling in Indonesia and sub-Saharan Africa, and isolationist groups such as the Amish. An illustrative case is the emergence in northeastern Nigeria of Boko Haram, a terrorist organization whose name translates to “western education is forbidden”.

Our work is a natural extension of the cultural transmission framework developed by Bisin and Verdier (2000, 2001), and extended by Bisin and Verdier (2017) to the co-evolution of culture and institutions. We add to this a centralized socializing agent—the education system. In the standard model, socialization is done by households. Our model can be readily applied to other socializing institutions, including the media.

There is now a large literature on cultural evolution in economics (e.g. Bisin and Verdier, 2000; Kuran and Sandholm, 2008; Giuliano and Nunn, 2021). Recent work introduces socialization by cultural leaders and groups. Hauk and Mueller (2015) study how a leader can tune parameters in the standard Bisin-Verdier model, including the degree of cultural intolerance, to promote a cultural trait. Carvalho (2016) shows how oppositional groups can form to shield those who want to acquire alternative cultural traits from the transmission of mainstream traits by centralized socializing institutions (e.g. state media). Carvalho and

¹The American public education system has also been viewed as cultivating values of conscientiousness, time-keeping, and self-discipline that were required for capitalist production (see Bowles and Gintis, 1976; Katz, 1976).

Koyama (2016), Carvalho et al. (2017), Prummer and Siedlarek (2017), and Verdier and Zenou (2018) study interventions by a single leader to shape the cultural transmission process, while Verdier and Zenou (2015, 2018), Chen, McBride and Short (2019), and Carvalho and Sacks (2021) analyze competition among cultural leaders. Most notably, Verdier and Zenou (2018) examine cultural leaders who directly transmit traits in the manner described here. The difference is that they do not consider any of the three forms of cultural resistance that we study. Cohen-Zada (2006) analyzes a model of socialization through public and religious schooling. As in our model, alternative forms of education (e.g. religious schooling) are used to cultivate alternative cultural traits. However, the focus is on static school choice and not on cultural dynamics. Giusta et al. (2017) present a different and more specialized model of cultural transmission through the education system without strategic choice of institutional transmission, tuning out, turning out, or backlash.²

There is also a literature on the positive cultural effects of education including cultural homogenization and intergroup cooperation (Gradstein and Justman, 2002), pro-social values (Dixit, 2009), good work habits (Sáez-Martí and Zenou, 2012), crime reduction (Lochner and Moretti, 2004), civic engagement (Milligan et al., 2004; Glaeser et al., 2007), higher voter turnout and support for freedom of speech (Dee, 2004), support for democracy (Ticchi et al., 2013), and nation building and economic growth (Gradstein and Justman, 2002; Alesina et al., 2021). While cultural homogenization and national identification are viewed positively by mainstream/majority groups, they are often seen as a threat to the culture and identity of alternative/minority groups. G. Akerlof and Kranton (2002) propose that schools ‘impart an image of ideal students, in terms of characteristics and behavior’ (p. 1169). Students who do not fit this ideal identity may reject the education system. Rates of rejection can be reduced by making the ideal identity more inclusive, possibly by creating multiple ideals. R. Akerlof (2017) shows how individuals who reject academic achievement invest in alternative value systems and sever ties with academically successful peers.³ Building on this work, we unify the various responses under the umbrella of cultural resistance and show how they can be incorporated into the Bisin-Verdier cultural transmission framework.

²In a different context, Bisin et al. (2021) model the interaction between institutional and cultural dynamics to explain how institutional developments in the Islamic world could have helped to reinforce more conservative cultural trends. See also Iyigun et al. (2021) on conservative revivals.

³See also Bénabou and Tirole (2011) on the effect of investments in identity on economic behavior. Other theories of underinvestment in education focus on human capital (Borjas, 1992, 1995; Eguia, 2015) and social interactions (Austen-Smith and Fryer, 2005; Fryer, 2007).

The remainder of the paper is structured as follows. Section 2 presents the baseline model in which there is individual resistance to education in the form of dropping out and tuning out. Section 3 applies our results to a number of case studies of resistance to education. Section 4 analyzes collective resistance to education, or turning out, by allowing cultural communities to establish their own schools or otherwise shape the cultural content of education. Section 5 examines case studies of collective resistance to education. Section 6 concludes.

2 The Model

Consider a model in which individuals choose whether or not to get educated. Education confers human capital but also a higher likelihood of acquiring the mainstream cultural trait. We begin by treating as fixed the strength of cultural transmission through the education system, denoted by s , before allowing a policymaker to dynamically tune s in Section 2.3. We are interested in the effect of this cultural policy on education inequality and cultural dynamics.

At each time t , the adult population is a continuum with unit mass. Individuals have one of two cultural traits, $\theta \in \{a, b\}$. Trait a is the officially sanctioned or ‘mainstream’ trait and trait b is the alternative trait. The share of the adult population with trait a at time t is denoted by q_t . The initial cultural state q_0 is exogenously given.

At each time $t > 0$, every adult (asexually) produces a child, chooses whether or not to invest in the child’s education $e \in \{0, 1\}$, and is replaced by her child. It does not matter whether education is chosen by the parent or the child. For example, investment $e = 1$ can denote college education chosen by the parent or educational effort chosen by the child. Education produces human capital worth H at cost c . We assume the cost of education c is an i.i.d. draw from the c.d.f. F , which is continuously differentiable and strictly increasing on $[0, \bar{c}]$. Hence individuals vary in their (psychic and pecuniary) costs of education. To focus on interior solutions, we assume $F(H - 1) > 0$ and $F(H + 1) < 1$.

Education bundles the production of human capital with cultural content. Both the economic and cultural consequences of education are taken into account by individuals when choosing education. Following Bisin and Verdier (2000, 2001), we assume a type θ parent prefers that her child acquire trait θ , all else equal. Specifically, we assume a type θ parent receives a cultural payoff of $\Delta_\theta \in (0, 1)$ when her child ends up with trait θ and zero otherwise. As is

standard, Δ_θ is referred to as the ‘cultural intolerance’ of θ types, i.e. how much they dislike the other trait. A similar interpretation applies when e is the child’s choice of educational effort: Each child is born with her parent’s cultural trait θ and incurs a dissonance cost of Δ_θ when switching cultural traits.

We are interested in the degree to which the education system can be used to spread the mainstream trait a through the population. This trait can be thought of as an ideology or narrative. We begin with the benchmark case in which all schools are under the control of the policymaker and are oriented toward trait a . We allow cultural communities to establish their own schools in Section 4. An economic analysis recognizes that individuals have their own objectives and agency, so cultural transmission here is not a simple statistical process. Instead, the attempt at cultural control by the policymaker can be resisted in various ways. To understand the constraints a policymaker faces in shaping culture, we explore three forms of resisting education: (i) dropping out, (ii) tuning out, and (iii) turning out. We will introduce them by one by one to isolate their effects on education choice and cultural dynamics.

For uneducated ($e_i = 0$) children, cultural transmission occurs according to the [Bisin and Verdier \(2000, 2001\)](#) formulation: Let τ be parental socialization effort (or self-socialization effort). With probability τ , the child acquires her parent’s trait. This is called *vertical transmission*. If vertical transmission fails, with probability $1 - \tau$, the child acquires a cultural trait through *oblique transmission*. That is, she is exposed to a member of the adult population drawn uniformly at random and acquires their trait. Thus, through oblique transmission, a child at time t acquires trait a with probability q_t and trait b with probability $1 - q_t$.

For educated ($e_i = 1$) children, our contribution is to add a socializing institution—the education system—to the cultural transmission process.⁴ Once again vertical transmission succeeds with probability τ . Now if vertical transmission fails, the educated child can acquire a cultural trait through *institutional transmission*. Institutional transmission succeeds with probability s , in which case the child acquires the mainstream trait a . For example, s could be the fraction of the curriculum devoted to cultural content. We refer to $s \in (0, 1]$ as the strength of institutional transmission. With probability $1 - s$, institutional transmission fails

⁴As noted in the introduction, our modeling approach can also be applied to other socializing agents, including the media.

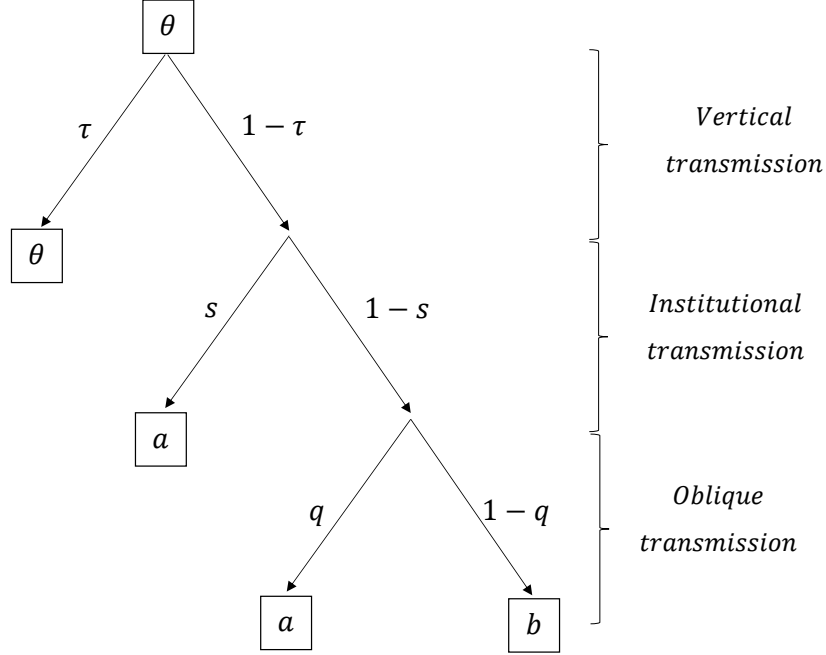


Figure 1: Cultural transmission probabilities for an educated individual ($e = 1$) born to a θ -type parent, where τ is parental (or self) socialization effort, s is the strength of institutional transmission, and q is the share of a types in the adult population. Cultural transmission probabilities for an uneducated individual ($e = 0$) are the same, except with $s = 0$.

and oblique transmission occurs as above. We assume for the moment that s is exogenous and fixed for all time. In Sections 2.3 and 4, we allow a policymaker to choose s .

This process of cultural transmission is depicted by Figure 1. For an educated individual, institutional transmission is added to the vertical and oblique transmission processes that form the standard Bisin-Verdier formulation.

Denote the likelihood that a type θ child with education e and socialization effort τ ends up with trait θ by $P_\theta(e, \tau)$. Dropping time notation for the moment, we can write:⁵

⁵Notice that it does not matter if vertical transmission occurs before or after institutional transmission as, for example, $\tau + (1 - \tau)[s + (1 - s)q] = s + (1 - s)[\tau + (1 - \tau)q]$.

$$\begin{aligned}
P_a(1, \tau) &= \tau + (1 - \tau)[s + (1 - s)q] \\
P_a(0, \tau) &= \tau + (1 - \tau)q \\
P_b(1, \tau) &= \tau + (1 - \tau)(1 - s)(1 - q) \\
P_b(0, \tau) &= \tau + (1 - \tau)(1 - q).
\end{aligned}$$

Recall that the (realized) cost of education is c . We assume the cost of socialization effort τ is $\frac{1}{2}\tau^2$. Hence the payoff to an a type with socialization effort τ depends on education as follows:

$$e = 1 \quad : \quad H + P_a(1, \tau)\Delta_a - \frac{1}{2}\tau^2 - c \quad (1)$$

$$e = 0 \quad : \quad P_a(0, \tau)\Delta_a - \frac{1}{2}\tau^2. \quad (2)$$

The payoff to a b type with socialization effort τ is:

$$e = 1 \quad : \quad H + P_b(1, \tau)\Delta_b - \frac{1}{2}\tau^2 - c \quad (3)$$

$$e = 0 \quad : \quad P_b(0, \tau)\Delta_b - \frac{1}{2}\tau^2. \quad (4)$$

We can now analyze education choices at the individual level and the cultural dynamics they produce at the population level.

2.1 DROPPING OUT

The first form of resisting education we analyze is dropping out, i.e., choosing $e = 0$. To isolate its effect, we begin by setting socialization effort τ to zero for the entire population. Parental socialization, another form of resisting education, is made endogenous in the next subsection.

Education Choice. Comparing (1) and (2) when $\tau = 0$, a types choose education when

$$c \leq H + s(1 - q)\Delta_a \equiv c_a. \quad (5)$$

Comparing (3) and (4) when $\tau = 0$, b types choose education when

$$c \leq H - s(1 - q)\Delta_b \equiv c_b. \quad (6)$$

Education imposes a cultural cost on alternative b types that induces them to underinvest in education relative to the benchmark case in which education has no cultural effect and relative to mainstream a types. Dropping out of the education system is a form of cultural resistance aimed at shielding b types from institutional transmission of the mainstream a trait. Absent the cultural effects of education, the share of both a and b types who choose $e = 1$ would be $F(H)$. Hence the extent of dropping out by b types is

$$D_b \equiv F(H) - F(c_b) = F(H) - F(H - s(1 - q)\Delta_b). \quad (7)$$

The extent of dropping out D_b is increasing in the strength of institutional transmission s and cultural intolerance Δ_b . It is also decreasing in the share of a types q , because the cultural effect of education matters less when q is large as individuals are likely to acquire the a trait anyway through oblique transmission. The effect of H , the value of human capital acquired through education, is ambiguous. If the education cost distribution F is strictly concave, then the extent of dropping out is decreasing in H . If F is strictly convex, however, the extent of dropping out is increasing in H . That is, an increase in the economic returns to education can amplify or dampen the cultural motivations for education depending on the shape of the distribution F .

It is a different story for a types who embrace education. They favor the cultural content of education and “drop in” to the following extent

$$D_a \equiv F(c_a) - F(H) = F(H + s(1 - q)\Delta_a) - F(H). \quad (8)$$

The comparative statics for dropping in by a types with respect to s , q , and Δ_a are precisely the opposite as those for dropping out by b types. However, human capital H has the same effect. That is, higher human capital H produced through education reduces dropping in when the distribution F is strictly concave and increases it when F is strictly convex.

As illustrated by the case studies to follow, dropping out can explain part of the variation in educational outcomes by ethnicity, class, and religion. Hence attempts to culturally transform society through the education system can have important economic effects on human capital formation and structural inequality.

Educational Representation. We can measure the degree to which dropping out of and into education affects the composition of the educated subpopulation as follows. The share of a

types among those choosing $e = 1$ is

$$\begin{aligned} q_{e=1} &= \frac{qF(c_a)}{qF(c_a) + (1-q)F(c_b)} \\ &= \frac{qF(H + s(1-q)\Delta_a)}{qF(H + s(1-q)\Delta_a) + (1-q)F(H - s(1-q)\Delta_b)} > q. \end{aligned} \quad (9)$$

Recall that absent the cultural effects of education, the share of each type choosing education would be $F(H)$, so the share of a types among those choosing $e = 1$ would be simply q , their population share. Hence the cultural content of education changes the mix of the educated population, increasing the educational representation of mainstream a types and disadvantaging alternative b types. Changing the cultural content of education thus has profound economic effects, shifting the distribution of human capital (and presumably economic and political power) toward mainstream a types. Hence, such a policy might be pursued by a policymaker who has no cultural interest, only an objective to maximize the power of the a -type subpopulation.

Cultural Dynamics. Responses to the cultural content of education at the individual level have an impact on cultural dynamics at the population level. Reintroducing time notation, and imposing $\tau = 0$, we have the cultural dynamic

$$\begin{aligned} q_{t+1} &= q_t [F(c_a)P_a(1, 0) + (1 - F(c_a))P_a(0, 0)] \\ &\quad + (1 - q_t) [F(c_b)(1 - P_b(1, 0)) + (1 - F(c_b))(1 - P_b(0, 0))] \\ &= (q_t F(c_a) + (1 - q_t)F(c_b)) [s + (1 - s)q_t] + (q_t [1 - F(c_a)] + (1 - q_t)[1 - F(c_b)]) q_t \\ &= q_t + (q_t F(c_a) + (1 - q_t)F(c_b)) s(1 - q_t). \end{aligned} \quad (10)$$

Subtracting q_t from both sides and taking the continuous-time limit yields

$$\dot{q} = (qF(c_a) + (1 - q)F(c_b)) s(1 - q), \quad (11)$$

where $\dot{q} = dq/dt$. By inspection, $\dot{q} > 0$ whenever $q < 1$ and $s > 0$, yielding the following proposition.

Proposition 1 *For $s > 0$, the cultural dynamic converges to the monomorphic all- a state:*

$$\lim_{t \rightarrow \infty} q_t = 1.$$

Therefore, despite dropping out, institutional transmission of cultural trait a leads to the complete spread of trait a through the population. Note that for $s = 0$, $q_t = q_0$ for all t .

2.2 TUNING OUT

We have so far abstracted from parental and other forms of socialization. In the Bisin-Verdier formulation, b -type parents can stop the b trait from dying out by socializing more intensively. Hence we now make socialization effort τ the subject of individual choice. This specification captures both the actions of parents and of children. Parents can shield children from the cultural effects of education through teaching cultural values at home, attending religious services, or exposing children to alternative role models. Children can also self-socialize by consuming alternative cultural messages via social media, joining clubs for religious and ethnic minorities at college, and so forth. We capture all of these ways of neutralizing the cultural content of education through the choice of socialization effort τ . We refer to such behaviors collectively as ‘tuning out’.

Socialization Effort. Let $\tau_{\theta e}$ be the optimal socialization effort for a θ type parent who chooses education e . Maximizing (1) and (2) with respect to τ yields the optimal socialization efforts for a types:

$$\tau_{a1} = [1 - q - s(1 - q)] \Delta_a \quad (12)$$

$$\tau_{a0} = (1 - q) \Delta_a. \quad (13)$$

Maximizing (3) and (4) with respect to τ yields the optimal socialization efforts for b types:

$$\tau_{b1} = [q + s(1 - q)] \Delta_b \quad (14)$$

$$\tau_{b0} = q \Delta_b. \quad (15)$$

Clearly, educated a types socialize less intensively because institutional transmission is a substitute for their socialization effort. The opposite occurs for educated b types who attempt to tune out the cultural content of education.

Cultural Transmission. Using the optimal socialization effort for each type, we can derive the equilibrium transmission probabilities. Since the education system transmits the a trait, one may think that individuals who choose education are more likely to acquire the a trait.

That is not necessarily true, however. Rather, *parental (and self) socialization can overwhelm institutional transmission.*

For alternative b types, education increases the likelihood that they acquire trait a if $P_b(1, \tau_{b1}) < P_b(0, \tau_{b0})$. From (14)-(15),

$$\begin{aligned}
P_b(1, \tau_{b1}) - P_b(0, \tau_{b0}) &= \tau_{b1} + (1 - \tau_{b1})(1 - s)(1 - q) - [\tau_{b0} + (1 - \tau_{b0})(1 - q)] \\
&= (\tau_{b1} - \tau_{b0})q - (1 - \tau_{b1})s(1 - q) \\
&= s(1 - q)q\Delta_b - s(1 - q)[1 - (q + s(1 - q))\Delta_b] \\
&= -s(1 - q)[1 - s\Delta_b - (2 - s)q\Delta_b].
\end{aligned} \tag{16}$$

Hence education increases the likelihood that a b type ends up with the a trait if and only if

$$\begin{aligned}
1 - s\Delta_b - (2 - s)q\Delta_b &> 0 \\
s &< \frac{1 - 2q\Delta_b}{(1 - q)\Delta_b} \\
&\equiv \bar{s}.
\end{aligned} \tag{17}$$

Note that $\bar{s} < 1$ whenever $\Delta_b > \frac{1}{1+q}$. Therefore, if alternative types are sufficiently intolerant, the policymaker might not wish to push the mainstream a trait too hard through education system. Otherwise, alternative b types will more than compensate for the cultural effect of education through parental or self socialization.

For a types, education increases the likelihood that they acquire trait a if $P_a(1, \tau_{a1}) > P_a(0, \tau_{a0})$. From (12)-(13),

$$\begin{aligned}
P_a(1, \tau_{a1}) - P_a(0, \tau_{a0}) &= \tau_{a1} + (1 - \tau_{a1})[s + (1 - s)q] - [\tau_{a0} + (1 - \tau_{a0})q] \\
&= (\tau_{a1} - \tau_{a0})(1 - q) + (1 - \tau_{a1})s(1 - q) \\
&= -s(1 - q)^2\Delta_a + s(1 - q)[1 - (1 - q)(1 - s)\Delta_a] \\
&= s(1 - q)[1 - (2 - s)(1 - q)\Delta_a].
\end{aligned} \tag{18}$$

Hence education increases the likelihood that an a type ends up with the a trait if and only if

$$\begin{aligned}
1 - (2 - s)(1 - q)\Delta_a &> 0 \\
s &> \frac{2(1 - q)\Delta_a - 1}{(1 - q)\Delta_a} \\
&\equiv \underline{s}.
\end{aligned} \tag{19}$$

Note that $\underline{s} < 1$. Hence for education to increase transmission of the a trait among a types, institutional transmission of the a trait must be sufficiently strong. The reason is that educated a types exert less socialization effort than uneducated a types, because part of their socialization comes from the education system. If s is low, this reduction in socialization effort overwhelms the strength of institutional transmission and reduces the likelihood that an educated a type acquires the a trait relative to an uneducated a type.

Education Choice. An a type chooses $e = 1$ if

$$c \leq H + [P_a(1, \tau_{a1}) - P_a(0, \tau_{a0})]\Delta_a - \frac{1}{2}(\tau_{a1}^2 - \tau_{a0}^2) \equiv \tilde{c}_a. \quad (20)$$

We derived $P_a(1, \tau_{a1}) - P_a(0, \tau_{a0})$ above. We can also derive

$$\begin{aligned} \frac{1}{2}(\tau_{a1}^2 - \tau_{a0}^2) &= \frac{1}{2}[(1-q) - s(1-q)]^2 \Delta_a^2 - \frac{1}{2}(1-q)^2 \Delta_a^2 \\ &= -s(1-q)^2 \Delta_a^2 + \frac{1}{2}s^2(1-q)^2 \Delta_a^2 \\ &= -\frac{1}{2}s(1-q)^2(2-s)\Delta_a^2. \end{aligned} \quad (21)$$

Hence the cutoff cost of education for an a type is

$$\tilde{c}_a = H + s(1-q) \left[1 - \frac{1}{2}(2-s)(1-q)\Delta_a\right] \Delta_a. \quad (22)$$

Notice that the education cutoff for a types is lower when we incorporate parental socialization: $\tilde{c}_a < c_a$ for $s > 0$ and $q < 1$. The rate of education among a types is high because they derive both an economic and cultural benefit from education. Parental socialization is a substitute for the cultural benefit of education for a types. Hence allowing for parental socialization reduces the rate of education among a types.

A b type chooses $e = 1$ if

$$c \leq H + [P_b(1, \tau_{b1}) - P_b(0, \tau_{b0})]\Delta_b - \frac{1}{2}(\tau_{b1}^2 - \tau_{b0}^2) \equiv \tilde{c}_b. \quad (23)$$

We derived $P_b(1, \tau_{b1}) - P_b(0, \tau_{b0})$ above. In addition,

$$\begin{aligned} \frac{1}{2}(\tau_{b1}^2 - \tau_{b0}^2) &= \frac{1}{2}[q + s(1-q)]^2 \Delta_b^2 - \frac{1}{2}q^2 \Delta_b^2 \\ &= s(1-q)q\Delta_b^2 + \frac{1}{2}s^2(1-q)^2 \Delta_b^2 \\ &= \frac{1}{2}s(1-q)[s + (2-s)q]\Delta_b^2. \end{aligned} \quad (24)$$

Hence the cutoff cost of education for a b type is

$$\tilde{c}_b = H - s(1 - q) \left[1 - \frac{1}{2}s\Delta_b - \frac{1}{2}(2 - s)q\Delta_b \right] \Delta_b. \quad (25)$$

Notice that the education cutoff for b types is higher when we incorporate parental socialization: $\tilde{c}_b > c_b$ for $s > 0$ and $q < 1$. The reason is that tuning out mitigates the negative cultural effects of education on b types and thereby reduces dropping out. Again, $\tilde{c}_a > \tilde{c}_b$. Hence, a types still have a higher rate of education, but the difference is less pronounced, because parental socialization dampens the cultural effects of education. As a consequence, it is straightforward to show that the cultural mix of the educated subpopulation is still tilted toward mainstream a types, but not as much as before. Hence cultural interventions through education have a less pronounced effect on educational inequality between groups.

Cultural Dynamics. Accounting for parental socialization, the cultural dynamic is

$$\begin{aligned} q_{t+1} &= q_t [F(\tilde{c}_a)P_a(1, \tau_{a1}) + (1 - F(\tilde{c}_a))P_a(0, \tau_{a0})] \\ &\quad + (1 - q_t) [F(\tilde{c}_b)(1 - P_b(1, \tau_{b1})) + (1 - F(\tilde{c}_b))(1 - P_b(0, \tau_{b0}))] \end{aligned} \quad (26)$$

$$\begin{aligned} &= q_t P_a(0, \tau_{a0}) + q_t F(\tilde{c}_a) [P_a(1, \tau_{a1}) - P_a(0, \tau_{a0})] \\ &\quad + (1 - q_t) [1 - P_b(0, \tau_{b0})] + (1 - q_t) F(\tilde{c}_b) [P_b(0, \tau_{b0}) - P_b(1, \tau_{b1})] \end{aligned} \quad (27)$$

$$\begin{aligned} &= q_t [(1 - q_t)^2 \Delta_a + q_t] \\ &\quad + s q_t (1 - q_t) F(\tilde{c}_a) [1 - (2 - s)(1 - q_t) \Delta_a] \\ &\quad + (1 - q_t) [q_t - (q_t)^2 \Delta_b] \\ &\quad + s(1 - q_t)^2 F(\tilde{c}_b) [1 - s\Delta_b - (2 - s)q_t \Delta_b] \end{aligned} \quad (28)$$

$$\begin{aligned} &= q_t + q_t(1 - q_t) [(1 - q_t) \Delta_a - q_t \Delta_b] \\ &\quad + s q_t (1 - q_t) F(\tilde{c}_a) [1 - (2 - s)(1 - q_t) \Delta_a] \\ &\quad + s(1 - q_t)^2 F(\tilde{c}_b) [1 - s\Delta_b - (2 - s)q_t \Delta_b]. \end{aligned} \quad (29)$$

Subtracting q_t from both sides and taking the continuous-time limit, we have

$$\begin{aligned} \dot{q} &= q(1 - q) [(1 - q) \Delta_a - q \Delta_b] \\ &\quad + s q (1 - q) F(\tilde{c}_a) [1 - (2 - s)(1 - q) \Delta_a] \\ &\quad + s(1 - q)^2 F(\tilde{c}_b) [1 - s\Delta_b - (2 - s)q \Delta_b]. \end{aligned} \quad (30)$$

The classic Bisin-Verdier result can be recovered by setting $s = 0$. In this case, the dynamic converges from any interior state $q_0 \in (0, 1)$ to

$$q^* = \frac{\Delta_a}{\Delta_a + \Delta_b}.$$

The greater the relative intolerance of a types, the greater their steady-state population share. With institutional transmission $s > 0$, there is no general closed-form solution for the long-run cultural distribution. In addition, without further restrictions on the distribution F , we cannot rule out the possibility of multiple interior steady states. Nevertheless, we can say a significant amount about the equilibrium structure.

Denote the right-hand side of (29) as $G(q)$. A steady state of the cultural dynamic (30) is a fixed point of G . $G : [0, 1] \rightarrow [0, 1]$ is a continuous function, so a fixed point exists by Brouwer's fixed point theorem. Because (30) is a differential equation in one dimension, it converges to one of these fixed points.

Note that $G(0) = sF(H - s(1 - \frac{1}{2}s\Delta_b)\Delta_b)[1 - s\Delta_b] > 0$. By inspection $G(1) = 1$. In addition, $\lim_{q \rightarrow 1} G'(q) = 1 + \Delta_b + sF(H) > 1$. Hence $G(q) < q$ for q close to 1. As G is continuous, these facts imply that there exists at least one interior fixed point of G by the intermediate value theorem.

In addition, the fact that $G(0) > 0$ and $G(q) < q$ for q close to 1 implies that $G(q)$ cuts the 45° line from above at the smallest and largest interior steady states. Hence these states, denoted by $\underline{q}$ and $\bar{q}$ respectively, are asymptotically stable. Finally, the fact that $G(1) = 1$ and $G(q) < q$ for q close to 1 implies that $q = 1$ is an unstable steady state.

These results are summarized in the following proposition:

Proposition 2 *For $s > 0$, the following behavior is exhibited:*

- (i) *From any initial state $q_0 \in [0, 1)$, the dynamic converges to an interior state ($0 < q < 1$).*
- (ii) *There exists a steady state at $q = 1$, which is not Lyapunov stable.*
- (iii) *The smallest and largest interior steady states, $\underline{q}$ and $\bar{q}$, are asymptotically stable.*

According to Proposition 2, the policymaker can no longer fully eliminate trait b from the population by pushing the mainstream a trait through the education system. From every state except $q_0 = 1$, a polymorphic distribution of cultural traits arises. *Tuning out preserves cultural diversity despite institutional transmission*, something dropping out alone could not do. In the Bisin-Verdier model, a similar mechanism preserves cultural diversity: the smaller the cultural minority, the more intensively it socializes, which keeps the minority culture from dying out. In this model, the stronger the cultural intervention by the policymaker, the more intensive is socialization (tuning out) by the alternative cultural group. This cultural resistance is strong enough to prevent the alternative cultural trait from dying out.

2.3 ENDOGENOUS s : THE POLICYMAKER'S PROBLEM

Up to this point, we have assumed that the strength of institutional transmission s is exogenous and derived results for all $s > 0$. We shall now make s the subject of choice by a policymaker who sets $s_t \in [0, 1]$ in each period to maximize the share of mainstream types. The cultural dynamic is deterministic, so the policymaker can at the outset ($t = 0$) choose a sequence $\{s_t\}_{t=1}^{\infty}$ to maximize the following payoff function:

$$\sum_{t=1}^{\infty} \delta^{t-1} \alpha(q_t(s_t, q_{t-1})), \quad (31)$$

subject to the dynamic (29).

We assume α is a strictly increasing function and $\delta \in (0, 1)$. Hence, when tuning the strength of institutional transmission, the policymaker cares about the share of mainstream types along the entire transition path. In the continuous-time limit, this is equivalent to choosing s in each state q to maximize $\dot{q}(s, q)$. Note that the dynamic $\dot{q}(s, q)$ given by (30) is continuous in s and $s \in [0, 1]$. Hence, by Weierstrass' theorem, there exists a maximizer $s^*(q)$ in each state q . We denote by $q_t(s^*)$ the solution to this differential equation when s is dynamically tuned by the policymaker according to (31). As before, when the policymaker chooses a fixed s for all time, we denote the solution by $q_t(s)$.

How effective is such a policymaker at spreading the mainstream trait through the education system?

Proposition 3 *When the strength of institutional transmission s_t is endogenous:*

- (i) *The maximizer $s^*(q) > 0$ in all states $q \in [0, 1)$.*
- (ii) *The results of Proposition 2 continue to hold: From any initial state $q_0 \in [0, 1)$, the dynamic converges to an interior state.*
- (iii) *Beginning in any initial state $q_0 \in [0, 1)$, the share of mainstream types at each time t is larger than when education is culturally neutral: $q_t(s^*) > q_t(0)$ for all $t \in (0, \infty)$.*

The proof of this all other propositions is in the Appendix.

First, the policymaker chooses a positive strength of institutional transmission whenever the alternative trait is present.⁶ Numerical analysis indicates that $s^*(q)$ is increasing in the share of mainstream types q , and strictly so for $s^*(q) < 1$. Second, even when dynamically tuning the strength of institutional transmission, the policymaker cannot eliminate the alternative trait. Once again, this occurs due to tuning out. The difference is that some additional technical arguments are required when s is endogenous. Third, even though the policymaker cannot completely eliminate the alternative trait, cultural interventions are not entirely ineffective. By an appropriate choice of $s(q)$, the policymaker can achieve a larger population share of trait a in each period than without institutional transmission. Hence, from every initial state $q_0 \in [0, 1)$, $\lim_{t \rightarrow \infty} q_t(s^*) > q^* = \frac{\Delta_a}{\Delta_a + \Delta_b}$.

While the policymaker can increase the spread of the mainstream trait through the education system, the steady state share of mainstream types may not be monotonically increasing in the strength of institutional transmission s . As we shall now see, the policymaker can push it too far resulting in a form of “backlash”.

2.3.1 Backlash

Backlash occurs when increasing the strength of institutional transmission s beyond some threshold reduces the share of the mainstream trait a in the population. Hence backlash does not simply constitute resistance to the cultural content of education. It also requires this resistance to overwhelm the direct effect of strengthening institutional transmission. Naturally, a sophisticated policymaker will set $s < 1$ to avoid a backlash.

⁶Recall that $q = 1$ is a steady state regardless of the policymaker’s choice of strictness. Hence $s^*(1)$ can be any feasible value.

Proposition 4 *There exists a neighborhood of $(0, 1)$ such that, if (Δ_a, Δ_b) lies in this neighborhood, then the following applies:*

- (i) *There exists a threshold share of mainstream types $\hat{q} \in (0, \frac{1}{2})$ such that the policymaker sets $s^*(q) < 1$ to avoid a backlash if and only if $q_t < \hat{q}$, i.e. if the share of alternative types is large enough.*
- (ii) *If $F(H)^2 < F(H - \frac{1}{2})$, then for all initial states $q_0 \in [0, 1)$, there exists a finite time t_0 (possibly zero) such that the policymaker sets $s_t^* < 1$ to avoid a backlash for all $t \geq t_0$.*

That is, when mainstream types are highly tolerant and alternative types are highly intolerant, the policymaker cannot push the mainstream trait too hard through the education system without a backlash. In particular, alternative types produce a backlash to strong institutional transmission $s^* = 1$ of the mainstream trait if and only if their population share is large enough. Even if the share of alternative types is small to begin with, so that $s_t^* = 1$ initially, it eventually grows large enough to generate a backlash when Δ_b is large, Δ_a is small, and $F(H)^2 < F(H - \frac{1}{2})$. The latter condition means that the economic return to education H is not too large.

To illustrate, let us examine a few examples.

Example 1 $c \sim U(0, m)$. The condition $F(H)^2 < F(H - \frac{1}{2})$ becomes $(\frac{H}{m})^2 < \frac{H - \frac{1}{2}}{m}$, which is verified to always hold when $H + 1 < m$.⁷

Example 2 $c \sim \text{Exp}(\lambda)$. The condition $F(H)^2 < F(H - \frac{1}{2})$ simplifies to

$$e^{-\lambda H} < 2 - e^{\frac{\lambda}{2}}. \quad (32)$$

For $\lambda \geq 2 \log 2$, this inequality is violated for all values of $H > 1$. For $0 < \lambda < 2 \log 2$, the inequality holds whenever $H > -\frac{1}{\lambda} \log \left(2 - e^{\frac{\lambda}{2}} \right)$, which is a large segment of the domain. For $0 < \lambda < -2 (\log(2) - \log(\sqrt{5} + 1))$, the inequality always holds.

Finally, Figure 2 provides a numerical illustration of backlash. Suppose education costs are uniformly distributed ($F = U(0, 55)$), b types are highly intolerant ($\Delta_b = 0.9$), and a types are less intolerant ($\Delta_a = 0.1$). In panel (a), with $s(q) = 0$ for all $q \in [0, 1]$, we

⁷To show this, $H^2 < (H - 1/2)m$ iff $(H - 1/2)H + 1/2H < (H - 1/2)m$ and thus $1/2H < (H - 1/2)(m - H)$. As $m - H > 1$, the right side exceeds $H - 1/2$, which is larger than $1/2H$ iff $H > 1$.

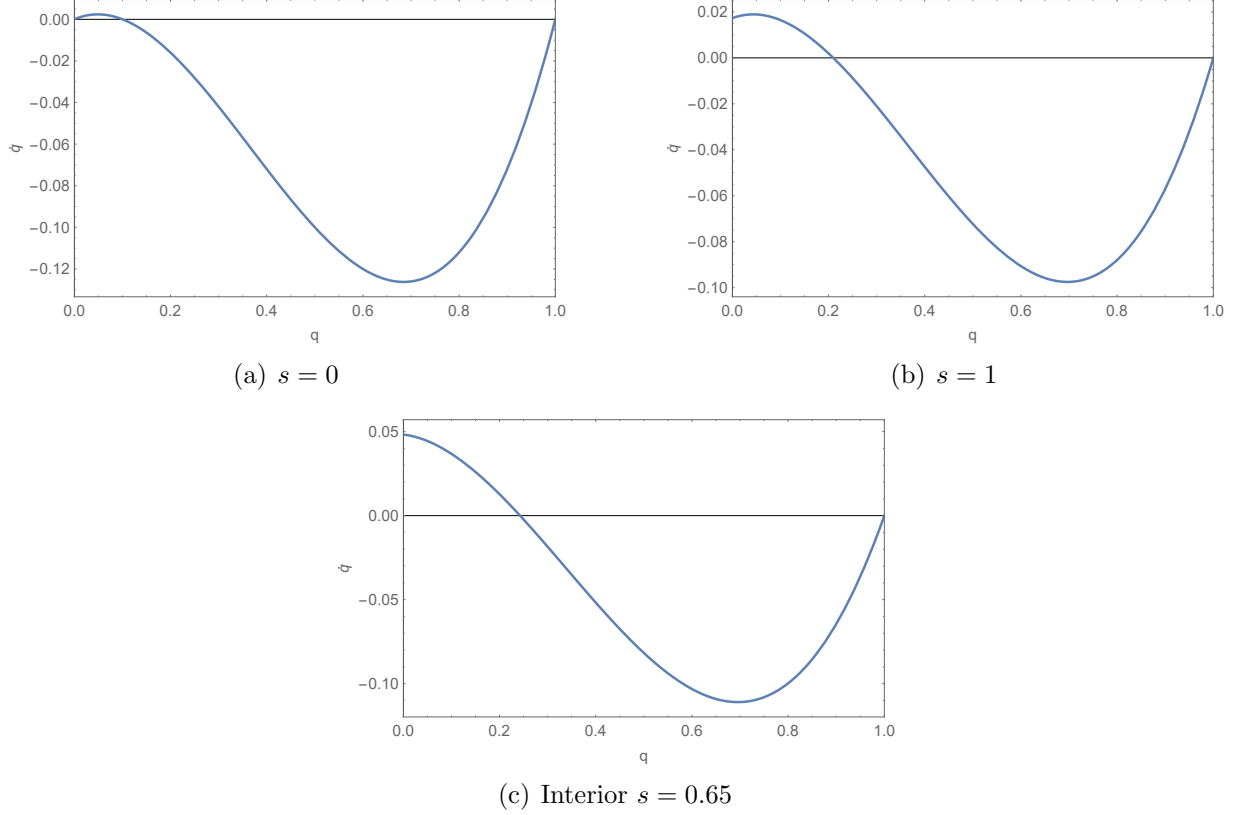


Figure 2: The cultural dynamic under various strengths of institutional transmission s , given $F = U(0, 55)$, $\Delta_a = 0.1$, $\Delta_b = 0.9$, and $H = 10$. The interior steady state in each case is (a) $q = 0.1$, (b) $q \approx 0.21$, (c) $q \approx 0.25$.

see the baseline Bisin-Verdier cultural dynamic. Let us focus on the unique stable steady state. We know the steady-state share of the population that acquires the mainstream a trait is $q^* = \frac{\Delta_a}{\Delta_a + \Delta_b}$, which in this example equals 10%.⁸ Now suppose the strength of institutional transmission is increased fully to $s(q) = 1$ for all $q \in [0, 1]$. The resulting dynamic is shown in Figure 2(b). The steady-state share of a types rises to just below 21%. Hence the policymaker can significantly boost the share of mainstream types by using the education system for cultural transmission. However, the policymaker can do even better by choosing an interior sequence of strengths: $s(q) \in (0, 1)$ for all q . To illustrate suppose the policymaker unconditionally chooses $s = 0.65$. Clearly, a policymaker can improve upon this strategy by dynamically tuning s . But even the unconditional choice of $s = 0.65$ results

⁸By mainstream trait, we do not necessarily mean that the trait is held by the majority, since a trait could be promoted through the education system by a small elite.

in a dynamic, shown in Figure 2(c), that has a unique interior steady state of approximately 25%. Therefore, the policymaker can increase the share of mainstream types by *weakening* institutional transmission of the mainstream trait. In other words, when alternative b types are sufficiently intolerant, strengthening the transmission of the mainstream trait generates a backlash, with dropping out and tuning out overwhelming the larger direct effect of education on cultural transmission. In contrast, when b types are less intolerant (e.g. $\Delta_b = 0.5$), numerical results indicate that the interior steady state is monotonically increasing in s and backlash does not occur. One possible implication is that extreme assimilationist policies will not work on groups that are culturally distant and strongly attached to their culture/identity.

In the next section, we apply our results to several case studies that illustrate the cultural content of education and its effect on educational attainment and inequality.

3 Case Studies

In this section we put our model “to work”. We show that it provides a *unified explanation* for policy-relevant puzzles from a range of literatures including education policy, sociology, economic history, and political economy.

3.1 CLASS AND EDUCATION IN BRITAIN

Our first case study examines the following puzzle in British education. In recent decades, while the returns to education have risen significantly, educational attainment has not responded evenly as some groups have invested more in education than others. The group that is least likely to go on to post-16 education are white British students from poor socio-economic backgrounds. Using data drawn from between 1979 and 2005, [Dustmann and Theodoropoulos \(2010\)](#) find that ethnic minority immigrants and British born ethnic minorities have higher levels of education compared to white natives despite facing lower returns to education. Wealth or credit constraints are unlikely to be the main reason for this as this pattern holds among children eligible for free school meals, a widely used proxy for social disadvantage. Table 1 reports that among these students only 25.8 percent of white students obtain the 5 or more A–C grades including English and Mathematics usually required to attend university, compared to 39.1 percent of black students, 45.7 percent of ‘Asian’ (South Asian) students, and 68.4 percent of Chinese (East Asian) students between

2005 and 2010.⁹

Underachievement at age 16 replicates itself in higher education. Recent research provides striking evidence for long standing concerns that working class individuals are underrepresented in higher education (Willis, 1977; Blackburn and Jarman, 1993). A report by the Sutton Trust found that students of white UK heritage were the ethnicity least likely to continue to higher education (Sammons et al., 2015, 3). This was driven by white males from disadvantaged backgrounds.¹⁰ Among males from socially and economically disadvantaged backgrounds, only 27% entered the three or more A-Levels usually required to study at university (Sammons et al., 2015, 18). At elite British universities such as Oxford and Cambridge, white working class students remain severely underrepresented. In contrast, students from the lowest socio-economic quintile are mostly likely to attend lower status post-1992 universities if they attend higher education at all.

We propose that these patterns can be explained by the cultural content of education and its effects. Rich qualitative evidence collected by sociologists indicates that higher education is perceived by working class whites as transmitting hostile cultural values. This reflects historical experience. During the nineteenth century independent schools emerged to cater to the demand for human capital among the middle class, while compulsory primary education was perceived by members of the working class as an attempt to discipline and subdue them (McCoy, 1998). Education in the UK is, as a consequence, closely associated with the inculcation of middle class values (e.g. Power et al., 2003), and seen as hostile to traditional working class culture (Willis, 1977). In the words of a prominent sociologist, the education “system itself is one which valorizes middle—rather than working-class cultural capital” (Reay, 2001, 334). In the language of our model, the education system transmitted a package of cultural values, beliefs, and habits that was at odds with working class identity. Because they do not have the same historical experience of class structure, the cultural content of education in the UK is less threatening to members of other minority groups (e.g. Chinese and African immigrants).

⁹Education scholars in the UK use eligibility of free school meals as a proxy for social disadvantage (see Chowdry et al., 2013). Children are eligible for free school meals if their parents are in receipt of income support, unemployment benefit or other forms of income-related employment support. In 2011, 1.2 million children were known to be eligible. By 2019-2020, the percentage of white student obtaining 5 or more A-C grades had fallen to 23.2%.

¹⁰British students usually study for their A-Levels between the age of 16-18. Hence it is equivalent to high school in the US.

In our model, dropping out occurs when an individual’s identity is threatened by the cultural content transmitted by the education system. This is precisely the mechanism highlighted by scholars of education who report working-class individuals in elite universities describing themselves as “strangers in paradise” or “fish out of water” (Reay et al., 2009, 1104). Middle class parents have an additional incentive to encourage children, even those who are less academically able, to enter higher education in order to instill these values. Working class parents, in contrast, face a trade-off. They can encourage their children to acquire education which brings material rewards, but comes at the cost of greater cultural distance between parents and child. Thus, there is greater dropping out among the working class, a phenomenon which reproduces the class structure.

Tuning out is also part of the British educational experience. Both parents and students can be responsible for this. A seminal study of working class students studying in (selective) grammar schools in the 1960s conducted by Jackson and Marsden (1966) provides an example of “tuning out” where one mother recalls: “Our Alfred would be doing his homework in the front room, and his father wasn’t a bit understanding. He’d make it in his way to go through that room as many times as he possibly could—to disturb him” (Jackson and Marsden, 1966, 118). In other cases, students themselves invested in values that were at odds with educational attainment by positing “Higher Education as unrealistic and undesirable” and “as not fitting with their own investments in ... desirable identities” (Archer et al., 2007, 231). For example, Archer et al. (2003) quote a student who describes her reluctance to attend university in the following terms:

“Well my boyfriend keeps on telling this to me ...once I come into university I will start acting like a uni student, I will start talking like a uni student, I’ll start reading the papers that they read, you know? [laughs] I’ll start behaving properly like one.” (Archer et al., 2003, 177)

This statement highlights the cultural threat posed by education. Education is associated with a distinctly middle-class culture which working-class student can find alienating.

3.2 GERMAN AMERICANS IN THE EARLY TWENTIETH CENTURY

Our second case study analyzes a historical example of failed assimilation policies. This provides an example of *tuning out*. A recent literature in political economy has examined

the ability of states to assimilate minorities ([Alesina et al., 2021](#)). In some cases these policies have achieved the intended outcome; in other instances they have failed. [Fouka \(2019\)](#) studies the effects of the prohibition of German as the language of instruction in public schools during World War 1 on German ethnic identity. Between 1917 and 1923, 21 states prohibited the use of a foreign language as a language of instruction in public schools. These laws were designed to reinforce national identity and targeted German speakers who were the largest non-English speaking minority in the United States at the time. Exploiting variation between treated cohorts and untreated cohorts who were too old to be at school when the laws were introduced, as well as variation across states, Fouka finds evidence of backlash: ethnic Germans took steps to strengthen their German identity. Rates of endogamy and distinctively German names rose among ethnic Germans. Focusing on the borders of Indiana and Ohio with Michigan and Kentucky, treated cohorts were 10-12 percent less likely to volunteer in Word War 2 prior to the introduction of conscription.

This illustrates how attempts to shape culture and identity through the education system can induce cultural resistance. Viewed through the lens of our theory, German Americans in the 1920s and 1930s were “tuning out” the message of the mainstream education system. They deliberately invested more heavily in their German identity, precisely to offset the “Anglo” content of the English language public education system. In this case, this investment in “tuning out” was sufficient to induce a backlash: the attempt to use the education system to assimilate German Americans (increasing s in our model) was counterproductive, at least according to the metrics examined by [Fouka \(2019\)](#).

3.3 SECULAR EDUCATION AND RELIGION IN TURKEY

Our third case study builds on the example of failed ethnic assimilation considered above. In the case of German-Americans in the early 20th century, the strong Anglo-Saxon cultural content of the mainstream education system turned away German Americans who strongly identified with their ethnicity. In contrast, the example of more religious education in Turkey suggests that weakening the secular cultural content of education in line with [Figure 2](#) can lead to both improved educational outcomes among religious families and have the unintended consequence of increasing the spread of the mainstream trait.

Due to political changes in the 1990s, an intensely secular education system (established by Atatürk in the 1920s) was reformed to allow for more religious influence. This corresponds to

a weakening of the cultural (secular) content of education, s , in our model. Meyersson (2014) applies a regression-discontinuity design to the municipal elections of 1994. Where Islamic mayors were elected, rates of female high school education increased, especially among the poor and religious. Meyersson provides evidence that Islamic mayors helped finance the provision of Islamic ‘add-ons’ to the public education system, such as Quranic study groups and dorms in which girls were able to wear headscarves. This made parents from conservative families more likely to send their daughters to school. This implies that prior to the election of Islamic mayors, girls from conservative families were “dropping out” of the education system. In fact, Turkey’s female-to-male high school enrollment ratio was only just over 0.5 prior to the reforms, lower than Saudi Arabia, Morocco, Tunisia, and Syria (based on data from the World Bank 2021).¹¹ Moreover, the treated students ended up becoming *more* secular. They were less likely to be married in adolescence and express Islamic political preferences. The conclusion is that the secular education system not only put girls from conservative families at an economic disadvantage, as conservative families resisted education of their daughters, but it also reduced the spread of secular beliefs.

3.4 SECULAR EDUCATION & MUSLIMS IN FRANCE

Next, we use our framework to study how in France, the emphasis on secular education, and in particular, the prohibition on headscarfs in schools, has intensified the tension between education and retaining traditional values for Muslims.

The French emphasis on a Republican and secular French identity in the education system has long been a source of tension, first, for religious Catholics (see Squicciarini, 2020), and more recently, for France’s Muslim population (e.g. Limage, 2000; Keaton, 2005; Werbner, 2007; Adida et al., 2016). This is evident in the debate over the banning of headscarfs in public places (the *affaire des foulards* (Carvalho, 2013)). But it also has wider implications for secular education.

As part of its Republican and secular identity, religion in France is separated from all public affairs. The concept of *laïcité* confines religion to the private sphere. This is particularly true of schooling, control over which was taken away from the Catholic Church in the 1880s (Franck and Johnson, 2016), a decision that laid the foundation for modern secular education in France. The implementation of mass compulsory education in 1882 “deprived the

¹¹By 2018, after the reforms, Turkey’s female-to-male high school enrollment ratio was 0.9.

Catholic Church of its public role in moral socialization and established the school as the privileged site for inculcating in citizens-to-be a secular morality based on the republican universal values of reason, freedom, and equality” (Fernando, 2014, 111). French teachers are civil servants; education is centralized and the model is universal rather than multicultural (Limage, 2000).

The prominence of secular values in public education poses a dilemma for devout French Muslims. On the one hand, Muslims are concentrated among the lower socio-economic strata and education offers the most reliable route to higher incomes. On the other hand, the extent to which education emphasizes secular Republican values makes this potential channel out of poverty costly because secular education can undermine Muslim identity. Schools propagate a secular Republican identity that is perceived by some to be starkly at odds with Islam.¹² Moreover, the “state continues to fund private religious schools—most of them Catholic—that teach the national curriculum. Only two state-funded Muslim schools exist in France” (Fernando, 2014, 81). It is this threat to their religious beliefs and identity that helps to explain underinvestment in education by French Muslims (i.e., dropping out).

Viewed through the lens of our model, recent developments, including the 2004 ban on headscarfs in schools, represent a strengthening of the secular content of mainstream education—that is, an increase in s . As predicted by our model, these policies have intensified the tension. Abdelgadir and Fouka (2020) find that the headscarf ban reduced the educational attainment of Muslim women, in line with the hypothesis of Carvalho (2013, Proposition 7). Specifically, affected women were less likely to complete secondary education, being more likely to drop out at age 17. They also took longer to complete their education. Lower educational attainment translated into lower labor force participation and employment rates. Following the headscarf ban, Muslim women identified more strongly with their religion. This provides another empirical example of a pro-assimilation policy backfiring because of cultural resistance.

¹²For example, ‘The core of the matter was that many of the French-born, French-educated Muslim youths experienced a falling out with the vocal secularists who opposed the Islamic veils in schools in the name of secularism’ (Maillard, 2005, 75).

4 Collective Resistance: Turning Out

Up to this point, we have only considered resisting education at the individual level. In addition to dropping out and tuning out, b types could ‘turn out’ as a community to collectively resist mainstream education. For example, b types could establish their own schools. Alternatively, the local curriculum content in b -type regions could be altered to transmit the alternative b trait. These forms of collective resistance can be captured by a simple change to the baseline model.

Let the education choice set now be $\{0, 1a, 1b\}$, where $1a$ is mainstream education and $1b$ is alternative b type education. For example, $1a$ could be state-provided schooling and $1b$ could be private religious schooling. Alternatively, $1a$ could be a choice of school district with mainstream public schooling and $1b$ a school district with alternative public schooling (e.g. a ban on teaching evolution). If no education $e = 0$ is chosen, the payoffs are the same as for an uneducated individual in Section 2. If education $e = 1a$ is chosen, the individual acquires human capital worth H_a at cost c . The strength of institutional transmission of trait a is $s_a \in (0, 1]$. If education $e = 1b$ is chosen, the individual acquires human capital worth H_b at higher cost $c + \kappa$. The strength of institutional transmission of trait b is $s_b \in (0, 1]$. We will describe the endogenous determination of s_a and s_b shortly. We assume $H_a \geq H_b - \kappa \geq 0$, so that mainstream education has a larger net economic benefit than alternative education. This could reflect, for example, the higher cost of private education or the lower quality of strict religious schooling.

The likelihood that a type θ child with education e and socialization effort τ ends up with trait θ , $P_\theta(e, \tau)$, is given by

$$\begin{aligned}
P_a(1a, \tau) &= \tau + (1 - \tau)[s_a + (1 - s_a)q] \\
P_a(1b, \tau) &= \tau + (1 - \tau)(1 - s_b)q \\
P_a(0, \tau) &= \tau + (1 - \tau)q \\
P_b(1a, \tau) &= \tau + (1 - \tau)(1 - s_a)(1 - q) \\
P_b(1b, \tau) &= \tau + (1 - \tau)[s_b + (1 - s_b)(1 - q)] \\
P_b(0, \tau) &= \tau + (1 - \tau)(1 - q).
\end{aligned}$$

The payoffs to an a type with socialization effort τ are:

$$e = 1a : H_a + P_a(1_a, \tau)\Delta_a - \frac{1}{2}\tau^2 - c \quad (33)$$

$$e = 1b : H_b + P_a(1_b, \tau)\Delta_a - \frac{1}{2}\tau^2 - c - \kappa \quad (34)$$

$$e = 0 : P_a(0, \tau)\Delta_a - \frac{1}{2}\tau^2. \quad (35)$$

The payoffs to a b type with socialization effort τ are:

$$e = 1a : H_a + P_b(1_a, \tau)\Delta_b - \frac{1}{2}\tau^2 - c \quad (36)$$

$$e = 1b : H_b + P_b(1_b, \tau)\Delta_b - \frac{1}{2}\tau^2 - c - \kappa \quad (37)$$

$$e = 0 : P_b(0, \tau)\Delta_b - \frac{1}{2}\tau^2. \quad (38)$$

As $H_a \geq H_b - \kappa$ and $P_a(1_a, \tau) > P_a(1_b, \tau)$, a types will never choose alternative education $e = 1b$. Hence, with appropriate relabeling, the socialization efforts for a types are as before given by (12)-(13) and education choice is given by the cutoff (22).

However, b types might choose alternative education $e = 1b$ if the cultural benefit outweighs the economic cost. Maximizing (36)-(38) with respect to τ yields the optimal socialization efforts for b types:

$$\tau_{b1a} = [q + s_a(1 - q)] \Delta_b \quad (39)$$

$$\tau_{b1b} = q(1 - s_b)\Delta_b \quad (40)$$

$$\tau_{b0} = q\Delta_b. \quad (41)$$

Substituting (39) into (36), the payoff to b types from mainstream education is

$$H_a - c + [(1 - s_a)(1 - q) + \frac{1}{2}(q + s_a(1 - q))^2 \Delta_b] \Delta_b. \quad (42)$$

Substituting (40) into (37), the payoff to b types from alternative education is

$$H_b - c - \kappa + [1 - q(1 - s_b) + \frac{1}{2}q^2(1 - s_b)^2 \Delta_b] \Delta_b. \quad (43)$$

Denote the economic benefit of mainstream education by $E \equiv H_a - H_b - \kappa > 0$. Subtracting (42) from (43), b types prefer alternative to mainstream education when

$$E < s_b q [1 - q\Delta_b + \frac{1}{2}s_b q \Delta_b] \Delta_b + s_a(1 - q) [1 - q\Delta_b - \frac{1}{2}s_a(1 - q)\Delta_b] \Delta_b \quad (44)$$

$$\equiv \bar{E}(s_a, s_b, q, \Delta_b). \quad (45)$$

While the left-hand side of (44) is the economic benefit of mainstream education, the left-hand side is the cultural cost to b types of mainstream education. By observation, this cultural cost $\bar{E}(s_a, s_b, q, \Delta_b)$ is positive. Note that this threshold is strictly increasing in the strength of institutional transmission in both mainstream schools (s_a) and alternative schools (s_b). That is, the incentive for b types to switch to alternative schooling is greater when mainstream schooling is more of a cultural threat (s_a is high) and when alternative schools are more effective at transmitting the alternative cultural trait (s_b is high).

If $E \leq \bar{E}(s_a, s_b, q, \Delta_b)$, so that b types prefer alternative education to mainstream education, then b types would also choose $e = 1b$ over no education $e = 0$ if and only if

$$c \leq H - \kappa + s_b q \left[1 - \frac{1}{2}(2 - s_b)q\Delta_b \right] \Delta_b \equiv \hat{c}_b. \quad (46)$$

Note that $\hat{c}_b > \tilde{c}_b$ when mainstream types prefer alternative education to mainstream education, i.e., $E < \bar{E}(s_a, s_b, q, \Delta_b)$. The reason is that $\tilde{c}_b$ is the threshold below which b types prefer mainstream education to no education (see (25)). When $E < \bar{E}(s_a, s_b, q, \Delta_b)$, alternative education yields a higher payoff than mainstream education, hence the threshold $\hat{c}_b$ is larger. Intuitively, the rate of education for b types goes up because education now produces a cultural as well as economic benefit for them.

Educational Representation. The mix of cultural traits among the educated subpopulation, when turning out occurs is given by

$$\hat{q}_{e=1} \equiv \frac{qF(\tilde{c}_a)}{qF(\tilde{c}_a) + (1 - q)F(\hat{c}_b)}. \quad (47)$$

When b types prefer alternative education, we know $\tilde{c}_b < \hat{c}_b$. Hence, in this case, the overrepresentation of a types in education declines further as alternative education raises the rate of education among alternative b types. In fact, b types may no longer be underrepresented. In particular, if $s_b > s_a$ and the additional cost of alternative education κ is sufficiently low, then $\hat{c}_b > \tilde{c}_a$. This would make $\hat{q}_{e=1}$ less than q , which is the population share of a types.

Of course, if b types choose mainstream education, then educational representation is as before with dropping out and tuning out only, with b types underrepresented.

Cultural Dynamic. Consider the case in which turning out occurs: $E \leq \bar{E}(s_a, s_b, q, \Delta_b)$. The

cultural dynamic in this case is

$$q_{t+1} = q_t [F(\tilde{c}_a)P_a(1, \tau_{a1a}) + (1 - F(\tilde{c}_a))P_a(0, \tau_{a0})] \\ + (1 - q_t) [F(\hat{c}_b)(1 - P_b(1, \tau_{b1b})) + (1 - F(\hat{c}_b))(1 - P_b(0, \tau_{b0}))] \quad (48)$$

$$= q_t P_a(0, \tau_{a0}) + q_t F(\tilde{c}_a) [P_a(1, \tau_{a1a}) - P_a(0, \tau_{a0})] \\ + (1 - q_t) [1 - P_b(0, \tau_{b0})] - (1 - q_t) F(\hat{c}_b) [P_b(1, \tau_{b1b}) - P_b(0, \tau_{b0})] \quad (49)$$

$$= q_t [(1 - q_t)^2 \Delta_a + q_t] \\ + s_a q_t (1 - q_t) F(\tilde{c}_a) [1 - (2 - s_a)(1 - q_t) \Delta_a] \\ + (1 - q_t) [q_t - (q_t)^2 \Delta_b] \\ - s_b q_t (1 - q_t) F(\hat{c}_b) [1 - (2 - s_b) q_t \Delta_b] \quad (50)$$

$$= q_t + q_t (1 - q_t) [(1 - q_t) \Delta_a - q_t \Delta_b] \\ + s_a q_t (1 - q_t) F(\tilde{c}_a) [1 - (2 - s_a)(1 - q_t) \Delta_a] \\ - s_b q_t (1 - q_t) F(\hat{c}_b) [1 - (2 - s_b) q_t \Delta_b]. \quad (51)$$

Subtracting q_t from both sides and taking the continuous-time limit, we have

$$\dot{q} = q(1 - q) [(1 - q) \Delta_a - q \Delta_b] \\ + s_a q(1 - q) F(\tilde{c}_a) [1 - (2 - s_a)(1 - q) \Delta_a] \\ - s_b q(1 - q) F(\hat{c}_b) [1 - (2 - s_b) q \Delta_b]. \quad (52)$$

Again, we can recover the standard Bisin-Verdier dynamic by setting $(s_a, s_b) = (0, 0)$.

Hence, the overall cultural dynamic with turning out is¹³

$$\dot{q} = \begin{cases} (30) & \text{if } E \geq \bar{E}(s_a, s_b, q, \Delta_b) \\ (52) & \text{if } E < \bar{E}(s_a, s_b, q, \Delta_b). \end{cases} \quad (53)$$

Now let us examine the equilibrium dynamics given the choice of $s_a \in [0, 1]$ by a policymaker for the mainstream education system and the choice of $s_b \in [0, 1]$ by a policymaker for the alternative education system.

The mainstream policymaker's objective, similar to before, is given by choose a sequence $\{s_t\}_{t=1}^{\infty}$ to maximize the following payoff function:

$$\sum_{t=1}^{\infty} \delta^{t-1} \alpha(q_t(s_a, s_b, q_{t-1})), \quad (54)$$

¹³When applying (30) in this section, replace s with s_a and q with q .

subject to the dynamic (53).

The alternative policymaker's objective is given by

$$\sum_{t=1}^{\infty} \delta^{t-1} \beta(q_t(s_a, s_b, q_{t-1})), \quad (55)$$

subject to the dynamic (53), where β is a strictly decreasing function.

The equilibrium dynamics have the following properties.

Proposition 5 *For every initial state $q_0 \in (0, 1)$, the population share of majority types is (weakly) lower in the dynamic (53) with collective resistance than the dynamic (30) without collective resistance for all $t > 0$. The reduction is strict for a subset of parameters with positive measure.*

Hence collective resistance further limits the mainstream policymaker's ability to spread the mainstream trait through the education system. Once again, the alternative trait cannot be eliminated no matter how hard the mainstream policymaker tries. In fact, the policymaker may be further inhibited in its efforts due to a stronger form of backlash in which alternative types leave the mainstream education system.

As such, there are conditions under which the mainstream policymaker has to weaken the strength of institutional transmission beyond the level without collective resistance.

Proposition 6 *Fixing $s_b = 1$, for a subset of parameters with positive measure, collective resistance leads the a-type policymaker to reduce the strength of institutional transmission.*

This occurs when (i) the mainstream policymaker wants to keep alternative types in the mainstream education system in order to socialize them and (ii) alternative types would exit if the same strength of institutional transmission were chosen as in the case without collective resistance. In this case, the mainstream policymaker has to go further in weakening the strength of institutional transmission in order to maximize the spread of the mainstream trait.

While Propositions 5 and 6 are intuitive, it will be apparent from the proofs that they are not mathematically trivial.

5 Case Studies of Collective Resistance

5.1 MUSLIM EDUCATION IN SUB-SAHARAN AFRICA

Our first example of collective resistance to education comes from sub-Saharan Africa, where Muslims have fewer years of schooling on average and are less literate than Christians (Izama, 2014; Platas, 2018). This disadvantage is not explained by disparities in wealth, income, access to schooling, location or other predictors of educational attainment. Having rejected conventional explanations for Muslim underperformance, Platas (2018) focuses on a cultural explanation that closely matches our model.

Platas (2018) suggests that Muslims drop out of mainstream education because of its perceived cultural content. Christian missions founded the first schools in many parts of sub-Saharan Africa and were typically the main providers of education during the colonial period. Thus, Muslims associate education with the promotion of Christianity and secular values. Rather than individually investing in countering the Christian and secular cultural content of the school system, Muslims have organized collectively to establish alternative faith schools that teach material consistent with their religious beliefs and identity. In northern Nigeria, for example, parents send their children to Quranic schools even though state education is freely provided (Csapo, 1981).¹⁴ Indeed, as we predict, Platas (2018) find lower levels of Muslim underinvestment in education where Muslims establish their own faith schools.

More violent forms of collective resistance to education are also possible. An example of this, also from sub-Saharan Africa, is Boko Haram. Unlike the other examples considered here, Boko Haram is a terrorist group responsible for numerous bombings, murders, and terrorist attacks in Nigeria since 2009. They were not originally violent, however. Their name, Boko Haram, means “(western) education is prohibited”. Specifically, Boko Haram represents a strand of conservative Islam that was opposed to education and western influence in Nigeria. Walker (2012, 7) notes that Boko Haram is “against those in northern Nigeria known as

¹⁴There is particular hostility to girls attending state schools: ‘General public opinion associates an educated woman with low morals: the higher the education, the lower the morals’ as parents believe that ‘Western education would open the girls’ minds to the evils and vices of modern civilisation’ (Csapo, 1981, 313).

‘yan boko.’ Yan boko is literally translated as ‘child of the book.’ It refers to the elite created by the policy of indirect rule used by the British to colonize Nigeria—the people who have had their heads turned away from Allah by easy money and corrupting Western values. To be yan boko is to be spiritually and morally corrupt, lacking in religious piety, and guilty of criminally enriching oneself rather than dedicating oneself to the Muslim umma (community).”

5.2 SECULAR & ISLAMIC EDUCATION IN INDONESIA

An important example of collective resistance to education in Indonesia is studied by [Bazzi, Hilmy and Marx \(2020\)](#). The 1970s saw a mass expansion of education. The express motivation for this policy was nation building and secularization following the breakdown of the regime’s temporary alliance with political Islam. This policy, known as Sekolah Dasar Presidential Instruction (INPRES), saw the construction of tens of thousands of elementary schools, often in highly religious Muslim areas.¹⁵ Indeed, [Bazzi et al. \(2020\)](#) find that INPRES schools were disproportionately assigned to districts with more Islamic schools in 1972.

[Bazzi et al. \(2020\)](#) show that the expansion of mainstream secular education elicited a coordinated, supply-side response from religious Muslims. Regions where secular schools were established also saw the opening of religious schools, particularly secondary schools. In the language of our model, this is an example of collective resistance by alternative *b*-types or “turning out”. [Bazzi et al. \(2020\)](#) find that the newly created Islamic schools had a more religious curriculum and were successful in instilling Islamic values. The effects were long lasting. Exposure to INPRES is associated with *greater* attachment to Islam, Arabic literacy, and religious piety across a range of Islamic practices, years after the introduction of the policy. As these preferences have been transmitted both vertically and horizontally, Islamic political parties today have better electoral outcomes in areas treated by the policy. Hence collective resistance to the expansion of state education produced backlash in the form of an Islamic revival in Indonesia.

¹⁵[Bazzi et al. \(2020, 7\)](#) note that “SD INPRES aimed at secularizing and homogenizing primary education. Civic education was to supplant certain Islamic subjects, while instruction was to take place in the national language, Bahasa Indonesia, rather than the local ethnic languages or Arabic.”

5.3 THE AMISH & OTHER ISOLATIONIST GROUPS

The Amish provide a prominent example of collective resistance to education. The Old Order Amish live by a set of rules known as the *Ordnung*, which varies from community to community, but everywhere involves strict dress codes for men and women, a ban on full length mirrors, and limitations on the use of modern technology including a prohibition on driving motor vehicles. Because the Amish lifestyle is so drastically at odds with modernity, members who acquire modern tastes and values are at high risk of leaving the community. The preservation of the distinctive Amish way of life thus depends on insulating themselves from mainstream culture.

Anthropologists note that unlike other minority groups that have attempted to inoculate themselves against the influence of mainstream values, the Old Order Mennonites or Amish have successfully resisted mainstream education because they “retain economic self-sufficiency, residential independence, and complete control of their own schools” (Dewalt and Troxell, 1989, 308).

The history of the Amish and the public education system is revealing. The Amish did not always oppose public schools. So long as the public school system remained local and decentralized and schools remained small, the Amish continued to send their children to them because they were able to exert influence on the content of the curriculum (Hostetler, 1972).¹⁶

But as the age of compulsory schooling was increased and school districts were consolidated, the Amish began to pull their children out of school. In particular, Amish parents did not send their children to high school because it was there that they felt they might be particularly exposed to secular and foreign values.¹⁷ The Amish oppose high school education for two reasons: one, adolescents are seen to be particularly vulnerable to outside influences; and two, the subjects taught at high school (literature, art, sciences, civics and politics) are seen to be inherently corrosive of Amish values (Dewalt and Troxell, 1989; Waite and

¹⁶Scholars note that Amish were “not opposed to education,” rather they were “extremely concerned about properly educating their children”. What they did not want “their children to be subjected to the integrating influences of the public schools or to be taught the values of the larger society, which they consider to be part of the ‘Satanic Kingdom.’” (Casad, 1967, 425-426).

¹⁷Specifically, “[t]he paramount fear lurking beneath all the other concerns was that modern education would lead Amish youth away from farm and faith, and undermine the church. The wisdom of the world, said Amish sages, ‘makes you restless, wanting to leap and jump, and not knowing where you will land.’” (Kraybill, 1989, 2001, 131).

Table 1: Summary of Case Studies

Location	Time	Study	Alternative	Mainstream	Dropping Out	Tuning Out	Turning Out
Britain	21st c.		Working Class	Middle Class	✓	✓	
USA	Early 20th c	Fouka (2019)	German-Americans	Anglo-Americans	✓	✓	
Turkey	20th	Meyersson (2014)	Muslim	Secular	✓		
France	21st	Abdelgadir and Fouka (2020)	Muslim	Secular	✓		
Sub-Saharan Africa	21st	Platas (2018)	Muslim	Christian	✓	✓	✓
USA	20th	Choy (2020)	Amish	Secular	✓		✓
Indonesia	21st	Bazzi et al. (2020)	Muslim	Secular			✓

[Crockett, 1997](#)).¹⁸ In Amish schools the core curriculum contains reading, spelling, geography, arithmetic, German, and penmanship ([Dewalt and Troxell, 1989](#), 315). German plays a vital role in enforcing and enhancing the sense of cultural distance that the Amish maintain; religious texts and religious services are written and conducted exclusively in German. Science teaching thus conforms to the Amish communities literal interpretation of the bible and is shorn of any content that might lead students to question this interpretation ([Waite and Crockett, 1997](#)).

In the 1960s, the conflict between the Amish community and the government came to a head and some Amish parents were jailed for refusing to send their children to school. It was only resolved when, in 1972, the Amish were granted the right to limit formal education to eight grades (*Wisconsin v. Yoder*). Since, then Amish communities have provided their own community-based education through to eighth grade at which age Amish youth leave school and begin work as adults. The long-run survival of the Amish is consistent with Proposition 5. While rigorous empirical analysis has not been conducted, qualitative evidence suggests that by turning out and establishing their own community-based education system, the Amish have reduced the spread of secular values in their community.

[Choy \(2020\)](#) develops an overlapping generations model which explains Amish educational practices and the shunning of children who leave the community. Consistent, with the

¹⁸“Adolescence is the time when most parents decrease their control over their children, but also the time before the young person has joined the church. It is important that in this stage of their lives the young people identify with the Old Order community and not with the values of the world so that they establish a commitment to the community” ([Dewalt and Troxell, 1989](#), 309).

reasoning developed here, he notes that stricter (lower affiliation) parents are “more likely to send their children to private Amish schools instead of secular public schools”, but the less strict communities have to “devote more effort to teaching and enforcing Amish values in areas other than choice of school type” (Choy, 2020, 734).

Other examples of resisting education by isolationist groups include ultra-Orthodox Jews (e.g. Berman, 2000; Heilman, 1992). Ultra-Orthodox schools in North America, the UK, and Israel impose restrictions on secular education. The Tasher Hassidim in Montreal strictly edits textbooks used in their school, bans other books from being brought into class, and prohibits discussion of Israel, Zionism, or the theory of evolution. Schools in the Broughton Park area of Manchester where a large number of ultra-Orthodox Jews live require families sending their children to orthodox schools to sign agreements stating that they do not own a television as this is “seen as a major source of immorality and a corrupting force on children” (Oliver and Valins, 2000, 581). The rise of religious education and home schooling in the United States is likewise an example of individuals “turning out” to resist the cultural values implicit in mainstream education in the United States (see Carper, 2000). Political opposition in the United States to the perceived stances of public education—for example the recent controversies surrounding the teaching of “critical race theory”—also satisfies our definition of turning out.

Table 1 summarizes the case studies we have reviewed in this paper. Our model provides the first unified theory of these phenomena.

6 Conclusion

Influential work in economics has emphasized the importance of culture and identity to economic decision making (Bisin and Verdier, 2000, 2001; Akerlof and Kranton, 2000, 2010). Recognizing that education not only builds human capital but also transmits cultural values, this paper studies the interaction between economic and cultural incentives for education. We analyze a policymaker who wishes to spread a mainstream cultural trait through the population using the education system, and study cultural resistance to such an intervention. Introducing a taxonomy of resistance to education, we unify a growing literature on the cultural forces shaping education choice. We also characterize the cultural dynamics arising from the interplay between top-down cultural interventions in the education system and

bottom-up resistance.

First, individuals whose values deviate from the mainstream can reduce their investment in education in order to preserve their cultural identity. We call this dropping out, and discuss various examples including the white working class in Britain, Germans in the US following World War 1, and Muslims in Turkey and France. Though alternative types can limit their exposure to the mainstream cultural trait by reducing education, dropping out does not prevent the policymaker from completely eliminating the alternative cultural trait from the population. Second, individuals can be shielded from the cultural effects of education by investing in alternative forms of socialization (e.g. religious education). We called this tuning out and showed that it plays an important role in preserving cultural diversity. Despite tuning out, the policymaker can increase the spread of the mainstream trait beyond the no-intervention benchmark, but it cannot eliminate the alternative trait completely. Moreover, the policymaker may have to moderate the cultural content of education to avoid a backlash that causes the alternative trait to spread. Finally, we examined collective resistance to education by allowing alternative types to form their own schools or otherwise shape the cultural content of education. This further reduces the spread of the mainstream cultural trait and can generate a stronger form of backlash. Our analysis of collective resistance provides a unified framework for understanding disparate phenomena, including Islamic schooling in sub-Saharan Africa and Indonesia, and the successful preservation of rare cultural values and belief systems by the Amish and other groups through control over their own schools.

While we focus on the education system in this paper, our model can be readily applied to other socializing institutions, including the media. Recent studies have shown that the media shapes political and social outcomes, including decreasing support for incumbent parties ([Enikolopov et al., 2011](#)), instilling nationalist beliefs ([Della Vigna et al., 2014](#)), encouraging support for extremist parties ([Adena et al., 2015](#)), and even inciting genocide ([Yanagizawa-Drott, 2014](#)). Our framework can be adapted as follows. Rather than choosing whether to invest in education, individuals choose whether or not to tune into mainstream media sources. Alternative types who tune into mainstream media for information can tune out its cultural content through parental and other forms of socialization. In addition, if mainstream media becomes too culturally homogeneous and slanted, alternatives forms of media can emerge with the opposite slant. Of course, a full analysis of resistance to cultural control via the media would require specialized concepts and analysis, which we leave to

future work.

Our analysis does not speak to the normative implications of resisting education. The desirability of attempts to transmit certain cultural traits or to resist them will vary from case to case. Indeed, precisely because education in our framework affects cultural traits, and hence preferences, the welfare consequences of resisting education may be difficult to assess. Our framework is flexible enough to permit a number of extensions, including contests among different groups over curriculum content and the *joint* intergenerational transmission of human capital and cultural values, with attention paid to their interaction. We encourage future theoretical and empirical work in these areas.

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Appendix

Proof of Proposition 3. (i) Write the dynamic as a function of s : $\dot{q}(s)$. Differentiating (30) with respect to s :

$$\begin{aligned} \frac{d\dot{q}(s)}{ds} = & q(1-q)F(\tilde{c}_a) [1 - (2-s)(1-q)\Delta_a] \\ & + sq(1-q)\frac{dF(\tilde{c}_a)}{ds} [1 - (2-s)(1-q)\Delta_a] + sq(1-q)F(\tilde{c}_a)(1-q)\Delta_a \\ & + (1-q)^2F(\tilde{c}_b) [1 - s\Delta_b - (2-s)q\Delta_b] \\ & + s(1-q)^2\frac{dF(\tilde{c}_b)}{ds} [1 - s\Delta_b - (2-s)q\Delta_b] - s(1-q)^2F(\tilde{c}_b)(1-q)\Delta_b. \end{aligned} \quad (56)$$

Evaluating at $s = 0$:

$$\left. \frac{d\dot{q}(s)}{ds} \right|_{s=0} = q(1-q)F(H) [1 - 2(1-q)\Delta_a] + (1-q)^2F(H) [1 - 2q\Delta_b]. \quad (57)$$

This is positive if and only if

$$q - 2q(1-q)\Delta_a + 1 - q - 2q(1-q)\Delta_b > 0 \quad (58)$$

or rather

$$2q(1-q)[\Delta_a + \Delta_b] < 1, \quad (59)$$

which holds for all $q \in [0, 1]$ because $\Delta_a < 1$ and $\Delta_b < 1$ by assumption.

It follows that for s positive but close to zero, $\dot{q}(s) > \dot{q}(0)$ for all $q \in [0, 1]$. Hence, the optimal s is positive.

(ii) Define $G^*(q) = \max_{s \in [0, 1]} G(s, q)$. We establish part (ii) by showing that $G^*(q)$ has an unstable fixed point at $q = 1$, has at least one other fixed point, and all other fixed points are interior.

The proof applies the envelope theorem presented in Theorem 2 of [Milgrom and Segal \(2002\)](#). To apply the theorem, we first note that $G(s, \cdot)$ is continuously differentiable in q and therefore absolutely continuous and differentiable for all $s \in [0, 1]$. Also, the derivative $\frac{\partial G(s, q)}{\partial q}$ is bounded for all $s \in [0, 1]$. Differentiating G in q and evaluating at $q = 1$ obtains

$$\left. \frac{\partial G(s, q)}{\partial q} \right|_{q=1} = 1 + \Delta_b + sF(H).$$

Thus, there exists a neighborhood U of one such that, if $q \in U$, then $\frac{\partial G(s, q)}{\partial q} > 1$ and all $s \in [0, 1]$. For $q \in U$

$$G^*(1) - G^*(q) = \int_q^1 \frac{\partial G(s^*(q'), q')}{\partial q} dq' > 1 - q$$

and thus because $G^*(1) = 1$, the above simplifies to $G^*(q) < q$. The Berge maximum theorem provides that $G^*(q)$ is continuous. Thus, because $G^*(0) > 0$ the conclusions follow.

(iii) In part (i) we argued that $\dot{q}_t(s^*) > \dot{q}_t(0)$ at any two points in time such that $q_t(s^*) = q_t(0)$. Thus, the dynamics can cross at at most one point in time since $q_t(s^*)$ can only cross from beneath $q_t(0)$. The conclusion follows from the requirement that the dynamics begin at the same state $q_0(s^*) = q_0(0) = q_0$.

□

Proof of Proposition 4. (i) Evaluating (56) at $s = 1$ and $(\Delta_a, \Delta_b) = (0, 1)$ yields:

$$\begin{aligned} \frac{d\dot{q}(s)}{ds} \Big|_{s=1} &= q(1-q)qF(\tilde{c}_a) \\ &\quad + q(1-q)q \frac{dF(\tilde{c}_a)}{ds} \Big|_{s=1} + q(1-q)^2 F(\tilde{c}_a) \\ &\quad - q(1-q)^2 F(\tilde{c}_b) \\ &\quad - q(1-q)^2 \frac{dF(\tilde{c}_b)}{ds} \Big|_{s=1} - (1-q)^2(1-q)F(\tilde{c}_b). \end{aligned} \quad (60)$$

For $(\Delta_a, \Delta_b) = (0, 1)$, it is straightforward to show that $\frac{dF(\tilde{c}_a)}{ds} \Big|_{s=1} = \frac{dF(\tilde{c}_b)}{ds} \Big|_{s=1} = 0$. Hence

$$\frac{d\dot{q}(s)}{ds} \Big|_{s=1} = (1-q)[qF(\tilde{c}_a) - (1-q)F(\tilde{c}_b)]. \quad (61)$$

Note that for $s = 1$ and $(\Delta_a, \Delta_b) = (0, 1)$, $\tilde{c}_a = H$ and $\tilde{c}_b = H - \frac{1}{2}(1-q)^2$ by equations (22) and (25). Therefore,

$$\frac{d\dot{q}(s)}{ds} \Big|_{s=1} < 0 \iff q < \frac{F(H - \frac{1}{2}(1-q)^2)}{F(H) + F(H - \frac{1}{2}(1-q)^2)}. \quad (62)$$

Both sides of (62) are continuous in q on domain $[0, 1]$. The LHS of (62) increases linearly from 0 to 1 as q goes through the unit interval. The RHS increases monotonically from $\frac{F(H - \frac{1}{2})}{F(H) + F(H - \frac{1}{2})} > 0$ to 1/2 as q goes through the unit interval. Therefore, there exists a threshold $\hat{q} \in (0, \frac{1}{2})$ such that RHS is greater than the LHS for all $q < \hat{q}$. Hence $\frac{d\dot{q}(s)}{ds} \Big|_{s=1} < 0$ for all $q < \hat{q}$ and $(\Delta_a, \Delta_b) = (0, 1)$.

Therefore, by continuity, for (Δ_a, Δ_b) sufficiently close to $(0, 1)$, there exists an $s < 1$ such that $\dot{q}(s) > \dot{q}(1)$ for all $q < \hat{q}$. Hence the policymaker chooses $s(q) < 1$ in such cases.

(ii) It is sufficient to show that if $F(H)^2 < F(H - \frac{1}{2})$, there exists a neighborhood of $(0, 1)$ such that, if (Δ_a, Δ_b) lies in this neighborhood, each interior fixed point involves $s^* < 1$.

Denote $\Delta = (\Delta_a, \Delta_b)$ and $\Delta^* = (0, 1)$. Letting $Q(\Delta) \subset [0, 1]$ be the set of fixed points given Δ , Lemma 2 below implies that Q has a closed graph. Let $S(q, \Delta) \subset [0, 1]$ be the set of maximizers given (q, Δ) which the Berge Maximum Theorem and the Closed Graph Theorem imply must also have a closed graph.

For a contradiction, suppose there exists a sequence $\Delta^n \rightarrow \Delta^*$ and $\hat{q}^n \in Q(\Delta^n)$ such that $S(\hat{q}^n, \Delta^n)$ contains 1 for all n . As the graph of Q is closed, then (passing to a subsequence if necessary) there exists $q^* \in Q(\Delta^*)$ such that $\hat{q}_n \rightarrow q^*$. From the proof of Proposition 3(ii), it is clear that q^* must be interior and thus $1 \notin S(q^*, \Delta^*)$ by Lemma 1. But this entails a contradiction since $(\hat{q}^n, \Delta^n) \rightarrow (q^*, \Delta^*)$ and $1 \in S(\hat{q}^n, \Delta^n)$ for all n implies $1 \in S(q^*, \Delta^*)$ since S has a closed graph.

□

Lemma 1 *Assume $F(H)^2 < F(H - \frac{1}{2})$ and $(\Delta_a, \Delta_b) = (0, 1)$. Then for any initial position q_0 , there is a time t_0 such that, if $t \geq t_0$, then $s^* < 1$.*

From the previous proposition, the dynamics converge deterministically to an interior fixed point $q^* \in (0, 1)$ and thus, for every neighborhood U of q^* , there is time t_0 such that $q(t) \in U$ for all points in time $t \geq t_0$. Notice that if setting $s = 1$ is suboptimal at a fixed point, then because the policymaker's objective is continuous, then setting $s = 1$ remains suboptimal in a neighborhood of the fixed point. Our argument therefore proceeds by showing that under the hypotheses of the proposition, there cannot be an interior fixed point with $s^* = 1$.

To the contrary, suppose that there is an interior fixed point q^* at which $s^* = 1$ is optimal. This implies that

$$\begin{aligned} \dot{q} &= -q^{*2}(1 - q^*) + q^*(1 - q^*)F(H) - q^*(1 - q^*)^2F\left(H - \frac{1}{2}(1 - q^*)^2\right) = 0 \\ q^* &= \frac{F(H) - F\left(H - \frac{1}{2}(1 - q^*)^2\right)}{1 - F\left(H - \frac{1}{2}(1 - q^*)^2\right)}. \end{aligned} \quad (63)$$

From the policymaker's problem, we have that $\frac{\partial \dot{q}}{\partial s}|_{s=1, q^*} < 1$ if and only if

$$q^*F(H) - (1 - q^*)F\left(H - \frac{1}{2}(1 - q^*)^2\right) < 0.$$

Rearranging terms, we find equation (63) and this inequality simultaneously hold if and only if

$$F(H)^2 < F\left(H - \frac{1}{2}(1 - q^*)^2\right). \quad (64)$$

As the right side is strictly increasing in q^* , the inequality is guaranteed to at the fixed point if the inequality holds when we set $q^* = 0$, that is $F(H)^2 < F(H - \frac{1}{2})$. This implies a contradiction as setting $s^* = 1$ is suboptimal.

□

Lemma 2 *Suppose $f : X \times Y \rightarrow X$ is continuous and both $X \subset \mathbb{R}^m$ and $Y \subset \mathbb{R}^n$ are compact. Then $\{(x, y) \in X \times Y : f(x, y) = x\}$ is closed.*

Define $g : X \times Y \rightarrow X \times Y$ to be the continuous function satisfying $g(x, y) = (f(x, y), y)$. By the closed graph theorem (Aliprantis and Border, 2006, Theorem 17.11), because g is a continuous

function from a topological space into a compact Hausdorff space, its graph is closed. By (Aliprantis and Border, 2006, Lemma 17.51), the set of fixed points of g has a closed graph.

□

Proof of Proposition 5. Let $S(q)$ denote the strictness levels that are best replies for the policymaker when the fraction of mainstream types is $q \in (0, 1)$ in the presence of collective resistance. Each best reply $s_a \in S(q)$ is either (a) inclusive and *does not* bind the alternative types' participation constraint $E > \bar{E}$, (b) inclusive and *does* bind the alternative types' participation constraint $E = \bar{E}$, or (c) is exclusive.

In the case of (a), plainly the dynamics coincide. In the case of (b), the inequality must hold because the policymaker's constrained optimum cannot exceed the unconstrained optimum. Finally, to verify the conclusion in the case of (c), let $\dot{q}(s_a)$ denote the original dynamic without collective resistance given by (30) and $\dot{q}^\dagger(s_a, s_b)$ the dynamic with collective resistance given by (29). Let s_a^* denote an unconstrained maximizer for the inclusive dynamic and $\hat{s}_i$ the i -policymaker's equilibrium strictness with the collective resistance dynamic for a given $q \in (0, 1)$ and $i \in \{a, b\}$. From these definitions, we have $\dot{q}(s_a^*) \geq \dot{q}(\hat{s}_a)$ and also $\dot{q}^\dagger(\hat{s}_a, \hat{s}_b) \leq \dot{q}^\dagger(\hat{s}_a, 1)$. Using these inequalities, we now argue that $\dot{q}(s_a^*) > \dot{q}^\dagger(\hat{s}_a, \hat{s}_b)$.

Observe that $\dot{q}(\hat{s}_a) > \dot{q}^\dagger(\hat{s}_a, 1)$ if and only if

$$\hat{s}_a(1 - q)^2 F(\tilde{c}_b) (1 - \hat{s}_a \Delta_b - (2 - \hat{s}_a)q \Delta_b) > -q(1 - q)F(\hat{c}_b)(1 - q \Delta_b) \quad (65)$$

which is guaranteed to hold for all $0 \leq \hat{s}_a \leq 1$, $0 < q < 1$, and $0 < \Delta_b < 1$ whenever the participation of alternative types is higher with collective resistance $F(\tilde{c}_b) \leq F(\hat{c}_b)$. This is true because alternative types opt for alternative education when $(s_a, s_b) = (\hat{s}_a, \hat{s}_b)$, implying $\tilde{c}_b(\hat{s}_a) \leq \hat{c}_b(\hat{s}_a, \hat{s}_b) \leq \hat{c}_b(\hat{s}_a, 1)$. Thus, $\dot{q}(s_a^*) \geq \dot{q}^\dagger(\hat{s}_a, \hat{s}_b)$ which, integrating over time yields the desired conclusion $q \geq q^\dagger$.

Finally, it is straightforward to show that for a set of initial conditions q_0 and net benefits from majority education E with positive measure, the system begins in a state where alternative types strictly prefer alternative education for every level of strictness, in which case, for every strategy of the policymaker there is positive amount of time in which case (c) obtains. For such parameters, the desired inequality is strict $q > q^\dagger$ for all $t > 0$.

□

Proof of Proposition 6. Supposing $E < 1/2$, from Lemmas 3 and 4 below, there exists a neighborhood of the point $(0, 1)$ such that, if it contains (Δ_a, Δ_b) , then there is a value $0 < \hat{q} < 1$ for which $q \leq \hat{q}$ implies that the a -type policymaker's strategy is inclusive and at $\hat{q}$, the policy is indifferent between the optimal inclusive strategy and the exclusive strategy with $s_a = 1$. We wish to show that the optimal inclusive strategy at $\hat{q}$ strictly binds the b -types' participation constraint, meaning that the level of strictness is less than the optimal level in the absence of collective resistance.

Toward a contradiction, suppose that the unconstrained optimal policy remains optimal at $\hat{q}$. Using the notation from the proof of Proposition 5, we know that this level of strictness s_a^* must

do just as well as setting strictness equal to one: $\dot{q}(s_a^*) \geq \dot{q}(1)$. However, from inequality (65), we know that $\dot{q}(1) > \dot{q}^\dagger(1, 1)$. But this entails a contradiction since the a -type policymaker is indifferent between inclusive and exclusive policies, $\dot{q}(s_a^*) = \dot{q}^\dagger(1, 1)$. Thus, it must be that at $\hat{q}$, the unconstrained optimum s_a^* fails to satisfy the constraint $E < \bar{E}$. But this means that the constrained optimum lies below s_a^* . Moreover, this conclusion must likewise hold for all $q \leq \hat{q}$ in a neighborhood of $\hat{q}$.

□

Lemma 3 *For Δ_a in a neighborhood of zero, the optimal exclusive strategy for the a -policymaker is $s_a = 1$ for all $q \in (0, 1)$.*

When $\Delta_a = 0$, then for all $q \in (0, 1)$, $\frac{d\dot{q}_2}{ds_a} \propto F(\tilde{c}_a) = F(H_a) > 0$ and thus $s_a = 1$ is the unique maximizer. By Berge's theorem, for every neighborhood U of $s_a = 1$, there exists a neighborhood V of zero so that the unique maximizer lies in U whenever $\Delta_a \in V$. Also, because $\frac{d\dot{q}_2}{ds_a}|_{s_a=1} \propto F(\tilde{c}_a) + f(\tilde{c}_a)(1-q)\Delta_a(1-(1-q)\Delta_a) > 0$ for all $0 \leq \Delta_a, q \leq 1$, there exists a neighborhood U' of $s_a = 1$ for which the objective is strictly increasing in s_a for all $0 \leq \Delta_a, q \leq 1$. Thus, letting V' be the neighborhood of $\Delta_a = 0$ for which $\Delta_a \in V'$ implies that the unique maximizer lies in U' , the unique maximizer is $s_a = 1$.

□

Lemma 4 *Fix $s_b = 1$ and suppose $\Delta_a = 1 - \Delta_b = 0$. If $E \geq 1/2$, then all types adopt mainstream education. If $E < 1/2$:*

1. *For $q > 1 - \sqrt{1 - 2E}$, all strictness levels are exclusive for the a -policymaker.*
2. *There is a value $q^* < 1 - \sqrt{1 - 2E}$ for which, $q \in (q^*, 1 - \sqrt{1 - 2E})$ implies that the a -policymaker adopts an exclusive strategy.*
3. *For q small enough, the a -policymaker adopts an inclusive strategy.*

The highest s_a keeping alternative types in mainstream education satisfies $E = \bar{E}$, i.e.

$$\begin{aligned} E &= q[1 - q + \frac{1}{2}q] + s_a(1 - q)[1 - q - \frac{1}{2}s_a(1 - q)] \\ E &= q(1 - \frac{1}{2}q) + s_a(1 - q)^2(1 - \frac{1}{2}s_a). \end{aligned}$$

If $E \geq \max_{s_a, q} \bar{E} = 1/2$, then the alternative type always obtains mainstream education, proving the first claim.

Now assume $E < 1/2$. For high values of $q \in (1 - \sqrt{1 - 2E}, 1)$, no s_a can lure the alternative type to acquire mainstream education. At the lower bound of this interval $q = 1 - \sqrt{1 - 2E}$, the only inclusive strategy requires $s_a = 0$ which yields the dynamic $\dot{q}_1 = -q^2(1 - q)$. From the preceding lemma, we know that the optimal exclusive strategy is $s_a = 1$ which yields the dynamic

$$\dot{q}_2 = -q^2(1 - q) + q(1 - q)F(H_a) - q(1 - q)^2F(\hat{c}_b).$$

Thus, the a -policymaker adopts an exclusive strategy at this point if and only if $\dot{q}_2 > \dot{q}_1$, equivalently $F(H_a) - (1 - q)F(\hat{c}_b) > 0$. Since $\hat{c}_b = H_b - \kappa + q(1 - \frac{1}{2}q)$. Substituting the value $q = 1 - \sqrt{1 - 2E}$ into the expressions, we have

$$H_a = H_b - \kappa - q(1 - \frac{1}{2}q)$$

and thus

$$F(H_a) - (1 - q)F(\hat{c}_b) = qF(H_a) > 0.$$

This implies that the exclusive strategy is strictly preferred at $q = 1 - \sqrt{1 - 2E}$. By another simple application of Berge's Theorem, we can conclude that there exists an interval $(q^*, 1 - \sqrt{1 - 2E})$ of q whereby the a -policymaker adopts the exclusive strategy.

Finally, we now show that an inclusive strategy is optimal when q is small. The a -policymaker strictly prefers an inclusive strategy whenever $\dot{q}_1 > \dot{q}_2$, that is

$$\begin{aligned} -q^2(1 - q) + s_a q(1 - q)F(H_a) + s_a(1 - q)^2 F(\tilde{c}_b)(1 - s_a - (2 - s_a)q) \\ > -q^2(1 - q) + q(1 - q)F(H_a) - q(1 - q)^2 F(\hat{c}_b). \end{aligned}$$

As $q \rightarrow 0$, the inequality holds if and only if $s_a(1 - s_a)F(\tilde{c}_b) > 0$. Thus, the a -policymaker does strictly better by choosing a positive but inclusive level of strictness satisfying $E \geq \bar{E}$ than by being exclusive for q in a neighborhood of zero.

□