

Original citation:

Akerlof, Robert J. (2017) Value formation : the role of esteem. Games and Economic Behavior, 102. pp. 1-19.

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Value Formation: The Role of Esteem

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July 31, 2016

Abstract

People's values are a critical determinant of their behavior. But, how do values form and what causes them to change? This paper proposes a theory of value formation. In the model, agents choose values, motivated by economic considerations and, crucially, also by the desire for esteem. The comparative statics are driven by the following tension: agents obtain more esteem from peers if they conform in their choice of values; but they may obtain more self-esteem if they differentiate. This tension explains why, for instance, peer effects are sometimes positive and sometimes negative. Three applications are considered, related to: schools, inner cities, and organizational resistance. (JEL: Z10, J01.)

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1 Introduction

The values people hold are critical determinants of outcomes in many different contexts: for instance, in schools, in inner cities, and in firms. But, how do they form? What causes them to change? This paper proposes a theory of value formation. The model has applications to many disparate problems: to give three examples, why some schools fail, while others succeed; why US inner cities suffer from persistent high unemployment; and why workers, in many firms, put up resistance.

Agents in the model choose their values.¹ The choice of values is motivated by economic considerations but, crucially, also by the desire for esteem. There are two components of esteem; these components result in conflicting desires. On the one hand, people have a desire to be esteemed by peers, which is satisfied by conforming to them. On the other hand, people have a desire for self-esteem, which is often best satisfied by differentiating. This basic tension – between the desires to conform and differentiate – drives the paper’s results.

The baseline model is a two-player, simultaneous-move game. Players make three choices. First, they choose effort at two activities. The example of a school is carried through the paper. Corresponding to two traditional categories in US schools – “nerds” and “burnouts” (who are sometimes in rock bands) – these activities are referred to as academics and rock music (music for short). Achievement at academics (music) depends upon a player’s effort and upon his ability. Second, players choose whether or not to value achievement at academics and achievement at music. Third, players choose whether to initiate social interaction (potentially at a cost). Social interaction takes place if either player initiates it.

There are three key assumptions. Assumption 1: the basis upon which a player confers esteem depends upon his values. A player who only values academics (music) confers esteem only on the basis of academic (musical) achievement. Assumption 2: players are esteemed for their relative achievement. Assumption 3: players value self-esteem; when they interact, they also value the esteem of the other player. There is an

¹The assumption that people select values is consistent with a large literature in social psychology, discussed below. Note that I do not mean to suggest people are fully conscious of choosing values, just as agents in standard models make choices more or less consciously.

extensive discussion below of how these assumptions match the psychology literature.²

Equilibria of the model resolve the tension between the desire to conform and the desire to differentiate. In equilibrium, players focus their effort on a single activity (whichever has the highest esteem-returns to effort). They may or may not focus on the same activity. Players choose to value the activities they focus on when their achievement is sufficiently high. Players with the same (different) values tend to seek (avoid) interaction: a property known as value homophily.³ Values can be said to shape players' behavior, since they affect the esteem-returns to effort.

The model's comparative statics show how different policies and shocks affect values and behavior. Consider the effect in the model of encouraging social interaction (an example would be putting students in the same classroom). Players have a greater desire to conform when they interact, since only when they interact do they care about receiving the other player's esteem. Thus, encouraging interaction – reducing its cost – makes players more likely to focus on – and value – the same activities.

The model also makes predictions about the effect of peer quality on own performance. An increase in peers' academic ability, it turns out, has an ambiguous effect on own academic achievement. Own achievement is increasing in peer ability when peer ability is low and decreasing in peer ability when peer ability is high. On the one hand, the desire to conform can lead a player to exert more effort at academics when his peer's academic ability increases. On the other hand, an increase in peer academic ability makes it harder to obtain self-esteem through a focus on academics. Thus, a player might decide, when his peer's academic ability increases, to switch from a focus on academics to a focus on music. This finding reconciles conflicting results on peer effects. While most studies report positive peer effects (see, for instance, Hanushek et al. (2003)), a significant number report negative peer effects. For example, Carrell et al. (2013) find that low-ability students at the US Air Force Academy perform worse academically when they are placed in higher-ability squadrons.

²While one approach to these issues is to derive status/esteem preferences from economic primitives (e.g., Cole et al. (1992)), the approach in this paper allows for simple comparative statics and further insights into policy changes. The present paper bases its "reduced form approach" on robust findings in psychology and thus affords insights into the implications of preferences for esteem and status on economic outcomes.

³For a survey of work on value homophily, see McPherson et al. (2001). There is considerable evidence that people have a tendency to sort into groups according to values.

The model's assumptions accord with the theoretical perspectives and empirical findings of a large literature in social psychology on esteem. Dating back at least to William James (1890), esteem has been seen as related to values. In *Principles of Psychology*, James observed that a person's self-esteem depends not only upon his achievements but also upon the value he places upon them. Contemporary approaches assume that people implicitly choose values, placing more value on domains where they perform well, so as to enhance self-esteem (see Crocker and Wolfe (2001) and Osborne and Jones (2011) for reviews).⁴ A variety of findings are seen as providing empirical confirmation. For instance, developmental studies find that as children grow older, they increasingly describe as "important" those activities at which they excel (see Harter (1986)); the esteem of poorly performing students has been shown to improve when they adopt deviant values (see Rosenberg (1979), Gold (1978), Kaplan (1978, 1980), and Rosenberg et al. (1989)); when individuals become disabled, they typically devalue physical attractiveness and physical accomplishments (see Wright (1960)); and values have been shown to change in old age as competencies decline (see Brandtstädter and Greve (1994)).⁵

It has also long been recognized that self-esteem depends upon individuals' comparisons with peers: the seminal paper being Festinger (1954). Several experiments have found that the value subjects place on activities depends upon how well they perform relative to peers – rather than how well they perform absolutely (see Tesser and Campbell (1980, 1982)). Additionally, recent work by Marsh and coauthors argues that students find it harder to achieve high self-esteem through a focus on academics when peer academic ability is higher (see especially Marsh (2008) and Seaton et al. (2009)).

The model also accords with a third important idea in psychology: that people seek the esteem/approval of peers and are motivated, in consequence, to conform. Psychologists refer to this as "normative social influence" (see, for instance, Latané (1981), Lerner and Tetlock (1999), Cialdini and Goldstein (2004), and Zaki et al. (2011)). Experiments on normative social influence date back to Asch (1951); he showed subjects a line and

⁴In their *Psychological Review* article, Crocker and Wolfe (2001) note that: "the view that people are selective in the domains on which they stake their self-esteem has shaped theory and research on self-esteem for decades." (p. 598)

⁵Crocker and Major (1989) also argue that the low observed correlation between esteem and achievement is, in large measure, explained by individuals' "selectively devaluing... those performance dimensions on which they... fare poorly." (p. 616)

asked them to judge which of three other lines was of equal length; they answered after observing seven other participants – confederates of the experimenter – give an identical, wrong answer. Most subjects followed suit with the wrong answer on at least one occasion. In contrast, when subjects' responses were kept private, in a slight modification of the experiment, conformity significantly decreased (see Asch (1956)): suggesting that subjects had conformed in the original experiment largely because they sought peer esteem/approval, rather than because of changes in their beliefs. Neurological evidence is in line with this interpretation. In a further replication of the Asch experiment studying subjects' brain activity with fMRI, Berns et al. (2005) found subjects who failed to conform (by answering correctly) showed heightened activity in areas of the brain devoted to negative emotion and to the modulation of social behavior (the right amygdala and the right caudate nucleus).⁶

Related Literature

This paper studies the process by which culture/values form and change. While this topic is understudied in economics, its importance for understanding organizational and societal dysfunction has been widely recognized (see Collier (2016) and Guiso et al. (2006) for a discussion).⁷ One theoretical approach is offered by Bisin and Verdier (2000, 2001), who study the parental decision to instill values in their children. This paper considers a distinct mechanism, whereby the conflict between conformity and differentiation drives the process of cultural formation.

The paper brings together three forces – (1) flexible values, (2) social comparison, and (3) the desire for peer esteem/approval – which give rise to a conflict between conformity and differentiation. These forces have appeared in separate treatments in previous literature.

The paper relates to cognitive dissonance models (see especially Benabou and Tirole (2002, 2011), Oxoby (2003, 2004), Rabin (1994), and Akerlof and Dickens (1982)) since they assume agents' beliefs or values are flexible (Assumption 1). The work of Oxoby

⁶Following Asch, psychologists have explored the role of normative influence in many different contexts. See, for example, Schultz (1999) regarding recycling campaigns and Nolan et al. (2008) regarding reduction in energy use.

⁷The model captures a set of interactions – between behavior, values, and social networks – that Collier (2016) argues are critical for understanding the process of cultural formation.

(2003, 2004) is particularly related as he also assumes agents make social comparisons (Assumption 2). Agents consequently differentiate in his model; however, they lack a desire to conform. Neither Assumptions 2 nor 3 are present in Benabou and Tirole (2011); however, they generate conformity by a complementary mechanism.⁸

Another class of related models is based on the concept of identity (see especially Akerlof and Kranton (2000, 2002)). The choice of identity is similar to a choice of values; hence these models make a variant of Assumption 1. These models also typically make a variant of Assumption 3: that the utility from adopting an identity depends upon the number of adherents. This assumption gives rise to conformity. However, agents in existing identity models lack a desire to differentiate.⁹

There are also several related models in which values are fixed (Assumption 1 is absent). In particular, Bernheim (1994) and Frank (1985) assume agents seek esteem from peers (Assumption 3); they also assume peers' views of an agent are based upon social comparison (Assumption 2).¹⁰

Cicala et al. (2011) relates to the predictions regarding peer effects. They have suggested that a Roy model might explain why we see both positive and negative peer effects. However, values – and their determination – are not a focus. This paper's model additionally speaks to the possible convergence or divergence of values within a population.

Finally, the paper relates to the literature on contests. The model – which is effectively a contest for esteem – shows how ideas from this literature can be applied to yield new insight into how values form and change. The results are reminiscent of those in ex-

⁸Unlike this paper's model, in which values are chosen, values are inferred in Benabou and Tirole (2011). Agents conform in their model because they infer the appropriate values from others' behavior.

⁹The model in Akerlof and Kranton (2000) unambiguously predicts, in contrast to this paper's model, that own academic performance improves when peer academic ability increases. Akerlof and Kranton (2002) make a distinct argument as to why low ability students might be more inclined to adopt deviant identities in higher ability schools. They consider the possibility schools/teachers might set the "prescriptions" associated with holding an academic identity. Teachers set tougher prescriptions in higher ability schools; these tougher prescriptions increase the inclination of low ability students to adopt deviant identities.

¹⁰In Bernheim's model, agents are esteemed when they are believed to have high ability. Since high relative achievement signals high ability, esteem is effectively conferred based upon relative achievement. In Frank (1985)'s *Choosing the Right Pond*, agents compare themselves to those in their pond. Frank's model is primarily concerned with agents' choice of ponds (comparison groups) – a choice that is absent in this paper.

isting contest models: in particular, just as contest models find that competition is most intense when players are closely matched (see, for instance, Lazear and Rosen (1981) and Nalebuff and Stiglitz (1983)), players exert the most effort at academics (compete most intensely) when they possess similar academic ability. With its choice of activities, the model particularly relates to the literature on multi-battlefield contests, such as Borel (1921)'s Colonel Blotto Game (see Kovenock and Roberson (2012) for a review).

The paper proceeds as follows. Section 2 presents the baseline model. Section 3 shows how the model can be extended to allow for more than two players and more than two activities. Section 4 discusses three applications, related to: schools, US inner cities, and organizational resistance. Section 5 concludes.

2 The Model

2.1 Setup

The baseline model is a two-player, simultaneous-move game. Players also compare their actions to the fixed behavior of a background population of n agents.¹¹

The players ($i \in \{1, 2\}$) make three choices. They choose (1) effort at two activities ($e_{i1}, e_{i2} \geq 0$), (2) whether to value achievement at those activities ($\theta_{i1}, \theta_{i2} \in \{0, 1\}$), and (3) whether to initiate interaction with the other player ($x_i \in \{0, 1\}$). Interaction takes place if either player initiates it (if $x_1 = 1$ or $x_2 = 1$).

We will carry the example of a school throughout the paper. Corresponding to two common categories in US schools – “nerds” and “burnouts” – we will refer to activity 1 as academics and activity 2 as rock music (or, music for short). Players’ achievement at activities depends upon both effort and ability. More specifically, achievement at academics is given by: $a_{i1} = \alpha_i e_{i1}$, where $\alpha_i > 0$ denotes player i 's ability at academics. Players may differ in their academic ability; for simplicity, we assume players have the same musical ability, which we normalize to 1: so that $a_{i2} = e_{i2}$.

¹¹The model naturally extends to a many-player game, in which the behavior of the entire population is endogenous. We consider such an extension in Section 3.

The players have the following utility function:

$$U_i = -\frac{1}{2}(e_{i1} + e_{i2})^2 - kx_i + E_i.$$

There is an economic component to the utility function and a non-economic component. The first two terms are the economic component. They reflect the cost of exerting effort and the cost k of initiating social interaction. k can be positive or negative. The final term, E_i , which we will discuss presently, reflects players' desire to be esteemed. To simplify the analysis, we assume players do not exert effort at music if they are otherwise indifferent; nor do they value activities when otherwise indifferent.

There are two sources of esteem utility (E_i). Players value self-esteem (E_i^i). When players interact, they also value being esteemed by the other player (E_i^j). More precisely:

$$E_i = E_i^i + G(x_1, x_2) \cdot E_i^j,$$

where $G = 1$ if social interaction takes place (if x_1 or $x_2 = 1$) and $G = 0$ otherwise. Observe that players may derive positive or negative esteem utility from social interaction depending upon whether they are esteemed by the other player ($E_i^j > 0$) or disesteemed ($E_i^j < 0$).

Let us now discuss the basis upon which esteem is conferred. The esteem player i grants a player l – l may refer to himself or to the other player – depends upon player l 's achievement relative to others at activities valued by player i . More precisely, player i 's esteem for player l is given by:

$$E_l^i = \sum_{s=1}^2 \theta_{is}(a_{ls} - \bar{a}_s).$$

Observe that esteem is only conferred for achievement at valued activities (activities for which $\theta_{is} = 1$ rather than 0), and esteem is conferred based upon relative achievement ($a_{ls} - \bar{a}_s$). \bar{a}_s denotes the average achievement of a comparison group or "reference group" at activity s .

We assume players compare themselves to one another (i.e., both players are in the reference group). We assume players also compare themselves to a background population of n agents with 0 achievement at both activities. Consequently, $\bar{a}_1 = \frac{a_{11} + a_{21}}{n+2}$ and

$$\bar{a}_2 = \frac{a_{12} + a_{22}}{n+2}.$$

We will focus on pure-strategy Nash equilibria, henceforth referred to as the equilibria of the game.

2.2 Discussion of the Model

Let us pause briefly to discuss a number of modeling choices.

First, we assume players, in addition to comparing themselves to one another, compare themselves to a background population of n agents. The reason we need a background population is that, without it, it is impossible for both players to be above average at an activity. We find that players always focus on different activities when a background population is absent ($n = 0$). As n increases, players compare themselves less to one other; consequently, their desire to differentiate becomes less intense and they may end up focusing on the same activities in equilibrium. Section 3 considers a many-player version of the model. In that case, it is unnecessary to include a background population; the behavior of the entire population is endogenous.

Second, we assume players compare themselves to one another regardless of whether they interact. In reality, people probably compare themselves particularly to those with whom they interact. This aspect of social interaction is a prominent feature of other models such as Frank (1985), who assumes that agents especially compare themselves to those in their own “pond.” We abstract away from this aspect of social interaction in order to focus squarely on another aspect: the concern it creates about how one is esteemed by peers. One could imagine constructing a richer model, though, in which both aspects of social interaction are present.

Third, the model implicitly assumes that players observe one another’s values. In reality, values cannot be directly observed; they are, instead, inferred. Nonetheless, this assumption may be reasonable. Work by psychologists on “theory of mind” shows that people have a talent for intuiting values from behavior (see Baron-Cohen (1995)).

Fourth, in the model, players can unilaterally initiate interaction (i.e., interaction takes place if $x_1 = 1$ or $x_2 = 1$). We might alternatively have assumed both players must agree in order for interaction to take place (i.e., interaction takes place only if

$x_1 = x_2 = 1$). The choice of one assumption over the other does not reflect a strict preference. The comparative statics of the model (which will be our main focus) look similar regardless of which assumption we make.

Fifth, there is an economic cost associated with exerting effort but there are no economic benefits. We might have assumed, for instance, that players are economically incentivized to perform well academically. While benefits are not explicitly included, we can think of the effort cost function as the cost of effort *net of any benefits*. Under this interpretation, incentivizing players to perform well academically is like increasing their academic abilities (α_1, α_2) .

Sixth, some results depend upon the curvature of the utility function. The effort cost function has the special property that the marginal cost of effort is the same at both activities. A consequence is that players focus all their effort on one activity (whichever has the higher esteem-returns) and value at most one activity. This functional form was chosen precisely because it has these properties. But, it may be worthwhile to consider alternative functional forms. A different effort cost function (for instance, $\frac{1}{2}e_{i1}^2 + \frac{1}{2}e_{i2}^2$) allows for the possibility players will exert effort at – and value – multiple activities.

Seventh, there is a discrete choice whether to value an activity or not. It might be more realistic had we assumed players can value activities more or less: for instance choose $\theta_{is} \in [0, 1]$ rather than $\theta_{is} \in \{0, 1\}$. In fact, we can allow agents to choose values from the unit interval. Doing so has no effect on the outcome/equilibria: since players will always choose to place maximal or minimal value on activities. We would see players valuing activities more or less, however, if, additionally, we assumed it is costly to value an activity more. It would be a worthwhile extension to consider this case.

Eighth, just as players' values might be made less discrete, it might also be worthwhile as an extension to consider a case in which interaction is more continuous. In such an extension, the amount player i cares about how he is esteemed by player j would depend upon the intensity of interaction.

Ninth, agents have complete flexibility to choose their values in the model. In reality, though, some values are probably universal and hard-wired. We consider the case of complete flexibility for simplicity, but we might capture lack-of-flexibility by placing constraints on players' choice of values. It is worth noting that, when agents are

completely free to choose their values, they end up having positive self-esteem in equilibrium ($E_i^i \geq 0$); constraints on values may help explain why, in reality, some people suffer from negative self-esteem (see, for instance, Owens (1994)).

Finally, the model is static. We consider changes to the system but through comparative static exercises. The comparative statics correspond to a dynamic setup in which agents can change values from one period to the next at low cost. This approach has the benefit of simplicity and it produces sensible results (i.e., results that fit a wide variety of applications). It is possible, though, that some insight could be gained from a dynamic version of the model in which the cost of changing values is high rather than low.

2.3 Properties of Equilibria

It is useful to relate four properties of equilibria, regarding respectively: effort, values, esteem, and interaction. The constraints imposed by these properties will enable us to succinctly describe the equilibrium set in the next section; at the same time, they yield intuition regarding many aspects of the equilibria.

Effort

Players focus their effort exclusively on one activity in equilibrium. They do not necessarily focus on the same activities. Players focus on whichever activity has the highest esteem-returns to effort. The esteem returns to effort are higher when: (1) a player is more able at an activity; (2) a player personally values the activity ($\theta_{is}^* = 1$); and (3) a player interacts with another player who values the activity ($\theta_{js}^* = 1$ and $G = 1$). The following lemma gives further detail. Formal proofs are given in the Appendix.

Lemma 1. *Let M_{i1} and M_{i2} denote the marginal esteem-returns to effort at academics and music respectively. An equilibrium must satisfy the following conditions:*

(1) *If $M_{i1} \geq M_{i2}$, player i focuses on academics:*

$$e_{i1}^* = M_{i1}, e_{i2}^* = 0,$$

(2) *If $M_{i1} < M_{i2}$, player i focuses on music:*

$$e_{i1}^* = 0, e_{i2}^* = M_{i2},$$

Furthermore:

$$M_{i1} = (\theta_{i1}^* + G(x_1^*, x_2^*) \cdot \theta_{j1}^*) \left(\frac{n+1}{n+2} \alpha_i \right) \text{ and } M_{i2} = (\theta_{i2}^* + G(x_1^*, x_2^*) \cdot \theta_{j2}^*) \left(\frac{n+1}{n+2} \right).$$

Observe that it will not be necessary when we describe equilibria to specify how much effort players exert (e_1^* and e_2^*): since, if we know the values players hold (θ_1^* and θ_2^*) and whether they interact ($G(x_1^*, x_2^*)$), Lemma 1 allows us to deduce e_1^* and e_2^* .

Values

In equilibrium, players only value activities when their achievement is above average. It is optimal for them to value activities when their achievement is above average: since that boosts self-esteem. Correspondingly, it is not optimal for them to value activities when their achievement is below average: since that lowers self-esteem.

Players value at most one activity in equilibrium: they may or may not value the activities on which they focus their effort; they never value the activities on which they are not focused since their achievement at those activities is always below average. We will refer to players who value academics as “scholars” and players who value music as “musicians.”

Lemma 2. *In equilibrium:*

- (1) *Players value activities ($\theta_{i_s}^* = 1$) if and only if their achievement is above average ($a_{i_s}^* - \bar{a}_s^* > 0$).*
- (2) *Players value at most one activity.*

Esteem

Self-esteem is always positive in equilibrium ($E_i^i \geq 0$), since players are above average at activities they value. Players’ esteem for one another, on the other hand, may be positive or negative. When players hold the same values ($\theta_1^* = \theta_2^*$), they positively esteem one another ($E_i^j \geq 0$). In fact, esteem judgments exactly coincide ($E_i^1 = E_i^2$). When players hold different values ($\theta_1^* \neq \theta_2^*$), achievement is below average at activities valued by the other player. So, players negatively esteem one another ($E_i^j \leq 0$). This means that players who value academics will look down on players who value music (and vice-versa). The following lemma gives more detail.

Lemma 3. *In equilibrium:*

- (1) *Players have positive self-esteem ($E_i^i \geq 0$). Players have strictly positive self-esteem ($E_i^i > 0$) when they value academics or music.*
- (2) *Players positively esteem one another ($E_i^j \geq 0$) when they hold the same values ($\theta_1^* = \theta_2^*$). Their esteem judgments also coincide ($E_i^1 = E_i^2$). They have strictly positive esteem for one another when, additionally, they value academics or music.*
- (3) *Players negatively esteem one another ($E_i^j \leq 0$) when they hold different values ($\theta_1^* \neq \theta_2^*$).*

Interaction

When both players value academics or when both players value music, they positively esteem one another and are therefore inclined to interact. If there is a positive but negligible cost of initiating interaction ($k = 0^+$), they will interact in equilibrium. On the other hand, when one player values academics and the other values music, they will be disinclined to interact. If there is a positive but negligible cost of initiating interaction, they will not interact in equilibrium. The following lemma summarizes.

Lemma 4. *Suppose there is a positive but negligible cost of initiating interaction ($k = 0^+$). If both players value academics or both value music ($\theta_{i1}^* = \theta_{j1}^* = 1$ or $\theta_{i2}^* = \theta_{j2}^* = 1$), they will interact in equilibrium ($G(x_1^*, x_2^*) = 1$). If one player values academics and the other values music ($\theta_{i1}^* = 1$ and $\theta_{j2}^* = 1$), they will not interact in equilibrium ($G(x_1^*, x_2^*) = 0$).*

More generally, there is a tendency for players with the same values to interact: since they positively esteem one another. Whether players interact will also be governed, though, by the cost of interaction (k).

2.4 Equilibria and Comparative Statics

We will now characterize the equilibria of the game and consider the model's comparative statics.

2.4.1 Negligible Cost of Interaction ($k = 0^+$)

First, we will consider the case in which there is a negligible cost of initiating interaction ($k = 0^+$). We will later examine the more general case, in which the cost of initiating interaction (k) may be positive or negative.

Before describing the results, let us develop some intuition. As mentioned in the introduction, there is a basic tension in the model: between players' desire to conform, on the one hand, and players' desire to differentiate, on the other. To illustrate, suppose the first player chooses to become a scholar. The first player's choice might incline the second player to conform and become a scholar as well: since doing so would earn him more esteem from the first player. However, the first player's choice might disincline the second player to focus on academics: since it is harder to obtain self-esteem at an activity on which others are focused. More generally, concern about self-esteem drives players to differentiate; concern about receiving peer esteem drives players to conform.

The results are driven by this tension. In particular, players are relatively willing to conform when they possess similar ability. But, when one player's ability far exceeds the other's, there is a strong temptation on the part of the less able player to differentiate.

Proposition 1 characterizes the set of equilibria. Figure 1 illustrates the equilibria that arise as a function of the players' abilities (α_1 and α_2) for a representative case in which $n = 4$.

Proposition 1. *Suppose there is a positive but negligible cost of initiating interaction: $k = 0^+$. And suppose, without loss of generality, player 2 is more able than player 1 at academics ($\alpha_2 \geq \alpha_1$).*

- (1) *When the players have low academic ability, equilibria exist in which both are musicians and interact. More specifically, existence requires: $\alpha_2^2 \leq 4(\frac{n}{n+1})$ and $\alpha_1^2 < 4(\frac{n-1}{n+1})$.*
- (2) *When the players have high academic ability and their academic abilities do not differ too much, equilibria exist in which both are scholars and interact. More specifically, existence requires: $\frac{2\alpha_1^2}{n+1} + \frac{1}{4} < \alpha_2^2 < \frac{3}{4}(n+1)\alpha_1^2$, and $\alpha_2^2 \leq (n+1)(\alpha_1^2 - \frac{1}{4})$.*
- (3) *When player 2 has relatively high academic ability and player 1 has relatively low academic ability, an equilibrium exists in which player 1 is a musician, player 2 is a scholar, and they*

do not interact. More specifically, existence requires: $\alpha_2^2 \geq \max\left(\frac{4n}{n+1}, (n+1)(\alpha_1^2 - \frac{1}{4})\right)$.

- (4) When $n = 0$ and $\alpha_1^2 \geq \alpha_2^2 - \frac{1}{4}$, an equilibrium exists in which player 1 is a scholar, player 2 is a musician, and they do not interact.

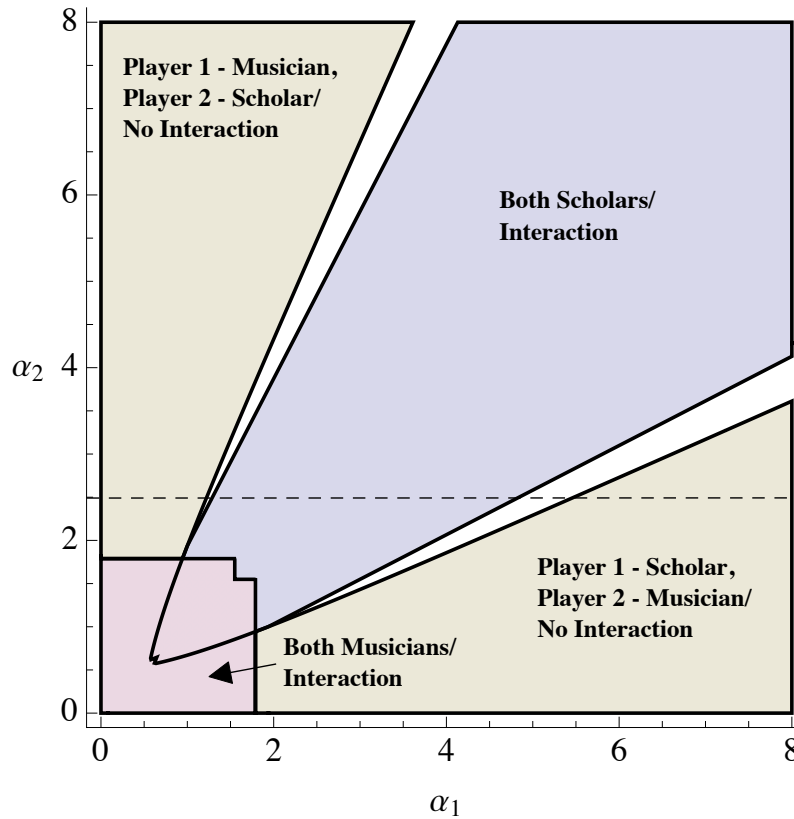


Figure 1 – Players’ equilibrium behavior. (Blank spaces are regions where equilibria do not exist; the dotted line is used in the discussion of comparative statics.)

We see in Figure 1 that if one player is considerably more able than the other at academics, the more able player becomes a scholar, the less able player becomes a musician, and they do not interact. If, on the other hand, the players possess similar ability (α_1 close to α_2), they focus on and value the same activity. If both have high academic ability, they become scholars and interact. If both have low academic ability, they become musicians and interact. If both have intermediate ability, they either become scholars or musicians and interact. Either is an equilibrium in this case, because of the players’ desire to conform to one another.

Several observations are worth making. First, equilibria exist in which a player who is more able at academics than music ($\alpha_i > 1$) nonetheless becomes a musician out of a desire to differentiate from the other player, who is a scholar.

Second, equilibria arise in which *both* players are superior at academics ($\alpha_1, \alpha_2 > 1$) but both, nonetheless, become musicians. In such equilibria, each player chooses to become a musician out of a desire to conform to the other. We also see equilibria in which both players become academics despite superior musical ability.

Third, multiple values can arise. More specifically, for some (α_1, α_2) pairs, equilibria exist in which both players value academics *and* equilibria exist in which both players value music. These values almost always differ in the welfare they give to players. If the players are more able at academics (music), they are both better off in the equilibrium in which academics (music) is valued.

Finally, it should be noted that two cases covered by Proposition 1 – the $n = 0$ and $n = 1$ cases – look different from Figure 1. The players' have a strong desire to differentiate from one another when the population is small. As a result, when $n = 0$ or 1, players always differentiate in equilibrium. Furthermore, when $n = 0$, the desire to differentiate is sufficiently intense that equilibria arise in which the player who is more able at academics becomes a musician while the player who is less able becomes a scholar.

Comparative Statics

What is the effect in the model of a change in one of the player's abilities? The dotted line in Figure 1 shows the effect of a change in the first player's academic ability (α_1) on the equilibrium. Player 2 is a scholar when α_1 is low, while player 1 is a musician. An increase in α_1 from a low level to an intermediate level causes player 1 to become a scholar as well. With α_1 in this intermediate range, players interact and share the same values. If α_1 increases further, however, player 2 switches from scholar to musician since he finds it hard to compete against player 1.

Figure 2 shows how players' effort and achievement at academics change with α_1 along Figure 1's dotted line.¹² Player 1's effort and achievement at academics are increasing in his ability with one exception: both drop discontinuously when player 2

¹²Recall that we can deduce players' effort and achievement from Lemma 1.

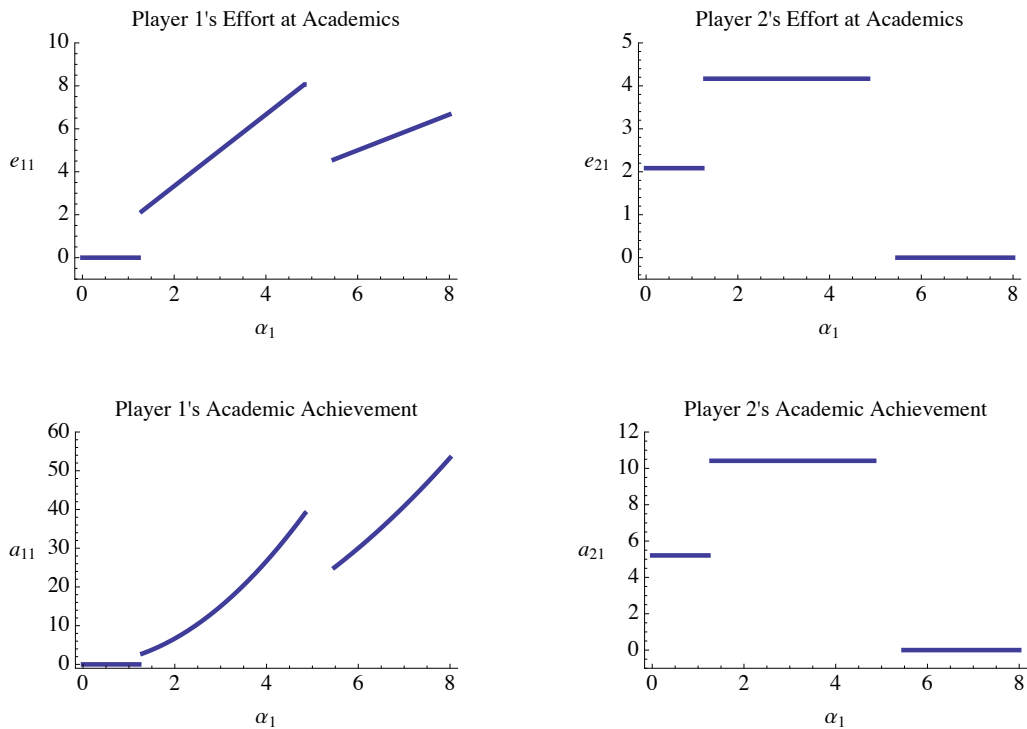


Figure 2 – How players’ effort and achievement change with α_1 (along Figure 1’s dotted line).

becomes a musician. Player 2 exerts some effort at academics when α_1 is low (since he is a scholar); he exerts more effort at academics when α_1 is in the intermediate range (since, additionally, he has a peer who is a scholar); he exerts no effort at academics when α_1 is high (since he is a musician).¹³ His academic achievement, in consequence, is increasing in his peer’s ability when α_1 is low and decreasing in his peer’s ability when α_1 is high.

This nonmonotonicity can be understood in terms of the competing desires to conform and differentiate. Achievement is increasing in peer ability when α_1 is low because

¹³A natural question is why, in Figure 2, player 2’s effort at academics is constant in the middle interval. We might expect player 2’s effort to rise over the interval, as player 1’s academic achievement rises. Player 2’s effort would be rising over the interval if U_i were a concave function of E_i . However, when U_i is a linear function of E_i , as we have assumed for simplicity, the marginal esteem returns to effort at academics (M_{i1}) do not depend upon the other player’s academic achievement (see Lemma 1), which results in constant effort over the interval.

the desire to conform dominates, while achievement is decreasing in peer ability when α_1 is high because the desire to differentiate dominates.

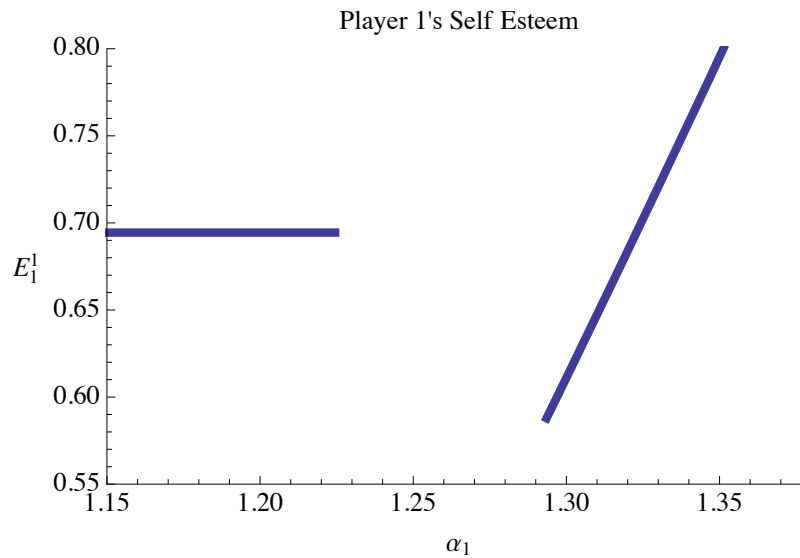


Figure 3 – How player 1’s self-esteem (E_1^1) changes with α_1 along Figure 1’s dotted line (in the region where player 1 switches from music to academics).

Perhaps contrary to intuition, self-esteem is non-monotonic in own ability. Figure 3 illustrates. It shows player 1’s self-esteem (E_1^1) along Figure 1’s dotted line, focusing on the region in which player 1 switches from music to academics. We see that self-esteem initially drops when player 1 switches from music to academics, even though his ability increases. The reason for this drop is that player 1 is willing to sacrifice self-esteem because he receives something else in return: more esteem from his peer.

2.4.2 Positive or Negative Cost of Interaction

We turn now to the general case, in which the cost of initiating interaction (k) may be positive or negative. The general case allows us additionally to consider comparative statics in k (i.e., the consequences of encouraging/discouraging interaction between players).

Once again, the results are driven by players’ competing desires to conform and differentiate. When k is high, players will not interact, and thus will be unconcerned about receiving the other player’s esteem. They will, in consequence, be inclined to differenti-

ate. When k is low, they will interact, and will therefore be more inclined to conform.¹⁴ As we will see presently, the result is that encouraging interaction (decreasing k) makes it more likely players will focus on and value the same activities.

The analysis is divided into three cases. First, we will characterize the equilibria when one of the players has high academic ability; then, we will characterize the equilibria when one of the players has low academic ability; finally, we will consider the case in which both players have intermediate ability.

Case 1. *One of the players has high academic ability.*

Proposition 2 characterizes the equilibria when one of the players – without loss of generality, player 2 – has high academic ability ($\alpha_2 > \bar{\alpha}_H$). Player 2 will always be a scholar. The behavior of player 1 depends upon α_1 and k . Figure 4 illustrates the equilibrium behavior of player 1 as a function of α_1 and k for a representative case (in which $\alpha_2 = 3$ and $n = 2$).

Proposition 2. *Suppose, without loss of generality, player 2 is more able than player 1 at academics ($\alpha_2 \geq \alpha_1$) and suppose $\bar{\alpha}_H$ is defined as follows:*

$$\bar{\alpha}_H = \begin{cases} \sqrt{\frac{4n}{n+1}}, & \text{if } n > 2 \\ \sqrt{3}, & \text{if } n = 2 \\ \infty, & \text{if } n < 2 \end{cases}.$$

If $\alpha_2 > \bar{\alpha}_H$, player 2 will always be a scholar in equilibrium. If, additionally,

- (1) *The cost of interacting is sufficiently high ($k \geq \bar{k}_1$) and player 1's academic ability is sufficiently low ($\alpha_1^2 \leq 1 + \frac{2}{(n+1)}\alpha_2^2$): equilibria exist in which the players do not interact and player 1 is a musician.*

¹⁴The preceding intuition can be stated more formally, as follows. Consider a modification of the two-player game of this paper in which players do not choose whether to initiate interaction: instead x_1 and x_2 are exogenously given. (1) If the players do not interact ($G(x_1, x_2) = 0$), the game exhibits strategic substitutability. (2) If the players do interact ($G(x_1, x_2) = 1$), the game does not exhibit strategic substitutability; in the limit as the size of the background population $n \rightarrow \infty$, the game exhibits strategic complementarity. The game exhibits strategic complementarity in the limit because players' desire to differentiate from one another decreases as the population size increases.

- (2) *The cost of interacting is sufficiently high ($k \geq \bar{k}_2$) and player 1's academic ability is sufficiently high ($\alpha_1^2 \geq 1 + \frac{2}{(n+1)}\alpha_2^2$): equilibria exist in which the players do not interact and player 1 is a scholar.*
- (3) *The cost of interacting is sufficiently low ($k \leq 0$) and player 1's academic ability is sufficiently low ($\alpha_1^2 \leq \frac{1}{4} + \frac{1}{2(n+1)}\alpha_2^2$, $\alpha_1 < 1$): equilibria exist in which the players interact and player 1 is a musician.*
- (4) *The cost of interacting is sufficiently low ($k \leq \bar{k}_3$) and player 1's academic ability is sufficiently high ($\alpha_1^2 \geq \frac{1}{4} + \frac{1}{n+1}\alpha_2^2$, $\alpha_1 > \frac{4}{3(n+1)}\alpha_2^2$): equilibria exist in which the players interact and player 1 is a scholar.*
- (5) *The cost of interacting is sufficiently low ($k \leq 0$) and player 1's academic ability is in an intermediate range ($1 < \alpha_1^2 < \frac{2}{3(n+1)}\alpha_2^2$): equilibria exist in which the players interact and player 1 focuses on but does not value academics.*

where:

$$\begin{aligned}\bar{k}_1 &= \frac{1}{2} \left(\frac{n+1}{n+2} \right)^2 \max \left(4\alpha_1^2 - \frac{4}{n+1}\alpha_2^2 - 1, -\frac{2}{n+1} \right), \\ \bar{k}_2 &= \left(\frac{n+1}{n+2} \right)^2 \left(\frac{3}{2}\alpha_2^2 - \frac{1}{n+1}\alpha_1^2 \right), \\ \bar{k}_3 &= \left(\frac{n+1}{n+2} \right)^2 \min \left(\frac{3}{2}\alpha_2^2 - \frac{2}{n+1}\alpha_1^2, 2\alpha_2^2 - \frac{1}{2} - \frac{4}{n+1}\alpha_1^2 \right).\end{aligned}$$

We see in Figure 4, as one might expect, that the players do not interact when it is costly to do so (k is high); they do interact when it is not costly (k is low). Player 1 becomes a musician when his academic ability is low (α_1 low); and he becomes a scholar when his academic ability is high (α_1 high). When k is low – so that the players interact – and player 1's ability is in an intermediate range, player 1 exerts effort at academics so player 2 will esteem him more highly. However, he chooses not to value academics, since his achievement is below average.

Comparative Statics

The four dotted lines in Figure 4 represent the possible consequences of encouraging interaction (decreasing k). If player 1's academic ability is sufficiently low, player 1 will be a musician regardless (see the first dotted line). Encouraging interaction has no effect on the behavior of either player.

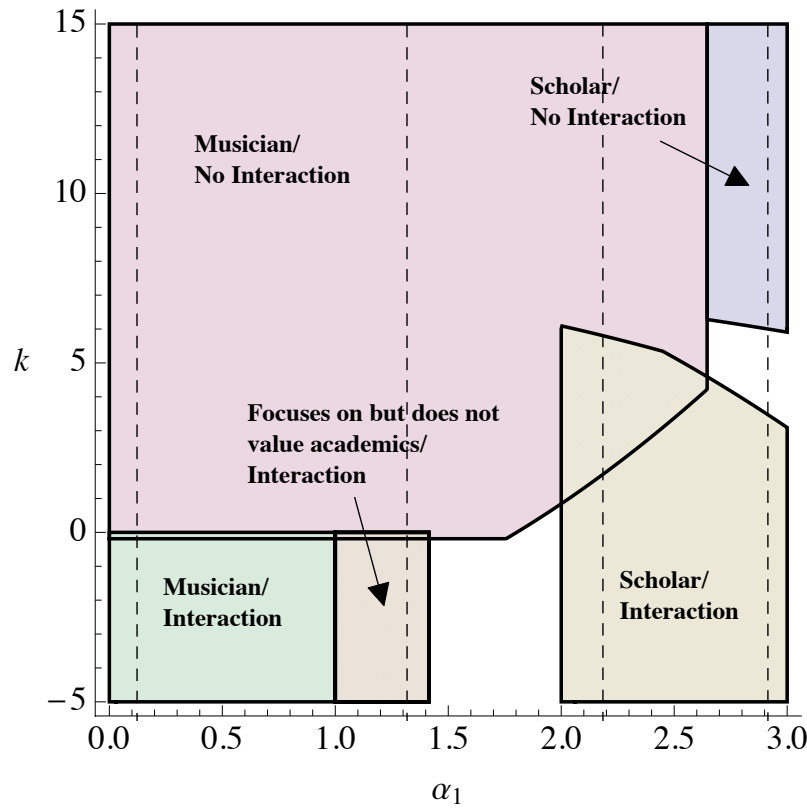


Figure 4 – Player 1’s equilibrium behavior. (Blank spaces are regions where equilibria do not exist; the dotted lines are used in the discussion of comparative statics.)

If player 1’s academic ability is slightly higher (the second dotted line), player 1 will choose to focus on academics – rather than become a musician – when interaction takes place. But, player 1 chooses not to value academics, since his achievement is below average.

If player 1’s academic ability is higher still (the third dotted line), player 1 switches from being a musician to a scholar when interaction takes place. Interaction causes player 1 to value academics as well as focus on it, in contrast to the second dotted line. Player 2 is also affected by interaction in this case: he exerts more effort at academics, motivated as he is by the desire to be highly esteemed by his peer (who also values

academics).^{15,16}

Finally, if player 1's academic ability is sufficiently high (the fourth dotted line), both players will be scholars regardless of whether they interact. But, interaction does affect players' effort. Both exert more effort at academics: since they are motivated by a desire to obtain the other player's esteem.

Case 2. *One of the players has low academic ability.*

Proposition 3 characterizes the equilibria when one of the players – without loss of generality, player 1 – has low academic ability ($\alpha_1 < \bar{\alpha}_L$). This case closely mirrors the first. Player 1 will always be a musician. The behavior of player 2 depends upon α_2 and k . Figure 5 illustrates the equilibrium behavior of player 2 as a function of α_2 and k for a representative case (in which $\alpha_1 = \frac{1}{4}$ and $n = 2$).

Proposition 3. *Suppose, without loss of generality, player 2 is more able than player 1 at academics ($\alpha_2 \geq \alpha_1$) and suppose $\bar{\alpha}_L$ is defined as follows:*

$$\bar{\alpha}_L = \begin{cases} \sqrt{\frac{n+1}{4n}}, & \text{if } n > 2 \\ \sqrt{\frac{1}{3}}, & \text{if } n = 2 \\ 0, & \text{if } n < 2 \end{cases}$$

If $\alpha_1 < \bar{\alpha}_L$, player 1 will always be a musician in equilibrium. If, additionally,

- (1) *The cost of interacting is sufficiently high ($k \geq \bar{k}_1$) and player 2's academic ability is sufficiently low ($\alpha_2^2 \leq \frac{n-1}{n+1}$): equilibria exist in which the players do not interact and player 2 is a musician.*
- (2) *The cost of interacting is sufficiently high ($k \geq \bar{k}_2$) and player 2's academic ability is sufficiently high ($\alpha_2^2 \geq \frac{n-1}{n+1}$): equilibria exist in which the players do not interact and player 2 is a scholar.*

¹⁵According to Lemma 1, when the players do not interact, player 2 exerts effort $\left(\frac{n+1}{n+2}\right) \alpha_2$ at academics and his achievement is $\left(\frac{n+1}{n+2}\right) \alpha_2^2$; when the players do interact, player 2 exerts effort $2 \left(\frac{n+1}{n+2}\right) \alpha_2$ at academics and his achievement is $2 \left(\frac{n+1}{n+2}\right) \alpha_2^2$.

¹⁶Goffman (1959) would call this a form of "presentation of self." One contribution of this paper is to capture such motivation and show some of its consequences.

- (3) The cost of interacting is sufficiently low ($k \leq \bar{k}_3$) and player 2's academic ability is sufficiently low ($\alpha_2^2 \leq \frac{4n}{n+1}$): equilibria exist in which the players interact and player 2 is a musician.
- (4) The cost of interacting is sufficiently low ($k \leq 0$) and player 2's academic ability is sufficiently high ($\alpha_2^2 \geq 4 - \frac{2}{n+1}$): equilibria exist in which the players interact and player 2 is a scholar.

where:

$$\bar{k}_1 = \left(\frac{n+1}{n+2}\right)^2 \max\left(\frac{3}{2} - \frac{1}{n+1}, \frac{1}{2}\alpha_2^2 - \frac{1}{2}\right),$$

$$\bar{k}_2 = \left(\frac{n+1}{n+2}\right)^2 \max\left(-\frac{1}{n+1}, \frac{2n}{n+1} - \frac{1}{2}\alpha_2^2, 2\alpha_1^2 - \frac{1}{2} - \frac{2\alpha_2^2}{n+1}\right),$$

$$\bar{k}_3 = \left(\frac{n+1}{n+2}\right)^2 \min\left(\frac{3}{2} - \frac{2}{n+1}, 2\left(\frac{n-1}{n+1}\right) - \frac{1}{2}\alpha_1^2\right).$$

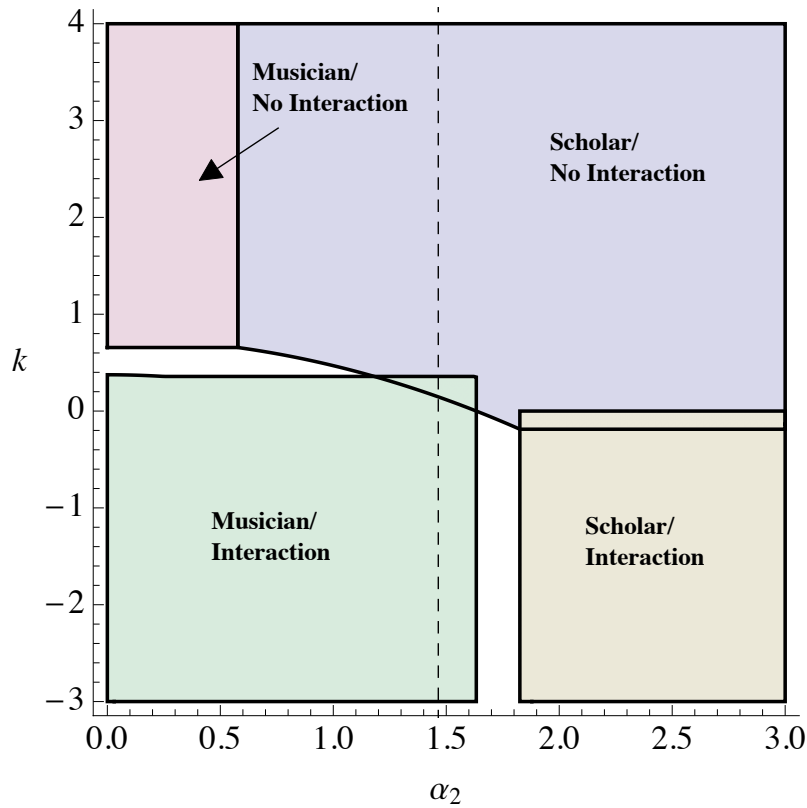


Figure 5 – Player 2's equilibrium behavior. (Blank spaces are regions where equilibria do not exist; the dotted line is used in the discussion of comparative statics.)

We see in Figure 5 that the comparative statics are similar to those in the first case. In the first case, interaction made it more likely player 1 would focus on and value academics. In this case, interaction makes it more likely player 2 will focus on and value *music*. The dotted line in Figure 5 shows that interaction causes player 2 to switch from a scholar to a musician when he has intermediate academic ability.

The one (small) difference between this case and the previous is that no equilibria arise in which player 2 focuses on an activity but does not value it. The reason for this difference is that, in contrast to academics, the players have the same musical ability.¹⁷

Case 3. *Both players have intermediate academic ability.*

When both players' abilities are in an intermediate range ($\bar{\alpha}_L \leq \alpha_1, \alpha_2 \leq \bar{\alpha}_H$), it is not possible to draw a representative picture – in two dimensions – of the equilibrium set as we did for the previous two cases. However, we can still characterize the equilibria (see Proposition 4 below) and examine the model's comparative statics. Importantly, as in the previous two cases, encouraging interaction makes it more likely players will focus on and value the same activities. This is stated formally in Lemma 5.

Proposition 4. *Suppose, without loss of generality, player 2 is more able than player 1 at academics ($\alpha_2 \geq \alpha_1$). Suppose further that $\bar{\alpha}_L \leq \alpha_1, \alpha_2 \leq \bar{\alpha}_H$. If, additionally,*

- (1) *The cost of interacting is sufficiently high ($k \geq \bar{k}_1$), and the players have high – and similar – academic ability ($\alpha_1^2 \geq 1 + \frac{2}{n+1}\alpha_2^2$): an equilibrium exists in which the players do not interact and both are scholars.*
- (2) *The cost of interacting is sufficiently high ($k \geq \bar{k}_2$) and the players' academic ability is low ($\alpha_2^2 \leq \frac{n-1}{n+1}$): an equilibrium exists in which the players do not interact and both are musicians.*
- (3) *The cost of interacting is sufficiently high ($k \geq \bar{k}_3, k > \bar{k}_4$) and player 2's academic ability is sufficiently high relative to player 1's ($\alpha_2^2 \geq \max(\frac{n-1}{n+1}, \frac{n+1}{2}(\alpha_1^2 - 1))$): an equilibrium exists in which the players do not interact, player 1 is a musician, and player 2 is a scholar.*

¹⁷The logic is simple. Because the players have identical musical ability, they will have the same level of achievement whenever they both focus on music. It follows that player 2 will always value music when he focuses on it – since his achievement will never be below average.

- (4) The cost of interacting is sufficiently high ($k \geq \bar{k}_5$) and the players both have an intermediate level of academic ability ($\alpha_1^2 \geq \max(\frac{n-1}{n+1}, \frac{n+1}{2}(\alpha_2^2 - 1))$): an equilibrium exists in which the players do not interact, player 1 is a scholar, and player 2 is a musician.
- (5) The cost of interacting is sufficiently low ($k \leq \bar{k}_6$), the players have high – and similar – academic ability ($\alpha_1^2 \geq \frac{1}{4} + \frac{1}{n+1}\alpha_2^2$, $\alpha_1^2 > \frac{4}{3(n+1)}\alpha_2^2$), and $n \geq 1$: equilibria exist in which the players interact and both are scholars.
- (6) The cost of interacting is sufficiently low ($k \leq \bar{k}_7$), the players have low academic ability ($\alpha_2^2 \leq \frac{4n}{n+1}$), and $n \geq 1$: equilibria exist in which the players interact and both are musicians.

Two additional types of equilibria exist when $n \leq 1$. If:

- (7) The cost of interacting is sufficiently low ($k \leq 0$), player 2's academic ability is sufficiently high relative to player 1's ($\alpha_2^2 \geq \max(\frac{4n+2}{n+1}, (n+1)(2\alpha_1^2 - \frac{1}{2}))$), and player 1 has low academic ability ($\alpha_1^2 < 1$): equilibria exist in which the players interact, player 1 is a musician, and player 2 is a scholar.
- (8) The cost of interacting is sufficiently low ($k \leq 0$), player 2's academic ability is sufficiently high relative to player 1's ($\alpha_2^2 \geq \max(\frac{3}{2}(n+1)\alpha_1^2, 1 + \frac{2}{n+1}\alpha_1^2)$), and player 1 has high academic ability ($\alpha_1^2 > 1$): equilibria exist in which the players interact, player 1 focuses on but does not value academics, and player 2 is a scholar.

where:

$$\begin{aligned}\bar{k}_1 &= \left(\frac{n+1}{n+2}\right)^2 \max\left(\frac{3}{2}\alpha_2^2 - \frac{1}{n+1}\alpha_1^2, \frac{1}{2} - \frac{1}{2}\alpha_1^2\right), \\ \bar{k}_2 &= \left(\frac{n+1}{n+2}\right)^2 \left(\frac{3}{2} - \frac{1}{n+1}\right), \\ \bar{k}_3 &= \left(\frac{n+1}{n+2}\right)^2 \max\left(\frac{2n}{n+1} - \frac{1}{2}\alpha_2^2, 2\alpha_1^2 - \frac{2}{n+1}\alpha_2^2 - \frac{1}{2}, \frac{-1}{n+1}\right), \\ \bar{k}_4 &= \left(\frac{n+1}{n+2}\right)^2 \left(\frac{1}{2}\alpha_1^2 - \frac{1}{n+1}\alpha_2^2 - \frac{1}{2}\right), \\ \bar{k}_5 &= \left(\frac{n+1}{n+2}\right)^2 \max\left(\frac{2n}{n+1} - \frac{1}{2}\alpha_1^2, 2\alpha_2^2 - \frac{2}{n+1}\alpha_1^2 - \frac{1}{2}, \frac{-1}{n+1}\right), \\ \bar{k}_6 &= \max\left(0, \left(\frac{n+1}{n+2}\right)^2 \min\left(\frac{3}{2}\alpha_2^2 - \frac{2}{n+1}\alpha_1^2, 2\alpha_2^2 - \frac{4}{n+1}\alpha_1^2 - \frac{1}{2}\right)\right), \\ \bar{k}_7 &= \max\left(0, \left(\frac{n+1}{n+2}\right)^2 \min\left(2\left(\frac{n-1}{n+1}\right) - \frac{1}{2}\alpha_1^2, \frac{3}{2} - \frac{2}{n+1}\right)\right).\end{aligned}$$

Lemma 5. *Hold α_1 and α_2 fixed. Suppose a decline in k causes the players to move from an equilibrium in which they were not interacting (equilibrium 1) to an equilibrium in which they do interact (equilibrium 2). Such a decline in k makes it more likely that the players will focus on the same activity and will hold the same values. More specifically, if players do not focus on the same activity (hold the same values) in equilibrium 2, they definitely do not focus on the same activity (hold the same values) in equilibrium 1.*

3 An Extension: Many Players

This section shows how the model can be extended to allow for more than two players and more than two activities. It also characterizes the equilibria for a simple case. In contrast to the baseline model, in which there was a background population whose actions were fixed, the behavior of the entire population is determined endogenously.

Assume there is a continuum of players ($i \in [0, 1]$). As before, players make three choices: (1) effort at M activities ($e_{is} \geq 0$), (2) whether to value achievement at activities ($\theta_{is} \in \{0, 1\}$), and (3) whether to initiate interaction ($x_i^j \in \{0, 1\}, j \neq i$). x_i^j denotes player i 's choice whether to initiate interaction with player j ; players interact if either initiates it. Player i 's achievement at activity s (a_{is}) depends upon his effort and ability (α_{is}): $a_{is} = \alpha_{is} \cdot e_{is}$, where $\alpha_{is} \geq 0$.

The players have the following utility function, the terms of which are analogous to those in the baseline model:

$$U_i = -\frac{1}{2} \left(\sum_{s=1}^M e_{is} \right)^2 - k\bar{x}_i + E_i.$$

The first term is the cost of effort. The second term is the cost of initiating interaction, where \bar{x}_i denotes the share of the population with whom player i initiates interaction. The final term is esteem utility. To simplify analysis, we assume players prefer not to exert effort at activities or value activities when they are otherwise indifferent.

Esteem utility is given by:

$$E_i = \beta E_i^i + \int_{j \neq i} G(x_i^j, x_j^i) \cdot E_i^j dj,$$

where $G(x_i^j, x_j^i) = 1$ if interaction takes place between players i and j (if x_i^j or $x_j^i = 1$) and $G(x_i^j, x_j^i) = 0$ otherwise. The first term reflects player i 's concern about self-esteem (E_i^i). The second term reflects player i 's concern about peer esteem (E_i^j). We parameterize the weight players put on self-esteem by β (this will allow us to examine how concern about self-esteem affects the size of groups). As before, the esteem player i grants a player $l - l$ may refer to himself or another player – is given by: $E_l^i = \sum_{s=1}^M \theta_{is} (a_{ls} - \bar{a}_s)$, where \bar{a}_s denotes the average achievement of the whole population at activity s .

Again, we will focus on pure-strategy Nash equilibria.

Equilibria

As in the baseline model, there is a tension between players' desire to conform and players' desire to differentiate. Equilibria resolve this tension. We will characterize the equilibria for a simple case, in which players have ability of 1 at all activities ($\alpha_{is} = 1$ for all i and s) and the cost of initiating interaction is negligible ($k = 0^+$).¹⁸

Lemma 6 relates three properties of equilibria.

Lemma 6. *Suppose players have ability of 1 at all activities and there is a positive but negligible cost of initiating interaction. Then, equilibria have the following properties:*

- (1) *Players value one activity in equilibrium (except perhaps a set of players of measure zero).*
- (2) *Players interact with all those who share their values (except perhaps a set of measure zero) and no players with different values.*
- (3) *Players who value activity s exert effort $\lambda_s + \beta$ at activity s , where λ_s denotes the fraction of players who value activity s ; they exert zero effort at other activities; and they receive utility $(\frac{1}{2} - \lambda_s) (\lambda_s + \beta)^2$.*

¹⁸When players have heterogeneous ability, fully characterizing the equilibria is quite involved. Hence, doing so is beyond the scope of the paper.

According to Lemma 6, players form interaction groups according to their values. Proposition 5 characterizes the equilibria in which those groups are of equal size.¹⁹

Proposition 5. *Suppose players have ability of 1 at all activities and there is a positive but negligible cost of initiating interaction. The following is a characterization of the equilibria in which all groups are of equal size.*

- (1) *Equilibria exist in which the players divide into M groups, each of size $\frac{1}{M}$.*
- (2) *If $\beta < 1$ and $\bar{m} < m < M$: equilibria exist in which the players divide into m groups, each of size $\frac{1}{m}$. \bar{m} solves: $(\frac{1}{2} - \frac{1}{m})(\frac{1}{m} + \beta)^2 = \frac{1}{2}\beta^2$.*

According to Proposition 5, players either divide across all M activities in equilibrium or across a subset of size $m > \bar{m}$. As concern about self-esteem (β) increases, \bar{m} increases. In this sense, the equilibrium number of groups is rising in β and the equilibrium size of groups is falling in β . This result is intuitive since players have a stronger desire to differentiate when they care more about self-esteem.

The group size that maximizes players' utility is: $\lambda^* = \max(\frac{1-\beta}{3}, \frac{1}{M})$. As one would expect, the optimal group size is decreasing in β since concern about self-esteem makes players more inclined to differentiate. It follows from Proposition 5 that the equilibrium group size may be larger than or smaller than the optimum (λ^*). The prediction that groups may be suboptimally large is quite robust; the prediction that groups may be suboptimally small is less robust. This finding depends upon players having zero mass. If players had non-zero mass, they would deviate to form larger groups when the groups are suboptimally small. Hence, these equilibria disappear under a suitable equilibrium refinement.

4 Applications

This section highlights a number of environments where the theory explains observed patterns.

¹⁹There can be at most two group sizes in equilibrium. Suppose one group is of size $\bar{\lambda}$. This group gives members utility $\bar{U} = (\frac{1}{2} - \bar{\lambda})(\bar{\lambda} + \beta)^2$. In equilibrium, all groups must yield the same utility: otherwise, players switch groups. Observe that there is at most one other value of λ that yields \bar{U} .

Schools

The model is consistent with a variety of findings about schools. One of the classics in the sociology of education is James Coleman's (1961) *Adolescent Society*. Coleman's study, based upon research conducted in ten Illinois schools, provides strong evidence that students face a conflict between conforming and differentiating. More recent studies such as Milner (2004) and Crosnoe (2011) – appropriately titled *Fitting in, Standing Out* – also stress the importance of such a conflict. Using questionnaires, Coleman looked at the self-esteem of students. As one might expect, students in the “leading crowd” had high self-esteem. Students distant from the leading crowd, it turns out, also had high self-esteem. The students in the middle, who were associated with, but not solidly members of, the leading crowd, had the lowest self-esteem.²⁰

Coleman's explanation for this pattern is in line with the model. He argues that students distant from the leading crowd restore self-esteem by adopting different values.²¹ In keeping with this view, he finds that only a small fraction of students distant from the leading crowd want to be part of it (in senior year, just 12 percent). Students in the middle – who conform to the leading crowd's values but receive only limited acceptance – are willing to suffer low self-esteem, he argues, because they receive, in exchange, more esteem/status within the school as a whole. Observe that Figure 3 looks just like Coleman's findings if we think of α as ability to fit into the leading crowd: high- α types in Figure 3 are the leading crowd; low- α types are the students distant from the leading crowd; those in the middle, with the lowest self-esteem, are the hangers-on to the leading crowd.

The model predicts that student achievement is increasing (decreasing) in peer ability when peer ability is low (high). This prediction reconciles empirical findings about peer effects in schools. Many studies report large, positive effects of having peers with higher academic ability. For instance, looking at a large matched panel of third-to-sixth graders in Texas public schools, Hanushek et al. (2003) find that a one standard deviation increase in average peer test score leads to a 0.20 standard deviation increase in own test score. But a significant minority of studies, instead, report negative effects. Carrell et

²⁰Coleman measured self-esteem by asking students whether they would prefer to be someone else.

²¹Coleman writes: “Rather than continuing to hold a negative image about himself, the adolescent... will focus his interest on [activities] where he can feel good about himself.”

al. (2013), for example, find negative peer effects in an experiment conducted at the US Air Force Academy. Some students were put into squadrons that were positively sorted by academic ability while others were put into squadrons that were negatively sorted. The lowest ability students – those in the bottom third – performed worse under negative assortment (i.e., when they had more able peers). Their GPAs were 0.061 points lower. Carrell et al. (2013) also examined social interactions within squadrons: looking, specifically, at friendships, roommate selection, and choice of study partners. In keeping with the model's predictions (see Figure 1), students avoided interaction with peers of different ability. The negatively selected squadrons divided into homogeneous subgroups.²²

Finally, an important finding of the education literature is that, while public schools are somewhat comparable to Catholic schools in educating students at the top, Catholic schools have greater success with students at the bottom (see Powell et al. (1985)'s *Shopping Mall High School*). Altonji et al. (2005), for instance, find that attending a Catholic school rather than a public school substantially decreases the chance of dropout (by at least five percentage points). The cohesiveness of the Catholic schools relative to the public schools is a frequently cited reason for their success (see especially Bryk et al. (1993), Lesko (1988), and Coleman et al. (1982)). This difference is due, in significant measure, to public schools' greater permissiveness in choice of curriculum. Such choice allows the best students to separate themselves out (for example, into AP pro-

²²Hoxby and Weingarth (2005) report results similar to those of Carrell et al. (2013). They find that the worst students (those in the bottom decile) benefit more from having additional mediocre peers (peers in the 15th percentile) than they do from having additional high ability peers (peers in the 85th percentile). A ten percentage point increase in the share of peers scoring in the 15th percentile generates 4.5 more test points than the same size increase in the share of peers in the 85th percentile. 4.5 test points translates to 0.185 standard deviations: a substantial difference.

Other studies that have found negative peer effects include: Kling et al. (2005, 2007), who study the Moving to Opportunity (MTO) experiment; Cicala et al. (2011), who examine evidence from the New York Public Schools; and Lavy et al. (2012), who look at data on English secondary school students. Some studies, such as Kling et al. (2005, 2007), find negative peer effects for boys and positive peer effects for girls. The model suggests two possible explanations for these gender differences. The first explanation is that there may be differences between men and women in the economic part of the utility function. For instance, in the MTO experiment, the girls might be more attached to the labor force than the boys because of a need – or expected need – to support children. The second explanation is that there may be a difference between men and women in the non-economic part of the utility function. In particular, males may care more about self-esteem while women may care more about obtaining esteem from peers. Some social scientists, such as Gilligan (1982), Maccoby (1990), and Giordano (2003), have postulated the existence of such a difference.

grams). Bryk et al. (1993) construct 23 separate measures of cohesiveness, all of which are greater for the Catholic schools.²³ Cohesiveness, it is argued, makes students at the bottom more academically oriented, and hence less inclined to drop out. The model captures this story. We can think of Catholic schools as an environment where students of differing ability are forced to interact. As we saw in Figure 4, the performance of those at the bottom (low- α types) may improve when they are forced to interact with those at the top (high- α types).²⁴

The Decline of Inner Cities

One of the foremost problems in the United States has been the economic and social decline of the inner city. Many statistics are indicators: low rates of young male employment; high incarceration rates; and high incidence of out-of-wedlock births and single-parent households.

The leading explanation, given by William Julius Wilson, emphasizes the role of cultural change (see Wilson (1997, 2009)).²⁵ In Wilson's view, the decline of the inner city was primarily brought about by two shocks. One shock was deindustrialization, which began in the late 1960s. Manufacturing had been a locus of jobs especially well-suited

²³For example, Bryk et al. (1993) find that there is a higher likelihood in Catholic schools of a teacher knowing a given student; they also find that a greater fraction of students participate in extracurricular activities.

²⁴Another strand of the education literature concerns the effects of tracking. A potential reason for tracking is that it allows teachers to tailor the curriculum to student abilities. But, there are also peer effects associated with tracking. For example, Kulik and Kulik (1992) suggest that being put in a low track allows low-ability students to avoid comparing themselves to more able peers, and therefore enhances their self-esteem. Thus, Kulik and Kulik (1992) believe tracking may increase the motivation of low-ability students. Other scholars (see Oakes (1985)) worry that a low track reduces student self-esteem, and as a result, decreases their motivation.

These competing peer effects can be understood in terms of the model. Kulik and Kulik's point corresponds to the potential positive effect on academic achievement in the model of having a less able peer (see Figure 2). Oakes' argument can be understood in an extension to the model, in which players have imperfect information about their relative achievement. In such an extension, receiving a negative signal about one's relative academic achievement could cause a decline in academic performance. Oakes' point is that being put in a low track might serve as just such a negative signal.

A recent experiment on tracking by Duflo et al. (2011), conducted in Kenya, finds positive effects of tracking for students in all quantiles.

²⁵Other scholars who emphasize the role of culture include Anderson (1999), Massey and Denton (1993), Waters (1999), Patterson (2000), Wacquant (2008), Harding (2010), and Harding et al. (2010). Loury (1998, 1999) also argues that economists need to incorporate values and social interactions into their analysis of the inner city.

for the low skilled, but willing-to-work. The other shock was middle-class flight: in the 1970s, significant numbers of middle-class African Americans left the inner city, as reduced discrimination made flight to the suburbs possible.

The resultant concentration of joblessness, in Wilson's view, led to the emergence of a street culture, in opposition to mainstream values. This street culture allowed marginalized inner-city residents to retain a modicum of dignity; however, it further blocked opportunities.²⁶ In Wilson's survey of 190 Chicago-area employers, for example, many indicate pessimism about the work ethic of inner-city workers and express a reluctance to hire them. Some even throw applications out solely on the basis of inner-city addresses.^{27,28}

The model captures Wilson's story. Think of activity 1 in the model as working and activity 2 as street-related activity. Deindustrialization is like a negative shock to α (ability to work). As we see in Figure 1, a reduction in α can cause a player to shift from an activity-1 (work) orientation to an activity-2 (street) orientation.²⁹ Middle-class flight is like a shock to k since it cuts off interaction between inner-city residents and the middle class. As we see in Figure 4, an increase in k that keeps a player from interacting with a high- α peer can induce a switch from an activity-1 (work) orientation to an activity-2 (street) orientation.

²⁶Ethnographies show that motivations in the inner city comport with Wilson's story. See especially Bourgois (1996), Anderson (1999), Venkatesh (2006), and Liebow (1967).

²⁷Waters (1999) finds that, among inner city residents, employers have a preference for hiring recent West Indian immigrants, whose values are less oppositional. In consequence, West Indian immigrants have a significantly higher rate of labor force participation. According to Waters, as West Indian immigrants assimilate, their differences relative to other inner city residents diminish: "Many of the children of the immigrants develop 'oppositional identities'....The cultural behaviors associated with these oppositional identities...erode the life chances of the children of the West Indian immigrants."

²⁸As additional evidence of a cultural shift, Fryer and Levitt (2004) have found that, in the early 1960s, there was little difference between the types of names chosen by African Americans and whites for their children. But, a major shift took place in the late 1960s and early 1970s. The median African-American female in a segregated neighborhood in California went from receiving a name that was twice as likely to be given to African Americans as whites to receiving a name that was twenty times as likely to be given to African Americans as whites. At the same time, a subset of African Americans, comprising roughly one quarter of all African Americans and one half of African Americans living in predominantly white areas, moved towards names that were more white than those they had chosen previously. This latter finding suggests a cultural shift – in the opposite direction – among middle-class African Americans.

²⁹A key assumption here is that inner-city residents compare themselves to people outside the inner city who are less affected by deindustrialization. If inner-city residents compared themselves only to other inner-city residents, it is not clear that deindustrialization would have brought about a significant shift in values.

The model predicts that, when some inner-city residents shift to a street orientation, they will start to look down on those who maintain a work orientation; they will put pressure on those residents to shift to a street orientation as well. Numerous scholars have described the existence of such pressure. In particular, Fordham and Ogbu (1986) describe the use of the term “acting white” as a pejorative.³⁰ Students who perform too well in school, for example, are so derided.³¹ Also in line with this prediction of the model, Furstenberg et al. (1999) find that many parents deliberately practice a strategy of social isolation in order to keep their kids away from negative influences. On the flip side, Newman (1999)’s study of workers at “Burger Barn” in Harlem examines the power of positive social influences. She describes, for instance, how Kyesha, when she first went to work at Burger Barn, was a poorly-performing sophomore in high school leaning towards a street orientation. Like the majority of her friends, she was at high risk of dropping out. Kyesha pulled away from her high school friends, though, as Burger Barn became the center of her social life. She ended up graduating (with a respectable average no less).

Resistance

Robert Ramsay (1966)’s study of the merchant marines describes crewmen’s intense anger at ship’s officers and the numerous ways in which they resisted officers’ orders. For instance: the catering staff would “heave a whole pile of dirty dishes through an open port-hole instead of washing them”³²; crewmen would intentionally foul up tanks while cleaning them; stewards in charge of personal laundry would burn through shirts with an iron “by mistake”; and deck crews would “take a malicious delight” in painting over oil and water.

What incensed the crew might seem minor. For example, Ramsay describes their anger when a broken coffee percolator was replaced with an old one in poor repair, retired from the officers’ saloon. In Ramsay’s view, the percolator was a serious issue rather than a minor one because of what it symbolized: “what enraged the crewmen was the knowledge that in the minds of those responsible [they] weren’t even worth a

³⁰See also Carter (2005), who tells a similar story in *Keepin’ It Real*.

³¹Austen-Smith and Fryer (2005) construct a model of “acting white” in which some students obtain less education in order to signal loyalty to their peers. The mechanism they describe is somewhat different.

³²Ramsay (1966), p. 123.

cup of coffee.”³³ In other words, the crew’s anger and resistance stemmed from being denied the esteem they felt was due. In terms of the model, E_i^i (the crew’s self-esteem) exceeded E_i^j (the officers’ esteem for them).

Workplace resistance has received relatively little attention in economics, but it is a major theme in sociology and is seen as important for understanding organizational dysfunction (for reviews, see Collinson and Ackroyd (2005) and Hodson (1995)). Forms of resistance that have been studied include absenteeism (see Edwards (1986), Gouldner (1954)), pilfering (see Mars (1982), Westwood (1984)), sabotage (see Juravich (1985)), and hazing (see Vallas (2006)).^{34,35} Scholars such as Hodson (1995, 2001) and Cavendish (1982) argue that denial of esteem is one of the primary reasons workers engage in resistance.³⁶

The model explains why workers would feel they had been denied the esteem they deserve ($E_i^j < E_i^i$). In so doing, it accounts for the presence (or absence) of resistance in numerous settings.³⁷ For instance, the model not only explains why many in the inner city adopt street orientations; it also explains why they then engage in resistance in the workplace. Consider Philippe Bourgois (1996)’s study of Primo, a Harlem crack dealer in the 1980s. In his early teens, Primo was work oriented, motivated to pursue the “working-class dream of finding a . . . factory job and working hard for steady wages.” When the garment industry left New York, though, Primo had difficulty making the transition into the service sector. Primo’s response was to adopt a street orientation. According to Bourgois, he made a “cultural redefinition [whereby] crack dealing and unemployment [are] a badge of pride.” Primo occasionally took service sector jobs, but

³³Op. cit., p. 99.

³⁴Vallas (2006), for example, describes hazing at a paper mill, stemming from manual workers’ anger at engineers, who accorded them low esteem. The manual workers taught a young engineer to press a particular black button whenever the paper machine went down, knowing full well that the button was not yet wired to the console. The manual workers “enjoyed the sight of this credentialed employee desperately pushing a useless button – a scene that went on for a period of several weeks.”

³⁵Some sociologists have used the term “resistance” to refer to shirking, which might be motivated by economic considerations (see, for instance, Burawoy (1979)). Nonetheless, the term is normally used to refer to behavior that is not purely economic in nature.

³⁶Other scholars have stressed differences in values as a reason for resistance (see Scott (1985)). Observe that, in the model, an agent i only feels he has been denied the esteem due to him by an agent j ($E_i^j < E_i^i$) when agents i and j possess different values.

³⁷It is important to note that anger-over-denial-of-esteem and the resistance such anger might bring about are not explicitly modeled in the paper. However, one could imagine doing so as an extension.

because of his street orientation, he received less respect from coworkers than he felt he deserved ($E_i^j < E_i^i$). This led him to engage in resistance. Bourgois describes how, in a mailroom job, Primo enjoyed putting on a thick accent when answering the phone – just to annoy his supervisor. More seriously, he pocketed money he had been given to mail letters. His behavior, not surprisingly, quickly got him fired.

The model also explains resistance in schools, such as the misbehavior documented by Willis (1977) in his study of “the lads” – a group of boys at a secondary school in the English Midlands. The lads’ working-class values stand in sharp contrast to the middle-class values of the teachers and other students at the school (whom they pejoratively refer to as “ear’oles”). While the teachers’ particularly stress the importance of academic achievement, the lads emphasize the importance of masculinity. They look down on the teachers, whom they consider effete. A consequence of their different values is that the lads feel the teachers accord them too little respect ($E_i^j < E_i^i$). The disrespect they suffer provokes anger and resistance. They make it their aim to retaliate by defeating the school’s “main perceived purpose: to make you ‘work.’”³⁸ Fuzz (one of the lads) tries to thwart the teachers by never writing a single word: “I writ ‘yes’ on a piece of paper, that broke me heart.”³⁹ During class, “there is a continuous scraping of chairs, a bad tempered ‘tut-tutting’ at the simplest request.” Outside of class, too, the lads make mischief. On one occasion, they steal a fire extinguisher from the school and set it off in a local park. On another, they make a disturbance during a school assembly.

Thus, while resistance is a phenomenon largely overlooked by economists, it is of considerable importance. The model accounts for its presence or absence.

5 Conclusion

Values play an important role in shaping behavior. But, how do they form and what causes them to change? This paper addresses these questions. It presents a model in which people choose their values. The choice is motivated by economic considerations but, crucially, also by the desire for esteem. A tension exists for agents between a desire,

³⁸Willis (1977), p. 26.

³⁹Op. cit., p. 27.

on the one hand, to conform in the choice of values and a desire, on the other hand, to differentiate. In conforming, an agent obtains more esteem from peers; in differentiating, an agent may obtain more self-esteem.

The model's comparative statics are driven by this tension. Since agents care more about conforming when they interact, encouraging interaction makes them more likely to focus on – and value – the same activities. An increase in peer ability can have a positive or negative effect on own achievement, depending upon whether the desire to conform, or the desire to differentiate, dominates. We find that own achievement is increasing in peer ability when peer ability is low and decreasing in peer ability when peer ability is high.

The model describes a wide range of social phenomena. The model fits especially well the motivation of students. It explains, for example, the success of Catholic schools in preventing dropout and why studies have found both positive and negative peer effects. The model captures the role of culture in the decline of US inner cities. It especially elucidates William Julius Wilson's argument why deindustrialization and middle-class flight would have caused inner-city residents to shift from a work orientation to a street orientation. Furthermore, sociologists have emphasized the importance of "resistance" in organizations, which, in their view, frequently arises because of worker frustration over being accorded too little esteem. The model identifies the underlying factors that lead workers to feel they deserve more esteem. In so doing, it accounts for the presence or absence of resistance in many settings.

The paper suggests questions for future research, many relating to firms. Our focus has been on how values form, but a further question – relevant for firms – is: how might they be manipulated? How, for instance, might firms encourage obedience to authority (dependent as it is upon the formation of values that promote it)? How might firms structure the workplace so as to prevent workers from negatively influencing one another? And, how might firms reduce the likelihood of resistance? Understanding the answers to these questions will yield insight into firms – as well as other organizations.

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