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Integrating the Human Sciences to Evolve Effective Policies

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Abstract

This paper describes an evolutionary perspective on human development and wellbeing and contrasts it with the model of self-interest that is prominent in economics. The two approaches have considerably different implications for how human wellbeing might be improved. Research in psychology, prevention science, and neuroscience is converging on an evolutionary account of the importance of two contrasting suites of social behavior—prosociality vs. antisocial behaviors (crime, drug abuse, risky sexual behavior) and related problems such as depression. Prosociality of individuals and groups evolves in environments that minimize toxic biological and social conditions, promote and richly reinforce prosocial behavior and attitudes, limit opportunities for antisocial behavior, and nurture the pursuit of prosocial values. Conversely, antisocial behavior and related problems emerge in environments that are high in threat and conflict. Over the past 30 years, randomized trials have shown numerous family, school, and community interventions to prevent most problem behaviors and promote prosociality. Research has also shown that poverty and economic inequality are major risk factors for the development of problem behaviors. The paper describes policies that can reduce poverty and benefit youth development. Although it is clear that the canonical economic model of rational self-interest has made a significant contribution to the science of economics, the evidence reviewed here shows that it must be reconciled with an evolutionary perspective on human development and wellbeing if society is going to evolve public policies that advance the health and wellbeing of the entire population.

Keywords

Antisocial behavior; Evolution; Policy; Poverty; Prevention; Prosociality

1. Introduction: An evolutionary science of human behavior

This special issue examines how economics and policymaking could make a greater contribution to human wellbeing if they were integrated with other human sciences within an evolutionary framework. Gowdy, Dollimore, Witt, and Wilson (this issue) argue that

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D63 Equity, Justice, Inequality, and Other Normative Criteria and Measurement

D64 Altruism; Philanthropy

H23 Externalities; Redistributive Effects; Environmental Taxes and Subsidies

I14 Health and Inequality

J18 Public Policy

Z13 Economic Sociology; Economic Anthropology; Social and Economic Stratification

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“Evolutionary principles and evidence can be used to compare the model of human nature governed by self-interest in canonical economics with the more complex, socially embedded model of human nature ... (p. xx).”

This paper provides such a comparison. Over the past 30 years, diverse areas of the human sciences have converged on an understanding of the basic conditions that lead to the selection of prosocial behavior and those that lead to antisocial behavior and related problems. Developmental psychology has shown the benefit for the individual and the group of nurturing prosocial behavior and the harm resulting from allowing antisocial behavior and related psychological and behavioral problems to develop. Evidence from behavioral analyses of human interactions has delineated how these two types of behavior are selected by behavioral consequences. Neuroscience and genetics are demonstrating the biological substrata of these selection processes and provide plausible accounts of how both types of behavior were selected by their contribution to survival. Prevention science has identified numerous interventions that can prevent problem development and nurture prosocial behavior by ensuring that young people’s environments minimize conditions that select antisocial behavior and, instead, nurture the selection of prosocial behavior. And public health is providing a framework for translating the accumulated knowledge into benefits for entire populations.

These advances in our understanding of the biological and behavioral processes of selection bring human evolution to a point where we can realistically envision the intentional evolution of cultural practices that ensure the wellbeing of most people (Biglan, 2012). Guided by the principle of selection by consequences, we can specify the types of behavior that are beneficial to human wellbeing, the environments that select those behaviors, and the interventions that make their selection more likely. The canonical focus of economics on self-interest is not wholly irrelevant to this cultural evolution. But it must be reconciled with this emerging evolutionary account in order to contribute to the selection of the most beneficial public policies.

2. Selection of prosocial and antisocial behavior by their consequences

Evolution occurs at the behavioral as well as the genetic and epigenetic levels (Jablonka and Lamb, 2005). Evidence accumulated over the past 40 years by developmental and behavioral psychologists has delineated the selection of two contrasting suites of behavior with distinct selecting consequences and diametrically opposed effects on human wellbeing. This body of evidence stands in contrast to assumptions about the nature of human behavior that underpin the rational actor theory of economics and it leads to different conclusions about the policies needed to improve human wellbeing.

People—and those around them—benefit from a cluster of behaviors and attitudes best characterized as *prosociality*. Prosociality includes an orientation toward self-development and self-regulation, and toward helping others and the community (Kasser et al., 1995; Wilson and O’Brien, 2008). People high in these traits have fewer psychological and behavioral problems (Caprara et al., 2000; Kasser and Ryan, 1993; Sheldon and Kasser, 1998; Wilson and Csikszentmihalyi, 2008). They show greater empathy toward others (Eisenberg et al., 1991), do better in school (Caprara et al., 2000), have more and better friends (Clark and Ladd, 2000), and contribute to their community (Wilson and O’Brien, 2008). Groups with a high proportion of prosocial individuals benefit in many ways (Henrich, 2004; Kasser, 2004; Sober and Wilson, 1998; Wilson et al., 2012). Indeed, Kasser (2011) found that countries with a higher proportion of people who endorse prosocial values scored higher on measures of children’s wellbeing, provided better maternal leave benefits, advertised less to children, and emitted less CO₂.

In contrast, a large proportion of the suffering of individuals and those around them involves psychological and behavioral problems, including especially antisocial behavior, depression, substance abuse, risky sexual behavior, and academic failure. Until recently researchers and policymakers treated these problems as though they were unrelated. However, it is now clear they are highly inter-related. For example, 87% of 19-year-olds involved in violence have at least one other problem involving substance use or risky sexual behavior (Biglan et al., 2004). These problems develop primarily during childhood and adolescence, but once established they continue to harm people, often throughout their lives. They contribute to marital discord and divorce, abuse of others, crime, physical illness, and poverty (Biglan et al., 2004). They are also major risk factors for cardiovascular disease and cancer, thus playing a large role in the burden of healthcare costs (Anderson and Smith, 2003).

Patterson and colleagues (Patterson et al., 1992) have shown the conditions that select antisocial behavior and related problems. They directly observed the moment-to-moment interactions of parents and children. Young children's choose aggressive behavior after seeing its benefit in getting other family members to "back off." A parent tells a child to go to bed and the child whines. If the parent stops insisting that the child go to bed, it reinforces the child's whining. High-conflict families shape the aggressive repertoires of family members through hundreds of episodes in which escalating aggression causes other family members to desist from teasing, criticizing, or demanding. The same types of contingencies are involved in the development of marital discord (Patterson et al., 1976); couples' negative behavior toward one and other is selected by its intermittent success in getting their partner to stop aversive behavior. Thus, despite the long-term adverse consequences of these behaviors in modern society, they persist because of their short-term advantage in reducing the aversive behavior of others.

The fact that these problem behaviors are associated with numerous harmful outcomes might imply they have no long-term adaptive function. However, genetic, epigenetic, behavioral and neuroscientific analyses are converging to suggest that, in a stressful and threatening environment, these behaviors have survival value. Aggressive children are quick to respond to threat with counter-aggression and are prone to read others' behavior as threatening (Dodge, 2006). These children are more likely to form deviant peer groups in adolescence and the formation of these groups has been shown to contribute to early childbearing (Dishion et al., 2012). Thus, although this constellation of behaviors is counterproductive in modern society, it is highly plausible that in the evolutionary history of humans, those who were prone to be aggressive, form bonds with other aggressive individuals, and have children early would be more likely to survive and to pass on their genes (Ellis et al., 2009; 2011).

A similar convergence of behavioral and biological evidence is emerging in the study of depression (Allen and Badcock, 2006). Depression is more likely in stressful conditions (Hagen, 2011). Similar to the analysis of aggressive behavior, depressed behavior is more likely in families where such behavior gets other people to stop being aggressive toward the depressed person (Biglan et al., 1988). Thus depressive behavior may also play an evolutionary role in helping people to survive in threatening environments. It seems to function to reduce others' attacks by diminishing the attacker's motivation to continue the attack (Biglan, Hops, and Sherman, 1988; Biglan, 1991; Hagen, 2011).

Given the cost to individuals and society of antisocial behavior, depression, and related problems (Biglan et al., 2004), developing public policies that reduce the incidence and prevalence of these problems should be a high priority. Yet economic theory is largely silent about their origin or what can be done about them. Considering that policies that increase economic inequality and poverty contribute to the development of these problems

(Yoshikawa et al., 2012), and the fact that some versions of the rationale self-interest theory encourage such policies (Smith, 2012), it is imperative that economists bring the rational actor theory in line with current understanding of the development of pro- and anti-social behavior.

3. Nurturing human development through evidence-based treatment and prevention

Thirty years of treatment and prevention research show that problematic patterns of behavior can be prevented and prosociality promoted through nurturing family, school, and community environments (Biglan et al., 2012). The strongest evidence for the importance of nurturance comes from hundreds of randomized controlled trials of treatment and prevention interventions conducted in families and schools (Hayes et al., 2006; National Research Council [NRC] and Institute of Medicine [IOM], 2009). Nurturing environments have at least four characteristics. First, they minimize biologically and socially toxic conditions that contribute to (a) stress and its attendant physical illnesses (Sapolsky, 1994); (b) human conflict (Patterson et al., 1992); and (c) most psychological and behavioral problems (Biglan et al., 2004). Second, nurturing environments promote and richly reinforce prosocial behaviors such as caring for others, personal development, and contributing to one's community (Wilson 2007, 2011). Third, they limit temptations and opportunities to engage in antisocial or other problem behavior (e.g., Dishion and McMahon, 1998). Finally, environments nurture prosocial development when they encourage psychological flexibility, which is the ability to pursue valued directions even when thoughts and feelings discourage taking action (Biglan et al., 2008; 2012).

Research on the selection of behavior by consequences also provides empirical support for the value of group level selection in the development of prosociality. For example, the Good Behavior Game (GBG) rewards teams of elementary school children for working together cooperatively. Since the game was invented in the 1960s by an elementary school teacher, it has been tested in numerous studies around the world. It dramatically reduces children's disruptive behavior. Such behavior is often reinforced by the attention of other students. However, making small rewards contingent on the group working cooperatively enlists other children's social reinforcement for cooperative behavior.

Perhaps the most impressive evidence for the value of the Game comes from a longitudinal, randomized trial conducted by Sheppard Kellam and his colleagues (Kellam et al., 1998a; 1998b) in Baltimore inner-city schools. They randomized first grade children to classrooms in 19 schools and then randomly assigned classrooms to play or not play the GBG. The game had an immediate effect in reducing disruptive behavior in classrooms. Direct observation of behavior in classrooms that got the GBG showed that students were academically engaged and cooperative and had low levels of misbehavior. In some control classrooms in which teachers had good classroom management skills, instruction was taking place, but in the majority of these classrooms, children were disruptive, inattentive, and uncooperative. Much less instruction was taking place in these classrooms.

When Kellam and his colleagues followed children into middle school, they discovered that the ones who had received the GBG were less likely to have begun smoking or to be arrested. When they followed these kids into young adulthood (Kellam et al., 2008), they found that the boys who played the GBG in first grade were much less likely to be smoking or using other drugs. Both boys and girls who received GBG in elementary school were less likely to have suicidal ideation as young adults. The benefits were most pronounced for boys who were aggressive at the outset of the study. Aggressive boys are at very high risk to become criminals, to have drug abuse problems, and to have conflicts with others. But the

aggressive boys who had the GBG--in just first or second grade--were much less likely to have an antisocial personality disorder (100% of controls vs. 40% who received GBG) or to engage in violence as adults. Cost-benefit analyses of GBG indicate that a return of about \$35 on every dollar invested (Miller and Hendrie, 2008).

In sum, evidence from the behavioral sciences provides a detailed, empirically supported view of the nature and developmental origins of key human behavioral repertoires, which contrasts sharply with the traditional economics assumptions about rational actors and the benefits of the invisible hand. Although there is little doubt that competition has evolved enormously beneficial economic practices, the view that rational actors pursuing their self-interest necessarily leads to beneficial outcomes for the individuals and those around them needs to be reconciled with the evidence about the benefits of prosociality and the nature of antisocial behavior and related behavioral problems. People will act in the interest of others only when their social environment nurtures prosocial values and behaviors. In the absence of such socialization, people will pursue their self-interest through coercive behaviors that may bring them immediate benefit, but often incur large costs to them and those around them.

Both theory and extensive empirical evidence point to the value of prosocial behavior to the individual and the group and deleterious consequences of allowing antisocial behavior and related problems to be selected. The evidence constitutes a direct challenge to the theoretical foundation of the rational actor economic framework.

4. Public health and public policy

The self-interested rational actor view in economics has had a powerful influence on policymaking. But evidence about the nature and consequences of prosocial and antisocial repertoires suggest the value of creating a framework for policymaking that considers all available evidence about the factors influencing human wellbeing. Public health provides such a framework.

Although evolutionary thinking does not explicitly drive the public health framework, public health practice itself is a product of cultural evolution. Its practices were selected by the ultimate evolutionary criterion: survival. They evolved from often desperate efforts to control infectious disease. Practices such as quarantine and surveillance of disease were selected in the 15th and 16th centuries by their benefit in reducing the spread of disease (e.g., Kelly, 2005). They expanded to controlling infectious agents as the role of those agents became clearer in the 19th Century (e.g., Johnson, 2006). Practices have continued to expand. They now include efforts to control any condition or practice with a demonstrated impact on physical health. For example, after the Centers for Disease Control (1989) identified smoking as a risk factor for heart disease and many cancers, attention turned to reducing the proportion of the population that smokes. That, in turn, led to identifying and influencing factors that affect smoking, such as parental smoking (Flay et al., 1994), academic failure (Forrester et al., 2007), and, recently, the tobacco companies' marketing practices (Biglan, 2004; National Cancer Institute [NCI], 2008).

The cardinal features of the public health framework are (a) its focus on affecting the incidence and prevalence of diseases and risk factors for diseases in entire populations and (b) its pragmatic approach to identifying *any* policies, programs, or practices that affect incidence or prevalence.

Using this framework, the evidence on human development that was reviewed above points to an empirically based goal for the intentional evolution of public policy, namely increasing the prevalence of prosocial behavior and decreasing the prevalence of antisocial behavior

and related problem behaviors. This in turn requires that we increase the prevalence of environments that nurture prosociality (Biglan et al., 2012).

5. The impact of poverty and economic inequality on nurturance

Poverty and economic inequality are two of the most important factors undermining nurturance. Virtually every health, psychological, and behavioral problem that plagues society, from academic failure (Dubow and Ippolito, 1994) and crime (Wen et al., 2003) to depression and cardiovascular disease (Wilkinson and Marmot, 2003) is made more likely by family poverty (Yoshikawa et al., 2012) and economic inequality (Wilkinson & Pickett, 2009). Families living in poverty experience more stress, which directly contributes to physical illness and conflict (Sapolsky, 1994). They have more coercive interactions, which contribute to the development of aggressive social behavior and most other psychological and behavioral problems (Biglan et al., 2004). Parents coping with economic adversity provide less supervision of their children's behavior, which makes it more likely that the children will develop problems (Conger et al., 1995; Patterson et al., 1992). Poverty also increases parental depression, which affects the extent and quality of parenting (Munoz et al., 2012).

Economic inequality is a risk factor for ill health even for more affluent people living in an unequal society (Wilkinson and Pickett, 2009). An extensive study of the relationship between inequality and societal problems showed that countries that have a larger gap between the income of the top and bottom quintiles of the population have more crime, violence, depression, obesity, and drug abuse, as well as less educational attainment and shorter life expectancies (Wilkinson and Pickett, 2009).

One reason that unequal societies are less healthy may be because they are more materialistic. Economically unequal societies have higher rates of materialistic values (Kasser, 2002; Wilkinson and Pickett, 2009) and higher rates of advertising (Wilkinson and Pickett, 2009). Materialistic values involve desires for wealth and fame. As an empirical matter, people seldom endorse both materialistic and prosocial values (Kasser et al., 2007). People who endorse materialistic values have poorer interpersonal relationships (Kasser et al., 2007), are less satisfied with their lives (Brown and Kasser, 2005), and report more anxiety and depression (Kasser and Ryan, 1993). Countries with a higher proportion of people who endorse materialistic values have fewer policies that provide support for families and the development of children (Kasser, 2011). Given the relationship between materialistic values and health and the benefits of prosocial values to individuals (Wilson and Csikszentmihalyi, 2008) and to those around them (Kasser, 2011; Wilson, 2003; Wilson and O'Brien, 2008), there is good reason for societies to evolve less materialistic values.

Finally, there is the stress that people experience when living in poverty or an unequal society. Wilkinson and Pickett (2009) review evidence from meta-analyses showing that the most potent stressors for humans involve social and evaluative threats. Stressors of this sort increases people's materialism (Kasser and Sheldon, 2000), their aggressiveness toward others (Ferriday et al., 2011), and their sense of inferiority (Wilkinson and Pickett, 2009).

Thus, we have a vicious cycle in which people become distressed due to their economic conditions and the threats that these conditions pose for their wellbeing and become more aggressive toward others, more oriented toward materialistic values, and less interested in supporting the wellbeing of others. As this orientation becomes more dominant in a society it becomes even more likely that conditions that promote materialism, interpersonal conflict, and threat will grow.

To summarize, converging evidence from diverse areas of the human sciences indicates that human wellbeing would improve through an increase in the prevalence of prosociality in the population and reduction in the prevalence of the cluster of behaviors selected in coercive, non-nurturing environments. Poverty and economic inequality make such problematic environments more likely. A critical question then is, can we evolve social policies that reduce poverty and economic inequality so that we increase the prevalence of the nurturing environments needed to promote prosociality and wellbeing?

6. Policies and programs that affect poverty and inequality

In the past 30 years the field of prevention science has evolved programs and policies that can, in principle, prevent most psychological and behavioral problems. The IOM report on prevention concluded:

The scientific foundation has been created for the nation to begin to create a society in which young people arrive at adulthood with the skills, interests, assets, and health habits needed to live healthy, happy, and productive lives in caring relationships with others (NRC and IOM, p. 387).

Table 1 presents a sample of policies found to provide direct financial benefit to poor families. These policies have the potential to ameliorate risk factors that undermine young people's development and thereby prevent inter-generational poverty. Tenant-based rental assistance can help families move to safer and more orderly neighborhoods (Anderson et al., 2003). Affordable, high-quality childcare can significantly improve young children's cognitive and academic development, which can contribute to reducing intergenerational poverty (Pianta et al., 2005).

In a recent paper in the *American Psychologist*, Yoshikawa et al. (2012) note: The EITC's [Earned Income Tax Credit] effects on children's school performance have been evaluated in a study by Dahl and Lochner (2008), who found that with each increase of \$1,000 brought about by income tax credits, children's performance on reading and math standardized tests increased by about 0.06 *SD*. (p. 278)

Yet an earlier study sponsored by the Brookings Institute (Berube, 2003) found that, sadly, many low-income wage earners are simply unaware of the available tax credits that could provide substantial refunds. In an analysis of 27 metropolitan and rural areas in the U.S., Berube found "generally between one in seven and one in three filers" (p. 7).

Evidence of the benefits for children of increasing family income comes from a natural experiment (Costello et al., 1997). The Great Smoky Mountains Study examined development of mental disorders among 1,420 families in western North Carolina for eight years. The sample included 350 families from the Eastern Band of Cherokee Indians. Three years into the study the tribe opened a casino. As a result, every tribal member began to receive money; children's money went into trust funds for them. By 2001, each tribe member was receiving \$6,000 a year. In addition, the casino and hotels hired more workers, many of whom were tribal members. Before the casino opened, the poorer children had higher rates of psychiatric symptoms than non-poor children did. After the casino opened, the Indian children who were lifted out of poverty had no more symptoms than the children who had never been poor to start with.

In addition to policies, a number of family interventions have been shown to significantly improve the prospects that poor children can escape from inter-generational poverty. For example, the Nurse Family Partnership (NFP; Olds, 2008) provides support during pregnancy and the first two years of life for poor single mothers. In a series of three randomized controlled trials over a 20-year period, NFP has been shown to be highly cost

effective in reducing mothers' welfare dependency, increasing their mothering skills, preventing child abuse, and improving children's cognitive and academic development. A long-term follow-up of the first NFP evaluation showed that children who had been in the program were less likely to be arrested in adolescence (Olds, 2007). An independent analysis of the cost-benefit of NFP showed that the average cost per family was \$9,600, while the benefits from reduced costs were \$22,781, a benefit-to-cost ratio of \$2.37.

Numerous other family interventions have shown their value for helping poor families establish the kind of conditions that nurture the social and academic skills children need to escape from poverty. Patterson et al. (2010) reported a nine-year follow-up of a parenting program designed for families going through divorce. The program reduced the level of coercive parent-child interactions. Mediation analyses showed that reduced levels of coercive interactions one year post intervention led to improvements in the mothers' standards of living and reductions in the likelihood of delinquency over the next eight years. Similarly, Zhou et al. (2008) reported that a divorce adjustment program reduced coercive interactions and led to children's improved academic performance. Dishion et al. (2008) tested a brief family intervention for indigent parents of young children. It significantly reduced the development of problem behavior from age 2 through 4, increased children's self-regulatory skills, and led to better academic performance when the children were seven and a half years of age.

We have presented only a tiny sample of the evidence-based policies and programs that can contribute to these outcomes. Based solely on the empirical evidence about human wellbeing, society should be mobilizing to enact the evidence-based policies and programs that have proven value in increasing the wellbeing of children and adolescents. We are, in fact, beginning to see ambitious comprehensive efforts, such as the Harlem Children's Zone, that seek to affect development in entire communities (Tough, 2008).

However, current public policies affecting poverty and inequality are inconsistent with what is needed and have been moving in the wrong direction for some time (Smith, 2012). Among developed nations, the U.S. has the highest rate of both child poverty (UNICEF, 2007) and economic inequality (Wilkinson and Pickett, 2009). In the past 30 years inequality has soared: between 1979 and 2006 incomes of those in the fourth quintile of the income distribution (i.e., the 60th to the 80th percentile) rose 32% while incomes of the top 1% rose 256%. Some of the U.S. policy changes that contributed to this situation include (Hacker and Pierson, 2010):

- Reductions in federal income tax rates for the highest earners
- The erosion of policies that redistributed wealth (e.g., failure to have the minimum wage keep up with inflation)
- Reduction in unionization in the labor force due, in part, to reduction in government protection of union organizing
- Failure to regulate new financial developments, such as hedge funds and collateralized debt obligations.

Hacker and Pierson (2010) note that most of these changes were unique to the United States and help to explain why poverty and inequality are greater in the U.S. than in other countries.

In sum, there is substantial evidence of proven solutions that can reduce poverty and ameliorate its impact on human development. Insisting that public policy conform to a theory of rational self-interest can no longer be justified, when we have so much empirical evidence that these policies do not reduce poverty and inequality, make environments more

nurturing, or increase the prevalence of prosociality. Empirically supported theory about the role of self-interest in economic processes is certainly valuable. If it can be integrated with the body of evidence reviewed here, a more complete and beneficial framework for the development of public policy will emerge.

7. The organizational ecosystem affecting policymaking

The analysis brings us to a higher and more distal level of influences on wellbeing. The quality of family and school environments heavily influence the biological and behavioral development of children and adolescents. The quality of these environments is, in turn, influenced by the level of poverty and inequality. Numerous policies could affect poverty and inequality, but U.S. policymaking has actually moved in the wrong direction over the past 30 years. We need to analyze the larger organizational ecosystem and its influence on recent policymaking. The system includes for-profit corporations, government, non-governmental organizations (NGOs), and political parties.

Here too, an evolutionary account in terms of selection by consequences is helpful. Just as consequences shape and maintain the behavior of individuals, the actions of groups and formal organizations can be understood in terms of the consequences that select actions (Biglan, 1995; Biglan, 2009; Biglan and Glenn, in press). The cooperative efforts of human groups have been vital to human cultural evolution (Wilson, 2003; 2007). Groups that effectively coordinated food production and defense were simply more likely to survive. Corporations that can maximize profits are more likely to survive, and other corporations are likely to adopt the practices that contribute to their success. The same principle applies to non-profits: those that fail to generate enough revenue are less likely to survive, while those that steadily increase their revenue grow and other nonprofits tend to copy their practices.

Formal organizations have evolved a wide variety of activities to survive. Besides providing goods or services, for-profits benefit from effective marketing, PR that affects the public perception of the company, and government lobbying. Lobbying may involve the efforts of one company to obtain benefits from government. However, just as corporations have evolved because the cooperation of groups of people often was more profitable than the actions of individuals, corporations in one industry have sometimes found it profitable to create industry groups that conduct public relations and lobby government on behalf of the entire industry. For example, for nearly 40 years the Tobacco Institute successfully advanced the view that smoking had not been proven harmful to health and prevented the imposition of taxes and restrictions on advertising that would have curtailed smoking (NCI, 2008).

At an even higher level of organization, corporations and investors from diverse businesses can band together to make a more general case for the interests of business. In fact, in the late 1960s and early 1970s when the political influence of the business community was at a low point, a network of businesses began to advocate for their interests. Alterman (2003) and Hacker and Pierson (2010) document how these efforts grew over the years. Think tanks and advocacy groups, such as the Heritage Foundation and the Cato Institute now effectively make the case for minimizing taxes and regulation on business. A system of scholarships at major universities support the identification and development of advocates for business and business-friendly policies. Certainly the influence of the rational actor theory of economic behavior on public policymaking is due in part to this advocacy (Smith, 2012). Between 1970 and 1980, corporate spending on political action committees increased fivefold (Hacker and Pierson, 2010). Hacker and Pierson enumerate the specific political victories that resulted for business interests and the impact they had in eroding support for the poorest citizens and increasing inequality.

The issue of the rational pursuit of self-interest is as relevant to the evolution of corporations as to the evolution of individual behavior. There can be little doubt that capitalism creates an ecosystem that selects innovative and efficient practices bringing great benefit to society. But ultimately, corporate practices are selected by their economic consequences. There is no guarantee that all of those practices will benefit society as a whole (Biglan, 2011). Just as it is in the interest of individuals and those around them to promote prosocial behavior and limit opportunities for antisocial behavior, it is important to create societal contingencies that select and maintain corporate behavior that contributes to society's wellbeing.

Unlike for-profit corporations, whose practices are selected by their effect on profits, foundations and nonprofits face dual selection pressures. They must deliver on the benefits that they are chartered to provide and continue to attract new resources. The selection pressures here are not identical either to for-profit corporations or to governments. Unlike for-profit organizations, nonprofits can attract capital that is sequestered from the drive to maximize returns. Unlike governments, they can pursue an idea with appeal to a narrow range of donors without having to attract wider public support. Moreover, the duality of their selection pressures means there may be no direct relationships between their success in fundraising and their impact on the outcomes they seek to affect. For example, the American Cancer Society might offer a smoking cessation program. The program might impress donors and garner donations, but have little impact on smoking. Alternatively, it might be very effective, but fail to engender financial support. Aligning these two types of contingencies is critical in ensuring that these organizations both benefit society and satisfy donor expectations.

The proximate cause of the shift in public policy affecting poverty and inequality was the well-organized and well-funded advocacy and lobbying by the business community (Hacker & Pierson, 2010; Smith, 2012). But obviously, in a democratic society, the ultimate selection is at the polls: political leaders must do what is necessary win election. Corporations have a stake in the outcomes of elections and will act to protect their interests. Many other groups and organizations will do the same. The problem for society is to evolve a set of policies that increase the prevalence of wellbeing. That in turn seems to require the evolution of policies and practices that ensure that policymakers are selected who will work toward this goal.

8. Evolving policies to enhance wellbeing: The tobacco control movement as a model

The tobacco control movement provides an example of a successful public health movement that could serve as a model for the evolution of a more prosocial society (Biglan and Taylor, 2000). Between 1954 and 2008 the rate of adult smoking in the U.S. dropped from 45% to 21% (Saad, 2008). The culture relevant to smoking changed from one in which virtually every social or business gathering occurred in a smoke-filled room to one in which it would be unthinkable to smoke in such settings. The sources of this massive cultural change are well-documented (Biglan and Taylor, 2000; NCI, 2008).

The tobacco control movement began with the epidemiological evidence that smoking caused lung cancer. Such evidence began to change norms, attitudes, and behavior and prompted further research on the harms of smoking. Further evidence provided additional support for expansion of research on the smoking problem, greater advocacy against smoking, media campaigns to discourage smoking, and development of smoking cessation programs. As a growing number of citizens realized they or their loved ones were victims of cigarette smoking, funds flowed to existing organizations such as the American Lung Association and to the establishment of new advocacy organizations such as Action on

Smoking and Health (<http://ash.org/nationalorgs.html>). The tobacco companies long characterized smoking as simply an adult lifestyle choice, research increasingly documented the fact that cigarettes were addictive and that tobacco marketing was influencing adolescents to become addicted (NCI, 2008).

A series of Surgeon General (SG) reports and monographs from the NCI and the IOM (2009) carefully marshaled the evidence relevant to specific policies that would affect smoking. For example the SG report on secondhand smoke documented the number of people killed due to other people's smoke. This enlisted nonsmokers in efforts to change policies about smoking, resulting in numerous local efforts to adopt indoor air policies. Even when these efforts failed, they educated citizens about smoking in ways that slowly changed public opinion. Ballot measures to increase taxes on cigarettes further influenced this cultural change. The campaigns for these measures educated citizens, the taxes reduced youth initiation and prompted smokers to quit (U.S. Department of Health and Human Services, 2000), and often tax revenues were dedicated to further antismoking efforts.

The tobacco control movement benefited from a surveillance system that monitored the prevalence of smoking and the incidence of young people starting to smoke. Data on the rates of smoking helped to select increasingly effective strategies for reducing smoking and motivated course corrections when the data indicated that existing policies were not working.

In sum, the tobacco control movement provides a model for intentional cultural evolution. In a virtuous cycle, antitobacco advocacy was selected by the accumulation and dissemination of evidence about the harm of smoking that steadily increased support for effective antitobacco policies and further advocacy.

9. Evolving more nurturing environments

A similar process could change American culture relevant to promoting prosociality and the conditions influencing it (e.g., poverty and inequality). Above, we cite evidence of the benefit of promoting prosociality and the harmful effects of poverty and inequality. That evidence is the basis for advocacy efforts and for calls for additional research on how to create more nurturing environments. As the evidence grows, it can become the basis of SG and IOM reports on the benefits of promoting prosociality and reducing poverty and inequality. Such reports will strengthen support for further research and policy change.

Increased efforts are already addressing the problem of poverty (Duncan and Murnane, 2011; Tough, 2008). The Aspen Institute recently announced an effort to identify communities making progress on ending intergenerational poverty. The Bill and Melinda Gates Foundation, with the Rockefeller, Knight, and Annie E. Casey foundations; Bloomberg Philanthropies; Nancy and Miles Rubin; and the Forum for Community Solutions are funding this effort.

With the evidence that virtually every behavioral and psychological problem becomes more likely amid non-nurturing environments, many advocacy and professional organizations that focus on specific problems could band together to advocate for policies and engage in practices that increase the prevalence of nurturing families, schools, and communities (Biglan et al., 2012). Examples of these organizations include Mothers Against Drunk Driving, the Children's Defense Fund, Community Anti-Drug Coalitions of America, the NAACP, the Southern Poverty Law Center, and the Alan Guttmacher Institute. Professional organizations could include the American Academy of Pediatrics, the American Medical Association, the American Psychological Association, the Association for Behavior

Analysis International, the Association for Contextual Behavioral Science, and the Society for Prevention Research.

Finally, the surveillance system for monitoring the prevalence of prosocial and antisocial behavior and major risk factors for these groups of behavior could be strengthened. As the importance of working with multiple youth problem behaviors has become clear, systems have been developed to monitor their prevalence nationwide (Mrazek et al., 2005). However, monitoring prosociality and the conditions nurturing it has lagged behind. Ultimately, it will be important to enable each community to track the prevalence of prosociality and nurturing families and schools just as we currently have indicators that track the economy.

The cultural evolution we envision will be fostered by evolving more effective practices of charities and NGOs. This, in turn, requires altering the organizational ecosystem so that it selects more effective practices. Elsewhere (Biglan, 2011) I have described policies that could do this. It would be possible to create a class of NGOs chartered by government to receive additional tax benefits and other forms of societal support based on whether they are targeting well-specified aspects of human wellbeing, such as poverty. To qualify, they would have to be dedicated to preventing or ameliorating a health condition, behavior, or risk factor for ill health that affected a significant proportion of the population. The Surgeon General might designate the appropriate targets.

Such organizations would also require an extra measure of transparency. They would have to report on their activities and their impact on the targeted health outcome. This would sharpen the contingency between action and outcome and enable donors to shape increasingly effective practices.

This system would also enable society to provide greater tax benefits to this class of organizations. Although money donated to nonprofit organizations is already deductible, the money donated to these organizations might have a greater rate of deductibility. Indeed there is no reason not to calibrate the rate of tax deductible benefit to individual organizations' levels of success. The current movement to create social impact bonds is a step in this direction (http://www.americanprogress.org/issues/2011/02/social_impact_bonds.html).

10. Reconciling homo economicus with an evolutionary perspective

The evidence reviewed here shows that the canonical economic model of self-interested human behavior is simply inconsistent with what we now know about biological, behavioral, and cultural evolution. If the ultimate value of the human sciences is to be judged by their contribution to human wellbeing, then economics, along with other branches of human sciences, must develop and test public policies and programs that increase the prevalence of prosociality and reduce the prevalence of antisocial behavior and related problems. The evidence makes it clear that allowing everyone to pursue self-interests will not result in such outcomes. Rather, if we want people to act in ways that benefit themselves and those around them, we must create environments that nurture prosociality. This will require public policies to reduce poverty and economic inequality and provide evidence-based programs that support nurturing families and schools. That, in turn, will require that we create public policies favoring the selection of corporate, foundation, non-profit, and governmental practices that contribute to the selection of nurturing families, schools, workplaces, and communities.

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Highlights

- We provide an evolutionary account of human development and cultural evolution
- We offer a better framework for public policy than self-interest economic models
- Prosociality involves a set of behaviors that benefit people and those around them
- Nurturing environments can prevent antisocial behavior and related problems
- Prevention science has identified numerous nurturing family and school programs

Table 1

Policies and programs that affect poverty

Policy	Policy Components	Impact	Evidence
Tenant-based rental assistance	<ul style="list-style-type: none"> Vouchers or cash subsidies for rent Housing search counseling Community networking Landlord outreach Post-placement services 	6–22% reductions in experience of victimization within the neighborhood 3–89% reductions in neighborhood social disorder (public drinking/drug use, seeing people carrying weapons, hearing gunfire)	Anderson et al., 2003
Access to affordable (or free) quality childcare services	<ul style="list-style-type: none"> Early childcare with a wide range of operating hours Childcare from infancy to school-age Addresses child's developmental needs and parent's employment needs Subsidies to help pay for childcare Strategies to promote high-quality centers Paid family leave and flexible work schedules 	<p>Outcome</p> <p>IQ at age</p> <p>IQ at age 5</p> <p>Grade retention</p> <p>Special education</p> <p>5 or more arrests</p> <p>Arrests-drug deals</p> <p>Change</p> <p>+4.2%</p> <p>+4.1%</p> <p>41.5%</p> <p>59.6%</p> <p>-74.8%</p> <p>-72.1%</p>	Zoritch et al., 2000
Earned Income Tax Credit	<ul style="list-style-type: none"> Direct cash payments to those making between \$0 and \$35,000 a year 	<ul style="list-style-type: none"> Raises employment among single mothers¹ Reduces welfare dependency¹ Reduces poverty¹ Improved performance on standardized test scores² 	¹ . Center on Budget & Policy Priorities, 2012 ² . Dahl et al., 2008
Living wage ordinances	<ul style="list-style-type: none"> City ordinance mandating businesses under contract with the city must pay workers a wage sufficient to support a family A minimum wage requirement higher than that set by federal or state legislation 	<ul style="list-style-type: none"> Positive and significant effects on the wages of low-wage workers¹ Increasing pay in low-skill jobs² Modest reductions in the likelihood that urban families live in poverty¹ Reduction in turnover² Very little to no employment loss³ 	¹ . Neumark and Adams, 2003 ² . Fairris and Reich, 2005 ³ . Brown, 1999
Conditional cash transfers	<ul style="list-style-type: none"> Rewarding full time work with additional cash subsidies 	<ul style="list-style-type: none"> Reduced family poverty Increased student school performance 	Yoshikawa et al., 2012

Policy	Policy Components	Impact	Evidence
		• Reduced student externalizing behaviors	