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A framework for intentional cultural change

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ABSTRACT

We present a framework for a pragmatic science of cultural evolution. It is now possible for behavioral science to systematically influence the further evolution of cultural practices. As this science develops, it may become possible to prevent many of the problems affecting human wellbeing. By *cultural practices*, we refer to everything that humans do, above and beyond instinctual or unconditioned behaviors: not only art and literature, but also agriculture, manufacturing, recreation, war making, childrearing, science—everything. We can analyze cultural practices usefully in terms of the incidence and prevalence of individual behavior and group and organization actions. An effective science of intentional cultural evolution must guide efforts to influence the incidence and prevalence of individuals' behaviors and the actions of groups and organizations. In this paper, we briefly sketch advances in scientific understanding of the influences on individual behavior. Then we describe principles that could guide efforts to influence groups and organizations. Finally, we discuss legitimate concerns about the use and misuse of a science for intentional cultural change.

1. Introduction

This paper presents a framework for a pragmatic science of cultural evolution. Behavioral science has developed to the point that it is possible to systematically influence the further evolution of cultural practices (Wilson, Hayes, Biglan, & Embry, in press). Such a science has its basis in understanding what influences individual behavior but is beginning to address how to affect the incidence and prevalence of behaviors in the population and how to influence group and organizational practices. As this science develops, it could become possible to prevent most of the problems affecting human wellbeing.

By *cultural practices*, we refer to everything that humans do, above and beyond instinctual or unconditioned behaviors: not only art and literature, but also agriculture, manufacturing, recreation, war making, childrearing, science—everything. We can analyze cultural practices usefully in terms of the incidence and prevalence of individual behavior and group and organization actions (Biglan, 1995). For example, tobacco control researchers analyze the cultural practice of cigarette smoking in terms of the incidence of young people starting to smoke (Pierce & Gilpin, 1995); the prevalence of smoking among adolescents and adults (Centers for Disease Control and Prevention, 2008a, 2008b); the manufacturing, marketing, and lobbying practices of tobacco companies; and the efforts of various tobacco control organizations (Biglan, 1995; Biglan & Taylor, 2000).

An effective science of intentional cultural evolution must guide efforts to influence the incidence and prevalence of individuals' behaviors and the actions of groups and organizations. In this paper, we briefly sketch advances in scientific understanding of the influences on individual behavior. Then we describe principles that could guide efforts to influence groups and organizations. Finally, we discuss legitimate concerns about the use and misuse of a science for intentional cultural change.

2. A values-driven, pragmatic science

Over the past 20 years, there has been a resurgence of pragmatic or contextualist thinking within the behavioral sciences (e.g., Hayes, 1993; Hayes & Long, 2013; Wilson, Whiteman, & Bordieri, 2013). The goal of functional contextualism is to identify variables that allow the prediction and influence of the behavior or action of interest (Biglan & Hayes, 1996). While most of the discussion of this framework has focused on behavior, we believe that the framework is just as relevant to influencing cultural evolution (Wilson et al., in press).

The contextualist framework encourages us to be explicit about our values and goals. We seek a science of cultural change that contributes to improving the wellbeing of all people. We aspire to a world that meets the basic needs of all people: they have adequate food and shelter; they have the best health achievable for a mortal species; they are free from avoidable harms, including

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disease, natural disaster, toxic substances, and attack from others. It is now possible to measure each of these outcomes. The science we envision will monitor the prevalence of these outcomes in populations and systematically test strategies to increase the prevalence of these types of wellbeing.

Once you embrace a set of values, a pragmatic orientation follows naturally. If we seek cultural change that improves well-being, we must identify *manipulable variables* we can use to influence cultural practices. For example, it is not enough to know that tobacco marketing entices young people to start smoking (Biglan, 2004; National Cancer Institute, 2008). We also need to know what would influence tobacco companies to end such marketing.

In seeking to change the incidence or prevalence of a behavior, we must identify the influences on that behavior and employ those influences to reach many people (Biglan & Glenn, 2013). For example, evidence of the impact of raising the drinking age on reducing alcohol-related car crashes among young people led to increases in the drinking age in all U.S. states (Wagenaar, 1981). Increasing the prevalence of peer and adult reinforcement for prosocial behavior in classrooms and schools reduces the incidence of antisocial behavior in the short-term and the lifetime prevalence of criminal behavior and psychological disorders (e.g., Embry, 2002; Kellam et al., 2008). Similarly, if we are interested in reducing corporate actions that harm the environment, we could raise the cost of those actions through taxes, a cap and trade system, or outright prohibition (Biglan, 2009).

3. Nurturing prosociality: a useful goal of cultural evolution

We find it useful to characterize the necessary conditions for human wellbeing in terms of two classes of human behavior and four facets of nurturing environments. We base this analysis on the extensive body of evidence that has arisen in the past 40 years regarding the development of behavior and effective treatment and preventive interventions. We also base these observations on human evolutionary history and the clear-cut preference of humans not to be harmed or coerced by other humans.

3.1. Prosociality

Prosociality refers to a constellation of behaviors, values, and attitudes that involve cooperating with others, working for the wellbeing of others, sacrificing for others, and fostering self-development (Kasser & Ryan, 1993; Wilson, 2007). Prosociality has numerous benefits for individuals—as long as they are in environments in which most other people are prosocial (Wilson & Csikszentmihalyi, 2008). Compared to those who are not prosocial, prosocial individuals have fewer behavioral problems (Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000; Kasser & Ryan, 1993; Sheldon & Kasser, 1998; Wilson & Csikszentmihalyi, 2008), do better in school (Caprara et al., 2000), have more and better friends (Clark & Ladd, 2000), and have better health (Biglan & Hinds, 2009). Even in the business world, cooperators typically fare better (Channer & Hope, 2001).

From an evolutionary perspective, this constellation of behaviors has great value for the group: cooperative groups can outcompete groups with few prosocial members (Henrich, 2004; Kasser, 2004; Sober & Wilson, 1998; Wilson et al., 2013). Prosocial individuals contribute more to their communities (Wilson & O'Brien, 2009). The benefits of prosociality are apparent even at the level of nations. Countries with a higher proportion of people endorsing prosocial values are higher on measures of children's wellbeing, provide better maternal leave benefits, advertise less to children, and emit less CO_2 (Kasser, 2002).

Good self-regulation appears to be foundational for prosociality (Rothbart, 2011). Young children's ability to inhibit their first impulse and to regulate their emotions enables them to do things others request and to restrain behavior that may harm or annoy others. This ability is the product of hundreds of interactions in which others prompt or request behavior from the child and reinforce self-regulated behavior (e.g., Agran, Blanchard, Wehmeyer, & Hughes, 2001). Through these socialization processes children become better able to cooperate with others: an important step in developing prosociality.

Empathy also appears to be foundational for prosociality. Prosocial individuals show greater empathy toward others (Eisenberg, Miller, Shell, McNalley, & Shea, 1991). This ability requires that a child or adult be able to take the perspective of others. There is growing evidence that perspective-taking is learned and that it facilitates the ability to understand others' emotions (McHugh & Stewart, 2012).

3.2. Antisocial behavior and related problems

A contrasting constellation of behaviors includes directly antisocial behavior (e.g., aggression, verbal abuse, coercion, homicide, theft, fraud) as well as behaviors that are dysfunctional for the individual or those around them. Examples of the latter category include risky sexual behavior, substance abuse, academic failure, truancy, and depression. For years behavioral scientists studied these behaviors in isolation, as if they were unrelated. However, the evidence is overwhelming that they are inter-related (e.g., Biglan, Brennan, Foster, Holder, & Miller, 2004). Now there is growing reason to see them as evolutionary adaptations to threatening environments (Ellis et al. 2011; Ellis & Bjorklund, 2012).

Boles, Biglan, and Smolkowski (2006) provide an example of how extensive these inter-relationships have become. They report on the co-occurrence of a variety of behavioral problems in a large representative sample of 8th- and 11th-grade students. Among eighth graders, a youth who engaged in antisocial behavior was 5.42 times more likely to use substances than one who did not engage in antisocial behavior. The relative risk of risky sexual behavior given antisocial behavior was 7.80; it was 2.62 for eating disorders. The relative risks of these problems given antisocial behavior were smaller for 11th graders, but all were highly statistically significant.

Although some risk factors are unique for some of these problems, all share some of the most significant risk factors. In particular, coercive social environments and the lack of reinforcement for prosocial behavior are major influences on the development of each of these problems. And although delinquency, substance abuse, early sexual behavior, and depression tend to be treated simply as abnormalities, we would argue that they are better construed as evolutionary adaptations to stressful, threatening human social contexts. It may be more useful to see them as evolutionary-based adaptive consequences of the predatory actions of other humans.

The role of coercive environments has been most extensively studied in development of antisocial behavior. Patterson and colleagues (e.g., Patterson, Reid, & Dishion, 1992) reported on direct observations of family interactions that found the families of aggressive children to be marked by high levels of conflict in which the escalated aggression by family members functioned in getting others to cease their own criticism, commands, and attacks. At the same time, there was less reinforcement for peaceful ways of interacting than shown in families of non-aggressive children. Longitudinal studies of children with aggressive social repertoires show that, by the time these children reach

elementary school, they tend to be aggressive with peers and uncooperative with teachers, which leads to academic failure and peer rejection (Patterson, DeBaryshe, & Ramsey, 1989). By early adolescence, these rejected children are forming deviant peer groups. Because high levels of conflict have diminished their parents' willingness or ability to monitor and set limits on the children's activities, these youth tend to be unsupervised. Thus the deviant peer group becomes a "training ground" (Snyder et al., 2005) for most types of problematic adolescent behavior, including delinquency; tobacco, alcohol, and other drug use; and risky sexual behavior (Biglan et al., 2004).

Jablonka and Lamb (2005) have argued that evolution occurs at four levels: genetic, epigenetic, behavioral, and symbolic. Patterson's analysis of coercion is an example of behavioral evolution when behavior is selected by its consequences. Aggressive social behavior is reinforced by its effect in getting others to cease their aversive behavior, even briefly. The process becomes more likely in families where positive reinforcement for prosocial behavior fails to select prosocial behavior.

This evolutionary account at the behavioral level has recently been supplemented by an evolutionary account that suggests that youth living in such coercive and threatening environments are following a developmental pathway that was once valuable for survival in human history. Ellis et al. (2011) propose an evolutionary model that suggests that the constellation of adolescent problem behaviors are adaptations to a harsh and unpredictable environment, particularly caused by other humans and/or events that place humans in high competition for scarce resources. In these circumstances, risk taking, aggressive social behavior, and deviant peer group formation all contribute to early reproduction (Dishion, Ha, & Véronneau, 2012), which would have had an evolutionary advantage when human groups encountered particularly threatening conditions.

Depression may seem wholly unrelated to this group of antisocial behaviors. Certainly depression is commonly treated as a distinct entity (e.g., American Psychiatric Association, 2000). Yet the empirical evidence suggests a different view: Boles et al. (2006) reported that young people with antisocial behavior were 3.74 times more likely to report depression, those reporting risky sexual behavior were 4.46 times more likely, eighth graders with eating disorders were four times more likely, and those using drugs were 3.66 times more likely to be depressed.

Analyses of the environments influencing depression show that it becomes more likely amid some of the same factors that influence development of antisocial and related problems. Based on Patterson's work on coercive family processes, Biglan, Hops, and Sherman (1988) observed family interactions of depressed mothers and their families to see if a similar process was involved. They found that the conditional probability that other family members would behave aggressively was significantly lower when the mother engaged in depressive behavior. In essence, mothers' depressive behavior was functional in reducing other family members' aggressive behavior (Biglan et al., 1985; Hops et al., 1987). Beach and O'Leary (1986) and O'Leary and Beach (1990) showed that treatment of marital discord among couples with a depressed wife led to remission of her depression. This evidence indicates that depression is selected for its benefit in coping with an aversive environment. More recently, Allen and Badcock (2006) have proposed an evolutionary analysis of depression. Consistent with the coercion analysis, they argue that, in a threatening human social environment, depression has survival value.

3.3. Nurturing environments

Recognition that the most common and costly behavioral problems of humans stem from the same toxic environments can organize a much more efficient and effective strategy for improving human wellbeing. Instead of trying to treat or prevent each problem in isolation, we can target environmental circumstances that contribute to all of them. Biglan, Flay, Embry, and Sandler (2012) have recently described the key features of the environments needed to nurture wellbeing.

3.3.1. Minimize toxic events

Nurturing environments minimize biological and psychologically toxic events. Epidemiological researchers have identified numerous toxins that affect wellbeing. During pregnancy they include poor maternal nutrition (Bodnar & Wisner, 2005; Brennan, Grekin, & Mednick, 2003; Mathews, Yudkin, Smith, & Neil, 2000), maternal smoking, alcohol use, and other drug use (Brennan et al., 2003; Newton, 1988). In infancy and childhood, they include abuse, neglect, and coercive interactions (Patterson et al., 1992). Family conflict continues to be a risk factor for adolescents and adults, contributing to delinquency, depression, marital conflict, and divorce (Biglan et al., 2004).

As biological research has expanded, it has become clear that most toxins affect both physical wellbeing and psychological wellbeing. For example, high levels of conflict increase interpersonal aggression and negatively affect cardiovascular health (Levi, 1983).

Evidence-based treatment and prevention interventions identified over the past 20 years involve efforts to reduce toxic events in people's environments. For example, the Nurse Family Partnership (Olds, Hill, O'Brien, Racine, & Moritz, 2003) improves development among high-risk infants. It makes the infants' environments more nurturing by improving their mothers' nutrition, convincing those among them who smoke to quit, and reducing mothers' abuse and neglect. Evidence-based behavioral parenting skills programs influence parents to replace harsh discipline techniques with more gentle, patient, and caring methods (e.g., Dishion & Bullock, 2002; Forgatch & DeGarmo, 2007). Marital therapies help couples reduce their angry attacks on each other (Stanley, Bradbury, & Markman, 2000). Schoolwide Positive Behavior Support (Sprague et al., 2001) helps schools replace punitive discipline practices with more positive approaches. Toxic events also include peer reinforcement for deviant behavior. Such, often unintentional, reinforcement is a powerful predictor of lifetime adverse child and adolescent development (Dishion, Spracklen, Andrews, & Patterson, 1996).

Research on the effects of poverty on individual and family wellbeing also supports the principle of minimizing toxic stimulation: both poverty and economic reverses such as job loss increase family conflict and contribute to depression, childhood aggression, and adolescent delinquency (Conger et al., 2002; Conger, Ge, Elder, Lorenz, & Simons, 1994; Dodge, Pettit, & Bates, 1994; Gutman, McLoyd, & Tokoyawa, 2005; NICHD Early Child Care Research Network, 2005). Costello, Compton, Keeler, and Angold (2003) documented how the number of Native American children in western North Carolina with psychological disorders declined after their tribe (the Eastern Band of Cherokee Indians) opened a casino and every family's income rose.

Some events are toxic due to an evolutionary mismatch, which The Evolution Institute describes on its website (http://evolution-institute.org/node/5) as follows:

> Natural selection adapts organisms to their past environments and has no ability to foresee the future. When the environment changes, adaptations to past environments can misfire in the current environment, producing a mismatch that can be solved only by subsequent evolution or by modifying the current environment. Mismatches are an inevitable consequence of evolution in changing environments. They are especially

relevant to human affairs, since modern human environments are so radically different from ancestral human environments.

Over the past 50 years, modern culture introduced many sources of evolutionary mismatch, with toxic effects. For example, the electronic media explosion created multiple toxic influences. First, chronic child exposure to TV violence directly increased lifetime aggression and violence (Huesmann, Moise-Titus, Podolski, & Eron, 2003). Second, the migration of such media to children's bedrooms in the past 10–20 years has caused sleep loss, with adverse consequences on physical and mental health (Dworak, Schierl, Bruns, & Strüder, 2007; Paavonen, Pennonen, Roine, Valkonen, & Lahikainen, 2006).

Dietary changes have introduced evolutionary mismatches. For example, humans have historically had dietary fatty acid ratios of 2-to-1 or 4-to-1 of omega-6 (n6) to omega-3 (n3) (Blasbalg, Hibbeln, Ramsden, Majchrzak, & Rawlings, 2011). In the United States today, that ratio is more like 25-to-1, with serious adverse consequences for individuals and the whole population, including higher rates of mental illness, homicide, suicide, and other psychiatric disorders (Hibbeln, Nieminen, Blasbalg, Riggs, & Lands, 2006). Vitamin D3 deficiencies among pregnant mothers and young children have increased (Merewood et al., 2010) due to an increased indoor lifestyle and less consumption of fortified milk and other sources (Fulgoni, Keast, Auestad, & Quann, 2011; Looker et al., 2011). This is particularly adverse for people of color, contributing to a significant rise in diabetes and auto-immune and infectious diseases (Dawodu & Wagner, 2012; Hill, Graham, & Divgi, 2011; Janisse, Cakan, Ellis, & Brogan, 2011), and an increase in some developmental disorders (Dealberto, 2011; Huotari & Herzig, 2008; Shamberger, 2011; Tolppanen et al., 2012).

A thoroughgoing science of human wellbeing needs to incorporate both biological and social influences on wellbeing. Behavioral scientists have often ignored biological influences. One will not find, for example, many discussions of the role of omega-3 deficiency or higher levels of airborne lead interacting with the rise of delinquency, homicide, and violence (Hibbeln, 2007; Hibbeln, Nieminen, & Lands, 2004; Stretesky & Lynch, 2001, 2004). Yet processes such as these examples of a toxic influence during pregnancy and early life cause a cascade of adverse behavioral outcomes, which in turn trigger toxic behaviors that can affect others.

3.3.2. *Promote, teach, and richly reinforce prosociality*

Nurturing environments are highly reinforcing. Most evidence-based treatment and prevention interventions encourage people to praise, recognize, and reward others (Biglan, 2003). They also promote more subtle forms of reinforcement, such as simply attending to others, playing with them, listening to them, and so on. Reinforcement is at the core of many of the behavioral parenting skills programs that have been validated in recent years (Biglan, 2003). These programs shift parents away from punitive means of control while they promote myriad ways of responding positively to what children do. Positive reinforcement of desirable behavior is also fundamental to successful behavior management systems in schools (Eddy, Reid, Stoolmiller, & Fetrow, 2003; Ialongo, Poduska, Werthamer, & Kellam, 2001; Metzler, Biglan, Rusby, & Sprague, 2001), successful marital therapy programs (Hahlweg & Markman, 1988; Kistenmacher & Biglan, 2000), and effective job performance systems in workplaces (Daniels, 1999; Daniels & Daniels, 2004, 2006).

Similarly, evidence-based preventive interventions in schools teach and reinforce prosociality. For example, the Positive Action program provides instruction to students about desirable behaviors (Flay & Allred, 2010). It does so through lessons and through recognition of prosocial behavior. Positive Action has been shown to prevent substance abuse and improve academic performance (Snyder et al., 2010). PeaceBuilders teaches students and adults in high-risk schools to reinforce prosocial actions among each other with positive, written “praise notes” posted on the walls, shared on the public address system, and even via mass media (Embry, Flannery, Vazsonyi, Powell, & Atha, 1996). That simple strategy reduced violent injuries at school (Krug, Brener, Dahlberg, Ryan, & Powell, 1997) and significantly increased positive behaviors while decreasing symptoms of externalizing disorders in just a few months (Flannery et al., 2003), especially among the most at-risk children (Vazsonyi, Belliston, & Flannery, 2004).

In schools, reducing peer attention to negative behavior can magnify positive reinforcement (Embry, 2002; Embry, Staatemeier, Richardson, Lauger, & Mitich, 2003). The Good Behavior Game studies best illustrate this: children learn to self-regulate and to ignore negative peer behavior. The impact of this is immediate in classrooms (Embry, 2002), with a profound impact on reducing lifetime problematic behaviors from criminal involvement to drug use (Kellam et al., 2008). That same strategy increases multiple indicators of academic success, from high school graduation to college entry (Bradshaw, Zmuda, Kellam, & Ialongo, 2009).

3.3.3. *Limit opportunities for problem behavior*

Environments that promote prosociality also limit opportunities for antisocial behavior. One of the key components of all effective parenting interventions teaches parents to monitor what their children are doing when the parents are not around and to set limits on their children being in situations where they could experiment with problem behavior (Dishion & McMahon, 1998). Schools that are effective in promoting prosocial behavior monitor the level of misbehavior and ensure that effective supervision is available in all venues (Horner & Sugai, 2000).

3.3.4. *Fostering psychological flexibility*

Nurturing environments support the development of psychological flexibility, which is the ability to act consistently with one's values even when distressing thoughts and feelings seem to get in the way of doing so. Recent research on mindfulness therapies, such as Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999), indicates that people become better able to live effective, values-driven lives when they receive help in taking an accepting, nonjudgmental stance toward their own thoughts and feelings. Over 60 randomized trials have shown the benefit of ACT for problems as diverse as smoking, epilepsy, schizophrenia, and diabetes (Biglan, Hayes, & Pistorello, 2008).

Moreover, many treatment and prevention interventions have in common an accepting attitude on the part of the interventionist. For example, in motivational interviewing for people with drinking problems, interventionists gently question clients about their drinking and any problems they are experiencing, but do not criticize. In this nonthreatening context, many people are better able to see the problems that their drinking is causing and to choose to change their drinking behavior (Miller, 1983). Similarly, effective therapists and teachers accept the things their clients and students do while gently guiding them to behave more effectively.

The benefits of psychological flexibility are not limited to therapeutic situations. Increasing psychological flexibility increases adoption of innovation in businesses and organizations, critical for their success (Bond, Hayes, & Barnes-Holmes, 2006; Hayes, Bunting, Herbst, Bond, & Barnes-Holmes, 2006). Psychological flexibility improves leadership in businesses and organizations (Gill, in preparation; Gill & Williamson, 2010). One of the most important findings about psychological flexibility is that it is associated with good health (Kashdan & Rottenberg, 2010). Given the spiraling healthcare costs related to psychological inflexibility,

methods for increasing psychological flexibility could be vital to our national economic success.

3.3.5. The value of these principles

The tendency of behavioral scientists to work on one or two problems (e.g., depression or antisocial behavior) has obscured the commonalities among these seemingly different problems. One can work successfully on a specific problem without having to analyze its similarity to other problems. However, identifying crosscutting principles may extend the range of problems we can effectively address (Kellam, Koretz, & Moscicki, 1999; Kellam & Van Horn, 1997). More importantly, these principles open the way to more broad-based public health interventions that affect the prevalence of nurturing environments, not only through programs, but through media and normative changes in society.

4. Principles for evolving beneficial cultural practices

Despite extensive evidence about what influences the development of most psychological and behavioral problems and how to treat or prevent them, we have not seen substantial declines in the prevalence of most problems. In fact, the prevalence rates in the United States appear to be increasing, especially in comparison to other rich democracies (Copeland, Shanahan, Costello, & Angold, 2011; Copeland, Shanahan, Worthman, Angold, & Costello, 2012; Costello, Copeland, & Angold, 2011). This would seem to belie our claim that significant improvements in human wellbeing are achievable. However, despite mounting evidence of what is needed to ensure prosocial development, these nurturing conditions are not sufficiently widespread to produce significant improvements in the wellbeing of entire populations. The next natural step in research and public health practice is to focus on increasing the prevalence of nurturing environments in whole populations. Instead of continuing to mount treatment and prevention programs targeting distinct problems, we must re-orient the research and practice communities to develop, evaluate, and implement strategies to affect the quality of people's environments. Put another way, what have traditionally been independent variables in research on psychological, behavioral, and health problems (i.e., the environmental conditions) would become the dependent variables.

A concerted public health movement to increase the prevalence of nurturing environments will gradually increase the prevalence of caring and cooperative people. As the proportion of such people grows, it will further increase the prevalence of nurturing environments, creating a virtuous cycle. We can envision such a movement in terms of six facets.

4.1. Research

Research on the inter-relationships among problems, their common origins, and the interventions that affect them has brought us to the current synthesis. Organizing further research in light of the central role of environments in affecting human wellbeing can accelerate the spread of nurturing families, schools, workplaces, and communities.

One line of research that would be helpful would explore the degree to which diverse problems have common origins. It will be particularly valuable to characterize the population-attributable risk of the most important risk factors for each of the most common psychological, behavioral, and health problems. Most epidemiological and etiological research has focused on the risk factors for individual problems. Such a focus tends to obscure the importance of common environmental risk factors. For example, enumerating the environmental and intrapersonal (genetic, behavioral) risk factors for antisocial behavior might show that particular genes make a larger contribution to this behavior than, say, poverty or coercive social interactions. However, if we examined the contribution of coercive interactions to each common problem, we might find coercive interactions stand out as risk factors accounting for a significant proportion of each and every problem. Such research would contribute directly to advocating for a focus on nurturing environments.

A second line of research would focus on testing methods to increase the prevalence of nurturing environments and their impact on multiple problems. For example, the community wide parenting program known as Triple *P* has been shown to affect the incidence of child abuse in entire counties (e.g., Prinz, Sanders, Shapiro, Whitaker, & Lutzker, 2009). Given the evidence cited above of the importance of nutritional influences on development this line of work ought not be limited to changing behavioral and social influences on development.

4.2. A system for monitoring wellbeing and its context

Ultimately, every community will need a surveillance system to track the extent to which families, schools, and workplaces minimize punitive practices, promote and reinforce prosociality, limit opportunities for problem behavior, and promote psychological flexibility. Such surveillance systems are core components of public health efforts and are in growing use for tracking psychological and behavioral aspects of wellbeing. Monitoring the prevalence of substance use and antisocial behavior has been advanced thanks to the efforts of Monitoring the Future, the CDC Youth Risk Behavior Survey, and the CDC Behavioral Risk Factor Surveillance System. Increasingly, communities are also developing local surveillance systems (Mrazek, Biglan, & Hawkins, 2005). Yet tracking internalizing problems (e.g., depression) has lagged behind monitoring externalizing ones (National Research Council & Institute of Medicine, 2009) and we are far from having an accepted and widely used system to estimate the proportion of families or schools providing a sufficient level of nurturance. Indeed, it will take further research to develop standards for identifying what constitutes adequate nurturance. The surveillance system must assess critical influences on development and the key developmental outcomes.

The surveillance system must have a frequently publicized scoreboard (Embry, 2004). Without such a scoreboard, it will be difficult to rally the public. And the scoreboard recruits sustainable funding. We have used such dashboards or scoreboards for reducing youth violence (Embry et al., 1996), increasing engagement in child safety strategies (Embry, 1984), and reducing youth tobacco access and use (Embry & Biglan, 2009).

Some political jurisdictions have instituted surveillance systems for nurturing environments as a matter of public policy. For example, the Canadian province of Manitoba passed the Healthy Child Manitoba Act (see web2.gov.mb.ca/laws/statutes/ccsm/h037e.php), which mandates reports on the wellbeing of the province's children. Manitoba created a linked database system to correlate multiple outcomes for children. This enables the province to confidently test policy initiatives for maximum benefit for children, families, and the community. This act and related infrastructure allows the province, community partners, and local businesses to deploy powerful protective strategies quickly and evaluate their outcomes, including cost benefits (see www.gov.mb.ca/healthychild/).

4.3. Evidence-based programs and practices

As the evidence we have reviewed suggests, researchers have already identified numerous programs and practices that can

contribute to making families and schools more nurturing. Increasingly, research focuses on the question of how to get these interventions widely and effectively implemented. As this work proceeds, it will need systems for tracking the robustness, fidelity, and multiple impacts of disseminated interventions, since we cannot simply assume that interventions will continue to work after implementation (Biglan, Flay, & Foster, 2003). Some interventions may be easier to implement reliably with measurable impact (referred to as *robust*). Currently, no set of principles defines what makes practices or programs more robust, though there are good beginning considerations. For example, practices need social validity and acceptability (Wolf, 1978); should be generalizable across time, people, places, and behaviors (Fox & McEvoy, 1993; Kennedy, 2002; Stokes & Baer, 1977); and should be cost efficient compared to alternatives (Embry, 2004; Satpathy & Bansal, 1982).

The other issue for this category is convincing society to fund the implementation of evidence-based programs and practices. As we propose, this will require effective advocacy.

4.4. Organizational infrastructure

Societal change depends on organizations. When like-minded people create organizations, they are able to garner the resources to produce cultural change. Accordingly, if the scientific community is to contribute to the spread of environments that nurture most people's wellbeing, it must develop and test strategies for altering the practices of the networks of organizations that directly or indirectly affect human development. Currently, many foundations and non-profit organizations are working to affect specific aspects of population wellbeing. However, if our analysis of the central importance of nurturing environments is correct, the total benefit of these efforts would be greater if organizations that focus on individual problems (e.g., crime, alcohol or drug use, or child abuse) band together to try to affect the prevalence of nurturing families, schools, and workplaces. By combining resources and targeting these outcomes, they can significantly increase the prevalence of nurturance in society.

On the other hand, some of the practices of for-profit organizations constitute risk factors that directly affect wellbeing or influence the prevalence of nurturing environments (Biglan, 2011). Examples of the former include the marketing of tobacco, alcohol, and unhealthy food. A prominent example of corporate practices that affect the prevalence of nurturing environments is the effective lobbying by some business organizations for governmental policies that have increased economic inequality and poverty, thereby increasing the stress and conflict in many families, schools, and communities (Biglan, 2009, in press; Biglan & Cody, 2013; Smith, 2012). If we as a society are to succeed in reducing the epidemics of mental, emotional, behavioral, and related health problems in our children, we must develop organizational innovations that rein in the short-term selection by consequences that favor corporations' marketing of obesity-causing foods, addictive substances, private prisons, pharmaceuticals, and harmful entertainment media. We will also need policies that diminish lobbying for policies that protect the short-term profits generated by these activities at the expense of society's future generations.

What might be a template for organization structures to protect the common futures of our children? We argue for thinking of future generations as a common-pool resource (Gardner, Ostrom, & Walker, 1990). A common-pool resource (CPR) is a type of good consisting of a natural or human-made resource that is available to all or many people. Traditionally examples of CPRs are a water supply system, such as the irrigation system of rice farmers in Bali or fishing grounds. The size or characteristics of CPRs make it very difficult to exclude potential beneficiaries from obtaining benefits from their use, and CPRs are prone to over-exploitation for private gain.

Why is it useful to think of our children as a common-pool resource? Because to the extent that individuals and organizations exploit children for their economic or personal gain, they harm a fundamental resource that benefits the entire society. Miller (in Biglan et al., 2004) calculated the costs incurred by youth who engage in multiple problem behaviors. He totaled the costs incurred by all American youth for one year who engaged in underage drinking, heroin or cocaine abuse, high-risk sex, youth violence, youth smoking, high school dropout, and youth suicide. Including continuing costs, such as the long-term care and lost productivity of a person disabled by violence or an alcohol-related car crash, Miller estimated that the cost would be $557.3 billion.

This way of thinking provides a clear criterion for public policymaking. Every proposed public policy can be evaluated in terms of its impact on the society's common pool resource, its young people. The goal of policymaking then becomes encouraging practices that increase the prevalence of successfully developing young people and decreasing practices that harm development. Examples of the latter policies include increased taxes on cigarettes and alcohol, prohibition on marketing unhealthy foods to young people, and estimating the impact of any proposed military engagement on the incidence of death, injury, and PTSD on combatants. Examples of policies that would encourage organizations to promote prosocial development include funding nonprofits to provide family support services in high poverty neighborhoods and increasing the tax benefits of giving to nonprofits whose practices have shown empirically to increase the proportion of children developing successfully (Biglan, 2009).

4.5. Policies affecting the prevalence of nurturing environments

Many government policies can directly affect nurturance. What is needed is a systematic review of government policy that asks how any given policy affects nurturance. Indeed, the lynchpin or overarching policy might be that every policy adopted must be evaluated in terms of its environmental impact—not on the physical environment, but on the social environment. The question would be, “How will this policy affect the prevalence of nurturance in families, schools, and workplaces?”

Some policies will directly affect nurturance. They include those affecting poverty and economic inequality (Wilkinson & Pickett, 2009) and those that affect the use of punishment in schools, families, and the criminal justice system (Lawrence, 1998; Skiba & Peterson, 1999). Departments of Labor and Commerce might examine how their policies affect the degree to which workplaces are nurturing versus confrontational and unsupportive.

Other policies affect what government does or does not do to advance nurturance. These include federal policies that govern research and practice. With respect to research, the central importance of nurturance points to the need to reorganize research priorities so that we move from research focused on individual problems to research focused on social environments. With respect to practice, there is already an increasing movement at the federal level and in some states to require that social and educational practices be evidence-based (e.g., the Georgia Department of Corrections Risk Reduction Services, Iowa's mandate for evidence-based practices in its Public Health System). Still other policies will affect whether the necessary surveillances systems are developed.

4.6. Media

Two aspects of media are fundamental to cultural change. First, there is the use of media to advocate for nurturing environments. The tobacco control movement has been very successful in creatively communicating critical epidemiological facts in creative ways. For example, tobacco control advocates often describe the number of people killed by smoking in terms of two Boeing 747 s crashing every day of the year, killing everyone on board.

As research on the influence of nurturing environments mounts, Surgeon General and Institute of Medicine reports can marshal the evidence and communicate in ways that influence policymaking, further research, and individual behavior.

Such media advocacy can help to mobilize opinion leaders around a shared view of what society needs. But for society to truly transform, we need a second development—a change in the advertising and entertainment media that affect people directly and alter their context. It is already well-established that media depictions of aggression influence aggressive behavior in young people (Hausman, Spivak, & Prothrow-Stith, 1995) and, although little progress has been made in reducing young people's exposure to such media, there is some evidence they can be inoculated against the influence (Jeong, Cho, & Hwang, 2012).

Less is known about the degree to which marketing promotes a general culture of experiential avoidance through ads that indicate we must reduce every discomfort or those that heighten stress by making social status comparisons more salient. There is evidence that more economically unequal societies such as the U.S. have significantly higher rates of advertising (Wilkinson & Pickett, 2009). Research is needed to explore how heavily marketing has exacerbated these influences.

The more significant development might come from the development of popular entertainment that promotes nurturance. As the harmfulness of smoking has become more widely understood, there has been a significant change in the way that cigarette smoking is depicted, with smoking characters becoming ill due to their smoking. How might popular culture be transformed to promote nurturance?

5. Concerns about the use and misuse of a science of intentional cultural change

Ever since Skinner (1953) wrote about using science to change human behavior (1953), concerns have been expressed about the dangers of such a science (e.g., Chomsky, 1971). Much of the concern arose from the view that human behavior is determined by the autonomous choices that humans make and that any effort to influence human behavior would violate people's freedom. That concern has receded as it has become much more widely accepted that the environment shapes human behavior. However a legitimate and important question remains regarding who will determine the direction of cultural evolution and what kind of culture we choose to work toward.

We would argue that the public health framework and our system of democracy and civil liberties provide the context for addressing these concerns. The public health research reviewed in this paper indicates that it is in the interest of individuals and those around them for society to promote prosocial behavior and prevent antisocial behavior and related problems. Such a society will have a healthier, more productive, and, most likely, happier population.

Yet ultimately, in a democratic society the people decide the priorities for societal change. Whether or not we choose to make promoting prosocial behavior a central priority of public policy will depend on whether or not voters support politicians who advocate and implement the policies and programs such a decision would require.

It would be naïve in the extreme, however, to assume that voters simply decide on such issues by freely choosing. The political process is as amenable to scientific analysis as any other behavioral process and it is incumbent upon us to understand the forces that influence which issues become matters of public policy and what social forces influence how the democratic process unfolds. Elsewhere, we have described how the evolution of corporate practices in our capitalistic system has selected public advocacy and lobbying practices that resulted in policies that increased poverty and economic inequality (Biglan, 2009, 2011, 2013). Anyone who would fear the influence of behavioral scientists on the direction of societal change might consider how change is currently being determined. In the end, the issue is not whether humans influence one another, but whether, as individuals and groups, we have equal access to the tools of influence that provide for the good of many, rather than wellbeing of only a few.

We have described how organizations could band together to advocate for policies, programs, and practices to make environments more nurturing. Such advocacy is in the main stream of how democratic societies guide their evolution. For behavioral scientists and public health leaders to advocate that society focus its resources on making our families, schools, and workplaces more nurturing is as legitimate as the agenda of any other groups trying to influence public policy. And, we would argue that what we outline here is likely to influence society's evolution in directions that will strengthen the best features of corporate capitalism, while reducing practices that undermine human wellbeing.

6. Conclusion

The human sciences have converged on an understanding of human behavior that simplifies the prescription for improving wellbeing. Most psychological, behavioral, and health problems stem from a common set of environmental conditions that stress people and promote conflict. The past 40 years of treatment and prevention research have delineated family and school interventions to reduce stress and conflict and increase prosocial behavior to benefit individuals and those around them. Just as an organized cultural change movement changed the smoking culture, the same principles of cultural change can increase the prevalence of nurturing environments through advocacy, policy, and dissemination of evidence-based programs and practices. The result can be a society with less crime, drug abuse, conflict, depression, and academic failure than society has ever enjoyed.

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