



Published in final edited form as:

Am Psychol. 2012 ; 67(4): 257–271. doi:10.1037/a0026796.

The Critical Role of Nurturing Environments for Promoting Human Wellbeing

Anthony Biglan, Brian R. Flay, Dennis D. Embry, and Irwin N. Sandler

Abstract

The recent Institute of Medicine report on prevention (National Research Council [NRC] & IOM, 2009) noted the substantial inter-relationship among mental, emotional, and behavioral disorders, and pointed out that, to a great extent, these problems stem from a set of common conditions. However, despite the evidence, current research and practice continues to deal with the prevention of mental, emotional, and behavioral disorders as if they are unrelated and each stem from different conditions. This paper proposes a framework that could accelerate progress in preventing these problems. Environments that foster successful development and prevent the development of psychological and behavioral problems are usefully characterized as *nurturing environments*. First, these environments minimize biologically and psychologically toxic events. Second, they teach, promote, and richly reinforce prosocial behavior, including self-regulatory behaviors and all of the skills needed to become productive adult members of society. Third, they monitor and limit opportunities for problem behavior. Fourth, they foster psychological flexibility—the ability to be mindful of one's thoughts and feelings and act in the service of one's values, even when one's thoughts and feelings discourage taking valued action. We review evidence to support this synthesis and describe the kind of public health movement that could increase the prevalence of nurturing environments and, thereby, contribute to the prevention of most mental, emotional, and behavioral disorders.

The 2009 Institute of Medicine report on prevention (NRC & IOM, 2009) documented the substantial accumulation of knowledge on preventing the most common and costly psychological and behavioral disorders. The report reviewed how and why psychological and behavioral disorders develop and discussed numerous programs, policies, and practices to prevent these problems. The next big challenge is to translate this knowledge into significant reductions in the incidence and prevalence of multiple disorders.

Doing so requires us to accept two other conclusions of the report: psychological and behavioral disorders and related problems co-occur (e.g., Biglan, Brennan, Foster, & Holder, 2004; Donovan, Jessor, & Costa, 1993; Flay, 2002) and these problems stem largely from the same conditions (Biglan et al., 2004; Flay, Snyder, & Petraitis, 2009; Petraitis, Flay, & Miller, 1995). The next natural step is to put more research and public health effort into modifying these common environmental conditions to prevent the full range of costly problems (Biglan et al., 2004; Biglan, Mrazek, Carnine, & Flay, 2003; Flay, 2002).

Yet despite the evidence, progress faces a disciplinary archipelago that obscures problems' common origins and the potential of comprehensive prevention. Public health practice is similarly fragmented. From federal to local levels, separate agencies deal with mental illness, drug abuse, and crime as if they had nothing in common. Thus progress proceeds glacially. A new way of thinking would accelerate progress in preventing multiple and costly problems from continuing to plague society.

An Integrative Framework: Nurturing Environments

This paper builds on the 2009 IOM report by proposing an integrative framework to effectively organize both research and practical action. Biological, behavioral, etiological, and intervention evidence converges on a fairly simple and straightforward principle: If we want to prevent multiple problems and increase the prevalence of young people who develop successfully, we must increase the prevalence of nurturing environments.

The principle will encourage research that pinpoints the key features of environments that nurture successful development. As these features become clear, we must translate existing knowledge into significant improvements in human wellbeing across the lifespan, through public health campaigns, public policies, and targeted programs to promote nurturing environments (Biglan et al., 2003).

In what follows, we describe the key features of nurturing environments; summarize the evidence about how each feature influences development; and describe the kind of public health movement needed to increase the prevalence of nurturing environments.

Clear and conservative criteria are vital in helping to pinpoint the features of nurturing environments. It would be wasteful, perhaps harmful, if we targeted conditions that had no effect on development. For example, observational studies might indicate the need for a diet change, but subsequent experimental studies might show that the change had no effect or was unsafe. We have thus adopted the following criteria for identifying nurturing conditions:

1. Epidemiological evidence should show that the factor has a significant association with one or more aspects of healthy or pathological development. Factors with the largest population-attributable risk should receive the greatest weight.
2. Optimally there should be evidence about the physiological and psychological pathways through which the factor affects development because (a) it strengthens our confidence in the importance of the risk or protective factor and (b) it may be helpful in communicating the importance of the factor to the public.
3. There should be experimental evidence that altering the factor through intervention contributes to the prevention or amelioration of psychological, behavioral, or health problems. Factors whose modification contributes to long-term effects to prevent multiple problems and to promote multiple aspects of positive development (without accompanying iatrogenic effects) should have greater weight.

Evidence from mediational studies is also important for pinpointing malleable factors that affect development (Sandler, Schoenfelder, Wolchik, & MacKinnon, 2011). Real-world interventions are often complex, making it difficult to discern if an effect was due to changing a specific risk or a protective factor. For example, a parenting intervention that increases parents' use of rewards and their monitoring might prevent substance use. However, mediational analyses allow us to examine whether an intervention changed a hypothesized mediating factor, which in turn influenced an outcome (MacKinnon, 2008). This evidence is particularly powerful when (a) it is found in a true randomized intervention and (b) the effects are prospectively longitudinal and optimally account for long-term outcomes (MacKinnon, 2008). Demonstrating such mediation effects, particularly when informed by developmental theory, provides convincing evidence of the construct validity of the nurturing environment.

This analysis meshes with integrative theories such as the Theory of Triadic Influence (TTI; Flay et al., 2009). According to the TTI, behavior can be analyzed in terms of distal intrapersonal, social, and cultural contexts and of proximal cognitive and affective factors in

the intrapersonal (self-efficacy), social (normative beliefs), and environmental (attitudes toward the behavior) domains. These domains influence behavioral decisions/intentions that, in turn, predict behavior. Thus, the TTI integrates ecological and affective/cognitive models. The theoretical perspective we are articulating elaborates the key biological, social, and cultural characteristics of the environment that affect development of cognitions and behaviors.

Minimize Toxic Conditions

Biologically and socially toxic conditions interfere with successful development. They influence development of the affective/cognitive factors that mediate behavior (Flay et al., 2009) and can undermine the development of social bonds with others and counter the development of prosocial norms and skills (Flay et al., 2009).

Aversive Social Conditions

Etiological evidence—Aversive events cause physiological stress and motivate people to avoid them. They threaten satisfaction of basic human needs (e.g., the need for safety and biological integrity, positive self evaluation, control over one's environment, and a sense of social ties in which there is a bond of mutual value, caring, and concern; (Sandler, 2001). Abuse—emotional, physical, or sexual—is a major risk factor for development of internalizing and externalizing problems of youth (e.g., Trickett & Bride-Chang, 1995). Less severe forms of aversiveness, such as criticism, teasing, insults, and exposure to parental conflict (Davies, Sturge-Apple, Cicchetti, & Cummings, 2007; Wolchik et al., 2009) are also harmful. Patterson and colleagues (e.g., Dishion, Patterson, & Kavanagh, 1992; Forgatch, Beldavs, Patterson, & DeGarmo, 2008; Patterson, Reid, & Dishion, 1992) have documented how aversive interactions (which they call coercive) among family members shape angry, hostile, and combative behavior of young children. Subsequent research has found aversive interactions also to contribute to marital discord (Weiss & Perry, 2002) and depression (Biglan, Hops, & Sherman, 1988), both of which can affect child development (Rutter, 1985; Rutter & Sandberg, 1992; Rutter, 1997).

Aversive social conditions are also physiologically harmful. Threats to social status are among the most powerful stressors (Dickerson & Kemeny, 2004): they perturb the hypothalamic-pituitary-adrenal axis and promote inflammatory processes that contribute to CVD and a propensity toward depression and aggression (Kemeny, 2009). Davies et al. (2007) found that kindergarteners' chronic exposure to parental conflict led to reduced cortisol reactivity, which then predicted developing externalizing behavior two years later. Choi, Jeong, Rohan, Polcari, and Teicher (2009) found that parental verbal abuse, even absent other forms of abuse, affected brain white matter tract integrity. Affected areas of the brain deal with verbal IQ, depression, and anxiety. Similarly, schools with high levels of victimization and frequent punishment have higher rates of aggressive social behavior, and the aversive ways people treat each other in these settings is a major reason for the high levels of aggression (Mayer, 1995).

Experimental Evidence—Reducing aversive conditions such as harsh and inconsistent discipline, and parental rejection is a core component of virtually every experimentally evaluated parenting intervention (Biglan & Taylor, 2000b; Sandler et al., 2011). We found no studies that isolated the unique contribution of reducing such aversive parenting. However, Patterson, Forgatch, and DeGarmo (2010) reported several mediational analyses indicating the benefits of reducing coercive parenting. Using nine years of data from a parenting intervention with divorcing mothers, they examined the intervention's impact on a construct involving coercive parenting and its relationship to changes in other family processes, the child's behavior, and other family outcomes. The coercive parenting construct

consisted of direct observation measures of parents' explosive discipline and nattering (nagging), and observer ratings of coercive discipline (e.g., "overtly strict, authoritarian"). Intervention-caused reductions in coercive discipline one year post intervention led to reductions in the growth in delinquency over the following nine years. Improvements in the mothers' standards of living were also mediated by reductions in coercive parenting, as were reductions in mothers' arrest rates.

Zhou, Sandler, Millsap, Wolchik, & Dawson-McClure (2008) analyzed the mediators of the impact of New Beginnings, an intervention for divorcing families, on child outcomes measured six years later. The program focused on improving post-divorce adjustment of all family members. Discipline was operationalized in terms of child and mother reports of the consistency and appropriateness of discipline, with limit setting and rule enforcement considered appropriate and punitiveness and coercion considered inappropriate. Effects of the program on adolescents' GPA were mediated by changes in discipline practices. The results provide some support for the value of reducing coercion, though the analysis does not separate effects of reduced coercion from limit setting.

There is also evidence that reducing aversive interactions and punitive practices in schools helps to prevent diverse problems and promote academic and prosocial behavior. Several tested interventions systematically help schools replace punitive discipline with promotion and reinforcement of prosocial behavior (Beets et al., 2009; Durlak et al., 2007; Flannery et al., 2003; Horner et al., 2009; Snyder et al., 2010). However, we are unaware of studies focused only on reducing punitiveness, since doing so virtually requires increasing positive practices.

Biologically Toxic Conditions

Observational and experimental studies show that diets high in omega 6 fatty acids and low in omega 3 fatty acids contribute to depression, aggression, and CVD (Hibbeln, 1998, 2001; Hibbeln, Ferguson, & Blasbalg, 2006). Omega 3 deficiencies perturb neural development in ways that promote inflammatory processes underlying these problems (Hibbeln et al., 2007). The consumption of soy oil, which contains omega 6, increased in the American diet a thousand fold between 1909 and 2000 (Hibbeln, Nieminen, & Lands, 2004). One double-blind placebo controlled trial of omega 3 supplementation during pregnancy and lactation found that taking the supplements significantly increased children's performance on a test of mental processing at age 4 (Helland, Smith, Saarem, Saugstad, & Drevon, 2003). Another study that included omega-3 supplementation with other micronutrients found that supplements significantly decreased discipline problems in an English prison (Gesch, Hammond, Hampson, Eves, & Crowder, 2002).

Abnormal levels of lead even below 10 micro/d predict academic and cognitive problems of children, including lower verbal IQ, Wechsler Individual Achievement scores, reading and math scores, attention, and working memory, even when controlling for age, race, socioeconomic status, and mothers' IQ (Surkan et al., 2007). Other studies show that lead exposure is associated with an increased lifetime burden of special education, attention deficit disorder, crime, and even homicide (Gould, 2009; Nevin, 2007; Stretesky & Lynch, 2004).

Some randomized trials have shown how to reduce lead exposure effects. Providing free prenatal supplementation of 1,200 mgs of calcium reduces maternal lead blood levels (Ettinger et al., 2009), but may or may not when given postnatally or during childhood (Bruening et al., 1999; Markowitz, Sinnott, & Rosen, 2004). Delayed umbilical cord clamping (i.e., waiting for the placenta to emerge and stop pulsing) reduces the burden of lead in the infant (Chaparro et al., 2007). Increased iron (Fe) levels among infants and

children, one side effect of delayed cord cutting, also reduces lead burden (Rico et al., 2006; Wolf, Jimenez, & Lozoff, 2003; Zimmermann, Muthayya, Moretti, Kurpad, & Hurrell, 2006). But chelation therapy well after chronic exposure does not advance the cognitive development of seriously lead-exposed children (Dietrich et al., 2004), arguing for earlier efforts to reduce exposure. Yet it remains unclear whether reducing lead exposure will prevent cognitive deficits, since no experimental evaluations of the effects of reducing exposure have been reported.

Alcohol use during pregnancy can result in fetal alcohol syndrome, which includes facial abnormalities, heart and kidney defects, mental retardation and learning disabilities, and aggressive behavior (Kavale & Karge, 1986). However, no experimental studies have shown that reducing fetal alcohol exposure will prevent these problems.

Poverty

Poverty contributes to both biological and social toxicity. Aber, Yoshikawa, and Beardslee (in this issue) document the critical role of poverty in increasing stress and producing a variety of harmful outcomes. They review experimental and quasi-experimental evaluations of poverty reduction strategies shown to improve children's development.

Teach, Promote, and Richly Reinforce Prosociality

The IOM report (2009) envisions a society where “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” (page 387). Prosociality is an umbrella concept we use to capture this vision. It involves having the motivation and skills to play meaningful prosocial roles in society (Wilson, O'Brien, & Sesma, 2009). It also involves having the cognitive, social, self-regulatory, and physical skills to enable performing these roles, despite any obstacles. The IOM report enumerates the skills needed in each developmental phase and the family, school, and community characteristics that will help to attain them (pp 78-80, Table 4.1).

David Sloan Wilson and colleagues (Sober & Wilson, 2003; Wilson, 2003) have provided an extensive analysis of the contribution of prosociality to human evolution. In a study of prosociality in Binghamton, New York, Wilson et al. (2009) characterized adolescents as prosocial if they responded positively to questions such as, “I think it is important to help other people” or “I am sensitive to the needs and feelings of others.” They found differences among neighborhoods in the level of prosociality that predicted several other aspects of social behavior, including (a) how much people in those neighborhoods would cooperate in a prisoner's dilemma game; (b) if they would return lost letters; and (c) how many decorated their homes for Halloween and Christmas. In studying a nationwide sample of adolescents, Wilson and Csikszentmihalyi (2007) found that adolescents low in prosociality faced more stressful events.

The work of Kasser and colleagues also indicates the value of a prosocial orientation. They found that materialistic goals (e.g., fame and wealth) predicted later psychological problems, while goals having to do with self-fulfillment and helping others predicted better long-term adjustment (Kasser, Cohn, Kanner, & Ryan, 2007); (Kasser & Ryan, 2001).

This analysis agrees with comprehensive theories such as Social Cognitive Theory (Bandura, 1986) and the TTI (Flay et al., 2009), which posit that social environments that model and instruct young people about diverse forms of prosocial behavior develop the basic processes of self-control that are a prerequisite to more complex forms of prosociality.

Experimental Evaluations of Interventions to Increase Prosociality

Components to develop prosociality are key facets of most school-based programs to prevent social behavior problems (NRC & IOM, 2009), including PATHS (Promoting Alternative Thinking Strategies (Kam, Greenberg, & Kusche, 2004)), Positive Action (PA; (Flay & Allred, 2010), Positive Behavior Support (PBS; Horner et al., 1996), PeaceBuilders (Flannery et al., 2003), and the Good Behavior Game (GBG; Kellam et al., 2008). For example, PA (Flay & Allred, 2010) teaches and reinforces prosocial skills and values. Evaluation of K-5 components indicate that PA reduces substance use and violence (Beets et al., 2009) and increases prosocial behavior, school attendance, and reading and math achievement (Snyder et al., 2010).

Nearly every evidence-based parenting intervention influences parents to teach and promote prosociality (Taylor & Biglan, 1999). They teach them to replace aversive practices with reinforcing prosocial behavior through extrinsic rewards and positive interactions, with the parents letting their children lead so that parents simply reinforce whatever the children do by providing attention and affection (Webster-Stratton, 1982). Others teach parents to listen to their children without criticizing or disapproving (Dishion & Stormshak, 2007).

Several mediational analyses of parenting program evaluations have isolated the impact of positive parenting focused on prosocial behavior. Patterson et al. (2010), cited above, tested the role of a positive parenting construct on the impact of their program for divorcing mothers. The construct included observer ratings of skill encouragement (e.g., reinforces success), positive involvement (e.g., showed warmth, respect, empathy, interest, and affection), and monitoring. The intervention produced one-year reductions in coercive parenting that predicted growth in positive parenting over three years, which then predicted lower growth in delinquency over nine years.

Dishion et al. (2008) conducted a mediational analysis of the impact of a parenting intervention on positive parenting and child behavior for mothers of young children. Their *positive parenting* construct consisted of four measures: (a) coder ratings of parent involvement (e.g., “parent talks to child while doing household work”); (b) coding of positive behavior support (including prompting and reinforcing the child's positive behavior); (c) observed length of interactions between the mother and child; and (d) coder ratings of proactive parenting, such as communicating to the child in a clear way and giving the child choices. They found the intervention significantly affected growth in problem behavior from ages 2 through 4 as measured by both the Child Behavior Checklist (Achenbach, 1991) and the Eyberg Child Behavior Inventory (Eyberg, 1992) and that, in both cases, the effect was mediated by changes in positive parenting when the child was 3 years old.

Zhou et al. (2008), described above, assessed the mediation of changes in relationship quality on six-year outcomes. They measured relationship quality by child and mother reports of communication quality and of acceptance vs. rejection. They found relationship quality mediated the effects of the program on adolescent externalizing and internalizing problems six years later.

The Importance of Reinforcement

An enormous amount of experimental evidence exists on the benefits of reinforcing prosocial behavior (Biglan, 2003). Much of the direct experimental evidence comes from interrupted time-series experiments of the effects of making specific reinforcers contingent on behavior in families and schools. Biglan (2003) provides 39 examples of the use of positive reinforcement to affect behaviors ranging from infants' gazing to senior citizens' participation in a meal program. In addition, numerous randomized controlled trials evaluate

school and family interventions in which reinforcing prosocial behavior plays a key role, including PA (Beets et al., 2009; Flay & Allred, 2010; Snyder et al., 2010), PBS (Horner, Sprague, & Sugai, 1996) and PeaceBuilders (Flannery et al., 2003). Parenting interventions routinely teach parents how to use rewards and how to increase positively reinforcing social attention (Taylor & Biglan, 2000).

The GBG (Barrish, Saunders, & Wolf, 1969; Embry, 2002) isolates the effects of simply reinforcing prosocial, self-regulated behavior. Classrooms part into two or more teams; teams earn rewards for being on task and cooperative, first for brief periods, eventually for much longer. Examples of rewards include longer recess and opportunities to dance or make animal sounds in class for 10-30 seconds. A randomized trial in which playing the GBG in first grade was the only intervention showed lasting effects to age 21 (Kellam et al., 2008), including reduced alcohol, tobacco, and drug addictions; reduced engagement in delinquency and violent crime; and increased high-school graduation and college entry. Recent replications of the GBG show similar positive effects on the development of prosociality (van Lier, Muthén, van der Sar, & Crijnen, 2004).

Some interrupted time-series experiments show the value of parent reinforcement when it is not combined with other strategies (e.g., Christophersen, Arnold, Hill, & Quilitch, 1972).

Controversies impede the spread of appropriate reinforcement practices—

Despite the importance of positive reinforcement, it does not receive the attention it should (Biglan, 2003). It may be due to criticism of the use of explicit rewards. In the popular press, Kohn (1993) argued that the use of material or extrinsic rewards harms children. In the scientific literature, Deci, Koestner, and Ryan (1999) presented considerable evidence that using rewards can undermine interest in activities if the rewards impinge on one's autonomy or imply a lack of competence.

Space does not permit a thorough discussion of this issue, but a rapprochement between these views is essential if environments supporting successful development are to flourish. While it is crucial to minimize conditions in which providing explicit rewards could undermine young people's interest in activities, rigorous experimental evaluations of interventions such as the GBG (Embry, 2002) show the clear value of reinforcing prosocial behavior.

Presumably, all parties would agree that the critical issue is determining what conditions will lead to the greatest motivation and learning. We have two observations. First, many events besides explicit rewards provide reinforcement. Any interaction in which an adult plays with a child, follows the child's lead, or interacts with the child in caring ways can provide a context that reinforces new skills and interests. Deci et al. (1999) characterize such interactions as involving autonomy support. Many behavioral scientists tend not to think of these interactions as involving reinforcement, but ample evidence indicates the powerful reinforcing effects of parental attention and interest (e.g., Gottfried, Marcoulides, Gottfried, & Oliver, 2009). In early learning, adults' attention provides moment-to-moment consequences that shape and enhance a child's skills and enjoyment of an activity. For example, the interest a child displays in an activity such as coloring depends on the skill others have helped that child develop and the interest others have shown in their coloring.

Second, we might think of explicit rewards as prosthetic devices to support development of behavior that otherwise might not develop. Extensive special education literature shows the value of using rewards (e.g., Witzel & Mercer, 2003). In some cases an extra measure of reward can motivate a child to something new and develop new skills.

In sum, behavioral scientists and public health advocates must encourage policymakers, parents, and educators to make social environments more reinforcing. Social recognition, sympathetic attention, acts of caring, and receiving comfort are all positively reinforcing and vital to young people's development and everyone's wellbeing. Evidence that explicit rewards can at times undermine motivation signifies the need to focus on nurturing children's and adults' skills and interests in activities rather than on achievement aimed at obtaining recognition or reward. However, when explicit rewards can motivate behavior that would otherwise not change, they should be used. Increasing the prevalence of positive reinforcement beyond the context of evidence-based programs to multiple community settings potentially can advance mental, emotional, and behavioral wellbeing.

Monitor and Limit Opportunities for Problem Behavior

The Theory of Triadic Influence (Flay et al., 2009) posits that cognitive and affective influences on behavior depend upon whether the family, school, and neighborhood environments monitor and set limits on opportunities to experiment with problem behaviors. Setting effective limits involves detecting instances of rule violation or misbehavior and providing consistent non-harsh consequences for the behavior (Dishion & McMahon, 1998). In parenting interventions and in schools' behavior management, this typically involves improving the monitoring of young people's behavior, limiting opportunities for them to experiment with problem behaviors, increasing rules clarity, and replacing harsh consequences with more effective mild negative consequences or positive consequences for rule compliance. Richardson and colleagues (Richardson et al., 1989; Richardson, Radziszewska, Dent, & Flay, 1993) found that adolescents are significantly more likely to experiment with substance use, become depressed, take risks, and get poor grades if they have no after-school supervision. Knowing this has increased efforts to put after-school programs in place, which has led to growing evidence of their value in preventing academic and behavioral problems (Durlak & Weissberg, 2007).

Research on neighborhood crime highlights the importance of monitoring and setting limits. Sampson, Morenoff, and Gannon-Rowley (2002) concluded that crime rates are lower in neighborhoods where residents cooperate in monitoring young people's behavior and intervening to prevent misbehavior.

Experimental Evidence

Evidence-based parenting interventions routinely include a component focused on increasing parental monitoring and limit setting. Although few parenting studies evaluate this component by itself, Brody et al. (2004) reported on an experimental evaluation of a parenting intervention for African American parents of 11 year olds that primarily focused on these processes. The intervention encouraged parents' *Regulated Communicative Parenting*, operationally defined in terms of vigilance in tracking children's activities, communicating norms and expectations regarding sexual activity and alcohol use, and socializing the children about dealing with racism. The intervention significantly increased parents' Regulated Communicative Parenting and improved children's goal-directed future orientation, negative images of drinkers, negative attitudes about alcohol use and early sex, and acceptance of parental influence. A mediation analysis indicated that changes in parent's behavior mediated effects on youth; supplementary analyses indicated that, when considered separately, parental vigilance and expectations each mediated the effects of the intervention on young people's behavior.

In addition, the mediational analysis of Zhou et al. (2008), described above, showed that its intervention effects were mediated by changes in a construct that combined limit setting with reduced coercion.

Promote Mindful Psychological Flexibility

Recent research in clinical psychology has shown that a surprisingly broad range of psychological and behavioral problems diminish as people learn to become more psychologically flexible (Baer, 2003; Biglan, Hayes, & Pistorello, 2008; Brown & Ryan, 2003; Davidson et al., 2003; Grossman, Niemann, Schmidt, & Walach, 2004; Hayes, Luoma, Bond, Masuda, & Lillis, 2006; Kabat-Zinn, 1982, 2005; Langer, 2000). Psychological flexibility involves being clear about one's values and mindful of one's thoughts and feelings, and acting in the service of one's values, even when thoughts and feelings discourage taking valued action. Growing evidence shows that this facilitates emotional regulation (Kashdan & Rottenberg, 2010).

Many preventive interventions promote psychological flexibility. For example, parenting skills interventions often encourage parents to clarify their values regarding their children's futures and to be more mindful in their interactions with their children (Burke, 2010; Singh et al., 2007). The diverse psychological and behavioral benefits of cultivating a mindful, values-based way of living suggest we could help prevent many problems by helping people to make their values explicit and encouraging them to become more mindful in their daily lives (Biglan et al., 2008).

The strongest evidence for value of promoting psychological flexibility comes from randomized trials of Acceptance and Commitment Therapy (ACT), which explicitly promotes it. These studies have shown the benefit of ACT for affecting a broad range of psychological problems, including cigarette smoking, depression, anxiety, hallucinations, epilepsy, chronic pain, diabetic self-management, obsessive-compulsive disorder, self-harm, substance abuse, prejudice, and job burnout. Hayes et al. (2006) conducted a meta-analysis of 21 trials that showed the average effect size (Cohen's *d*) was 0.66 at post treatment and 0.65 at follow-up (on average 19.2 weeks later). Many of these studies included mediation analyses that showed that the impact of the intervention was mediated by changes in psychological flexibility.

The findings on psychological flexibility have two implications for creating nurturing environments. First, environments are more likely to promote wellbeing if they promote psychological flexibility. They should encourage people to make their values explicit and should celebrate people acting in the service of their values (Flay & Allred, 2010). Perhaps the unique contribution of this work is the idea of cultivating mindfulness (Kabat-Zinn, 2005). When people become skilled at noticing their thoughts and feelings *as thoughts and feelings*, they become better able to detach from their struggles to control them. The diverse problems that benefit from flexibility-enhancing interventions suggest that this generalized ability may prepare people to cope with diverse challenges in their lives.

Second, environments may become more nurturing in all respects as the prevalence of psychological flexibility increases in the people who inhabit them. The evidence is more limited with respect to this issue, but there is evidence that organizations can improve social relationships by providing flexibility-promoting interventions (Biglan, Layton, Rusby, Hankins, & Jones, under review). Moreover, there is evidence that these interventions reduce negative attitudes toward others (Lillis & Hayes, 2007), and there is considerable evidence in many of the clinical studies cited above that interpersonal relationships improve for those receiving this type of intervention, even when enhancing those relations is not a direct focus of therapy. The psychological mechanism underlying this process apparently involves people noticing negative thoughts and feelings about others, along with how they feel about themselves as they act in certain ways, and then acting on these thoughts and feelings only when doing so seems likely to further an outcome that they value. Few people

value conflict with others, so the result is often an improvement in interpersonal relationships. Thus, as the proportion of psychologically flexible people in a given environment increases, conflict may decrease and more people may act in ways that foster positive social relations.

A Public Health Movement to Increase the Prevalence of Nurturing Environments

In the mid-19th century, London was the largest and most prosperous city in the world. Yet cholera epidemics routinely ravaged the city. They ended when John Snow showed that contaminated water was causing them (Johnson, 2006). Over the next 50 years, the major economically developed cities of Europe and the U.S. developed sanitation systems that would prevent cholera and other water-borne infectious diseases.

A similar evolution is possible with respect to the environments that influence human development. Now that we know that contaminated water causes cholera, we would be shocked to hear that someone emptied sewage into the street. Yet it was commonplace in the 1850s in London (Johnson, 2006). Now that we understand the importance of nurturing environments, we should aspire to a society where we would be shocked to find that an environment did not nurture its children. The epidemiological and intervention knowledge is available to make it happen and such an ambitious effort to change our culture is not unprecedented. The tobacco control movement achieved a massive change in the culture of smoking, despite a sophisticated and well-funded disinformation campaign by the tobacco industry (Biglan, 2004; Biglan & Taylor, 2000; National Cancer Institute, 2008). Over the past 50 years, the U.S. has evolved from a society where smoking occurred in nearly every social gathering to one in which we are surprised to see someone light a cigarette in any gathering. Between 1965 and 2002, the smoking rate among men dropped from 51 to 25%, while for women it dropped from 34 to 20% (CDC, 2008). The change was due largely to a well-organized, empirically grounded, persuasive, and constantly expanding campaign to influence citizens and policymakers to understand the harm of smoking and to adopt policies that would curtail it (Biglan & Taylor, 2000).

In a sense, the tobacco control movement had an easy target. Smoking is one behavior, influenced by just a few factors. In contrast, reducing the incidence and prevalence of multiple psychological and behavioral problems, such as substance use, criminal behavior, or depression would seem to require diverse strategies. In practice, this has been society's strategy. From the federal to the local level, separate systems treat and prevent different problems, despite the fact that they share common environmental influences. But evidence that many interventions affect multiple problems (e.g., Beets et al., 2009; Flay, 2002; Flay et al., 2004; Zhou et al., 2008) underscores the potential of developing a comprehensive public health movement to increase the prevalence of the nurturing environments that can prevent all of these problems.

The highest priority environments are families and schools, since they influence child and adolescent development and since most problems develop during childhood or adolescence (NCR & IOM, 2009). However, as people routinely begin to ask, "What contributed to this problem?" they will also see ways in which neighborhoods (Biglan & Hinds, 2009), workplaces (Flaxman & Bond, 2010), and prisons (Travis & Waul, 2003) contribute to the burden of psychological, behavioral, and health problems.

Maibach and colleagues (Dearing, Maibach, & Buller, 2006; Maibach, Abrams, & Marosits, 2007) provide a framework for pursuing large-scale societal change. It involves mobilizing relevant national organizations to influence local action, forging a widely shared view of the

societal change needed, using media to influence individual behavior and organizational and policy change, diffusing practices at the local level to efficiently support change, and creating a surveillance system that focuses attention on the targeted change and indicates what works and what does not.

Mobilizing Organizations

The first step is to identify the opinion-leading organizations at the national, state, and local level that could influence the diffusion of nurturing environments. Table 1 provides examples at the national level of the types of organizations relevant to the two most important environments—families and schools. Not in this table, because they are too numerous, are religious organizations, which have a huge influence on many family environments.

Dearing et al. (2006) argue that national organizations typically have distribution channels through which they can affect state and local organizations. Successful change efforts identify and influence opinion leaders in national organizations and supply them with the support needed to influence change at the state and local level.

The current infrastructure for improving human wellbeing consists largely of advocacy organizations working on single problems, including tobacco use (e.g., The American Cancer Society; <http://www.cancer.org>), drunk driving (e.g., Mothers Against Drunk Driving; <http://www.madd.org/>), domestic violence (e.g., The National Domestic Violence Hotline (<http://www.ndvh.org/about-support/>), mental illness (e.g., Mental Health America; <http://www.nmha.org/>), eating disorders (e.g., The National Eating Disorders Association; <http://www.nationaleatingdisorders.org/>), and many other problems. However, each organization addresses a problem caused by non-nurturing environments. For example, drunk driving, domestic violence, and mental illness are each more likely to occur in environments with high levels of conflict that fail to teach and reinforce prosocial behavior and do not limit, monitor, or guide youth development (Biglan et al., 2004). An important priority, therefore, will be to evolve new organizations—through coalitions or the creation of new organizations—whose mission is to foster nurturing environments.

Forging a Widely Shared Vision of What Is Needed

Perhaps the most critical thing needed to motivate the key institutions of society to cultivate more nurturing environments, is a widely shared vision of their value. Just as society mobilized to combat cigarette smoking thanks to creative marshaling of a growing body of evidence about its harm, we can marshal and expand the evidence about the value of nurturing environments so that individuals, policy makers, and major, relevant organizations begin to see these environments.

Reports from the Surgeon General and Institute of Medicine—The tobacco control movement benefited from Surgeon General reports and related publications that documented an ever-expanding list of the harms of tobacco use and the factors that influenced tobacco use (e.g., (National Cancer Institute, 1989; 1993; 2008; NCI Smoking and Tobacco Control Program., 1993; National Cancer Policy Board & IOM & Commission on Life Sciences, 1998); U.S. Department of Health and Human Services, 1980; 1982; 1986; 1988; 1989; 1990; 1994; 2000). These reports marshaled evidence to influence individual behavior and provided support for organizational efforts to alter public policy. Here are examples of the kinds of reports that the Surgeon General or Institute of Medicine might generate to achieve more nurturing environments:

- Reducing the toxicity of social environments

- Reducing the biological toxicity of environments
- The value of promoting prosocial behavior in families and schools
- The value of monitoring and limit setting in families and schools
- The value of increasing psychological flexibility

Each report would summarize the epidemiological evidence about multiple problems arising from negative environments and the multiple benefits of nurturing ones. They would review the evidence about programs and policies to transform the major environmental aspects.

These reports would shape the research agenda even further. Prevention scientists would be prompted to expand their efforts to pinpoint the nature of nurturing conditions; the diverse benefits of these conditions; and the programs, policies, and practices that contribute to making families, schools, workplaces, neighborhoods, and prisons more nurturing.

While such reports stimulated further research, they would have direct impact on individuals, prompting policymakers and citizens to ask whether they or their communities could minimize harmful stressors. Just as the Surgeon General report on environmental tobacco smoke (CDC, 2006) stimulated widespread efforts to eliminate smoking in workplaces, schools, homes, and public places, sensitizing people to the problem of toxic environments could stimulate significant cultural change even before further research occurs. Examples of such developments already exist. For example, the Los Angeles Unified School District (2007) adopted a policy to limit the use of punitive practices in schools.

Media advocacy—Media campaigns have played a huge role in changing the culture of smoking (Biglan & Taylor, 2000a). They influence individuals to stop smoking (Flay, 1987) and promote policies (Dorfman, Wallack, & Woodruff, 2005; Wallack, 1990). Mass media communications translate epidemiological evidence into vivid, persuasive communications (Biglan & Hinds, 2009). For example, tobacco control advocates often compare the death toll from cigarette smoking in the U.S. to two Boeing 747s crashing and killing everyone on board every day of the year. As epidemiological evidence about the harm of non-nurturing environments accumulates, we envision the development of a set of messages that dramatically remind people of the toll that stressful environments take.

Media campaigns could help to advocate for better policies. Local advocacy for clean indoor air laws succeeded in passing many local ordinances and laid the groundwork for state laws. The Surgeon General report on secondhand smoke documented the harm of other people's smoking and thus enlisted support from nonsmokers for smoking control policies. Similarly, messages to the public might emphasize the risk to every person of environments that produce children with aggressive behavior problems, drug use, risky sexual behavior, and depression.

It will be vital for national organizations to provide the materials and strategies for implementing local campaigns. For example, the American Psychological Association can support local school and clinical psychologists' advocacy for better supports to families and schools; these messages will create demand among parents and teachers for greater efforts to support nurturance in schools and families.

The Importance of Local Organizing

Ultimately, however, the success of this effort will depend on action at the local level (Dearing et al., 2006). In the tobacco control movement, spreading evidence about the harm of smoking mobilized local advocates who had been harmed by smoking to get clean-indoor

air policies implemented that changed norms about smoking and fostered widespread support for change (Biglan & Taylor, 2000).

At least three types of organizations are operating at the local level: (a) those providing direct services, (b) those setting policies, and (c) those advocating for policies and programs. For example, families have organizations providing direct service, including schools and churches that may advise parents. Policymaking bodies at the local and state level affect the kind of services provided and determine how much funding will be available to provide services. Advocacy organizations include those working to reduce child and spousal abuse, homelessness, and poverty.

Implementing Effective Population-Wide Change Strategies

We enumerated above some of the growing number of evidence-based interventions that can prevent multiple problems by making environments more nurturing. Making these interventions widely available at the local level will be pivotal in achieving the society we envision. Increasingly, prevention researchers are deploying and testing these interventions in entire populations.

Triple-P, the Positive Parenting Program (Sanders, Cann, & Markie-Dadds, 2003), is an example of this kind of work. It is a population-based approach to providing advice and skills training for parents in small or large doses, depending on what they need. Based on numerous studies of parenting skills training (e.g., Nowak & Heinrichs, 2008), the program helps parents reduce the use of harsh discipline methods, make greater use of positive reinforcement, and spend more time in enjoyable activities with their children. Triple-P provides advice about common problems of parenting through the media, trains those who are likely to come into frequent contact with parents to provide brief advice, and has more intensive skills training programs for parents who need more. Triple-P was developed through a worldwide network of researchers who have accumulated empirically evaluated component interventions that make up the different levels of intervention. In a randomized trial in South Carolina (Prinz, Sanders, Shapiro, Whitaker, & Lutzker, 2009), the project trained about 600 people in 9 counties to provide advice and training to parents of young children; nine other counties served as controls. The intervention prevented hospital-reported child abuse and foster care placement, with a favorable cost-benefit ratio (Foster, Prinz, Sanders, & Shapiro, 2008).

The Nurse-Family Partnership (Olds, 2010) provides comprehensive support to high-risk mothers during their pregnancy and the first two years of the child's life. Randomized trials, with long-term follow-up have found such interventions to reduce coercive parenting significantly, increase mother's patience, and improve children's cognitive and behavioral development, even into adolescence.

As noted above, systematic methods of making schools more nurturing have already evolved considerably. Based on extensive research on classroom management over the past 40 years (e.g., classroom management), at least three systems for supportive prosocial behavior have been developed (Embry, Flannery, Vazsonyi, Powell, & Atha, 1996; Flannery et al., 2003); (Flay, Allred, & Ordway, 2001; Flay & Allred, 2003)

Not only programs, but simple, effective, behavior-influence techniques are emerging. Embry has dubbed such techniques kernels (Embry, 2004) and Embry and Biglan (2008) have identified more than 50 of them. Kernels, such as public-posting, can help to increase community donations (Jackson & Mathews, 1995) or safe driving (Ludwig, Biggs, Wagner, & Geller, 2001; Ragnarsson & Bjorgvinsson, 1991), reduce injuries to children (Embry & Peters, 1985), or "beat the buzzer" to increase safety-belt use. The simplicity of kernels,

their low cost, and rapid results make them useful as first-pass strategies to increase nurturing, reduce toxic influences, and increase psychological flexibility at population levels.

Public policy is another critical tool for achieving nurturing environments, though it is often overlooked by psychologists who are traditionally oriented toward working with individuals and small groups. A substantial body of evidence identifies public policies that would contribute to making environments more nurturing. The Promise Neighborhoods Research Consortium enumerates more than 50 of them on its website (<http://promiseneighborhoods.org/>). For example, multiple policies have been shown to reduce alcohol abuse and related problems. As the importance of nurturing environments becomes clear, more research will evaluate policies that can foster nurturing environments.

It is difficult to be sure which policies will be essential, in the sense of having a large impact and facilitating adoption of other policies. Policies requiring funding of services to increase nurturance of families or schools programs like Positive Action could have a huge impact, but it may be hard to enact such policies until their essential value is better understood.

A Surveillance System to Monitor Prevalence of Nurturing Environments

If we are correct about the central importance of nurturing environments, the next natural step should be to track the prevalence of those environments. A surveillance system tracking the prevalence of nurturing family and school environments will focus public attention on them and provide feedback about the success (or failure) of efforts to promote them. How many families nurture by minimizing aversiveness, reinforcing prosocial behavior, monitoring and setting limits, and promoting psychological flexibility? What proportion of schools has the features of Positive Behavior Support? What proportion of neighborhoods has a level of social cohesion associated with low levels of crime and stress? We envision the evolution of a system for tracking all aspects of nurturance that can mobilize support for effective public policy and encourage individuals to be more nurturing. Such a surveillance system (Biglan et al., in preparation; Flay et al., in press; Komro et al., 2011) will contribute directly to the spread of nurturance, as practices associated with increasing nurturance are retained and those that do not are modified or abandoned.

A Paradigm Shift

Without a drastic shift away from a focus on individual problems to a focus on the prevalence of nurturing environments, progress in reducing mental, emotional, and behavioral disorders will continue at a glacial pace. Agencies funding research will continue to define themselves in terms of individual disorders and will only slowly develop a coordinated effort commensurate with the facts we already have. If practice agencies continue to fund interventions that target only individual disorders, then it will be similarly difficult to discover efficient methods of preventing and treating problems.

The nurturing environments framework integrates efforts to prevent multiple problems by focusing attention on the fundamental conditions needed to foster prosocial behavior and prevent diverse mental, emotional, and behavioral disorders. It can guide the integration of research and practice around efforts to increase the prevalence of nurturing environments. As understanding of the value of nurturing environments grows, research will increasingly be evaluated in terms of how well it contributes to increasing the prevalence of such environments. A public health movement built on this foundation can increase the prevalence of nurturing environments, so that we can reduce academic failure, crime, mental illness, abuse and neglect, drug addiction, risky sexual behavior, poverty, and physical illness to levels never before seen in the United States.

Reference List

- Achenbach, TM. Manual for the Child Behavior Checklist/4-18 and 1991 Profile. University of Vermont; Burlington, VT: 1991.
- Biglan A, Taylor TK. Why have we been more successful in reducing tobacco use than violent crime? *American Journal of Community Psychology*. 2000a; 28:269–302. [PubMed: 10945118]
- Biglan, A. Direct written testimony in the case of the U.S.A. vs. Phillip Morris et al. U.S. Department of Justice [On-line]. 2004. Available: <http://www.ori.org/ohr/testimony.html>
- Biglan A, Flay BR, Komro KA, Embry DD, Aldridge WA II, Prinz RJ, et al. The evaluation and research infrastructure for comprehensive prevention. 2010 in preparation.
- Biglan A, Hinds E. Evolving prosocial and sustainable neighborhoods and communities. *Annual Review of Clinical Psychology*. 2009; 5:169–196.
- Biglan A, Taylor TK. Increasing the use of science to improve child-rearing. *Journal of Primary Prevention*. 2000b; 21:207–226.
- Burke CA. Mindfulness-based approaches with children and adolescents: A preliminary review of current research in an emergent field. *Journal of Child and Family Studies*. 2010; 19:133–144.
- Centers for Disease Control and Prevention. Youth Risk Behavior Surveillance - United States, 2007. *Surveillance Summaries*, 2008. Morbidity and Mortality Weekly Report, 57. 2008
- Choi J, Jeong B, Rohan ML, Polcari AM, Teicher MH. Preliminary evidence for white matter tract abnormalities in young adults exposed to parental verbal abuse. *Biological Psychiatry*. 2009; 65:227–234. [PubMed: 18692174]
- Christophersen ER, Arnold CM, Hill DW, Quilitch HR. The home point system: token reinforcement procedures for application by parents of children with behavior problems. *Journal of Applied Behavior Analysis*. 1972; 5:485–497. [PubMed: 16795372]
- Dearing JW, Maibach EW, Buller DB. A convergent diffusion and social marketing approach for disseminating proven approaches to physical activity promotion. *American Journal of Preventive Medicine*. 2006; 31:11–23.
- Dickerson SS, Kemeny ME. Acute stressors and cortisol responses: A theoretical integration and synthesis of laboratory research. *Psychological Bulletin*. 2004; 130:355–391. [PubMed: 15122924]
- Dietrich KN, Ware JH, Salganik M, Radcliffe J, Rogan WJ, Rhoads GG, et al. Effect of chelation therapy on the neuropsychological and behavioral development of lead-exposed children after school entry. *Pediatrics*. 2004; 114:19. [PubMed: 15231903]
- Dishion, TJ.; Patterson, GR.; Kavanagh, KA. An experimental test of the coercion model: Linking theory, measurement, and intervention.. In: McCord, J.; Tremblay, RE., editors. *Preventing antisocial behavior: Interventions from birth through adolescence*. Guilford; New York: 1992. p. 253-282.
- Dishion TJ, Shaw D, Connell A, Gardner F, Weaver C, Wilson M. The Family Check Up with high-risk indigent families: Preventing problem behavior by increasing parents' Positive Behavior Support in early childhood. *Child Development*. 2008; 79:1395–1414. [PubMed: 18826532]
- Dishion, TJ.; Stormshak, E. *Intervening in children's lives: An ecological, family-centered approach to mental health care*. APA Books; Washington, DC: 2007.
- Dorfman L, Wallack L, Woodruff K. More than a message: Framing public health advocacy to change corporate practices. *Health Education & Behavior*. 2005; 32:320–336. [PubMed: 15851542]
- Embry DD. Community-based prevention using simple, low-cost, evidence-based kernels and behavior vaccines. *Journal of Community Psychology*. 2004; 32:575–591.
- Embry DD, Biglan A. Evidence-based kernels: Fundamental units of behavioral influence. *Clinical Child and Family Psychology Review*. 2008; 11:75–113. [PubMed: 18712600]
- Embry DD, Flannery D, Vazsonyi A, Powell K, Atha H. PeaceBuilders: A theoretically driven, school-based model for early violence prevention. *American Journal of Preventive Medicine*. 1996; 22:91–100. [PubMed: 8909629]
- Embry, D.; Peters, L. A three-city evaluation of the diffusion of a pedestrian-safety injury control intervention. New Zealand Ministry of Transport; Wellington, NZ: 1985.
- Eyberg, S. Parent and teacher behavior inventories for the assessment of conduct problem behaviors in children.. In: Vandecreek, L.; Ritt, LG., editors. *Innovations in clinical practice: A source book*,

Volume 11. Professional Resource Press/Professional Resource Exchange; Sarasota, FL: 1992. p. 261-270.

- Flannery DJ, Vazsonyi AT, Liau AK, Guo S, Powell KE, Atha H, et al. Initial behavior outcomes for the PeaceBuilders universal school-based violence prevention program. *Developmental Psychology*. 2003; 39:292–308. [PubMed: 12661887]
- Flaxman PE, Bond FW. A randomised worksite comparison of acceptance and commitment therapy and stress inoculation training. *Behaviour Research and Therapy*. 2010; 48:816–820. [PubMed: 20627269]
- Flay BR, Allred CG. Long-term effects of the Positive Action program. *American Journal of Health Behavior*. 2003; 27:S6–s21. [PubMed: 12751643]
- Flay, BR.; Allred, CG. The Positive Action Program: Improving academics, behavior, and character by teaching comprehensive skills for successful learning and living.. In: Lovat, T.; Toomey, R.; Clement, N., editors. *International research handbook on values education and student wellbeing*. Springer; New York: 2010. p. 471-501.
- Flay BR, Allred CG, Ordway N. Effects of the Positive Action program on achievement and discipline: Two matched-control comparisons. *Prevention Science*. 2001; 2:71–89. [PubMed: 11523754]
- Flay BR, Biglan A, Komro KA, Wagenaar AC, Embry DD, The Promise Neighborhoods Research Consortium. Designs for evaluating comprehensive community interventions in neighborhoods and communities. 2010 In press.
- Forgatch, MS.; Beldavs, ZG.; Patterson, GR.; DeGarmo, DS. From coercion to positive parenting: Putting divorced mothers in charge of change.. In: Kerr, M.; Stattin, H.; Engels, RCME., editors. *What can parents do? New insights into the role of parents in adolescent problem behavior*. John Wiley & Sons, Ltd.; West Sussex, England: 2008. p. 191-209.
- Foster EM, Prinz RJ, Sanders MR, Shapiro CJ. The costs of a public health infrastructure for delivering parenting and family support. *Children and Youth Services Review*. 2008; 30:493–501.
- Jackson NC, Mathews RM. Using public feedback to increase contributions to a multipurpose senior center. *Journal of Applied Behavior Analysis*. 1995; 28:449. [PubMed: 16795875]
- Johnson, S. *The ghost map*. Riverhead Books; New York: 2006.
- Kam CM, Greenberg MT, Kusche CA. Sustained effects of the PATHS curriculum on the social and psychological adjustment of children in special education. *Journal of Emotional & Behavioral Disorders*. 2004; 12:66–78.
- Kasser T, Cohn S, Kanner AD, Ryan RM. Some costs of American corporate capitalism: A psychological exploration of value and goal conflicts. *Psychological Inquiry*. 2007; 18:1–22.
- Kasser, T.; Ryan, RM. Be careful what you wish for: Optimal functioning and the relative attainment of intrinsic and extrinsic goals.. In: Schmuck, P.; Sheldon, KM., editors. *Life goals and well-being: Towards a positive psychology of human striving*. Hogrefe & Huber; Ashland, OH: 2001. p. 116-131.
- Kavale KA, Karge BD. Fetal Alcohol Syndrome: A behavioral teratology. *Exceptional Child*. 1986; 33:4–16.
- Kohn, A. *Punished by rewards: The trouble with gold stars, incentive plans, A's, praise, and other bribes*. Houghton, Mifflin; Boston, MA: 1993.
- Komro KA, Flay BR, Biglan A, The Promise Neighborhoods Research Consortium. Creating nurturing environments: a science-based framework for promoting child health and development within high-poverty neighborhoods. *Clinical Child and Family Psychology Review*. 2011; 14:111–134. [PubMed: 21468644]
- Ludwig TD, Biggs J, Wagner S, Geller ES. Using public feedback and competitive rewards to increase the safe driving of pizza deliverers. *Journal of Organizational Behavior Management*. 2001; 21:75–104.
- MacKinnon, DP. *Introduction to Statistical Mediation Analysis*. Erlbaum; Mahwah, NJ: 2008.
- Maibach E, Abrams L, Marosits M. Communication and marketing as tools to cultivate the public's health: a proposed. *BMC public health*. 2007; 7:88. [PubMed: 17519027]
- Mayer GR. Preventing antisocial behavior in the schools. *Journal of Applied Behavior Analysis*. 1995; 28:467–478. [PubMed: 16795877]

- National Cancer Institute. Smokeless tobacco use in the United States. NCI. 1989; 8:1–105.
- National Cancer Institute. Major local tobacco control ordinances in the United States. NIH publication ; no. 933532. U.S. DHHS, Public Health Service, NIH, NCI; Bethesda: 1993.
- National Cancer Institute. The role of the media in promoting and reducing tobacco use. Tobacco Control Monograph No. 19. U.S. DHHS, NIH, NCI; Bethesda, MD: 2008. vols. NIH Pub. No. 07-6242
- National Cancer Institute Smoking and Tobacco Control Program. Respiratory health effects of passive smoking : lung cancer and other disorders. The report of the U.S. Environmental Protection Agency. NIH publication ; no. 933605. U.S. DHHS, PHS, NIH, NCI; Bethesda: 1993.
- National Cancer Policy Board & Institute of Medicine and Commission on Life Sciences, N.R.C.. Taking action to reduce tobacco use. National Academy Press; Washington, DC: 1998.
- Nowak C, Heinrichs N. A comprehensive meta-analysis of Triple P-Positive Parenting Program using hierarchical linear modeling: Effectiveness and moderating variables. *Clinical Child and Family Psychology Review*. 2008; 11:114–144. [PubMed: 18509758]
- Olds, DL. The nurse-family partnership: From trials to practice.. In: Reynolds, AJ.; Rolnick, AJ.; Englund, MM.; Temple, JA., editors. *Childhood programs and practices in the first decade of life: A human capital integration*. Cambridge University Press; New York: 2010. p. 49-75.
- Prinz RJ, Sanders MR, Shapiro CJ, Whitaker DJ, Lutzker JR. Population-based prevention of child maltreatment: The U.S. Triple P System Population Trial. *Prevention Science*. 2009; 10:1–12. [PubMed: 19160053]
- Ragnarsson RS, Bjorgvinsson T. Effects of public posting on driving speed in Icelandic traffic. *Journal of Applied Behavior Analysis*. 1991; 24:53–58. [PubMed: 16795744]
- Rico JA, Kordas K, Lopez P, Rosado JL, Vargas GG, Ronquillo D, et al. Efficacy of iron and/or zinc supplementation on cognitive performance of lead-exposed Mexican schoolchildren: a randomized, placebo-controlled trial. *Pediatrics*. 2006; 117:e518. [PubMed: 16510631]
- Rutter M. Resilience in the face of adversity: Protective factors and resistance to psychiatric disorder. *British Journal of Psychiatry*. 1985; 147:598–611. [PubMed: 3830321]
- Rutter M. Comorbidity: Concepts, claims and choices. *Criminal Behaviour and Mental Health*. 1997; 7:265–285.
- Rutter M, Sandberg S. Psychosocial stressors: Concepts, causes and effects. *European Child and Adolescent Psychiatry*. 1992; 1:3–13.
- Sanders MR, Cann W, Markie-Dadds C. Why a universal population-level approach to the prevention of child abuse is essential. *Child Abuse Review*. 2003; 12:145–154.
- Sandler IN, Schoenfelder EN, Wolchik SA, MacKinnon DP. Long-term impact of prevention programs to promote effective parenting: Lasting effects but uncertain processes. *Annual Review of Psychology*. 2011; 62:299–329.
- Sandler I. Quality and ecology of adversity as common mechanisms of risk and resilience. *American Journal of Community Psychology*. 2001; 29:19–61. [PubMed: 11439827]
- Singh NN, Lancioni GE, Singh Joy SD, Winton ASW, Sabaawi M, Wahler RG, et al. Adolescents with conduct disorder can be mindful of their aggressive behavior. *Journal of Emotional and Behavioral Disorders*. 2007; 15:56.
- Taylor TK, Biglan A. Behavioral parenting skills programs: A review of the literature for clinicians and policy makers. *Journal of Clinical Child & Family Psychology Review*. 1999; 2:169–182.
- Travis, J.; Waul, M. The children and families of prisoners.. In: Travis, J.; Waul, M., editors. *Prisoners once removed: The impact of incarceration and reentry on children, families, and communities*. The Urban Institute; Washington, DC: 2003. p. 1-30.
- Trickett PK, Bride-Chang C. The developmental impact of different forms of child abuse and neglect. *Developmental Review*. 1995; 15:311–337.
- U.S. Department of Health and Human Services. The health consequences of smoking for women. A report of the Surgeon General. USDHHS, PHS, Office of the Assistant Secretary for Health, Office on Smoking and Health; Washington, DC: 1980.
- U.S. Department of Health and Human Services. The health consequences of smoking: Cancer: Report of the Surgeon General. USDHHS, PHS, CDC, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; Washington, DC: 1982.

- U.S. Department of Health and Human Services. The health consequences of involuntary smoking. A report of the Surgeon General. Vol. 1. USDHHS, PHS, CDC, Center for Health Promotion & Education, Office on Smoking & Health. CDC 87-8398; Rockville, MD: 1986.
- U.S. Department of Health and Human Services. The health consequences of smoking: Nicotine addiction. A report of the Surgeon General. USDHHS, PHS, CDC, Center for Health Promotion and Education, Office on Smoking and Health. DHHS Publication No. (CDC) 88-8406. Government Printing Office; Washington, DC: 1988.
- U.S. Department of Health and Human Services. Reducing the health consequences of smoking: 25 years of progress. A report of the Surgeon General. USDHHS, PHS, CDC, Office on Smoking and Health. DHHS Publication No. CDC 89-8411; Washington, DC: 1989.
- U.S. Department of Health and Human Services. The health benefits of smoking cessation: A report of the Surgeon General. USDHHS, PHS, Office on Smoking and Health. Report No. CDC 90-8416; Rockville, MD: 1990.
- U.S. Department of Health and Human Services. Preventing tobacco use among young people: A report of the Surgeon General. USDHHS, PHS, CDC, National Center for Chronic Disease Prevention and Health Promotion, OSH; Atlanta, GA: 1994.
- U.S. Department of Health and Human Services. Surgeon General report on reducing tobacco use. USDHHS; Washington, DC: 2000.
- van Lier PAC, Muthén B, van der Sar RM, Crijnen AAM. Preventing disruptive behavior in elementary schoolchildren: impact of a universal classroom-based intervention. *Journal of Consulting and Clinical Psychology*. 2004; 72:467. [PubMed: 15279530]
- Wallack, L. Media advocacy: Promoting health through mass communication.. In: Glanz, K.; Lewis, FM.; Rimer, BK., editors. *Health behavior and health education: Theory, research, and practice*. Jossey-Bass; San Francisco, CA: 1990. p. 370-386.
- Webster-Stratton C. Teaching mothers through videotape modeling to change their children's behavior. *Journal of Pediatric Psychology*. 1982; 7:279–294. [PubMed: 7131215]
- Witzel BS, Mercer CD. Using rewards to teach students with disabilities: Implications for motivation. *Remedial and Special Education*. 2003; 24:88–96.
- Wolchik SA, Sandler IN, Jones S, Gonzales N, Doyle K, Winslow E, et al. The new beginnings program for divorcing and separating families: Moving from efficacy to effectiveness. *Family Court Review*. 2009; 47:416–435. [PubMed: 20160898]
- Wolf AW, Jimenez E, Lozoff B. Effects of iron therapy on infant blood lead levels. *The Journal of Pediatrics*. 2003; 143:789–795. [PubMed: 14657829]
- Zimmermann MB, Muthayya S, Moretti D, Kurpad A, Hurrell RF. Iron fortification reduces blood lead levels in children in Bangalore, India. *Pediatrics*. 2006; 117:2014. [PubMed: 16740843]

Table 1

Examples of the national organizations that could foster nurturing environments

Sector	Families	Schools
Research	National Institutes of Health Office of Juvenile Justice and Delinquency Prevention	U.S. Department of Education
Governmental	The White House	The White House
	Administration on Children and Families Substance Abuse and Mental Health Services Admin.	U.S. Department of Education
	Department of Justice	
	Department of Housing and Urban Development	
Professional	American Psychological Association	National Education Association
	American Academy of Pediatrics	American Federation of Teachers
	The Society for Prevention Research	Association for Positive Behavioral Support
	The Association for Behavior Analysis International, National Association for the Education of Young Children	The Society for Prevention Research The Association for Behavior Analysis International
National Associations of State-Level Government Agencies	National Governor's Association	National Governor's Association
	National Conference of State Legislators	National Conference of State Legislators
Foundations	Annie E. Casey Foundation	Gates Foundation
Advocacy	Children's Defense Fund Prevent Child Abuse America	
Business	Chamber of Commerce	Chamber of Commerce
	Business Roundtable	Business Roundtable