Eliminate Violence: A Strategy to Enhance Brain Functioning through the Transcendental Meditation Program

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Abstract

Success in combating the epidemic of violence will occur when public policy is guided by the principles of science. Three fundamental shifts towards a *Science-Based* public policy are envisioned: (1) adoption of rigorous scientific research as the basis for determining what programs work and what programs do not work; (2) adoption and funding of cost-effective programs that emphasize community-based innovative programs over policing and prisons; and (3) adoption of a strategy that implements prevention programs that can effectively address the root cause of violence—stress-induced imbalance in brain and behavior. In this paper, we trace the origin of violent, aggressive behavior to dysfunction of the brain arising from stress in schools and society. We discuss the evidence behind two fundamental forces impacting human behavior—nature or genes and nurture or experience. We conclude that experience has the greatest impact on behavior of the two and that it represents the most feasible form of intervention to alter brain imbalances underlying antisocial thinking and action. A summary is provided of possible neural correlates of at-risk behavior and a proven, practical prevention-oriented program is examined—the Transcendental Meditation program. This program fulfills the three criteria of successful public policy to eradicate violence in our schools. Considerable research is cited that indicates the ability of the Transcendental Meditation program to positively impact the wide spectrum of dysfunctional thinking and behavior in at-risk youth. Implementation of this program could bring about a rapid and permanent improvement in our efforts to eliminate violence and develop the full potential of our children.

The Epidemic of Violence: Source and Strategies

"Violence has become increasingly prominent in the lives of children in the United States, which has the highest youth homicide and suicide rates among the 26 wealthiest nations in the world and one of the highest rates of homicide worldwide. Homicide and suicide have become the second and third leading causes of death of teenagers; homicide is the leading cause of death of black youth. Children and youth face serious short- and long-term physical and emotional consequences as victims, witnesses, and perpetrators of violence. Furthermore, violence is an issue that crosses all geographic (urban to rural) and socioeconomic boundaries.

Homicide rates for males 15 to 19 years of age increased 113% between 1985 and 1995, surpassing rates for males of all other age groups except those 20 to 24 years of age, with firearm-related homicides accounting for almost all of this increase. Teenagers are now more likely to die of gunshot wounds than all natural causes combined." [1]

The National Crime Victimization Survey data [2] show that an estimated 2.7 million violent crimes take place annually either at school or near schools. About one in four public school teachers rated physical conflicts among students as a "serious" or "moderately serious" problem in their classrooms. The threat to students posed by robbery and physical assault at school has sparked widespread national concern.

Children are at increased risk for crime victimization. Children are the victims of many of the same crimes that victimize adults and they are as well subject to childhood crimes, like child abuse and neglect. "The impact of these crimes on young victims can be devastating, and the violent or sexual victimization of children can often lead to an intergenerational cycle of violence and abuse" [3, 4].

The Tip of the Iceberg

School violence has a source. A pyramid of dynamics underlies the most dramatic, media-highlighted tragedies (see figure 1 at end of this paper). For every fatal incident, rough estimates suggest there are approximately 2-10 times as many unreported severe injuries causing some permanent disability, associated with suffering and huge medical costs. Beneath this 'tip' of media attention, lie ever-expanding layers of tragedy. Our schools are filled with increasing disorder, disharmony and stress. One estimate suggests about 3 million violent crimes occur annually in or near our schools [2]. At the base of this pyramid of violence are the innumerable daily events that reverberate through the school environment and therefore impact the student psychologically and physiologically. Many daily experiences place considerable emotional, intellectual and physical overload on the nervous systems of the

student that can generate stress-related imbalances in brain and body including biochemical and neurological imbalances. These imbalances generate thinking that may be intolerant, prejudicial, rigid, obsessive, low in motivation, and/or low in self-regard. In turn, stressed thinking can lead to behavior that is impulsive, suicidal and/or aggressive [5, 6].

The problem of violence is thus a system-wide problem—it is a problem of growing stressful experience—yet, even as a nation, we continue to focus only on the most raw and exposed tip of the pyramid. Any effective and lasting solution will need to address the entire chronic and pervasive situation. Gun control, guards and video cameras may help [7], but they do not impact the fundamental problem of growing physiological imbalances in students and thus, will not change the nature of this epidemic of violence.

Violence can be compared to a disease state [8]. In this perspective, antisocial behavior is literally a state of *dis-ease*. In the face of a disease epidemic, medical science has two possible responses [9]: to inoculate and/or to quarantine—inner- and outer-directed strategies, respectively. Modern medicine would regard the inoculation program as the more effective of the two. Maximum impact on school violence will come from an immunization strategy which will develop inner resilience and resistance to stress-related imbalance.

What technologies are available which can fulfill this role? When the 'infective agent' is the stress which is already pervasive in schools and society, outer approaches, such as protection from violent action, are inadequate to resolve the problem. In contrast, an inner approach offers each student the opportunity to build within their brains and physiology adequate levels of orderliness capable of resisting the continuing onslaught of environmental stress and violence. In the absence of major reductions in environmental stress, it would be highly practical if we can prevent students from entering the pyramid of violence and from moving upwards into escalating outer expressions of growing inner disorder and confusion. Immunization is the most effective strategy to protect a population from an epidemic because it allows each individual to be physiologically self-sufficient—to resist the outer causative infectious agents by enlivening the natural, inner intelligence of the physiology. We will examine a proven, practical technology whereby, through restoring balance and enhancing the integration of brain function, the student's natural resistance to stressful environments can be increased leading to the elimination of the pyramid of violence.

This article will review theory and data that bear on the issue of how accumulated negative experience alters the normal developmental sequence of brain function to produce antisocial, aggressive, and violent behavior. It will discuss how brain and cognitive development can be disrupted by stressful childhood experience, especially for those with genetic predisposition. It will also describe how the Transcendental Meditation program and Consciousness-Based education can significantly help prevent and remove these negative outcomes and facilitate maximum growth of the students' potential, as well as reduce the stress in the environment. Finally, it will discuss how these technologies can be implemented in a science-based public policy for education in general and, more specifically, violence prevention in the educational system.

The Violent Brain

Numerous factors have been shown to contribute to youth violence. They can be divided into two categories: *nurture* (e.g., bad parenting; acute stress in childhood; poor education; violent TV, movies, and video games; growing up in neighborhoods with gangs and violence; low socioeconomic status; and easy access to drugs, alcohol and lethal weapons) and *nature* (genetic factors). Recent research indicates that these combined factors of nurture and nature can lead to specific biochemical imbalances and brain abnormalities. These imbalances form the biological roots of violence in the individual and can create a pyramid of antisocial and violent behavior [5-7, 10-14].

What can and should society do to nurture children and prevent antisocial behavior? The quality of life we develop can be understood in terms of the cycle of three key elements: *experience* alters the *brain* that generates *behavior*, which in turn generates new experiences [15-19]. The consequence of this mind/body relationship is that the quality of life experience can be considered the most important variable in determining the quality of behavior.

Even though neurogenetic research reports genetic elements that may predispose an individual to antisocial behavior, there are no 'violent' genes [20-28]. The naïve notion that biology and behavior can be reduced to individual genes is incorrect. The concept of the causative gene has been replaced by that of genetic complexity, in which multiple genes act in concert with non-genetic factors to produce a risk of mental disorder [22, 25]. Heritability studies on behavior confirm that a significant portion of the variance in personality is genetically transmitted from parents to offspring. At the same time, the brain is remarkably plastic, altering its structure and function to adjust to environmental experience. In addition, the normal range of diversity of human brain function and behavior is considered to reflect the same inherited genetic variation that can confer risk for disorders [29]. Thus, genetic variations in humans form a complex fabric that only partially determines suseptibility to aggression and violence.

Knockout Mice: The Role of Genes and Environment in Determining Brain Function

Recent neurogenetic research substantiates the view that experience can play a decisive role in brain and cognitive development [30]. The process of learning involves transfer of information between various parts of the brain with specific cell circuits using a variety of neurotransmitter systems. In the laboratory, it is possible to produce genetically engineered mice by deleting specific genes. If one removed a specific neurotransmitter gene, what would be the result? Such a 'knockout' mouse was created in which a specific component of a neurotransmitter gene was deleted or 'knocked out.' This particular gene is known to be responsible for creating a certain component in a specific part of the brain. The animals born without the gene were normal with the exception that various types of learning ability, known to be dependent on this particular neurotransmitter receptor component, were severely diminished. Thus, specific learning problems appeared due to the missing gene. Since humans possess similar neural systems and genes, it is very likely that cognitive variance in human populations could arise from variability in these same type of genes families [21, 22, 24, 28, 29, 31-34]. This result, therefore, would support the notion that genetics plays the lead role in determining human behavior.

However, the researchers then moved the adult knockout mice from simple, sterile laboratory cages into an enriched environment, full of toys and running-wheels. Shortly afterwards, when examined for their genetically-based learning disabilities, the environmentally-enriched mice showed significant reversal. Thus, even in the face of complete removal of a critical gene, the mice, when placed in a stimulating environment, could compensate for the genetic defect. These last findings turn the nature-nurture argument completely around. **The findings support the concept of remarkable experience-mediated brain plasticity (see section below) and support the considerable research on child development that shows that stimulating and nurturing environments can significantly overcome genetic predisposition that would otherwise contribute to dysfunctional behavior in children** [5, 35].

Nature, in terms of our genetic endowment, and nurture, in terms of our experiences, thus interact to form the final product. As science identifies more and more genetic correlations with various behavioral patterns [29], it is important to consider that the genetic makeup is not the 'problem' and thus cannot be targeted as the solution to violence [25, 31]. More success will come from searching for modifiable environmental risk factors that convert risk into maladaptive behavior [22, 36, 37]. Considering that one youth leaving high school for a life of crime and drug abuse costs society about $2 million, effective consideration of environmental risk factors offers considerable savings to society [38].

Of all the environmental factors, rising stress has been correlated most consistently with aggression and violent behavior. A growing body of research implicates mounting stress levels in the individual and society as a primary causal factor in social violence, especially youth and school violence. Chronic and acute stress leads to an out-of-balance neurophysiology, as evidenced by metabolic and electrical patterns in the brain. This neurophysiological imbalance can form the basis for aggression and compulsive, violent behavior. Over time, these biochemical and electrical imbalances become physiologically ‘entrenched,’ leading to acute and chronic brain dysfunction [6, 14, 39, 40].

Brain imaging using SPECT, single photon emission computer tomography, reveals a remarkably consistent and dramatic image of brain dysfunction in aggressive, violent individuals [10, 39]. In figure 2 (at the end of this paper), brain metabolism of a violent individual is strikingly reduced in many areas, compared to a non-violent individual. The dramatic differences in brain activity are especially evident in the crucial prefrontal lobes that normally provide an effective filter against impulsive, aggressive, and violent behavior. These metabolic lesions of the brain can result from head injuries, a contributing factor to aggressive, violent behavior [41-45]. In many cases, however, violent individuals (like the one shown here) have no history of head trauma and have no physical lesions. Nevertheless, SPECT brain imaging graphically reveals the presence of what can be considered “functional lesions”—regions of low metabolism and hence chronic dysfunction—in the brains of violent individuals. Extensive use of SPECT imaging thus provides an invaluable diagnostic “window” into the dysfunctional brains of violent youth [39]. Positron emission tomography (PET) imaging studies yield similar conclusions [46-49].

Is Violent, Aggressive Behavior An Adaptive, Learned Response?

How does aggression manifest? Head trauma, no doubt, can greatly impair various brain functions which normally underlie healthy behavior. However, a neuropathological history of brain trauma may not apply to many antisocial children, at least initially. **In many cases, aggression and violence appears to be a learned or conditioned response to environmental forces** [50].

In the context of aggression, *adaptation* refers to the psychological and physiological modifications by which an individual or organism learns to cope with an adverse event [40, 51-53].Thus, adaptation is a natural response of the brain to enhance coping strategy. As a form of adaptation, defensive behavior promotes escape, avoidance or elimination of situations that are judged to decrease one’s fitness or survival. Many individuals have had such experiences in civilian and military life. We do not know how all the factors or their complex interaction create an antisocial personality. Research, however, suggests that violence can originate from three modes of experience [6, 14, 28, 52].:

- **Normal Origin**: Aggression as a short-term adaptation or defensive response.
- **Abnormal Origin**: Aggression as an outcome of excessive, prolonged and/or inappropriate expressions of the normal defense response—a dysfunctional adaptation or dysregulated defensive response. This is an example of how a recurring acute state of response to stress over time—the 'state' of the individual—can become stabilized as a maladaptive style of perception and behavior referred to as the individuals enduring 'trait' [40, 51-53].
- **Neuropathological Origin**: Aggression as a result of a physical 'defect' arising from trauma, substance abuse, toxicity, etc [41-45].

Under what circumstances can violent, aggressive behavior be considered useful in social dynamics? Adaptive modes of cognitive and brain functioning are normally elicited by the appropriate environmental cues. From the viewpoint of behavioral adaptation, aggressive behavior can be considered 'useful' to an individual if promoting risky behavior helps to eliminate a threat and survive an adverse situation. For example, the individual may have a variety of motivations for committing risky behavior, including: (1) a wish to survive by diffusing or eliminating a threat, (2) a desire to achieve otherwise unreachable goals, (3) an urge to challenge authority, (4) a need to release excessive internal pressure (energy), and/or (5) a lack of proper coping strategy.

Thus, under specific, acute circumstances violence can be viewed as a necessary response to promote survival**. However, chronic exposure to real or perceived threat alters the brain physiology to provide a stable, automatic mode of aggressive response (referred to as aggressive trait)** [53, 54]. For example, a child growing up in an urban environment may experience a constant series of multiple threats from within and outside the family or school. To survive, the brain learns quickly how to maintain a high state of vigilance in order to facilitate detection, and hence elimination of or escape from threats. As learned behavior, the brain is slow to forget these survival strategies. Current examples are seen in the growing variety of post-traumatic stress disorders (PTSD) arising from both acute and chronic stressful experiences [55]. Stress generates increasing amounts of anxiety in both children and adults. **Recurring state anxiety will build up to trait anxiety, core measures of an individual's stress which are correlated with psychological and physiological imbalance** [56-58]. **Thus, our brains will faithfully build a stable worldview and corresponding behavioral strategies to match either consistent, predictable, nurturing and enriching experiences or chaotic, threatening and traumatic experiences** [53].

Experience and Brain Plasticity

Our brains are constantly 'metabolizing' the world and, in the process, modifying their own circuitry—either to stabilize and reinforce past concepts and behavior or to grow toward new states of inner potential. We can't stop the changing, plastic nature of the brain, but we can choose its direction. Do we 'feed' it comfort or threats? Does it 'drink' orderliness or disorderliness? Is it 'geared' for negative responses or open for learning new ideas? Is it settled, coherent and receptive or is it on the edge of anxiety—confused and restrictive**. Most aggressive, violent behavior, not related to traumatic brain injury, can be understood to arise from the maladaptive persistence of stress response patterns that distort thinking, emotion and behavior.** Appropriate treatment for dysfunctional children would utilize the inherent plasticity of their brains and permit the formation of new modes of neural computation arising from more nurturing and enriching experiences [59-61].

Programs are needed to supply the intellectual and experiential input to efficiently allow any student to overcome stress, anxiety and old patterns of dysfunctional adaptation and antisocial behavior, while enlivening their inner potential [See for example, 11]. The neurobiological basis of antisocial behavior can be reinforced by continuous stressful experience or it can be reduced by suitably orderly and restful experience. Garbarino [11] outlines three key strategies necessary for successful intervention with violent boys: promotion of physical and cultural safety, moral reasoning, and self-regulating techniques to deal with anger. Meditation is cited as one of the most likely avenues to facilitate these strategies and provide a calming, orderly and nurturing experience to otherwise troubled youth. The calmness and focus Garbarino indicates that arising from these practices can produce a state of mind and brain coherence that will allow educational and therapeutic programs to succeed.

At-Risk Behavior and Brain Function

Metabolic abnormalities in the brain are correlated with aggressive and violent behavior, based in part on evidence from brain PET and SPECT imaging. A variety of at-risk behaviors or factors observed in violent students and adults[62, 63] can be associated with four major brain systems: the prefrontal cortex, the cingulate cortex, the temporal lobes, and the limbic system. The imbalances or functional lesions in each of these brain systems preclude some degree of normal behavioral control and can account for the behavior of stressed and troubled students. The table (at the end of this paper) summarizes the correspondence between at-risk behavior and brain systems [10, 39, 64]. For example, activity of the prefrontal cortical areas is considered responsible for determining, in part, an individual's behavioral strategy, impulse control, and emotional reactivity [20, 46, 65, 66]. Prefrontal

cortical functional lesions revealed by brain imaging clearly correlate with increased impulsivity, aggression, and violence of the individuals examined.

Creating Coherence in Brain Function

In the following section, the Consciousness-Based system of education and the TM program will be discussed as methodologies that can rapidly and significantly help reduce stress and reverse these physiological abnormalities. In the summary table, the right hand column lists changes in the physiology and psychology of individuals practicing the TM technique. Note that the entire range of diverse at-risk behavior described in the table is significantly influenced by this simple technique [67]. These results are due to the high degree of coherence, integration and stress-reduction generated by the rest that occurs during the simple, effortless, natural practice of the TM technique. This stress-reducing technique has been successfully used in schools and in criminal and drug rehabilitation settings to reduce violence, drug and alcohol abuse, while permitting fuller development of brain potential [68-71]. The following sections introduce a Consciousness-Based solution. Research on this program shows that the experience of the TM technique can help reverse brain imbalances, even with the most resistant, dysfunctional physiology contributing to negative behaviors. Growing resilience and resistance to stress are developed, which positively impacts both the individual and his/her environment.

The Foundation of *Consciousness-Based* Education: Enlivening Consciousness and Brain Coherence through the TM Program

The primary component of Consciousness-Based education is the Transcendental Meditation technique. This technique is a simple, natural, mental procedure [15, 72] which allows the mind to effortlessly settle down and experience more refined and quiet states of the thinking process. During the TM technique, the individual experiences a state of restful alertness—a unique state of consciousness—which is a state of settled awareness and corresponding deep physiological rest [for further description of the mechanics of the technique see 72]. Since any experience leads to alterations in brain chemistry and structure, one would expect wide-ranging effects on brain and behavior from a technique which produces a holistic, integrated experience. Extensive scientific research published in peer-reviewed journals during the past 40 years has demonstrated that the single, most effective method of reducing the impact of chronic stress is the Transcendental Meditation (TM) program [72]. Over 600 scientific research studies have been conducted at more than 200 universities and research institutes in 30 countries, with papers published in more than 120 scientific journals [73].

Research on the meditation program has documented improvements in numerous aspects of physiological and psychological function. Marked improvements have been reported, for example, in **self-confidence and self-esteem** [74-77], **intelligence** [77, 78], **creativity** [77, 79-82], **memory** [83, 84], **cognitive flexibility memory** [83, 84], **emotional stability** [85-87], **academic performance** [88-91], and **psychological maturity** [92, 93]. Ongoing research supported by the National Institute of Health and other federal and private foundations is documenting the effectiveness of the TM program in treating and preventing primary stress-related, chronic disorders, such as cardiovascular disease and cancer [94-98].

The TM program (see summary table below) positively impacts the different brain areas shown to be dysfunctional in aggressive, violent individuals. For example, the prefrontal cortical regions are considered responsible for executive behavioral functions such as decision making, moral reasoning, impulse control, and goal-directed action reactivity [20, 46, 65, 66]. Since these behaviors can be markedly dysfunctional in violent and aggressive individuals [14, 28, 99], an approach to improve these cortical regions would likely reverse some of the antisocial and disruptive behaviors in students. Research shows that the TM technique markedly increases cortical functional integration, especially prefrontal-related behavioral functions [100-108]. This effect would most likely lead to reductions in impulsiveness, aggression and emotional volatility in stressed, antisocial students as well as to increases in creativity, academic achievement, moral reasoning, and concept learning. In addition, the TM technique can significantly influence another physiological correlate of violent behavior—low serotoninergic metabolism [6]. Research shows improved balance in the neuroendocrine system as seen in increases in serotonin metabolism, and in decreases in cortisol levels [109-115].

Since experience is a key determinant of brain function and hence social behavior, the regular experience of the TM technique can be viewed as a unique and effective means of 'nurturing and enriching' brain development, and, in turn, enhancing the brain's functional integration and balance. Enhancement of orderly brain function directly translates into more orderly and harmonious thinking and behavior [100, 102, 103, 116-120]. It is expected that the regular experience of the TM technique would generate its own unique set of alterations in brain structure and function—changes largely opposite to those produced by the daily stressful environment. Thus, the TM technique could have a profound ability to enlist mechanisms of brain plasticity in the service of creating more balanced and resilient brains and behavior [59-61, 105]. Furthermore, because the TM

technique develops the inner coherent functioning of the individual, this program can provide considerable improvement for the individual's brain and behavior even in the face of continuing environmental stress and disorder.

Building Better Brains: Restructuring Negative Traits & Restoring Balance

How easy is the program to practice for different populations? How fundamental are the benefits and how fast do they become evident? How universal is its application across diverse populations? Can the program be successfully applied in a stressful, even violent, environment? Research cited above has been carried out in schools and universities documenting the quick appearance of a wide range of benefits to mind and body [67, 121]. Here, we cite implementation in the context of severely dysfunctional populations to illustrate the ease of implementation and the inherent simplicity and profound effectiveness of the TM program.

Research on the TM technique over the past 40 years examined several populations of individuals displaying longstanding, highly stable or resistant negative traits [69, 71, 122]. These studies demonstrate the unique ability of this program to restore balance in individuals (1) who display even the most resistant maladaptive traits and (2) who live in even the most chaotic and stressful environments. Furthermore, the research supports the effectiveness of this program in diverse populations, with positive outcomes being reported within 6 to 12 months. These studies have been carried our on individuals in **prisons** [69, 122, 123], on **parole** [124], with **Posttraumatic Stress Disorder** [23, 54, 55, 85, 125], and with **substance abuse** [71, 122, 126].

Stress-induced dysfunctional and antisocial behavior reflects underlying neural and physiological imbalances. Research studies indicate that many conditions of physiological and psychological imbalance, including the most severe, can be significantly improved by the TM program in a relatively short period of time, and under less than optimal conditions. Thus, the program can be implemented in any school or rehabilitation environment with confidence that the technology will restore balance in the individual. Since the technique works regardless of state of intellectual, emotional or physiological development, anyone who can think at thought can learn and receive the benefits. In addition, studies show that not everyone in a school need participate in the program for successful outcomes. A number of projects have shown that significant improvement in individual and collective behavior can occur with only a fraction of the population participating in the TM program [70]

The *TM* Program's Uniqueness—Simple Mechanics, Profound Physiological Coherence and Documented Effectiveness

There are numerous methods currently purported to reduce stress. These methods, however, produce strikingly different results [127]. Thus, the choice of methods utilized may be critical for optimal effectiveness in preventing and reversing the neurophysiological and psychological effects of stress in students.

Early research found marginal or insignificant results for some of the procedures once thought to decrease stress. For example, a meta-analysis of 26 studies evaluating Benson's relaxation technique, progressive muscle relaxation, biofeedback, meditation (excluding TM) and other "stress management" procedures, found that the efficacy of these different approaches in reducing hypertension was significantly less than that of the TM technique and equivalent to that of placebo techniques [128]. A more recent summary of 8 meta-analysis of 597 studies, comparing the TM program and other stress-reduction techniques, confirms the TM program's uniqueness [127]. **It showed that the TM technique was the most effective technique in reducing trait anxiety, while the effect size of other treatment programs is the same or less than that of placebo control populations**. This research also reports that the TM technique, in comparison to other similar researched interventions, was the most effective means of reducing blood pressure, producing deep physiological relaxation, increasing self-actualization, improving psychological outcomes, and decreasing cigarette, alcohol and drug use. These results reinforce the understanding that a simple, effortless mental technique can produce an experience capable of dramatically increasing brain coherence and integration**. By providing a daily experience which increases brain and bodily balance, a wide range of long-standing maladaptive processes and behavior can be effectively treated** [95, 129-135]

Thus, the program is capable of helping reverse the physiological basis of violence across many populations. It is a practical approach [70, 72], requiring no intellectual effort, no change in lifestyle, no adoption of philosophical or religious belief, and it is highly cost-effective [136]. Of even greater consequence, the program has been shown to enhance the development of basic cognitive processes in children and adults.

School Violence Prevention through *Consciousness-Based* Education

The Consciousness-Based education Program has been used for several decades throughout the world to systematically develop the immense latent creativity and intelligence of students and to enhance their health, happiness, and quality of life [15, 18, 70, 90, 91, 102, 137]. The Consciousness-Based education program improves educational outcomes by promoting the overall development of students while reducing the negative effects of stress. Extensive scientific research and the experience of many thousands of students in culturally

diverse settings attest to the effectiveness of this approach for promoting pro-social behavior, bringing success to the learning experience, and creating a positive and harmonious school climate [15, 70, 138]. The Consciousness-Based education program can be easily integrated into a variety of school settings without making extensive changes to the existing curriculum or schedule. Complete curriculum materials and training programs for teachers in the knowledge and methodologies of this unique educational approach can be provided for immediate implementation (The National Center for Consciousness-Based Education, 1999). Based on the outcomes of research and reported experiences of school-age children, their teachers and parents, the following benefits are expected following implementation of Consciousness-Based program of education:

IMMEDIATE BENEFITS FOR ANY SCHOOL

Within a few <u>weeks</u> of implementation, one can expect:

- Greater cooperation from students [121]
- Less violence and disorder in classrooms and halls
- More focused classroom environment [70]

Within a few <u>months,</u> educational measurement will show:

- Increased ability to focus and broad comprehension [139-142]
- Increased intelligence [77, 78]
- Improved memory [83, 84]
- Decreased anxiety [75, 77, 85, 118, 143]
- Increased tolerance [77, 93]
- Increased self-confidence [75, 76, 144]

Within a <u>year,</u> educational measurement will show:

- Improved scores on standardized tests of basic skills [90, 91]
- Improved intellectual performance [84, 145-147]
- Increased creativity [77, 79-82]
- Improved moral reasoning [102, 137]
- Improved reaction time [148-151]
- Reduced substance abuse [152-156]

The *Consciousness-Based* Education Program for Schools: One Period A Day Is All That Is Needed

A simple, effective plan for the systematic development of students' full potential is easily implemented in one period a day, including the following special features of Consciousness-Based education (The National Center for Consciousness-Based Education, 1999):

- **The Transcendental Meditation program.** Professionally trained instructors are provided to instruct students and teachers; the daily period begins with 10-15 minutes for the students' practice of the Transcendental Meditation technique.
- **The Natural Law Curriculum sequence.** This course of study brings to light fundamental principles of natural law that describe patterns of order and growth, creativity and intelligence that can be identified in the world of nature, in society, and in our own lives.
- **Prevention-oriented health education.** Students gain both knowledge and skills to make life-supporting choices for a healthy, balanced life.

Transcendental Meditation: A Consciousness-Based Solution to Preventing Violence

In the arena of public policy today, the Transcendental Meditation program offers an effective solution to violence [70, 138]. Considerable scientific research indicates that the Transcendental Meditation program represents a *simple* solution to the *complex* problem of violence. This is good news to those who would like to apply simple solutions to complex social problems. Moreover, the TM program provides a tool to eliminate the underlying root cause—not just diverse symptomatic, surface aspects—of violence and aggression**. By providing a powerful coherent influence on the functioning of brain and body, the TM technique is unique in its unified effect on the diverse, complex functioning of the physiology** [17, 19, 116, 145, 157]. The TM technique can 'feed orderliness' to the developing or adult brain and counteract imbalances. In addition, the TM program is one of the few treatments that has been extensively researched over the last 40 years in diverse populations around the world. Thus, this simple program is unique because it can help transform the three key concerns of current public policy—the need for: 1) scientific validation, 2) prevention-oriented programs, and 3) programs that impact the underlying cause of violence, imbalances in brain function [158, 159].

Public Policy Promoting Self-Recovery through Self-Regulation

Even among techniques of relaxation and stress-reduction, the the TM program stands apart [127] because it impacts the root cause of physiological and psychological problems [19, 127, 145, 160, 161] . While easily and effectively eliminating stress, the TM program accomplishes more by simultaneously offering a truly holistic approach to enhancing brain functioning**. *The TM program enlivens and restores self-regulation* [16, 116, 162-164] *to allow self-recovery* [71].** Furthermore, by improving the individual physiological and psychological functions at a fundamental level of integration and coherence, the TM technique generates

significant changes in the individual that make this technique supportive and complementary to ongoing conventional social, therapeutic, and educational programs that target specific needs.

The brain is the fundamental resource of society [12, 165]. Therefore, coherent brain functioning and the development of its fullest potential should be the top priority of society and public policy. Since the brain functioning of a child reflects the nature of our education system and the diverse environmental experience provided by society, it is necessary for public policy to carefully examine the experience provided by the TM program [18, 70, 121]. As we move into the age of knowledge and technology, the full development of creative intelligence of the individual becomes a necessity. The Transcendental Meditation program represents a scientifically proven, cost-effective approach to eliminate experience-induced imbalance in brain function and antisocial behavior while developing the full creative potential of the child. Research has shown this program can be a cost-effective intervention for prevention and rehabilitation to reduce violence across a wide range of applications, including stress-ridden schools, drug and alcohol dependence, PTSD, and criminal behavior. Public policy should utilize Consciousness-Based education, in conjunction with strong scientific research, to help win the battle against violence that has been raging for the past thirty years in the U.S.

References

References available by request: please contact us at bri@mum.edu and mention the *Learning & Brain Expo* paper.

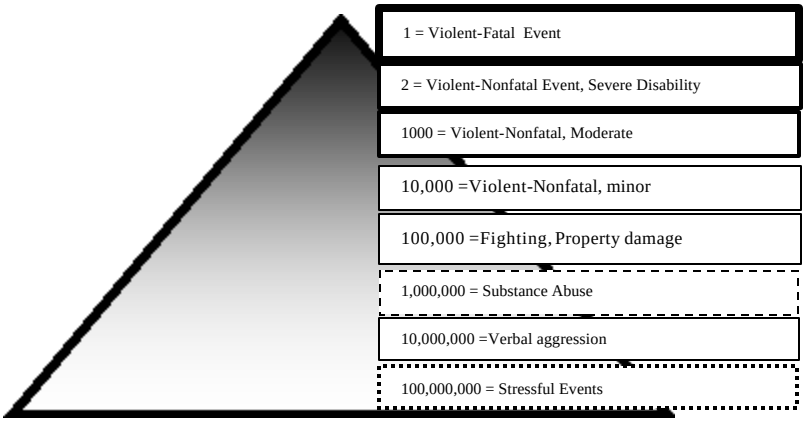

Figure 1. Violence pyramid in our schools.
Fatal events represent only the exposed "tip of the iceberg" of violence prevalent in our nation's schools. At the base of this pyramid are found the innumerable daily stresses that accumulate in the lives of the students and which eventually manifest as progressively more serious forms of violent behavior.

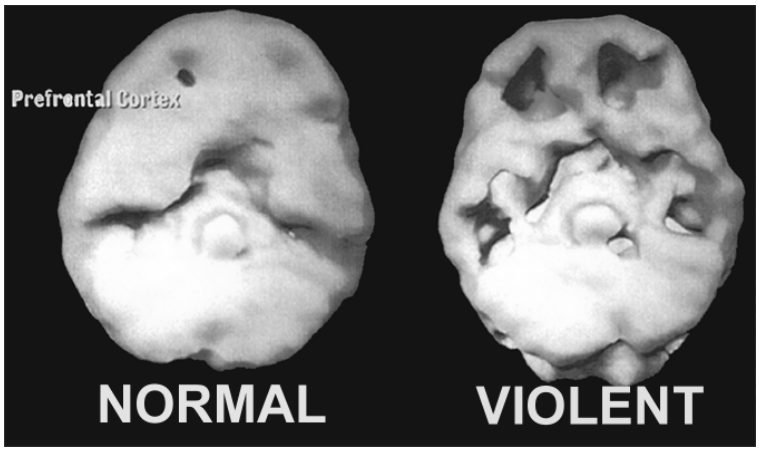

Figure 2. Brain SPECT imaging of normal and violent subjects.
These views of the human brain illustrate the extent of blood flow (normal brain on the left, brain of violent individual on the right). The perspective is looking up at the bottom of the brain. The front or prefrontal cortex is at the top of each image. Regional brain blood flow is related to the degree of local neural activity, and hence, function. Note that brains of some violent individuals have areas with greatly reduced levels of activity compared to controls. Areas of chronic dysfunction or functional lesions (i.e., areas of low blood flow) appear as “holes” in the brain in these computer rendering. Note especially in the violent case, these regions occur in the front of the brain (top of image), and thus may be expected to cause significant loss of impulse control, decision making, learning ability, moral reasoning, and emotional stability. Image courtesy of Dr. Daniel Amen.

Reversing the Neurophysiology of Violence

Summary of Benefits of the Transcendental Meditation Program

At-Risk Behavior in Students	Brain Systems & Functions	Orderly Brains Through TM
VIOLENT BEHAVIOR IS ASSOCIATED WITH: • Decreased Coherence • High Impulsivity • Antisocial Behavior • Low IQ • Low Self-Regard • Low Field Independence • Suicidal Tendencies • Low Empathy	**MAJOR FUNCTIONS OF BRAIN REGIONS:** **Prefrontal Cortex** • Impulse Control • Moral Reasoning • Rational Reasoning • Sense of Self	**TM PROGRAM INFLUENCE ON BRAIN & BEHAVIOR:** • Increased Coherence • Decreased Impulsivity • Increased Moral Reasoning • Increased IQ • Increased Self-Actualization • Increased Field Independence • Decreased Self-Destructive Tendencies • Increased Sensitivity to Others
• Intolerance for Differences • Prejudicial Attitudes • Rigidity of thinking & feeling • Obsessive thinking & action • Gang Affiliation • Witness of abuse and neglect • Victim of Violence • Feelings of Persecution	**Cingulate Cortex** • Emotion Control • Attention Shifting • Memory • Motivation	• Increased Tolerance • More Harmonious Relations • Increased Cognitive Flexibility • Increased Adaptability • Increase Self-Sufficiency • Resistance to Stressful Events • Improved Family Life • Increase Self-Esteem
• Lack of Organized Memory • Poor Academic Achievement • Low Motivation • Low School Interest • Unstable Mood • Increased Aggression • Intimidating Behavior • Behavioral Rigidity	**Temporal Lobes** • Memory • Learning • Motivation	• Improved Organization of Memory • Improved Academic Performance • Increase Tendency to Participate • Increased Persistence • More Balanced Mood • Decreased Aggression • Greater Consideration of Others • Decreased Behavioral Rigidity
• High Anxiety • High Stress • Uncontrolled Anger • Drug & Alcohol Use • Feelings of Isolation & Rejection • Antisocial Personality • Low Serotonin Metabolism • High Cortisol Levels	**Limbic System** • Emotional Control • Motivation • Arousal • Stress Response	• Decreased Anxiety • Reduced Social Stress • Decreased Negativity • Decreased Alcohol & Drug Use • Improved Interpersonal Relations • Increased Sociability • Increased Serotonin Metabolism • Decreased Cortisol Levels

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