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## Beyond Survival



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# Brain Functioning as the Ground for Spiritual Experiences and Ethical Behavior

By FRED TRAVIS, Ph.D.



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While it seems uncommon to have the words *brain* and *spiritual experiences* in the same phrase, placing the terms *spirituality* and *law enforcement* together may appear even more so. The author contends, however, that brain functioning is fundamental to both spiritual experiences and the complex decisions that law enforcement officers must make every day. In addition, he explores how spiritual experiences can reverse

the negative impact of noxious ones on brain functioning and enhance individual well-being.

The brain transforms sensations of outer objects into perceptions and inner intentions into actions. We cannot see the mind think, but we can see the brain fire. Thus, brain patterns can serve as proxy variables for conscious functioning and can provide objective measures of growing subjectivity—even of spiritual experiences and ethical behavior.

Different tasks activate specific brain regions. If we imagine a semitruck in our mind's eye and then a postage stamp, we would see activation in the calcarine fissure, a deep fold in the visual system at the back of the brain. Larger items produce activation deeper in the fissure, whereas smaller ones create it closer to the surface.<sup>1</sup> Other brain areas are activated during esthetic judgments. When we look at sculptures, we usually pick the one that

corresponds to the golden mean as more pleasing. Associated with that judgment is greater activation in the left back (parietal) brain area.<sup>2</sup> In contrast, making an ethical judgment (e.g., Is it right to steal a loaf of bread to feed someone who is starving?) causes areas in the front of the brain to become active.<sup>3</sup> The frontal area is the boss, or CEO, of the brain. Information from all brain areas converges on the front of the brain. Emotions, memories, unconscious processes, concrete perceptual experiences, intentions, and plans come together in frontal areas where the ongoing experience then is put into the larger context of past and future, right and wrong.

Frontal executive areas are responsible for planning, decision making, and judgment. At around age 12, connections of other parts of the brain with frontal areas begin to gain a fatty layer of myelin. This process continues through age 25. When output fibers are myelinated, information travels along them 20 times faster.<sup>4</sup> The world of teenagers can offer an apt illustration. The brain areas for seeing the world (back sensory areas) and responding to it (motor areas) are fully myelinated. Connections with the frontal brain areas are not yet developed. Consequently, the output of sensory and motor

processing is done first, and the teenagers act before the input from the frontal areas can be added to their decisions. Thus, their world remains rooted in concrete experiences and is not placed in relation to consequences (past and future) or overall plans and values. Teenagers are like a car that has the accelerator intact but without the brakes installed.

### EXPERIENCE CHANGES THE BRAIN

Experiences constantly tune the natural maturation of frontal areas. An experience flowing through the brain leaves its trace in the structure and function of the brain. When two cells fire together, they are wired together.<sup>5</sup> For instance, violin players have larger cortical representations in the primary somatosensory cortex corresponding to the fingers of the hand that

forms the chords than the one that holds the bow.<sup>6</sup> London taxicab drivers with more years of navigation experience have higher hippocampal gray matter volume, an area associated with spatial memory, than novices.<sup>7</sup> The phantom-limb experience in amputees results from cortical reorganization following the loss of an arm or leg.<sup>8</sup>

What about law enforcement officers? How do their experiences affect the brain? At the start of their careers, they may have joined the police force to protect their community. They met similar farsighted individuals who functioned at high levels of thinking and displayed superior moral reasoning. Now, after weathering about 10 years of service, what might have happened? One veteran officer commented, "Peace officers are exposed to the worst that life has to offer.

***Spiritual experiences occur at the silent recesses of the mind and, hence, compare with the depths of the ocean.***



*Dr. Travis is the director of the Center for Brain Consciousness and Cognition at the Maharishi University of Management in Fairfield, Iowa.*

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[T]hey see the denizens of society at their very worst—when they have just been victimized or when they have just victimized someone else. Peace officers see the perpetrators of evil and the results of their evil deeds. The constant contact with evil is corrosive, and those effects are cumulative.”<sup>9</sup>

Experiences change the brain. This is inevitable. The violence law enforcement officers see becomes part of the functioning of their brains and bodies. Neural imaging assessed activation of the areas of the brain that stop wrong behavior, called orbitofrontal cortex, after individuals watched violent movies. Activation in the orbitofrontal cortex decreased as participants watched more and more violent movies.<sup>10</sup> Bandura’s social learning research found that children who play violent video games act more hostile in play and allow more aggressive behavior toward friends.<sup>11</sup>

Stress affects brain connections. Under stress, the brain downshifts to a more primitive response style, fight or flight, causing frontal executive brain areas to go off-line. Under stress, humans see the world and respond to it. Chronic stress—a small elevation of stress over a long time—and acute stressors, such as the death of a spouse, produce

lasting change on brain functioning. High stress causes brain regions involved in memory and emotions, such as the hippocampus,<sup>12</sup> amygdala, and prefrontal cortex, to undergo structural remodeling, thereby impairing memory and increasing anxiety<sup>13</sup> and aggression.<sup>14</sup> This can lead to officers becoming distant from spouses, children, other family members, and friends because they are too drained to give to anyone else.<sup>15</sup>



***The brain transforms sensations of outer objects into perceptions and inner intentions into actions.***



Neural imaging of individuals who have been under extensive stress or abused alcohol or other drugs has revealed functional lesions in their frontal executive areas.<sup>16</sup> Although intact, the brain matter is not involved in planning and decision making.

Stressful experiences reduce connections with frontal executive areas of the brain and amplify stimulus-response circuits. To balance these negative, stressful experiences, people

need fundamentally different ones.

## **WHOLENESS BALANCES EXPERIENCES**

The author defines spiritual experiences as those of wholeness—those of our universal nature, or that part of us not tied to time, space, or our individual body or personality. Moreover, they are not confined to religious practices. To help explain this concept, the author models the mind as an ocean with constantly changing waves at the surface and silence at the depths. Thoughts and sentiments, picked up at the periphery of the mind, are analogous to the changing waves and represent the level of ordinary experiences. Intuition or vague feelings are received at more subtle levels of the mind and correspond to the ocean’s middle regions. Spiritual experiences occur at the silent recesses of the mind and, hence, compare with the depths of the ocean. This silent interiority of the mind has been called pure consciousness.<sup>17</sup> The adjective *pure* emphasizes it as wholly, or purely, an experience of wakefulness, self-awareness, or consciousness. Self-awareness continues, even though bodily sensations, sensory perceptions, thoughts, and feelings are absent.

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Spiritual experiences activate widespread brain areas and are reflected in higher brain-wave coherence,<sup>18</sup> a mathematical calculation of the degree of similarity of electrical activity between two areas on the scalp. Brain areas showing similar patterns of electrical activity are considered structurally or functionally related.<sup>19</sup>

Peak experiences investigated by Maslow fit into this category of spiritual experiences that happen spontaneously in many individuals and transform their worldview.<sup>20</sup> People become more self-reliant, self-sufficient, independent, and take responsibility for their lives and performance, rather than relying on others. Such experiences occur across cultures. But, because they transpire spontaneously, measuring the associated brain and bodily functioning of these experiences can prove difficult. The author's facility, however, has measured spiritual experiences during Transcendental Meditation (TM) practice. In terms of the analogy of the mind as an ocean, TM practice takes attention from the active surface-thinking level of the mind to its silent depths, pure consciousness devoid of mental content.<sup>21</sup> An analysis of pure consciousness experiences revealed three themes that characterized that state: the absence of

time, space, and body sense with an expanded sense of self-awareness.<sup>22</sup> This intrinsic state emerges in awareness when thought activity settles down. Brain patterns during pure consciousness could suggest how spiritual experiences may change them and, in turn, help reverse the toxic effects of stress and negativity.

### **TM CHANGES BRAIN PATTERNS**

Along with others, the author has conducted research on brain patterns and pure consciousness experiences during TM practice.<sup>23</sup> From their empirically identified measures, they generated a Brain Integration Scale (BIS).<sup>24</sup> The scores of the participants in the research positively correlated with emotional stability,

moral reasoning, and inner directedness and negatively correlated with anxiety.<sup>25</sup>

Interestingly, individuals with more years of meditation practice had higher BIS scores, a finding that led to two questions. First, do spiritual experiences during TM practice increase BIS scores, or are people with higher BIS scores more likely to learn and continue TM practice? Second, is the BIS just a "meditation" measure, or are the scores related to outer success? Research suggested that TM practice increased BIS scores in college students. Also, two studies reported that top-level athletes and managers had higher BIS scores.

### **College Students**

Fourteen students were assessed four times over their





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first year of TM practice: first at baseline and then after 2, 6, and 12 months of TM practice.<sup>26</sup> Findings suggested that the state gained during TM practice can be achieved successfully after only a few months and that meditation practice has useful benefits for daily life. These data emphasize the point that spiritual experiences have real, practical effects on the functioning of an individual's mind and body.

Another group of 38 college students participated in a randomized controlled trial investigating effects of TM practice on BIS scores, stimulus response to loud tones, and sleepiness. After pretest, students were randomly assigned to learn TM immediately or following the posttest. At posttest, the TM group had significantly higher BIS scores, less incidence of sleepiness during the day, and faster habituation rates (i.e., they were less jumpy and reactive).<sup>27</sup>

College is a time of great challenge. The academic, financial, and social demands can prove highly stressful.<sup>28</sup> TM practice buffered effects of high stress: BIS scores increased, sleepiness decreased, and sympathetic reactivity was lower.

### **World-Class Athletes**

Done in collaboration with the National Olympic Training Center in Norway and the Norwegian University for Sports

Sciences, the first study involved 33 professional athletes who met the criteria of placing among the 10 best performers in major competitions (e.g., Olympic Games, World Championships, or World Cup) for at least 3 seasons, being active on the top level within the past 5 years, and reaching the age of at least 25. A control group of 33 other athletes who had been active in training and competition at the senior level



for at least 3 seasons but did not consistently place among the top 50 percent in the Norwegian Championships also participated in this study. These subjects were matched with the world-class group by age, gender, and type of sport.

The two groups of athletes differed significantly in level of competitive performance and also in physiological and psychological measures. The

world-class performers had higher BIS scores, faster habituation rates to a loud tone, and elevated results on measures of self-development and moral reasoning.<sup>29</sup>

### **Top-Level Managers**

This second study involved 20 top-level Norwegian managers from the private and public sectors who demonstrated excellence in management performance as evidenced by expanding their business many times or turning around failing businesses and had a reputation for being socially responsible, having sound ethics, and displaying a more human orientation in business. A comparison group consisted of 20 people employed at lower and middle levels in organizations. These individuals were matched with the top-level group by gender and type of organization (competitive/noncompetitive).

As with world-class athletes, top-performing managers exhibited higher BIS scores and increased levels of moral reasoning. These results indicated more integrated functioning of the brain's frontal executive centers, the CEO of the brain.<sup>30</sup> Frontal integration provides a coherent framework to unite localized processes into a larger picture. It allows the person to rise above the demands of the moment and include more expanded concepts in making

decisions—for instance, the impact of actions on society, rather than only on the individual's needs.

### Law Enforcement Officers

The author's research has indicated that TM practice leads to increased frontal brain integration, faster habituation to stressful stimuli, and higher moral reasoning. Spiritual experiences enliven frontal coherence, which builds global circuits to place individual experiences in a larger framework. In this vein, spiritual experiences could provide the inner armor to protect law enforcement officers from the noxious effects of negative experiences and stress.

Research specific to the law enforcement profession has revealed the importance of spirituality to its members.<sup>31</sup> Additional studies should be undertaken to help officers remain effective in their work and thrive as human beings throughout their careers.

### CONCLUSION

The brain is the interface between human beings and their world. Brain functioning changes sensations into perceptions and thoughts into actions. Reverberations in brain circuits lead to conscious experience; these reverberations also structurally alter the brain. Stressful experiences change brain

regions involved in memory and emotions, impairing memory and increasing anxiety and aggression. Spiritual experiences modify frontal executive regions, wherein these areas become more coherent leading to more effective thinking and planning. Higher frontal coherence is correlated with higher moral reasoning, greater emotional stability, and decreased anxiety. Spiritual experiences enliven executive brain circuits to buffer the impact of noxious experiences and, therefore, could contribute to higher well-being. ♦

***An experience  
flowing through the  
brain leaves its trace  
in the structure  
and function of  
the brain.***

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**The violence law enforcement officers see becomes part of the functioning of their brains and bodies.**

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