

Lifestyle and Mental Health

Roger Walsh, M.D., Ph.D.

Editor's Note. We are thankful for Roger Walsh amassing a wealth of literature in this article to support the use of therapeutic lifestyle changes. This is crucial information to use in the integration phase of the Hakomi model to bridge the transformation of core beliefs into congruent habits and lifestyle changes that support the establishment of new neural networks that undergird long-term change. The article was originally published in the *American Psychologist* (2011, Vol. 66, No. 7, pp. 579–592), and is used with permission.

Roger Walsh M.D., Ph.D. is a professor at the University of California Medical School, editor of *The World's Great Wisdom: Humanity's Heritage of Timeless Teachings*, and author of *Essential Spirituality: The 7 Central Practices to Awaken Heart and Mind*. He has made lifelong contributions to the interface of spirituality and therapy, and has been a key contributor to the work of the Integral Institute.

Abstract

Mental health professionals have significantly underestimated the importance of lifestyle factors as contributors to and treatments of multiple psychopathologies, for fostering individual and social wellbeing, and for preserving and optimizing cognitive function. Consequently, therapeutic lifestyle changes (TLCs) are underutilized, despite considerable evidence of their effectiveness in both clinical and normal populations. TLCs are sometimes as effective as either psychotherapy or pharmacotherapy, and can offer significant therapeutic advantages. Important therapeutic lifestyle changes include exercise, nutrition and diet, time in nature, relationships, recreation, relaxation and stress management, religious/spiritual involvement, and service to others. This article reviews research on their effects and effectiveness, the principles, advantages, and challenges of implementing them, and the forces (economic, institutional, and professional) hindering their use. Where possible, therapeutic recommendations are distilled into easily communicable principles, since such ease strongly influences whether therapists recommend and patients adopt interventions. Finally, the article explores the many implications of contemporary lifestyles and therapeutic lifestyle changes for individuals, society, and health professionals. In the 21st century, therapeutic lifestyles may need to be a central focus of mental, medical, and public health.

Key Words

Lifestyle, therapeutic lifestyle changes, mental health, psychopathology, cognitive capacities

Lifestyle and Mental Health

The central thesis of this article is very simple: Health professionals have significantly underestimated the importance of lifestyle for mental health. More specifically, mental health professionals have underestimated the importance of unhealthy lifestyle factors in contributing to multiple psychopathologies, as well as the importance of healthy lifestyles for treating multiple psychopathologies, for fostering psychological and social wellbeing, and for preserving and optimizing cognitive capacities and neural functions.

Greater awareness of lifestyle factors offers major advantages, yet few health professionals are likely to master the multiple burgeoning literatures. This article, therefore, reviews research on the effects and effectiveness of eight major therapeutic lifestyle changes; the principles, advantages, and challenges of implementing them; the factors hindering their use; and the many implications of contemporary lifestyles for both individuals and society.

Lifestyle factors can be potent in determining both physical

and mental health. In modern affluent societies, the diseases exacting the greatest mortality and morbidity—such as cardiovascular disorders, obesity, diabetes, and cancer—are now strongly determined by lifestyle. Differences in just four lifestyle factors—smoking, physical activity, alcohol intake, and diet—exert a major impact on mortality, and “even small differences in lifestyle can make a major difference in health status” (Khaw, Wareham, Bingham, Welch, & Luben, 2008, p. 376).

Therapeutic lifestyle changes (TLCs) can be potent. They can ameliorate prostate cancer, reverse coronary arteriosclerosis, and be as effective as psychotherapy or medication for treating some depressive disorders (Frattaroli et al., 2009; Pischke, Scherwitz, Weidmer & Ornish, 2008; Sidhu, Vandana, & Balon, 2009). Consequently, there is growing awareness that contemporary medicine needs to focus on lifestyle changes for primary prevention, secondary intervention, and to empower patients’ self-management of their own health.

Mental health professionals and their patients have much to gain from similar shifts. Yet the importance of TLCs are insufficiently appreciated, taught, or utilized. In fact, in some ways, mental health professionals have moved away from effective lifestyle interventions. Economic and institutional pressures are pushing therapists of all persuasions towards briefer, more stylized interventions. Psychiatrists in particular are being pressured to offer less psychotherapy, prescribe more drugs, and focus on fifteen minute “med checks,” a pressure that psychologists who obtain prescription privileges will doubtless also face (Mojtabai & Olfson, 2008). As a result, patients suffer from inattention to complex psychodynamic and social factors while therapists can suffer painful cognitive dissonance and role strain when they shortchange patients who need more than mandated brief treatments allow (Luhmann, 2001).

A further cost of current therapeutic trends is the underestimation and underutilization of lifestyle treatments (Angell, 2009), despite considerable evidence of their effectiveness. In fact, the need for lifestyle treatments is growing, since unhealthy behaviors such as overeating and lack of exercise are increasing to such an extent that the World Health Organization (2008) warns that “an escalating global epidemic of overweight and obesity—‘globesity’—is taking over many parts of the world,” and exacting enormous medical, psychological, social, and economic costs.

Advantages of Therapeutic Lifestyle Changes

Lifestyle changes can offer significant therapeutic advantages for patients, therapists, and societies. First, TLCs can be both effective and cost-effective, and some—such as exercise for depression, and fish oils to prevent psychosis in high risk youth—may be as effective as pharmacotherapy or psychotherapy (Amminger et al, 2010; Dowd, Vickers, & Krahn, 2004; Sidhu et al., 2009). TLCs, which can be used alone or adjunctively, are often accessible and affordable, and many can be introduced quickly, sometimes even in the first session (McMorris, Tomporouski & Audiffren, 2009).

Therapeutic lifestyles have few negatives. Unlike both psychotherapy and pharmacotherapy, they are free of stigma, and can even confer social benefits and social esteem (Borogonovi, 2009). In addition, they have fewer side effects and complications than medications (Amminger et al., 2010).

Therapeutic lifestyles offer significant secondary benefits to patients, such as improvements in physical health, self-esteem, and quality of life (Deslandes et al, 2009). Furthermore, some TLCs—for example, exercise, diet and meditation—may also be neuroprotective, and reduce the risk of subsequent age-related cognitive losses and corresponding neural shrinkage (Hamer & Chida, 2009; Pagnoni & Cekis, 2007; Raji et al., 2009). Many TLCs—such as meditation, relaxation, recreation, and time in nature—are enjoyable, and may therefore become healthy self-sustaining habits (Didonna, 2009).

Many TLCs not only reduce psychopathology but can also enhance health and wellbeing. For example, meditation can be therapeutic for multiple psychological and psychosomatic disorders (Chiesa, 2009; Didonna, 2009; Shapiro & Carlson, 2009). Yet it can also enhance psychological wellbeing and maturity in normal populations, and cultivate qualities such as calm, empathy, and self-actualization that are of particular value to clinicians (Shapiro & Carlson, 2009; Shapiro & Walsh, 2006; Walsh, in press).

Knowledge of TLCs can benefit clinicians in several ways. Utilizing TLCs may result in greater clinical flexibility and effectiveness and less role strain. It will be particularly interesting to see to what extent clinicians exposed to information about TLCs adopt healthier lifestyles themselves and, if so, how this affects their professional practice, since there is already evidence that therapists with healthy lifestyles are more likely to suggest lifestyle changes to their patients (McEntee & Haglin, 1996). There are also entrepreneurial opportunities. Clinics are needed which offer systematic lifestyle programs for mental health similar

to current programs for reversing coronary artery disease (Pischke et al., 2008).

For societies, TLCs may offer significant community and economic advantages. Economic benefits can accrue from reducing the costs of lifestyle related disorders such as obesity, which alone costs over \$100 billion in the United States each year (WHO, 2008). Community benefits can occur both directly, e.g. through enhanced personal relationships and service (Post, 2007), and also indirectly through social networks. Recent research demonstrates that healthy behaviors and happiness can spread extensively through social networks, even through three degrees of separation to, for example, the friends of one's friends' friends (Fowler & Christakis, 2008; 2010). Encouraging TLCs in patients may therefore inspire similar healthy behaviors and greater wellbeing in their family, friends, and coworkers, and thereby have far reaching multiplier effects (Christakis, 2009; Fowler & Christakis, 2010). This offers novel evidence for the public health benefits of mental health interventions in general, and of TLCs in particular.

So what lifestyle changes warrant consideration? Considerable research and clinical evidence support the following eight TLCs: exercise, nutrition and diet, time in nature, relationships, recreation, relaxation and stress management, religious and spiritual involvement, as well as contribution and service to others.

Exercise

Exercise offers physical benefits that extend over multiple body systems. It reduces the risk of multiple disorders, including cancer, and is therapeutic for physical disorders ranging from cardiovascular diseases to diabetes to prostate cancer (Khaw et al., 2009; Ornish et al., 2008). Exercise is also, as the *Harvard Mental Health Letter* (September 2000) concluded, "a healthful, inexpensive, and insufficiently used treatment for a variety of psychiatric disorders" (p. 5).

As with physical effects, exercise offers both preventive and therapeutic psychological benefits. Preventively, both cross-sectional and prospective studies show that exercise can reduce the risk of depression, as well as neurodegenerative disorders such as age-related cognitive decline, Alzheimer's and Parkinson's diseases (Hamer & Chida, 2009; Sui et al., 2009). Therapeutically, responsive disorders include depression, anxiety, eating, addictive, and body dysmorphic disorders. Exercise also reduces chronic pain, age-related cognitive decline, severity of Alzheimer's, and some symptoms of schizophrenia (Colcombe & Kramer, 2003; Daley,

2002; Deslandes et al., 2009; Stathopoulou, Powers, Berry, Smits, & Otto, 2006).

The most studied disorder is mild to moderate depression. Cross-sectional, prospective, and meta-analytic studies suggest that exercise is both preventive and therapeutic, and therapeutically it compares favorably with pharmacotherapy and psychotherapy (Dowd et al., 2004; Sidhu et al., 2009). Both aerobic exercise and nonaerobic weight training are effective for both short-term interventions and long-term maintenance, and there appears to be a dose-response relationship with higher intensity workouts being more effective. Exercise is a valuable adjunct to pharmacotherapy, and special populations such as postpartum mothers, the elderly, and perhaps children appear to benefit (Hamer & Chida, 2008; Larun, Nordeim, Ekland, Hagen, & Heian, 2006; Sidhu et al., 2009).

Possible mediating factors that contribute to these antidepressant effects span physiological, psychological, and neural domains. Proposed physiological mediators include changes in serotonin metabolism, improved sleep, as well as endorphin release and consequent "runner's high" (Deslandes et al., 2009; Stathopoulou et al., 2006). Psychological factors include enhanced self-efficacy and self-esteem, interruption of negative thoughts and rumination (Dowd et al., 2004), and perhaps the breakdown of "muscular armor": the chronic psychosomatic muscle tension patterns that express emotional conflicts, and that are a focus of somatic therapies (Smith, 2000).

Neural factors are especially intriguing. Exercise increases brain volume (both grey and white matter), vascularization, blood flow, and functional measures (Erikson & Kramer, 2009; Hamer & Chida, 2009). Animal studies suggest that exercise-induced changes in the hippocampus include increased neuronogenesis, synaptogenesis, neuronal preservation, interneuronal connections, and BDNF (brain-derived neurotrophic factor, the same neurotrophic factor that antidepressants upregulate) (Cotman & Berchtold, 2002).

Given these neural effects, it is not surprising that exercise can also confer significant cognitive benefits (McMorris, Tomporowski & Audiffren, 2009). These range from enhancing academic performance in youth, to aiding stroke recovery, to reducing age-related memory loss and the risk of both Alzheimer's and nonAlzheimer's dementia in the elderly (Hamer & Chida, 2009; Quaney et al., 2009). Multiple studies show that exercise is a valuable therapy for Alzheimer's' patients that can improve intellectual capacities, social functions, emotional states, and caregiver distress (Christofolletti et al., 2007; Deslandes et al., 2009).

Meta-analytic studies provide more fine-grained details about the cognitive benefits of exercise for the elderly, and offer four kinds of good news. First, the effects can be large, reducing the risk of Alzheimer's by 45%, and increasing cognitive performance by 0.5 SD (Hamer & Chida, 2009). Second, though women may gain more than men, everyone seems to benefit, including both clinical and nonclinical populations. Third, improvements extend over several kinds of psychological functions, ranging from processing speed to executive functions. Fourth, executive functions, such as coordination and planning, appear to benefit most. This is a welcome finding given that executive functions are so important, and that both they and the brain areas that underlie them are particularly age sensitive (Colcombe & Kramer, 2003; Erikson & Kramer, 2009).

Finally, meta-analyses reveal the specific elements of exercise that benefit cognition. Relatively short programs of 1-3 months offer significant benefits, though six months or longer are more beneficial. There seems to be a threshold effect for session duration, since sessions shorter than 30 minutes—while valuable for physical health—yield minimal cognitive gains. Cognitive benefits are enhanced by more strenuous activity, and by combining strength training with aerobics (Colcombe & Kramer, 2003; Hertzog, Kramer, Wilson, & Lindenberger, 2009). In short, research validates the words of the second U.S. president, John Adams, who wrote that “Old minds are like old horses; you must exercise them if you wish to keep them in working order” (Hertzog et al., 2009, p. 26).

Fortunately, even brief counseling can motivate many patients to exercise (Long et al., 1996) and risks are minimal, although an initial medical exam may be warranted. Yet despite the many mental and medical benefits of exercise, only some ten percent of mental health professionals recommend it. And who are these ten percent? Not surprisingly, they are likely to exercise themselves (McEntee & Halgin, 1996).

Nutrition and Diet

There is now considerable evidence of the importance of nutrition for mental health, and an extensive review of over 160 studies suggests that dietary factors are so important that the mental health of nations may be linked to them (Gomez-Pinilla, 2008). Given the enormous literature on this topic, it is easy to feel overwhelmed. Therefore, the following section reviews this complex literature, but also distills easily communicable principles, since such ease strongly influences whether therapists recommend and

patients adopt treatments (Duncan, Miller, Wampold & Hubble, 2010). Two major dietary components must be considered: food selection and supplements.

Food Selection

For food selection, the key principles are to emphasize a diet that:

1. Consists predominantly of multicolored fruits and vegetables (a “rainbow diet”),
2. Contains some fish (a “pescovegetarian diet”). Preference should be given to cold deep seawater fish (which are high in beneficial omega-3 fish oils, e.g. salmon), while avoiding the four species with high mercury levels (shark, swordfish, king mackerel, and tilefish) (Oken et al., 2008).
3. Reduces excessive calories. For societies confronting the “globesity” epidemic, reducing excess calories offers both economic and public health benefits (Delpeuch, Marie, Monnnier & Holdsworth, 2009). For individuals, reducing excess calories offers medical and neuroprotective benefits (Prolla & Mattson, 2001). This neuroprotection is especially important in light of recent findings suggesting that adult obesity may be associated with reduced cognitive function, as well as reduced white and gray matter brain volume (Raji et al., 2009; Wolf et al., 2007). Fortunately, pescovegetarian diets are low in calories.

Multiple human and animal studies suggest that pescovegetarian diets may prevent or ameliorate psychopathologies across the life span (Gomez-Pinilla, 2008; Willis, Shukitt-Hale, & Joseph, 2009). Such diets may enhance cognitive and academic performance in children, as well as ameliorate affective and schizophrenic disorders in adults. They also offer neuroprotective benefits as demonstrated by reductions in the incidence of age-related cognitive decline, Alzheimer's and Parkinson's diseases (Gomez-Pinilla, 2008; Kang, Ascherio, & Groodstein, 2005; Morris, Evans, Tangney, Bienias, & Wilson, 2006). Several studies of the Mediterranean diet—including a meta-analysis of twelve prospective studies with over 1.5 million subjects—found reductions in incidence of both Alzheimer's and Parkinson's diseases (Sofi, Cesari, Abbate, Gensini, & Casini, 2008). Dietary elements that appear to be particularly neuroprotective include fish, vegetables, and perhaps fruit, as well as lower intake of animal fats (Gu, Nieves, Stern, Luchsinger, & Scarmeas, 2010; Kang et al., 2005; Morris et al., 2006). Of enormous public health importance are recent findings

suggesting that due to epigenetic factors, “the effects of diet on mental health can be transmitted across generations” (Gomez-Pinilla, 2008, p. 575).

Supplements

Growing evidence suggests that food supplements offer valuable prophylactic and therapeutic benefits for mental health. Research is particularly being directed to vitamin D, folic acid, SAME (S-adenosyl-methionine), and most of all to fish oil (Sarris, Schoendorfer, & Kavanagh, 2009).

Fish and fish oil are especially important for mental health. They supply essential omega-3 fatty acids, especially EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid), which are essential to neural function. Systemically, omega-3s are anti-inflammatory, counteract the proinflammatory effects of omega-6 fatty acids, and are protective of multiple body systems. Unfortunately, modern diets are often high in omega-6s and deficient in omega-3s (Freeman et al., 2006).

Is this dietary deficiency associated with psychopathology? Both epidemiological and clinical evidence suggest it is. Affective disorders have been most closely studied, and epidemiological studies, both within and between countries, suggest that lower fish consumption is associated with significantly, sometimes dramatically, higher prevalence rates of these disorders (Freeman et al., 2006; Noaghuil & Hibbeln, 2003). Likewise, lower omega-3 tissue levels are correlated with greater symptom severity in both affective and schizophrenic disorders, a finding consistent with emerging evidence that inflammation may play a role in these disorders (Amminger et al., 2010). However, epidemiological studies of dementia and omega-3 intake are as yet inconclusive (Freeman et al., 2006).

Epidemiological, cross-sectional, and clinical studies suggest that omega-3 supplementation may be therapeutic for several disorders. Again, depression has been most closely studied (Stahl, Begg, Weisinger, & Sinclair, 2008). Several meta-analyses suggest that supplementation may be effective for unipolar, bipolar, and perinatal depressive disorders as an adjunctive, and perhaps even as a stand-alone treatment (Appleton, Rogers & Ness, 2010; Lin & Su, 2007), though at this stage supplementation is probably best used adjunctively. Questions remain about optimal DHA and EPA doses and ratios, although one meta-analysis found a significant correlation between dose and treatment effect, and a dose of 1000 mg of EPA daily is often mentioned, which requires several fish oil capsules (Freeman et al., 2006; Kraguljac et al., 2009).

There are also cognitive benefits. In infants, both maternal intake and feeding formula supplementation enhance children’s subsequent cognitive performance (Freeman et al., 2006; Gomez-Pinilla, 2008; Innis, 2009;). In older adults, fish and fish oil supplements appear to reduce cognitive decline, but do not seem effective in treating Alzheimer’s (Fotuhi, Mohassel, & Yaffe, 2009).

The evidence on omega-3s for other disorders is promising, but less conclusive. Supplementation may benefit schizophrenia and Huntington’s disease, as well as aggression in both normal and prison populations. In children, omega-3s may reduce aggression and symptoms of ADHD (Freeman et al., 2006; Song & Zhao, 2008).

A particularly important finding is that fish oils may prevent progression to first episode psychosis in high risk youth. A randomized, double-blind, placebo-controlled study was conducted of 81 youths between 13 and 25 years of age with subthreshold psychosis. Administering fish oil with 1.2g of omega-3s per day for 12 weeks reduced both positive and negative symptoms as well as the risk of progression to full psychosis. This risk was 27.5% in controls but fell to only 4.9% in treated subjects. Particularly important was the finding that benefits persisted during the 9 months of follow up after treatment cessation (Amminger et al., 2010). Such persistence has not occurred with anti-psychotic medications, which also have significantly more side effects. Although only a single study, these findings suggest another important prophylactic benefit of fish oils.

With one exception, risks of fish oil supplementation at recommended doses are minimal, and usually limited to mild gastrointestinal symptoms. The exception is patients on anticoagulants or with bleeding disorders because fish oils can slow blood clotting. Such patients should therefore be monitored by a physician.

Omega-3s modify genetic expression, and as such are early exemplars of a possible new field of “psychonutrigenomics.” Nutrigenomics is an emerging discipline that uses nutrients to modify genetic expression (Gillies, 2007). Since genetic expression is proving more modifiable, and nutrients more psychologically important than previously thought, psychonutrigenomics could become an important field.

Space limitations allow only brief mention of another significant supplement, vitamin D. Vitamin D is a multipurpose hormone with multiple neural functions, including neurotrophic, antioxidant, and anti-inflammatory effects. (Cherniak, Troen, Florez, Roos, & Levis, 2009). Vitamin D deficiency is widespread throughout the population,

especially in the elderly, exacts a significant medical toll, and several studies suggest associations with cognitive impairment, depression, bipolar disorder, and schizophrenia. Mental health professionals are therefore beginning to join physicians in recommending routine supplementation (usually 400-1,000 units per day), and where indicated testing patients' vitamin D blood levels and modifying supplement levels accordingly (Cherniak et al, 2009).

There are further benefits to supplementation and pescovegetarian diets. First, they have multiple general health benefits and low side effects. Second, they may ameliorate certain comorbid disorders—such as obesity, diabetes, and cardiovascular complications—that can accompany some mental illnesses and medications. A diet that is good for the brain is good for the body. As such, dietary assessment and recommendations are appropriate and important elements of mental health care.

Nature

Imagine a therapy that had no known side effects, was readily available, and could improve your cognitive functioning at zero cost. Such a therapy has been known to philosophers, writers, and laypeople alike: interacting with nature. Many have suspected that nature can promote improved cognitive functioning and overall well-being, and these effects have recently been documented (Berman, Jonides, & Kaplan, 2008, p. 1207).

For thousands of years, wise people have recommended nature as a source of healing and wisdom. Shamans seek wilderness, yogis the forest, Christian Fathers the desert, and American Indians go on nature vision quests. Their experience is that nature heals and calms, removes mental trivia, and reminds us of what really matters (Walsh, 1999). More recently, romantic and existential philosophers echoed similar claims, which the romantic poet William Wordsworth (1998) famously summarized as:

*Getting and spending we lay waste our powers
Little we see in nature that is ours;
We have given our hearts away....* (p. 307)

Yet today we are conducting a global experiment in which we increasingly spend our lives in artificial environments: walled inside and divorced from nature. Within these nature-free settings, noise is often annoying, and lighting is often artificial, low intensity (often less than 10% of sunny days), with nonnatural spectra and rhythms. As the burgeoning field of environmental psychology demonstrates, the psychological costs of such settings can be wide-ranging. These costs include disruptions of mood, sleep, and

diurnal rhythms. Cognitive costs include short term impairment of attention and cognition, as well as long term reduced academic performance in the young, and greater cognitive decline in the elderly (Anthes, 2009; Higgins, Hall, Wall, Woolner, & McCaughey, 2005; Kuller, Ballal, Laike, Mikellides, & Tonello, 2006). Further psychological difficulties occur in special populations such as Alzheimer's and post-surgical patients (Anthes, 2009; Ulrich, 2006).

Media Immersion and Hyper-reality

In the last half century, a further artificial dimension has been added. Increasingly, we now spend hours each day immersed in a flood of multimedia stimuli, whose neurological impact we are only beginning to understand. However, some researchers have already concluded that "The current explosion of digital technology not only is changing the way we live and communicate but also is rapidly and profoundly changing our brains" (Small & Vorgan, 2008, p. 44). This is hardly surprising given that the average American spends several hours a day watching television, and increasing time with digital media (Putnam, 2000). As Thoreau (1854) lamented, people "have become the tools of their tools" (p. 85).

Fortunately, television and digital media can sometimes be beneficial. Multiple meta-analyses show that while aggressive television content can certainly foster negative attitudes and aggressive behavior, prosocial content can foster positive behavior such as altruism (Mares & Woodard, 2005; Preiss, Gayle, Burrell, Allen & Bryant, 2006). Likewise, digital immersion can benefit certain psychological and social skills in children, as the massive Digital Youth Project demonstrated (Ito et al., 2008).

However, media immersion can also exact significant psychological and physical costs in both children and adults, and a novel vocabulary has emerged to describe multiple "technopathologies." Excessive media immersion, especially when combined with heavy work demands, can create psychological dysfunctions that include disorders of:

Attention: *continuous partial attention* and *attention deficit trait*.

Cognition: *digital fog* and *techno-brain burnout*.

Overload: *data smog* and *frazzling* (frantic ineffectual multitasking).

Addiction: *screen sucking* and *on-line compulsive disorder*.

And, of course, *techno-stress* (Small & Vorgan, 2008; Wehrenberg & Coppersmith, 2008)

Yet the full implications of contemporary media and our

divorce from nature may extend much further and cut far deeper than individual stress and pathology. There is an exploding literature on social effects (e.g., Bracken & Skalski, 2009), and so powerful and pervasive is today's multimedia reality, that for philosophers such as Jean Baudrillard, it constitutes a "hyper-reality"—a simulated life-world that seems "more real than reality." So omnipresent are media manufactured images and narratives, and so divorced are we from the direct events they portray, that we largely live in, believe in, and respond to, this artificial hyper-real world, rather than to the natural world itself (Tiffin & Terashima, 2001).

Evolutionary, Existential, and Clinical Concerns

We have barely begun to research the many implications of artificial environments, new media, hyper-reality, and our divorce from nature. However, the problems they may pose can be viewed in multiple ways. Biologically, we may be adapted to natural living systems and to seek them out. This is the "biophilia hypothesis," and multiple new fields—such as diverse schools of ecology, as well as evolutionary, environmental, and eco psychologies—argue for an intimate and inescapable link between mental health and the natural environment (Esbjorn-Hargens & Zimmerman, 2009). In existential terms, the concern is that "...modern man—by cutting himself off from nature has cut himself off from the roots of his own Being" (Barrett, 1962, p. 126), thereby producing an existential and clinical condition generically described as "nature-deficit disorder" (Louve, 2005).

Clinicians harbor multiple concerns. Evolutionary and developmental perspectives suggest that children in environments far different from the natural settings in which we evolved, and to which we adapted, may suffer developmental disorders, with ADHD as one possible example (Bjorklund & Pellegrini, 2002). Likewise, evolutionary theory and cross-cultural research suggest that for adults, artificial environments and lifestyles may impair mental wellbeing, and also foster or exacerbate psychopathologies such as depression (Buss, 2000).

Therapeutic Benefits of Nature

Fortunately, natural settings can enhance both physical and mental health. In normal populations, these enhancements include greater cognitive, attentional, emotional, spiritual, and subjective wellbeing (Ho, Payne, Orsega-Smith, & Godby, 2003; Pryor, Townsend, Maller, & Field, 2006). Benefits also occur in special populations such as office workers, immigrants, hospital patients, and prisoners

(Maller, Townsend, Pryor, Brown, & Sleger, 2006).

Nature also offers the gift of silence. Modern cities abound in strident sounds and noise pollution, and the days when Henry Thoreau (1921) could write of silence as a "universal refuge...a balm to our every chagrin" (p. 291) are long gone. Unfortunately, urban noise can exact significant cognitive, emotional, and psychosomatic tolls. These range, for example, from mere annoyance to attentional difficulties, sleep disturbances, and cardiovascular disease in adults, and impaired language acquisition in children (Clark & Stansfeld, 2007). By contrast, natural settings offer silence as well as natural sounds and stimuli that attention restoration theory and researchers suggest are restorative (Berman et al., 2008).

As yet, studies of specific psychotherapeutic benefits are limited, and sometimes conflated with other therapeutic lifestyle factors. Though further research is clearly needed, immersion in nature does appear to reduce symptoms of stress, depression, and ADHD, and to foster community benefits (Taylor & Kuo, 2009; Taylor, Kuo, & Sullivan, 2001). In hospital rooms that offer views of natural settings, patients experience less pain and stress, have better mood and postsurgical outcomes, and are able to leave the hospital sooner (Devlin & Arneill, 2003; Ulrich, 2006). Consequently, nature may be "...one of our most vital health resources" (Maller et al., 2006, p. 62). Given the global rush of urbanization and technology, the need for mental health professionals to advocate for time in, and preservation of, natural settings will likely become increasingly important.

Relationships

Of all the means which are procured by wisdom to ensure happiness throughout the whole of life, by far the most important is the acquisition of friends.

—Epicurus (Gordon, 1999, p. 35).

The idea that good relationships are central to both physical and mental wellbeing is an ancient theme, now supported by considerable research. Rich relationships reduce health risks ranging from the common cold to stroke, mortality, and multiple psychopathologies. On the positive side, good relationships are associated with enhanced happiness, quality of life, resilience, cognitive capacity, and perhaps even wisdom (Fowler & Christakis, 2008; Jetten, Haslam, Haslam, & Branscombe, 2009). Analyses of different domains of life indicate that quality of life is "dominated by the domain of intimacy" and that people with overt psychopathology have a lower quality of life "most

particularly in the domain of intimacy” (Cummins, 2005, p. 559).

These clinical observations can now be grounded in the emerging field of social neuroscience, which suggests that we are interdependent creatures, hardwired for empathy and relationship through, for example, the mirror neuron system (Cattaneo & Rizzolatti, 2009). So powerful is interpersonal rapport that couples can mold one another both psychologically and physically. They may even come to look more alike, as resonant emotions sculpt their facial muscles into similar patterns, a process known as “the Michelangelo phenomenon” (Rusbult, Finkel & Kumashiro, 2009).

Not surprisingly, good relationships are crucial to psychotherapy. Multiple meta-analyses show that they account for approximately one-third of outcome variance, significantly more than does the specific type of therapy (Duncan et al., 2010), and that “The therapeutic relationship is the cornerstone” of effective therapy (Norcross, 2010, p. 114). As Irvin Yalom (2002) put it, the “paramount task is to build a relationship together that will itself become the agent of change” (p. 34). Ideally, therapeutic relationships then serve as bridges that enable patients to enhance life relationships with family, friends, and community.

The need may be greater than ever, because social isolation may be increasing, and exacting significant individual and social costs. For example, considerable evidence suggests that, compared to previous decades, Americans are now spending less time with family and friends, have fewer intimate friends and confidants, and are less socially involved in civic groups and communities (McPherson, Smith-Lovin & Brashears, 2006; Putnam, 1995; 2000). However, there is debate over, for example, whether Internet social networking exacerbates or compensates for reduced direct interpersonal contact, and over the methodology of some social surveys (Fischer, 2009). Yet there is also widespread agreement that “the health risk of social isolation is comparable to the risks of smoking, high blood pressure and obesity.... [while] participation in group life can be like an inoculation against threats to mental and physical health” (Jetten et al., 2009, p. 29, 33).

Beyond the individual physical and mental health costs of greater social isolation are public health costs. In “perhaps the most discussed social science article of the 20th century” (Montanye, 2001), and in a subsequent widely read book, *Bowling Alone*, the political scientist Robert Putnam (1995; 2000) focused on the importance of “social capital.” Social capital is the sum benefit of the community

connections and networks that link people and foster, for example, beneficial social engagement, support, trust, and reciprocity (Bhandari & Yasunobu, 2009). Social capital seems positively and partly causally related to a wide range of social health measures—such as reduced poverty, crime, and drug abuse—as well as increased physical and mental health in individuals. Yet considerable evidence suggests that social capital in the United States and other societies may have declined significantly in recent decades (Putnam, 1995, 2000).

In short, relationships are of paramount importance to individual and collective wellbeing, yet the number and intimacy of relationships seems to be declining. Moreover, “the great majority of individuals seeking therapy have fundamental problems in their relationships...” (Yalom, 2002, p. 47). Clients’ relationships are a major focus of, for example, interpersonal and some psychodynamic psychotherapies (Shedler, 2010). Yet clients’ interpersonal relationships often receive insufficient attention in clinical and training settings compared to intrapersonal and pharmacological factors (Pilgrim, Rogers, & Bentall, 2009; Shedler, 2010). Focusing on enhancing the number and quality of clients’ relationships clearly warrants a central place in mental health care.

Recreation and Enjoyable Activities

Through experiences of positive emotions people transform themselves, becoming more creative, knowledgeable, resilient, socially integrated, and healthy individuals

—Barbara Fredrickson (2002, p. 123).

Involvement in enjoyable activities is central to healthy lifestyles, and the word “re-creation” summarizes some of the many benefits (Fredrickson, 2002). Behaviorally, many people in psychological distress suffer from low reinforcement rates, and recreation increases reinforcement. Recreation may overlap with, and therefore confer the benefits of, other TLCs such as exercise, time in nature, and social interaction. Recreation can involve play and playfulness, which appear to reduce defensiveness, enhance wellbeing, and to foster social skills and maturation in children (Lester & Russell, 2008), and perhaps also in adults (Gordon & Esbjorn-Hargens, 2007). Recreation can also involve humor, which appears to mitigate stress, enhance mood, support immune function and healing, and serve as a mature defense mechanism (Lefcourt, 2002).

Further recreational activities include art and other esthetic pleasures, which have long been employed for self-healing. For example, the great 19th century philosopher, John Stuart Mill—one of history’s outstanding intellectual

prodigies—spent his childhood force-feeding himself with facts. However, when at twenty he fell into a severe depression, he turned to the arts—music, painting, and especially poetry—for self-therapy and these, his biographer reports, “saved him” (Gopnik, 2008).

Many studies suggest that enjoyable recreational activities, and the positive emotions that ensue, foster multiple psychological and physical benefits (Ho et al., 2003; Gordon & Esbjorn-Hargens, 2007; Lester & Russell, 2008). However, some studies of recreation include and conflate additional healthy lifestyle factors such as exercise, relaxation, and nature, and there are few clinical guidelines. Mental health professionals will therefore need to use their clinical skills to assess and support individual patients’ interests. “The bottom line message is that we should work to cultivate positive emotions in ourselves and in those around us not just as end states in themselves, but also as a means of achieving psychological growth and improved psychological and physical health over time” (Fredrickson, 2002, p. 120).

Relaxation and Stress Management

Chronic stressors can exact a major toll across multiple organ systems and levels. This toll extends from psychological to physiological to chemical (e.g., oxidative stress) to genomic expression (hence the new field of “psychosocial genomics”) (Dusek et al., 2008). Even though stress is universal, few people are trained in managing it. In addition, humans now face an array of novel stressors for which there are no evolutionary or historical precedents. Many people, therefore, respond unskillfully or even self-destructively, aided and abetted by pervasive unhealthy influences such as advertising, media role models, and novel psychoactive drugs (Buss, 2000). Yet many skillful strategies for stress management are now available, ranging from lifestyle changes to psychotherapy to self-management skills. Beneficial TLCs include almost all those discussed in this article—especially exercise, recreation, relationships, and religious/spiritual involvement—and specific self-management skills can both complement and foster TLCs.

Self-Management Skills

Specific stress management skills include somatic, psychological, and contemplative approaches. Somatic skills span both ancient Oriental and contemporary Western techniques. The Chinese mindful movement practices of tai chi and qui gong are increasingly popular in the West, and research studies suggest both physical and psychological benefits (Kuramoto, 2006). A review of fifteen randomized

controlled trials of tai chi’s effects on psychosocial wellbeing found significant benefits for the treatment of anxiety and depression, but also noted the mixed quality of the trials (Wang et al., 2009).

Western self-management skills include mental approaches such as self-hypnosis and guided imagery (Trakhtenberg, 2008), as well as somatic approaches, especially muscle relaxation therapies which center on systematically tightening and relaxing major muscle groups. By doing this, patients learn to identify and release muscle tension, and eventually to self-regulate both muscle and psychological tensions. Muscle relaxation skills are widely used for the treatment of anxiety disorders, including panic and generalized anxiety disorders, and meta-analyses reveal medium to large effect sizes (Manzoni, Pagnini, Castelnuovo, & Molinari, 2008)

Contemplative skills such as meditation and yoga are now practiced by millions of people in the United States, and by hundreds of millions worldwide (Walsh, in press). Concomitantly, an explosion of meditation research has demonstrated a wider array of effects—psychological, therapeutic, neural, physiological, biochemical and chromosomal—than any other psychotherapy (Walsh & Shapiro, 2006; Walsh, in press).

Considerable research suggests that meditation can ameliorate a wide array of (especially stress related) psychological and psychosomatic disorders in both adults and children (Arias, Steinberg, Banga & Trestman, 2006; Black, Milam & Sussman, 2009; Chiesa, 2009; Dusek et al., 2008). Multiple studies including meta-analyses, show that meditation can reduce stress measures in both clinical and normal populations (Chiesa & Serreti, 2009; Hofmann, Sawyer, Witt & Oh, 2010). Partially responsive psychosomatic disorders include, for example, cardiovascular hypertension and hypercholesterolemia, hormonal disorders such as primary dysmenorrhea and type two diabetes, asthma and chronic pain (Anderson, Liu & Kryscio, 2008; Shapiro & Carlson, 2009). Responsive psychological difficulties include, among others, insomnia, anxiety, depressive eating, and borderline personality disorders (Didonna, 2009; Shapiro & Carlson, 2009).

Meditation can also be beneficial when combined with other therapies. The best known combinations are Dialectical Behavior Therapy (primarily used for borderline personality disorder), Mindfulness-Based Stress Reduction, and Mindfulness-Based Cognitive Therapy. A meta-analysis of mindfulness based therapies found large effect sizes for anxiety and depressive symptoms of 0.95 and 0.97 respec-

tively, and therapeutic gains were maintained at follow-up (Hofmann, Sawyer, Witt & Oh, 2010).

It is now clear that meditation, either alone or in combination with other therapies, can be beneficial for both normal and multiple clinical populations. However, it is less clear how different meditation practices compare, or how meditation compares with other therapies and self-regulation strategies such as relaxation, feedback, and self-hypnosis (Walsh & Shapiro, 2006).

Yoga may also be helpful for stress and mood disorders. However, studies are fewer, and reviews draw cautious conclusions (da Silva, Ravindran, & Ravindran, 2009; Kirkwood, Rampes, Tuffrey, Richardson, & Pilkington, 2005; Pilkington, Kirkwood, Rampes, & Richardson, 2005).

In addition to its benefits for relaxation and stress management, meditation may also enhance measures of psychological capacities, health, and maturity in both patients and normals (Walsh & Shapiro, 2006). Particularly important to health care professionals are findings that meditation can enhance valued caregiver qualities such as empathy, sensitivity, emotional stability, and psychological maturity, while reducing distress and burnout (Shapiro & Carlson, 2009). On the cognitive side, studies suggest that meditation can enhance some measures of cognition, and may reduce age-related cognitive losses and corresponding brain shrinkage (Pagnoni & Cekic, 2007; Xiong & Doraiswamy, 2009). The universality of stress, as well as the multiple benefits of both lifestyle changes and self-regulation skills for managing stress, suggests that these TLCs and self-regulation skills deserve to be central components of health professionals' training, personal and professional practice, and public outreach.

Religious and Spiritual Involvement

Religious and spiritual concerns are vitally important to most people and most patients. Some 90% of the world's population engages in religious or spiritual practices, these practices are a major means of coping with stress and illness, and most patients say that they would welcome their health professionals inquiring about religious issues (Koenig, 2002). Yet few health professionals do. This may be unfortunate given the prevalence and importance of religious-spiritual practices, their many influences on lifestyle and health, their impact on therapeutic relationships and effectiveness, and the deep existential issues they open (Fowler, 1995; Koenig, 2009).

Considerable research suggests a complex but usually beneficial relationship between religious involvement and

mental health. The most massive review to date found statistically significant positive associations in 476 of 724 quantitative studies (Koenig, McCullough, & Larson, 2001). In general, religious-spiritual involvement is most likely to benefit when it centers on themes such as love and forgiveness, and likely to be less helpful or even harmful to mental health when themes of punishment and guilt predominate.

Benefits span an array of health measures. Mental health benefits include enhanced psychological, relational, and marital wellbeing, as well as reduced rates of disorders such as anxiety, depression, substance abuse, and suicide. For physical health, religious involvement seems beneficially related to both specific disorders such as hypertension and to nonspecific mortality rates (Koenig et al., 2001). Strikingly, those who attend religious services at least weekly, tend to survive for approximately *seven years* longer than those who don't, even when studies control for factors such as baseline health and health behaviors (Koenig et al., 2001). Important mediating and contributory factors likely include service to others, and especially social support. Contemplative practices such as meditation offer further psychological, somatic, and spiritual benefits (Didonna, 2009; Shapiro & Carlson, 2009; Walsh & Shapiro, 2006).

Religion, Spirituality, and Psychological Development

It is important for mental health professionals to recognize that there are multiple levels of religious development. These levels range from *preconventional* to *conventional* to *postconventional* (or from *prepersonal* to *personal*, and *transpersonal*), and are associated with extremely different kinds of religious faith, practice, behavior, and institutions (Fowler, 1995; Wilber, 2005, 2006).

For example, consider the developmental stages of religious faith. At the preconventional level, *mythic-literal* faith involves an unreflective, literal acceptance of culturally provided beliefs. At the *synthetic-conventional* level, people begin to create their own individual, but still largely unreflective, synthesis of diverse conventional beliefs. At later postconventional stages, such as *conjunctive* and *universalizing* faith, individuals critically reflect on conventional assumptions, open to multiple perspectives, confront paradoxes, and extend their care and concern to all peoples (Fowler, 1995; Wilber, 2006).

When developmental differences go unrecognized, problems ensue. For example, the views of one level are taken as normative, and those at this level tend to assume that people at other levels are mistaken, misguided, malevolent,

or disturbed (Wilber, 2005). Many contemporary religious and cultural conflicts appear to reflect these kinds of cross-level misunderstandings (Walsh, 2009).

This developmental perspective brings new clarity to many religious and spiritual issues. For example, it makes clear that religions are not only culturally diverse, but also developmentally diverse, and that mental health professionals need to be sensitive to both kinds of diversity. Religion can be an expression of immaturity, conventional maturity, and postconventional maturity, and of corresponding motives and concerns ranging from egocentric to ethnocentric to worldcentric (Wilber, 2006). Interpretations that view religion as, for example, always regressive or always transcendental, invariably overlook this developmental perspective. Examples of reductionistic interpretations that view religion as *necessarily* regressive or pathological include the writings of the so called “neoatheists,” such as the recent extremely popular books *The God Delusion*, *The End of Faith*, and *God Is Not Great*, all of which are ignorant of developmental research (Dawkins, 2006; Harris, 2005; Hitchens, 2007). Unfortunately, the widespread failure to recognize developmental differences—in faith, morality, values, ego, worldview, and more—and their far reaching implications for religion and multiple other areas of life, seems a significant factor underlying many contemporary cultural conflicts (Walsh, 2009; Wilber, 2006)

Of course, religious behavior can sometimes be regressive or pathological. However, religious behavior can also both express and foster healthy, mature, and even exceptionally mature development. In fact, a classic goal of spiritual practices such as meditation is to foster postconventional development through, for example, *bhavana* (mental cultivation) in Buddhism and *lien-hsin* (refining the mind) in Taoism (Walsh & Shapiro, 2006). Contemporary research and meta-analysis are supportive, since meditators tend to score higher on measures of ego, moral and cognitive development, as well as self-actualization, coping skills and defenses, and states and stages of consciousness (Alexander & Langer, 1990; Alexander, Rainforth, & Gelderloos, 1991). Ideally, religious-spiritual traditions offer both “legitimacy” (support for people’s current level of psychological and faith development), as well as “authenticity” (support for maturation beyond current levels) (Wilber, 2005). Given the significance of religious and spiritual involvement, it seems important for therapists to be familiar with developmental and other key issues, and where appro-

priate, to inquire about and support healthy involvement.

Contribution and Service

From ancient times, service and contribution to others have been regarded as virtues that can benefit both giver and receiver (Walsh, 1999). The world’s major spiritual traditions emphasize that, when viewed correctly, service is not necessarily a sacrifice, but rather can foster qualities that serve the giver, such as happiness, mental health, and spiritual maturity. Altruism is said to reduce unhealthy mental qualities such as greed, jealousy, and egocentricity, while enhancing healthy qualities such as love, joy, and generosity (Hopkins, 2001; Walsh, 1999). The benefits of service are also said to extend to healing, such that healing oneself and others can be intimately linked. Multiple myths and healing traditions describe “wounded healers”: people who by virtue of their own illness learn to heal others, and may thereby be healed themselves.

In our own time, both theory and research point to correlations between altruism and measures of psychological and physical health. Multiple studies, including those that control for prior health factors, suggest that people who volunteer more are psychologically happier and healthier, physically healthier, and may even live longer (Borgonovi, 2009; Grimm, Spring, & Dietz, 2007; Post, 2007). The so called “paradox of happiness” is that spending one’s time and resources on others can make one happier (Walsh, 1999).

Altruists of all ages may experience a “helpers-high” (Post, Underwood, Schloss, & Hulbert, 2002). Even required community service for adolescents seems to effect long-term positive psychological changes, while even mandated monetary donations can make college students happier than spending the money on themselves (Dunn, Aknin, & Norton, 2009). Erik Erikson (1959) famously suggested that “generativity” (care and concern for others, and especially for future generations) may be a hallmark of successful maturation. Moreover, altruism has a positive social contagion or multiplier effect. For example, cooperative behaviors cascade through social networks to induce further cooperation in others (Fowler & Christakis, 2010), while at the community level, service is a key contributor to social capital (Putnam, 2000).

In summary, considerable research shows positive relationships between altruistic behavior and multiple measures of psychological, physical, and social wellbeing. However, there are important qualifiers. Major exceptions include “caretaker burnout,” such as overwhelmed family members caring for a demented spouse or parent. Furthermore, the

kind of motivation powering prosocial behavior affects outcome. Whereas service motivated by pleasure in helping is associated with multiple positive measures (such as positive affect, self-esteem, self-actualization, and life satisfaction), this may not be true when service is driven by a sense of internal pressure, duty, and obligation (Gebauer, Riketta, Broemer, & Mai, 2008).

Psychotherapists repeatedly rediscover the healing potentials of altruistic behavior for both their patients and themselves. Alfred Adler emphasized the benefits of “social interest,” while helping other members contributes to the effectiveness of group therapy and support groups such as Alcoholics Anonymous (Duncan et al., 2010). Likewise, therapists often report that helping their patients can enhance their own wellbeing (Yalom, 2002). Wisely perceived, altruism is not self-sacrifice, but rather enlightened self-interest (Walsh, 1999). As the Dalai Lama put it, “if you’re going to be selfish, be wisely selfish—which means to love and serve others, since love and service to others bring rewards to oneself that otherwise would be unachievable” (Hopkins, 2001, p.150).

These benefits of altruism hold major implications for our understanding of health, lifestyle, and therapy. Based on their findings, Brown et al. (2003) wrote an article titled “Providing Social Support May be More Beneficial Than Receiving It,” and concluded that interventions “designed to help people feel supported may need to be redesigned so that the emphasis is on what people do to help others” (p. 326). Other researchers quipped, “If giving weren’t free, pharmaceutical companies could herald the discoveries of a stupendous new drug called ‘Give Back’—instead of ‘Prozac’...” (Post & Niemark, 2007 p. 7). Contribution and service to others have long been considered central elements of a life well lived. Now they can also be considered central elements of a healthy life.

Discussion

A culture’s technology has far reaching effects on people’s psychology and lifestyles (Wilber, 2000), and modern technology is now affecting our psychology, biology, society, and lifestyles in ways we are only beginning to comprehend. Moreover, technological innovations and their lifestyle effects are changing “more quickly than we know how to change ourselves” (Putnam, 2000, p. 402). Many of the resultant costs are doubtless as yet unrecognized, and this raises a disconcerting question: Could some of our patients be “canaries in the mine,” warning us of ways of life that may exact a toll on us all? This is a question that health professionals will need to confront increasingly as techno-

logical, environmental, and lifestyle changes accelerate.

Interactions Among Therapeutic Lifestyle Factors

Fortunately, individual TLCs appear to counter many medical and psychological complications of contemporary pathogenic lifestyles. This raises a hopeful possibility: Might multiple TLCs be even more effective? There is evidence for this in both animal studies and clinical medicine. For example, physical activity increases neuronogenesis in the rat hippocampus. However, the effect is maximal only when the animals are exposed to a rich social environment rather than living in isolation (Stranahan, Khalil & Gould, 2006). Similarly, in his program to reverse coronary arteriosclerosis, Dean Ornish employed four TLCs: exercise, vegetarian diet, relaxation and stress management, and social support. Each proved beneficial, and effects were additive (Pischke et al., 2008). Might this also be true for psychological disorders? Quite possibly, but as yet we have no clear answer.

Difficulties of Implementing Therapeutic Lifestyles

Given the many advantages of TLCs, why have mental health professionals been so slow to adopt them? The reasons range from patients to therapists to society. Effective public health programs will therefore need to address all these.

For patients, TLCs can require considerable and sustained effort, and many patients feel unable or unwilling to do them. Patients often have little social support, little understanding of causal lifestyle factors, and a passive expectation that healing comes from an outside authority or pill (Duncan et al., 2010). Societally, whole industries are geared towards encouraging unhealthy choices. Patients contend with a daily barrage of psychologically sophisticated advertisements encouraging them, for example, to consume alcohol, nicotine, and fast food, in the never ending search for what the food industry calls the “bliss point” of “eatertainment” through “hypereating” (Kessler, 2009). Unfortunately, you can never get enough of what you don’t really want, but you can certainly ruin your health and life trying (Walsh, 1999).

Therapists also face challenges. The first is simply to become familiar with the large literature on TLCs. The second is a professional bias towards pharmacological and formal psychotherapeutic interventions. In addition, fostering patients’ TLCs can be time intensive, can demand considerable therapeutic skill, and is not well reimbursed. Therapists may also harbor negative expectations (not with-

out some justification) that patients won't maintain the necessary changes. However, it is crucial to be aware of the Rosenthal effect: the self-fulfilling power of interpersonal expectations. Finally, cognitive dissonance may be at work when therapists' own lifestyles are unhealthy (McEntee & Halgin, 1996).

Taken together, these therapist beliefs and biases may constitute a variant of what is called "professional deformation." This is a harmful distortion of psychological processes such as cognition and perception produced by professional practice and pressures. As long ago as 1915, a sociologist observed that "The continued performance of a certain profession or trade creates in the individual a deformation of the reasoning process...such deformation is largely a matter of adaptation to environment" (Langerok, 1915). Professional deformation can be extreme. Consider, for example, the forced psychiatric hospitalization and drugging of Soviet dissidents by Soviet mental health professionals who believed that the counterconventional beliefs of these "patients" were diagnostic of "sluggish schizophrenia" (Voren, 2002).

However, more subtle forms of professional deformation may be more pervasive and more difficult to recognize. The mental health system's current pharmacological emphasis—at the cost of psychotherapeutic, social, and TLC interventions—may be one example. This pharmacological bias is heavily promoted by the pharmaceutical industry, and Marcia Angell (2009), former editor of *The New England Journal of Medicine*, concluded that "one result of the intensive bias is that...Even when changes in lifestyle would be more effective, doctors and their patients often believe that for every ailment and discontent there is a drug" (p. 12). An obvious question then becomes: Does the widespread underemphasis of lifestyle factors across mental health professions constitute a further example of professional deformation?

Are there additional therapeutic lifestyle factors? Certainly, and examples range from sleep hygiene to ethics, community engagement, and moderating television viewing, all of which have demonstrated mental health benefits (Ito et al., 2008; Preiss et al., 2006; Putnam, 2000; Walsh, 1999).

Wide scale adoption of TLCs will likely require wide scale interventions that encompass educational, mental health, and public health systems. Political interventions may also be necessary, for example, to reduce children's exposure to media violence and unhealthy food advertising. Of course, these are major requirements. However, given the enormous mental, physical, social, and economic costs of

contemporary lifestyles, such interventions may be essential. In the 21st century, therapeutic lifestyles may need to be a central focus of mental, medical, and public health.

References

- Alexander, C. & Langer, E. (1990). Higher stages of human development. New York, NY: Oxford University Press.
- Alexander, C. N., Rainforth, M. V., & Gelderloos, P. (1991). Transcendental meditation, self-actualization, and psychological health: A conceptual overview and statistical meta-analysis. *Journal of Social Behavior and Personality*, 6, 189-247.
- Amminger, G. P., Schäfer, M. R., Papageorgiou, K., Klier, C. M., Cotton, S., Harrigan, S. M., ... Berger, G. E. (2010). Long-chain n-3 fatty acids for indicated prevention of psychotic disorders: A randomized, placebo-controlled trial. *Archives of General Psychiatry*, 67(2), 146-154.
- Anderson, J., Liu, C. & Kryscio, R. (2008). Blood pressure response to transcendental meditation: A meta-analysis. *American Journal of Hypertension*, 21, 310-316.
- Angell, M. (2009). Drug companies and doctors: A story of corruption. *The New York Review of Books*, LVI (1), 8, 10, 12.
- Anthes, E. (2009). Building around the mind. *Scientific American Mind*, 20, 52-59.
- Appleton, K., Rogers, P. & Ness, A. (2010). Updated systematic review and meta-analysis of the effects of n-3 long-chain polyunsaturated fatty acids on depressed mood. *American Journal of Clinical Nutrition*, 91(3), 757-770.
- Arias, A. J., Steinberg, K., Banga, A., & Trestman, R. L. (2006). Systematic review of the efficacy of meditation techniques as treatments for medical illness. *The Journal of Alternative and Complementary Medicine*, 12, 817-832.
- Barrett, W. (1962). *Irrational man: A study in existential philosophy*. New York, NY: Doubleday.
- Berman, M., Jonides, J., & Kaplan, S. (2008). The cognitive benefits of interacting with nature. *Psychological Science*, 19, 1207-1212.
- Bhandari, H. & Yasunobu, K. (2009). What is social capital? A comprehensive review of the concept. *Asian Journal of Social Science* 37(3), 480-510.
- Bjorklund, D. F. & Pellegrini, A. D. (2002). *The origins of human nature*. Washington DC: American Psychological Association.
- Black, D. S., Milam, J., & Sussman, S. (2009). Sitting-meditation interventions among youth: A review of treatment efficacy. *Pediatrics*, 124, e532-e541.
- Borgonovi, F. (2009). Doing well by doing good: The relationship between formal volunteering and self-reported happiness. *Social Science and Medicine*, 66, 2312-2334.
- Brown, S., Nesse, R., Vinokur, A., & Smith, D. (2003). Providing social support may be more beneficial than receiving it. *Psychological Science*, 14: 320-327

- Bracken, C., Skalski, P. (2010). *Immersed in media: Telepresence in everyday life*. New York, NY: Routledge.
- Buss, D. (2000). The evolution of happiness. *American psychologist*, 55(1), 15-23.
- Cattaneo, L. & Rizzolatti, G. (2009). The mirror neuron system. *Archives of Neurology*, 66(5), 557-560.
- Cherniak, E.P., Troen, B.R., Florez, H.J., Roos, B.A. & Levis, S. (2009). Some new food for thought: The role of vitamin D in the mental health of older adults. *Current Psychiatry Reports*, 11(1), 12-19. doi: 10.1007/s11920-009-0003-3
- Chiesa, A. (2009). Zen meditation: An integration of current evidence. *Journal of Alternative and Complementary Medication*, 15, 585-592.
- Chiesa, A. & Serretti, A. (2009) Mindfulness-based stress reduction for stress management in healthy people: A review and meta-analysis. *The Journal of Alternative and Complementary Medicine*. 15(5), 593-600. doi:10.1089/acm.2008.0495
- Christakis, N.A. (2009). "You make me sick!" doi: 10.1136/bmj.b2739
- Christofoletti, G., Olini, M., Gobbi, S. & Stella, F. (2007). Effects of motor intervention in elderly patients with dementia: An analysis of randomized controlled trials. *Topics in Geriatric Rehabilitation*, 23 (2), 149- 154. doi: 10.1097/01.TGR.0000270183.90778.8e
- Clark, C. & Stansfeld, S. (2007). The effect of transportation noise on health and cognitive development: A review of recent evidence. *International Journal of Comparative Psychology*, (20), 145-158.
- Colcombe, S. & Kramer, A. F. (2003). Fitness effects on the cognitive function of older adults: A meta-analytic study. *Psychological Science*, 14, 125-130.
- Cotman, C. & Berchtold, N. (2002). Exercise: A behavioral intervention to enhance brain health and plasticity. *Neuroscience*, 25: 295-301.
- Cummins, R.A. (2005). The domains of life satisfaction: An attempt to order chaos. In A.C. Michalos (Ed.) *Citation Classics from Social Indicators Research*. (pp 559-584). Netherlands: Springer.
- da Silva, T., Ravindran, L., & Ravindran, A. (2009). Yoga in the treatment of mood and anxiety disorders: A review. *Asian Journal of Psychiatry*, 2, 6-16.
- Daley, A. J. (2002). Exercise therapy and mental health in clinical populations: Is exercise therapy a worthwhile intervention? *Advances in Psychiatric Treatment*, 8: 262-270.
- Dawkins, R. (2006). *The God delusion*. Boston, MA: Houghton Mifflin.
- Delpeuch, F., Marie, B., Monnner, E., & Holdsworth, M. (2009). *Globesity: A planet out of control*. London: Earthscan Publications.
- Deslandes, A., Moraes, H., Ferreira, C., Veiga, H., Silveria, H., Mouta, R., ...Laks, J. (2009). Exercise and mental health: Many reasons to move. *Neuropsychobiology*, 59, 191-198.
- Devlin, A. & Arneill, A. (2003). Health care environments and patient outcomes: A review of the literature. *Environment and Behavior*, 35, 665.
- Didonna, F. (Ed.). (2009). *Clinical handbook of mindfulness*. New York, NY: Springer.
- Dowd, S., Vickers, K., & Krahn, D. (2004). Exercise for depression. *Journal of Current Psychiatry*, 3, 10-20.
- Duncan, B.L., Miller, S.O., Wampold, B.E. & Hubble, M.A. (Eds.). (2010). *The heart and soul of change: Delivering what works in therapy*, 2nd ed. Washington DC.: American Psychological Association.
- Dunn, D., Aknin, L., & Norton, M. (2009). Spending money on others promotes happiness. *Science*, 319, 1687-1688.
- Dusek, J., Otu, H., Wohlhueter, A., Zerbini, L., Joseph, M., Benson, H., ...Hasin, M. (2008). Genomic counter-stress changes induced by the relaxation response. *PLOS One*, 3, e2576.
- Erikson, E. (1959). *Identity and the life cycle*. New York, NY: International University press.
- Erikson, K. & Kramer, A. (2009). Aerobic exercise effects on cognitive and neural plasticity in older adults. *British Journal of Sports Medicine*, 43, 22-24.
- Esbjorn-Hargens, S. & Zimmerman, M. (2009). *Integral ecology*. Boston, MA: Integral Books.
- Fischer, C. (2004). The 2004 GSS Finding of Shrunken Social Networks: An artifact? Published online by *American Sociological Review*, 74(4), 657-669. doi: 10.1177/000312240907400408
- Fotuhi, M., Mohassel, P., & Yaffe, K. (2009). Fish consumption, long-chain omega-3 fatty acids and risk of cognitive decline or Alzheimer disease: A complex association. *Nature clinical practice.Neurology*, 5, 140-152.
- Fowler, J. & Christakis, N. (2008). Dynamic spread of happiness in a large social network. *BMJ*, 337: a2338.
- Fowler, J. & Christakis, N. (2010). Cooperative behavior cascades in human social networks. *Proceedings of the National Academy of Sciences*, 107(12), 5334-5338.
- Fowler, J.W. (1995). *Stages of faith: The psychology of human development*. New York, NY: HarperOne
- Frattaroli, J., Weidner, G., Dnistrian, A., Kemp, C., Daubenmier, J., & Marlin, R. (2009). Clinical events in prostate cancer lifestyle trial: Results from two years of follow-up. *Urology*, 72, 1319-1323.
- Fredrickson, B. (2002). Positive emotions. In C.Snyder & S. Lopez (Eds.), *Handbook of positive psychology* (pp. 120-134). New York, NY: Oxford University Press.
- Freeman, M., Hibbeln, J., Wisner, K., Davis, J., Mischoulon, D., Peet, M., ...Stoll, A. (2006). Omega-3 fatty acids: Evidence basis for treatment and future research in psychiatry. *Journal of Clinical Psychiatry*, 67, 1954-1967.
- Gebauer, J., Riketta, M., Broemer, P., & Mai, G. (2008). Pleasure and pressure based prosocial motivation: Divergent relations to subjective well-being. *Journal of Research in Personality*, 42, 399-420.
- Gillies, P. (2007). Preemptive nutrition of pro-inflammatory

- states: A nutrigenomic model. *Nutritional Reviews*, 65, S217-S220.
- Gomez-Pinilla, J. (2008). Brainfoods: The effect of nutrients on brain function. *Nature Reviews Neuroscience*, 9, 568-578.
- Gopnik, A. (2008). Right again: The passions of John Stuart Mill. *The New Yorker*, October, 6, 85-91.
- Gordon, D. (1999). The Epicurean option. *Philosophy Now*, 24, 33-35.
- Gordon, G. & Esbjorn-Hargens, S. (2007). Integral play. *Journal of Integral Theory and Practice*, 2, 62-104.
- Grimm, R., Spring, K., & Dietz, N. (2007). The health benefits of volunteering: A review of recent research. Washington, D.C.: Corporation for National and Community Service.
- Gu, Y., Nieves, J.W., Stern, Y., Luchsinger, J.A. & Scarmeas, N. (2010). *Archives of Neurology*, 67(6). doi: 10.1001/archneurol.2010.84
- Hamer, M. & Chida, Y. (2009). Physical activity and risk of neurodegenerative disease: a systematic review of prospective evidence. *Psychological Medicine*, 39, 3-11.
- Hamer, M. & Chida, Y. (2008). Exercise and depression: A meta-analysis and critical review. In W.Hansson & E. Olsson (Eds.). *New perspectives on women and depression* (pp. 255-266). New York, NY: Nova Science Publishers Inc.
- Harris, S. (2005). *The End of Faith*. New York, NY: W.W. Norton.
- Hertzog, C., Kramer, A., Wilson, R., & Lindenberger, U. (2009). Fit body, fit mind? *Scientific American Mind*, 20, 24-31.
- Higgins, S., Hall, E., Wall, K., Woolner, P., & McCaughey, C. (2005). The impact of school environments: A literature review. <http://www.cfbt.com/PDF/91085.pdf>
- Hitchens, C. (2007). *God is not great*. New York, NY: Twelve Books.
- Ho, C., Payne, L., Orsega-Smith, E., & Godby, G. (2003). Parks, recreation, and public health. *Parks & Recreation*, 38, 18, 20-27.
- Hoffman, S.G., Sawyer, A.T., Witt, A.A. & Oh, D. (2010). The effect of mindfulness-based therapy on anxiety and depression: A meta-analytic review. *Journal of Consulting Clinical Psychology*, 78(2), 169-183. doi: 10.1037/a0018555
- Hopkins, J. (2001). *Cultivating compassion*. New York, NY: Broadway Books.
- Innis, S. M. (2009). Omega-3 fatty acids and neural development to two years of age. *Journal of Pediatric Gastroenterology and Nutrition*, 48, S16-S24.
- Ito, M., Horst, H., Brittani, M., Boyd, D., Herr-Stephenson, B., Lang, P., ...Robinson, L. (2008). *Living and learning with new media: Summary of findings from the digital youth project*. Cambridge: The MIT Press.
- Jetten, J., Haslam, C., Haslam, S., & Branscombe, N. (2009). The social cure. *Scientific American Mind*, 20, 26-33.
- Kang, J. H., Ascherio, A., & Grodstein, F. (2005). Fruit and vegetable consumption and cognitive decline in aging women. *Annals of Neurology*, 57, 713-720.
- Kessler, D. (2009). *The end of overeating*. New York, NY: Rodale Press.
- Khaw, K. T., Wareham, N., Bingham, S., Welch, A., & Luben, R. (2008). Combined impact of health behaviors and mortality in men and women. *Obstetrical & Gynecological Survey*, 63, 376-377.
- Kirkwood, G., Rampes, H., Tuffrey, V., Richardson, J., & Pilkington, K. (2005). Yoga for anxiety: A systematic review of the research evidence. *British Journal of Sports Medicine*, 39, 884-891.
- Koenig, H. (2002). *Spirituality in patient care*. Philadelphia, PA: Templeton Foundation Press.
- Koenig, H. G. (2009). Research on religion, spirituality, and mental health: A review. *Canadian Journal of Psychiatry*, 54, 283-291.
- Koenig, H. G., McCullough, M. E., & Larson, D. B. (2001). *Handbook of religion and health*. Oxford University Press.
- Kraguljac, N.V., Montori, V.M., Pavuluri, M., Chai, H.S., Wilson, B.S. & Unal, S.S. (2009). Efficacy of omega-3 fatty acids in mood disorders - a systematic review and metaanalysis. *Psychopharmacology Bulletin*, 42(3), 39-54.
- Kuller, R., Ballal, S., Laike, T., Mikellides, B., & Tonello, G. (2006). The impact of light and colour on psychological mood: A cross-cultural study of indoor work environments. *Ergonomics*, 49, 1496-1507.
- Kuramoto, A. (2006). Therapeutic benefits of Tai Chi exercise: Research review. *Wisconsin Medical Journal*, 105, 42-46.
- Langerok, H. (1915). A study of professional deformation. *The American Journal of Sociology*, 21, 30-34.
- Larun, L., Nordeim, L., Ekeland, E., Hagen, K., & Heian, F. (2006). Exercise in prevention and treatment of anxiety and depression among children and young people. *Cochrane Database of Systematic Reviews*. <http://www2.cochrane.org/reviews/en/ab004691.html>
- Lester, S. & Russell, W. (2008). *Play for a change - play, policy and practice: A review of contemporary perspectives*. London: National Children's Bureau.
- Lefcourt, H. (2002). Humor. In C.Snyder & S. Lopez (Eds.), *Handbook of positive psychology* (pp. 619-631). New York, NY: Oxford University Press.
- Lin, P. & Su, K. (2007). A meta-analytic review of double-blind, placebo-controlled trials of antidepressant efficacy of omega-3 fatty acids. *Journal of Clinical Psychiatry*, 68, 1056-1061.
- Lipton, L. (2008). Using yoga to treat disease: An evidence based review. *Journal of the American Academy of Physician Assistants*, 21, 34, 36, 38, 41.
- Long, B. J., Calfas, K. J., Wooten, W., Sallis, J. F., Patrick, K., Goldstein, M., ...Heath, G.. (1996). A multisite field test of the acceptability of physical activity counseling in primary care: Project PACE. *American Journal of Preventative Medicine*, 12, 73-81.
- Louve, R. (2005). *Last child in the woods: Saving our children*

- from nature-deficit disorder. Chapel Hill, NC: Algonquin Books of Chapel Hill.
- Luhrmann, T. M. (2001). *Of two minds: An anthropologist looks at American psychiatry*. New York, NY: Vintage.
- Maller, C., Townsend, M., Pryor, A., Brown, P., & Slegler, L. (2006). Healthy nature, healthy people: 'Contact with nature' as an upstream health promotion intervention for populations. *Health Promotion International*, 21, 45-54.
- Manzoni, G. M., Pagnini, F., Castelnuovo, G., & Molinari, E. (2008). Relaxation training for anxiety: a ten-year systematic review with meta-analysis. *BMC Psychiatry*, 8, 1-12.
- Mares, M.L. & Woodard, E. (2005). Positive effects of television on children's social interactions: A meta-analysis. *MediaPsychology*, 7(3), 301-322.
- McEntee, D. & Halgin, R. (1996). Therapists' attitudes about addressing the role of exercise in psychotherapy. *Journal of Clinical Psychology*, 52, 48-60.
- McMorris, T., Tomporowski, P. & Audiffren, M. (2009). *Exercise and cognitive function*. Chichester, England: Wiley-Blackwell
- McPherson, M., Smith-Lovin, L. & Brashears, M.E. (2006). Social isolation in America: Changes in core discussion networks over two decades. *American Sociological Review*, 71(3), 353-375. doi: 10.1177/000312240607100301
- Mojtabai, R. & Olfson, M. (2008). National trends in psychotherapy by office-based psychiatrists. *Archives of General Psychiatry*, 65, 962-970.
- Montanye, J. A. (2001). Bowling alone: The collapse and revival of an American community. *The Independent Review*, 5(3). <http://www.independent.org/publications/tir/article.asp?a=205>
- Morris, M., Evans, D., Tangney, C., Bienias, J., & Wilson, R. (2006). Associations of vegetable and fruit consumption with age-related cognitive change. *Neurology*, 67: 1370-1376.
- Noaghuil, S. & Hibbeln, J. (2003). Cross-national comparisons of seafood consumption and rates of bipolar disorder. *American Journal of Psychiatry*, 160, 2222-2227.
- Norcross, J. (2010). The therapeutic relationship. In B. Duncan, S. Miller, B. Wampold, M. Hubble, M. (Eds.). *The heart and soul of change: Delivering what works in therapy*, 2nd ed. (pp. 113-142). Washington, DC: American Psychological Association.
- Oken, E., Radesky, J. S., Wright, R. O., Bellinger, D. C. & Chitra, J., Amarasiriwardena, ... Gillman, M.W. (2008). Maternal fish intake during pregnancy, blood mercury levels, and child cognition at age 3 years in a U.S. cohort. *American Journal of Epidemiology*, 167, 1171-1181.
- Ornish, D., Lin, J., Daubenmier, J., Weidner, G., Epel, E., Kemp, C., ... Carroll, P. (2008). Increased telomerase activity and comprehensive lifestyle changes: A pilot study. *The Lancet Oncology*, 9, 1048-1057.
- Ospina, M. B., Bond, T. K., Karkhaneh, M., Tjosvold, L., Vandermeer, B. & Liang, Y.... Klassen, T.P. (2007). Meditation practices for health: State of the research. AHRQ Publication No.07-E010. <http://www.ahrq.gov/downloads/pub/evidence/pdf/meditation/medit.pdf>
- Pagnoni, G. & Cekic, M. (2007). Age effects on gray matter volume and attentional performance in Zen meditation. *Neurobiological Aging*, 28, 1623-627.
- Pilgrim, D., Rogers, A., & Bentall, R. (2009). The centrality of personal relationships in the creation and amelioration of mental health problems: The current interdisciplinary case. *Health: An interdisciplinary Journal for the Social Study of Health, Illness & Medicine*, 13, 235.
- Pilkington, K., Kirkwood, G., Rampes, H., & Richardson, J. (2005). Yoga for depression: The research evidence. *Journal of Affective Disorders*, 89, 13-24.
- Pischke, C.R., Scherwitz, L., Weidner, G. & Ornish, D. (2008). Long-term effects of lifestyle changes on well-being and cardiac variables among coronary heart disease patients. *Health psychology*, 27(5), 584-592. doi: 10.1037/0278-6133.27.5.584
- Post, S. (2007). *The science of altruism and health*. New York, NY: Oxford Press.
- Post, S. & Niemark, J. (2007). *Why good things happen to good people*. New York, NY: Broadway Books.
- Post, S., Underwood, L., Schloss, J., & Hulbert, W. (2002). *Altruism and altruistic love: Science, philosophy and religion in dialogue*. Oxford: Oxford University Press.
- Preiss, R.W., Gayle, B.M., Burrell, N., Allen, M. & Bryant, J. (2006). *Mass media effects research: Advances through meta-analysis*. New York, NY: Routledge Press.
- Prolla, T. A. & Mattson, M. P. (2001). Molecular mechanisms of brain aging and neurodegenerative disorders: Lessons from dietary restriction. *Trends in Neurosciences*, 24, s21-s31.
- Pryor, A., Townsend, M., Maller, C., & Field, K. (2006). Health and well-being naturally: 'Contact with nature' in health promotion for targeted individuals, communities and populations. *Health Promotion Journal of Australia*, 17, 114-223.
- Putnam, R. D. (1995). Bowling alone: America's declining social capital. *Journal of Democracy*, 6, 65-78.
- Putnam, R. D. (2000). *Bowling alone: The collapse and revival of American community*. New York, NY: Simon Schuster.
- Quaney, B.M., Boyd, L.A., McDown, J.M., Zahner, L.H., Jianghua, He, Mayo, M.S. & Macko, R.F. (2009). Aerobic exercise improves cognition and motor function poststroke. *Neurorehabilitation and Neural Repair*, 23(9), 879-885. doi: 10.1177/1545968309338193
- Raji, C., Ho, A., Neelroop, P., Becker, J., Lopez, O., & Kuller, L. (2009). Brain structure and obesity. *Neuroimage*, 47, (Supplement 1), S39-S41.
- Rusbult, C, Finkel, E. & Kumashiro, M. The Michelangelo phenomenon. *Current Directions in Psychological Science*, 18(6), 305-309.
- Sarris, J., Schoendorfer, N., & Kavanagh, D. J. (2009). Major

- depressive disorder and nutritional medicine. *Nutrition Reviews*, 67, 125-131.
- Shapiro, S. & Carlson, L. (2009). *The art and science of mindfulness*. Washington D.C.: American Psychological Association Press.
- Shedler, J.K. (2010). "The efficacy of psychodynamic psychotherapy." *American Psychologist*, 65(2), 98-109.
- Sidhu, K., Vandana, P., & Balon, R. (2009). Exercise prescription: A practical effective therapy for depression. *Current Psychiatry*, 8, 39-51.
- Small, G. & Vorgan, G. (2008). Meet your ibrain. *Scientific American Mind*, 19, 42-49.
- Smith, E. (2000). *The body in psychotherapy*. Jefferson, N.C.: McFarland & Company.
- Sofi, F., Cesari, F., Abbate, R., Gensini, G.F. & Casini, A. (2008). Adherence to Mediterranean diet and health status: meta-analysis. doi: 10.1136/bmj.a1344
- Song, C. & Zhao, S. (2008). Omega-3 fatty acid eicosapentaenoic acid: A new treatment for psychiatric and neurodegenerative diseases. *Expert Opinion on Investigational Drugs*, 16, 1627-1638.
- Stahl, L., Begg, D., Weisinger, R., & Sinclair, A. (2008). The role of omega-3 fatty acids in mood disorders. *Current Opinion in Investigational Drugs*, 9, 57-64.
- Stathopoulou, G., Powers, M., Berry, A., Smits, J., & Otto, M. (2006). Exercise interventions for mental health: A quantitative and qualitative review. *Clinical Psychology: Science and Practice*, 13, 179-193.
- Stranahan, A.M., Khalil, D. & Gould, E. (2006). Social isolation delays the positive effects of running on adult neurogenesis. *Nature Neuroscience*, 9, 526-533. doi: 10.1038/nn1668
- Sui, X., Laditka, J., Church, T., Hardin, J., Chase, N., Davis, K. & Blair, S. (2009). Prospective study of cardiorespiratory fitness and depressive symptoms in women and men. *Journal of Psychiatric Research*, 43, 546-552.
- Taylor, A. F. & Kuo, F. E. (2009). Children with attention deficits concentrate better after walk in the park. *Journal of Attention Disorders*, 12, 402-409.
- Taylor, A. F., Kuo, F. E., & Sullivan, W. C. (2001). Coping with ADD: The surprising connection to green play settings. *Environment and Behavior*, 33, 54-77.
- Thoreau, H. (1854). *Walden; or life in the woods*. Boston, MA: Ticknor & Fields.
- Thoreau, H. (1921). *A week on the Concord and Merrimack Rivers*. New York, NY: Charles Scribner & Sons.
- Tiffin, J. & Terashima, N. (2001). *HyperReality: Paradigm for the third millennium*. New York, NY: Routledge.
- Trakhtenberg, E. (2008). The effects of guided imagery on the immune system: A critical review. *International Journal of Neuroscience*, 118, 839-855.
- Ulrich, R. (2006). Evidence-based health care architecture. *The Lancet*, 368: 538-539.
- Voren, R. V. (2002). Comparing Soviet and Chinese political psychiatry. *Journal of the American Academy of Psychiatry and the Law*, 30, 131-135.
- Walsh, R. (1999). *Essential spirituality: The seven central practices*. New York, NY: Wiley & Sons.
- Walsh, R. The state of the integral enterprise, Part I: Current status, possible applications, and potential traps. *Journal of Integral Theory and Practice*, 4(3), 1-12, 2009.
- Walsh, R. Contemplative psychotherapies. In R. Corsini & Wedding (Eds.) *Current psychotherapies* (9th ed.). Belmont, CA: Thomson, in press.
- Walsh, R. & Shapiro, S. (2006). The meeting of meditative disciplines and Western psychology: A mutually enriching dialogue. *American Psychologist*, 61, 227-239.
- Wang, W., Zhang, A., Rasmussen, B., Lin, L., Dunning, T., Kang, S., ...Lo, S.K. (2009). The effect of Tai chi on psychosocial well-being: A systematic review of randomized controlled trials. *Journal of Acupuncture and Meridian Studies*, 2, 171-181.
- Wehrenberg, M. & Coppersmith, L. (2008). Technotrap: When work becomes your second home. *Psychotherapy Networker*, 32(2), 40-45,64.
- WHO (2008). Controlling the global obesity epidemic. <http://www.who.int/nutrition/topics/obesity/en/index.html>
- Wilber, K. (2000). *Integral psychology*. Boston, MA: Shambhala.
- Wilber, K. (2005). *A sociable God*. Boston, MA: Shambhala.
- Wilber, K. (2006). *Integral spirituality*. Boston, MA: Shambhala.
- Willis, L. M., Shukitt-Hale, B., & Joseph, J. A. (2009). Recent advances in berry supplementation and age related cognitive decline. *Current Opinion in Clinical Nutrition & Metabolic Care*, 12, 91-94.
- Wolf, P., Beiser, A., Elias, M., Au, R., Vasan, R., & Seshradi, S. (2007). Relations to obesity in cognitive function: The Framingham heart study. *Current Alzheimer Research*, 4, 111-116.
- Wordsworth, W. (1998). *The collected poems of William Wordsworth*. Hertfordshire, Great Britain: Wordsworth Editions Ltd.
- Xiong, G. L. & Doraiswamy, P. M. (2009). Does meditation enhance cognition and brain plasticity? *Annals of the New York Academy of Sciences*, 1172, 63-69.
- Yalom, I. (2002). *The gift of therapy*. New York, NY: Harper Collins.