

Restoring Mental Vitality in an Endangered World: Reflections on the Benefits of Walking

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Abstract

Coping with the challenges of global climate disruption and the peaking of the rate of fossil fuel production will require behavioral change on a massive scale. There are many skills that will help individuals deal with this coming transition but none more central than the abilities to problem-solve creatively, plan and restrain behavior, and manage the emotions that result from the loss of an affluent lifestyle. These abilities require a mental state called vitality. Even in the best of circumstances, maintaining this state can be difficult and, to make matters worse, it seems that modern culture is conspiring to wear down this aspect of mental effectiveness. This article discusses mental vitality as being based upon the capacity to direct attention. Functioning effectively despite the distractions and challenges of an electrifying and changing world fatigues this capacity. Restoring one's ability to direct attention is explained as a likely precondition to effective problem-solving, planning, and self-regulating, thus making such restoration essential for high levels of individual performance in general and for thoughtful coping in particular. Fortunately, restoring mental vitality requires nothing more than commonplace activities in everyday environments. In fact, since everyday nature is sufficient, there may be no special advantage to time spent in spectacular environments. For instance, the simple activity of walking in natural settings, particularly walking mindfully, may be all that is needed for restoration. The article concludes with a series of specific prescriptions for enhancing our ability to cope with the coming transition, which

can be summarized as simply to spend time walking outdoors, regularly, surrounded by and mindful of everyday nature.

Introduction

I personally have come to appreciate the many benefits of working in a park-like university setting. Outside my building is a commons that is forested and well manicured, free of undue distractions, and usually quiet by virtue of its seclusion from the lively commotion of the nearby town. In short, a tranquil and aesthetic natural environment kept just so. For me, recent encroachment which has brought with it added human vibrancy has only highlighted the importance that regular exposure to natural settings plays in managing the mental vitality essential to creative work and successful coping.

Unfortunately, we may have kept better care of university campuses than we have of nature in general. Our mindless misuse of the planet now threatens our survival. Many researchers and practitioners are responding by helping societies transition away from over-consumption of energy and materials, and away from policies and behaviors that treat the environment as if it were a costless waste sink. They are helping us to heal our relationship with nature by moving us toward sustainable living.

This transition is crucial and overdue, but hard. The process requires that we think and act in clever, clearheaded, and new ways. Yet such thought and action can wear us out mentally. Burned out people cannot help heal the planet. Thus, we need to know specifically what mental capacity is wearing out, how it wears out, and the conditions under which it can be restored. This article explores these issues and:

1. Suggests that coping with the environmental challenges we face demands a number of distinct mental and behavioral abilities.

2. Suggests that these abilities each draw upon a mental resource defined as the capacity to direct attention.
3. Explains what directed attention is, how it differs from another form of attention, how it fatigues, and the environments that help to restore it.
4. Provides a prescription for maintaining this vital mental capacity.

By following the prescription offered, we can restore and better manage our mental vitality. In a restored state we will have a greater ability both to pursue behaviors that heal nature and to learn to live well, within limits, on this one planet.

Coping With the Coming Transition

The central role that mental vitality will play in society's imminent transition to sustainable living can be understood by briefly outlining our current situation. The world is facing multiple global challenges, each capable of shaking the foundation of modern civilization. Two of these challenges have become, only recently, a part of everyday conversation, however contested.

Climate disruption, once a mere hypothesis, is now empirically established. Through the efforts of the Intergovernmental Panel on Climate Change and other bodies, we are now familiar with the changes that will occur during this century and beyond. Recent scientific updates suggest that what were recently only worst-case and distant scenarios are now happening. While efforts are underway to moderate these disruptions, few people suggest that our efforts will allow a return to a preindustrial climate state. As a result, some groups are actively promoting efforts to cope with, rather than just mitigate, climatic change (Bierbaum, Brown, & McAlpine, 2008).

A second challenge involves global energy dynamics. Fossil fuels, that is, solar energy stored eons ago as hydrocarbon compounds, is the foundation upon which our industrial civilization has flourished. The finiteness of this hydrocarbon store is unquestioned, but a new aspect of this finiteness has emerged: the rate of production from a reservoir peaks, sometimes abruptly, after which there is an inevitable and long production decline. The implications of a global peaking of the rate of production of fossil fuels are vigorously debated. The high emotions, competing competencies, and huge stakes that play out in this debate, and the astonishing political and media silence, makes it hard to assess the urgency of fossil fuel peaking. But agreement on one key aspect is emerging: soon the production rate of liquid fossil fuels will peak, with other fuels and materials following. Exactly

when these peaks occur is less important than the fact that they will occur. In fact, debating the exact timing can be a dangerous distraction. The task now is to make plans for living, and thriving, on dramatically less material and energy.

Although the situation will require far-reaching change, the transition need not be a collapse, nor a return to a distant and dark past. That said, if we are to transition gently then we need to quickly give up business-as-usual thinking and the misdirected hope that, given time, we can return to what appeared normal just recently. We must adopt a more appropriate pace, one austere yet potentially satisfying of our deepest needs. This is deep coping, a dynamic, ongoing, and long-term process that paradoxically can bring out the best in people.

In order to understand an individual-level aspect of deep coping, it may help to examine a review of *World Made By Hand* (2008), a recent piece of fiction by Kunstler about the coming transition that explores the behavioral implications of his non-fiction book, *The Long Emergency* (2005). Both books discuss individuals and communities coming to grips with a rapid collapse of social and ecosystem services, and both fall within what many call the gloom-and-doom version of environmental education. But a review of the former book by Thomas (2008) has an insight about the types of coping skills that may soon prove useful:

If Kunstler is right, most of the "survivalists" today with their "stocking up" are locked into 2008 thinking in a thing-centric way when more complex, subtle, and long-term preparation is required: real physical health, having the qualities that make one welcome as a community member, the ability to take and hold a leadership role, genuine kindness under stress, craft and music-making skills, stoicism, and practical knowledge of the natural world are what will serve people and communities far better in 2025 than guns and ammo.

Here Thomas interprets Kunstler's work as suggesting the primacy of emotional stability and clear-headedness, the ability to maintain our prosocial inclinations, the capacity to plan and restrain behavior, and the willingness to continue building and using one's competencies. As disparate as these aspects of coping seem, they share a common foundation: the ability to keep our wits about us in the face of potential chaos. Some writers doubt our ability to effectively manage our wits, and yet the question should not be whether we can cope, but rather under what conditions is such coping more likely. It is the focus of the rest of this article to discuss one of the preconditions to effective coping,

mental vitality, and to provide a simple prescription for its restoration and management.

Contemplative Effort

Mental effectiveness, albeit a well-studied process, is often portrayed as bordering on the mysterious. There exist numerous suggestions for supporting creative problem-solving (see for instance Loehle, 1990; Runco, 2004). We are usually advised to cultivate a motivating interest while simultaneously acquiring new factual knowledge. Some suggestions focus on input (e.g., fertilizing our head by reading widely, engaging in cross-disciplinary dialogue) while others deal with the process of working on the stored information in useful ways, De Bono's *Lateral Thinking* (1973) being an excellent example of the latter.

Despite the relative breadth of these findings, much of the writing about mental effectiveness contains a recurring theme: such effectiveness takes considerable effort. Maintaining this effort can be difficult in today's frenetically paced world. Mental vitality cannot be scheduled nor promised nor forced, but we are learning how to restore and better manage it.

A psychological term used to describe contemplative effort is attention. Kaplan and his colleagues at the University of Michigan have greatly expanded our understanding of the multidimensional nature of mental attention. Their work builds on William James' century-old distinction between two forms of attention called fascination and directed attention (Kaplan, 1995a). The former, fascination, is involuntary attention; it requires virtually no effort and is not under volitional control. Fascination is experienced when, out of innate interest or curiosity, certain objects (e.g., large trees, animals, flowing water) or processes (e.g., exploration, mysteries, puzzles) effortlessly engage our mind. James (1892/1985) provided a list of such innately fascinating stimuli: "strange things, moving things, wild animals, bright things, pretty things, metallic things, words, blows, blood, etc. etc." The potential significance of such objects and events argues for why this form of attention does not fatigue; it is adaptive that such things continue to rivet our attention even when encountered repeatedly in quick succession.

In contrast to fascination, the capacity to direct attention requires significant effort. This directed mental effort is essential for dealing with tasks lacking innate fascination. In order to contemplate important yet uninspiring objects and processes we must inhibit competing or peripheral yet perhaps more interesting thoughts and stimuli. Such inhibition allows us to carry out an important plan despite the presence of diversions, listen

closely while beset by noise, and feel compassion for or help others despite unmet personal needs. A key to understanding the role inhibition plays in our thinking is to realize that we apparently cannot amplify weak activity in the brain. We can only inhibit competing activity, that is, potential distractions, from taking over. Thus, directed attention is a way to favor weak current activity over a fringe, yet potentially captivating activity.

Directed attention allows for the enormous flexibility of human cognition and behavior. If we were unable to inhibit any stimuli, and instead were forced to attend to everything that the environment presents to us, then recollection, contemplation, and behavioral continuity would be difficult at best. Having the capacity to direct our attention allows for a cognitive and thus behavioral separation from the demands of the immediate environment. With this ability we can override automatic functioning whether based on innate stimulus-driven patterns (e.g., inherited inclinations) or learned patterns (e.g., habits). This capacity to inhibit the effect of some competing stimuli allows seemingly mundane, nonfascinating events and objects to become, if only for a short time, the central focus of our thinking. Thus we are able to acquire a broader variety of knowledge and build a larger repertoire of responses than is possible through the use of fascination alone.

The adaptive significance of the ability to inhibit is enormous. Behaviorally, the ability to hold the immediate environment at bay permits humans to insert their own intentions between stimulus and response. Cognitively, this ability allows us to run multiple, conflicting models in our head without undue confusion. We can contemplate alternate explanations for an observation, consider multiple causes, and explore initially weak alternatives instead of jumping inattentively to our first conclusion. These skills are sometimes considered facets of genius. Just the same, they are also the foundation of every human's ability to plan, remain competent, and behave with civility. In short, our ability to cope effectively may depend on the capacity to direct attention.

Fascinating Distractions

While involuntary fascination has its origin in adaptive response to environmental challenge, there is a nasty aspect to this form of attention. Fascinating objects and processes, whether internal or external, can act as impossible-to-ignore distractions if they are present while we have something important in mind which does not itself captivate us. Clearly Cummings (1926) understood the power of external fascination to distract when he explained "it is with roses and locomotives, not to mention acrobats, Spring,

electricity, Coney Island, the 4th of July, the eyes of mice and Niagara Falls, that my 'poems' are competing" (Forward).

Further, this attentional competition need not be benign; our ability to be fascinated can be used against us. In the wrong hands, our tendency to be involuntarily fascinated can be abused as a tool used to distract or deflect us from our own better intentions (Mander, 1978; Postman, 1985). Such effects help to explain the powerful lure of advertising (Midgley, 1978) and the inability for some to say no to a variety of coercive opportunities such as a new version of software, breaking news reports, an exciting speaker, or an intriguing administrative opportunity despite the fact that each may be peripheral to our personal agenda and contrary to our desire to remain mentally effective, on task, and at peak performance.

This nasty aspect of fascination also comes from its resistance to our efforts to stop its effect. Involuntary fascination cannot be easily suspended by using directed attention. But this does not stop us from quixotically trying to suspend its effect nor from incurring the mental fatigue that comes from such futile effort.

Mental Fatigue

Compounding the problem of irresistible distractions is the fact that the capacity to voluntarily direct our attention is finite. Almost all mental effort generates a mental cost even when such effort is in service to meaningful personal goals. When under continual demand, our ability to control the inhibitory process tires resulting in a condition called directed attention fatigue (DAF). This "tired in the head" (Akerstedt et al., 2004) condition reduces our mental effectiveness and makes coping difficult, if not impossible.

It is here that more recent work on attention contributes significantly to past understanding by introducing the notion of attentional fatigue. While over a century of research understood attention to be essential despite its being sometimes divided and often selective, it has only rarely (Mills, 1884/1893; Thorndike, 1914) and recently been understood to fatigue and be in need of regular restoration. The research that discusses the mechanism of attention is itself spread across the social sciences and seems to lack a common language, perhaps even an appreciation that the same thing is being studied (Amel, Manning, & Scott, 2009; Brown & Kasser, 2005; Runco, 2004). Very few researchers who study this mental mechanism understand that it fatigues with use (Akerstedt et al., 2004; Baumeister, Bratslavsky, Muraven, & Tice, 1998; Kaplan, 1995a; Kaplan & Berman, 2010).

Yet, the experience of DAF is familiar to all those who persevere on tasks central to their work, particularly mentally chal-

lenging tasks. After focusing closely for a long time on abstract concepts, professionals often report the mental exhaustion that is DAF. Particularly noticeable at the end of a long project or task, a number of symptoms are commonly attributed to this mental fog: irritability and impulsivity that results in regrettable utterances, impatience that has us quickly jumping to ill-formed conclusions, and distractibility that results in tasks being left unknowingly uncompleted (I regularly discover half-completed tasks scattered about the office, end-of-term fossils of interruptions to my plans brought on by mental fatigue).

There are a few counter-intuitive aspects to DAF. First, tasks that cause DAF can be thoroughly enjoyable and highly meaningful. In fact, the more we derive personal meaning from an activity the more likely it is that we will deplete directed attention by staying with that task for an extended period of time. Second, while both stress and DAF can have impacts on our mental and behavioral effectiveness, and while there are many situations where we would expect them to occur together, they are independent concepts. Kaplan (1995a) discusses their independence and offers a number of causal sequences that demonstrate their interaction. Finally, while the experience of DAF is familiar, it can be difficult to differentiate its causes from its outcomes. The causes are as varied as the many activities needed to live a meaningful and civil existence (Table 1). The resulting symptoms of DAF are just as varied and include many effects that counter successful coping. Kaplan (1995b) summarizes these as a greatly reduced ability to contemplate, plan, and decide with a resulting tendency toward impulsive action over thoughtful behavior. DAF may also increase irritability and reduce prosocial behavior (Cohen & Spacapan, 1978). What seems to be common across these outcomes is the inability to self-regulate thought and action (Table 2).

Restorative Environments

Mental fatigue is the normal outcome of the everyday pursuit of meaningful and worthwhile goals in situations where the world around us is neutral or hostile to our efforts. At the end of the task, the day, or the week, fatigue is inevitable. With a diminished capacity to inhibit, the ability to be contemplative and insightful suffers. But once this diminished capacity is understood to be a normal recurrent event, we can take steps to periodically restore our fatigued capacity to direct attention and, if planful, we can manage to reduce the occurrence of future DAF by seeking environments more supportive—that is, less fatiguing—of our mental efforts.

Table 1. Some Causes of Directed Attention Fatigue

Overuse	Focusing too long on one topic; being engaged in tasks having just enough fascination to engage one but that still require use of directed attention.
Listening or preserving a weak thought while in the presence of noise	Quixotically fighting beautiful and fascinating external distractions; fighting internal noise and confusion.
Running multiple threads	Executive functioning (e.g., running ahead in thought; monitoring a situation, managing a plan; tracking multiple ideas, feelings, or actions); deceiving others or seeking to detect deception; making multifaceted decisions.
Everyday circumstances	Working long hours and getting too little sleep; withholding response; needing to deal with ambiguity or prolonged uncertainty (e.g., awaiting a delayed decision, dealing with an extended illness).

For more common and less severe forms of mental fatigue, restoration is only a short step away. In order to restore the capacity to direct attention, it is necessary to seek out settings and situations that require little of this finite resource or that use other means of maintaining mental focus. Although recovery from DAF is sometimes available through a good night's sleep, often even sleep is insufficient. Fortunately recovery can also be achieved by pursuing daytime activities that rely heavily on involuntary fascination. As fascination is engaged, the need for directed attention is greatly reduced which thereby allows for its recovery. Thus one feature of restorative environments is their ability to elicit fascination.

Yet while fascination is an important condition of restoration, it is not in and of itself sufficient. Other conditions have been proposed as useful for mental restoration, such as being away, compatibility, and extent (Kaplan & Talbot, 1983). While each of these needs additional empirical support, and will likely be expanded

as our understanding grows, they do have face validity and thus merit a brief explanation.

Being away is sometimes used as a shorthand phrase to mean escaping from the normal routines of daily work to a restorative setting. A yearning to get away from it all often results in leaving the physical location of our work, and yet this notion of being away is just as easily fulfilled by changing the current focus of our mental activity. By increasing the variety within daily mental tasks, not spending too long on any one activity, and focusing on only one task at a time, we can be away and achieve at least a moderate level of restoration without ever leaving the work setting.

Compatibility can be described as a match between (a) opportunities afforded or required by a setting and (b) our purposes or inclinations (Kaplan, 1983). An environment that requires us to do other than that which we want to do is considered incompatible. The same is true of an environment that fails to provide the

Table 2. Some Effects of Directed Attention Fatigue

Failure of perspective	Losing the big picture; feeling hopeless or helpless; jumping to hasty conclusions.
Failure of focus	Being easily distracted; being unable to know when to stop; having lower capacity to make decisions, plan, or follow a plan.
Failure of creativity	Being stuck on one solution; having difficulty starting new tasks; being less flexible and open-minded; unable to think outside the norm.
Failure of civility and caution	Saying things you wish you had not; interrupting people; being disinclined to help others in need; feeling irritable or uncomfortable; having trouble listening; having greater impatience and impulsivity; adopting risky behavior.
General system failure	Having lower capacity to transcend (input from) the environment.

information needed to carry out our intentions. Clearly, there is an abundance of settings where the lack of such a match undermines what one hopes to accomplish. Such incompatible settings not only prevent restoration but may also increase fatigue by requiring considerable mental effort to complete work while controlling our frustration with the setting. In a highly compatible setting, we can achieve restoration and/or maintain our effectiveness longer since we require little directed attention to manage our interaction with the environment.

Extent involves the sense that we are in a space and thus involves distance to a boundary, be it physical or conceptual. This sense of space increases in settings that have both coherence and scope (Kaplan, 1995a). These concepts can be understood in terms of the cognitive maps we use to interact with environments. Having a cognitive map reduces the need to be overly vigilant as we can predict what is likely to happen next and thus have a chance to deal with it appropriately. Settings for which we have a well-developed cognitive map demand less directed attention. In a coherent setting, objects and events follow one another in a fairly predictable way, making it easier both to build and use cognitive maps without significant investment of directed attention. But a sense of space also may require that the boundary not come too soon. If the setting has insufficient scope then we must quickly switch from one cognitive map to another, an action that consumes mental effort. Scope is needed to reduce the frequency and thus mental cost of switching maps. The consumption of directed attention when repeatedly switching cognitive maps may be one reason why multitasking is so ill advised (Ophir, Nass, & Wagner, 2009).

In principle there are many types of restorative settings that share the features mentioned above. However, research has repeatedly highlighted the role of natural environments in restorative experiences (Frumkin, 2001; Herzog, Black, Fountaine, & Knotts, 1997; Hill, 2002; Kaplan & Kaplan, 1989) and is a concept that has been understood, at least anecdotally, for millennia. As early as imperial Roman times, small independent farms were consolidated into estates of large scope with gardens that the wealthy used as retreats for restoring themselves from the mental wear and tear of urban life (Pregill & Volkman, 1999). This same notion of getting away from the mental demands of everyday work is revealed in correspondences from Cosimo de Medici, the head of a wealthy family during the Italian Renaissance period. He wrote that his villa gardens were a place to get away from the obligations of, and to recover from the fatigue associated with, his high social and secular positions (Van der Ree, Smienk, & Steenbergen, 1992).

More recently Thoreau (1854) and Olmsted (1865) understood the positive effect of nature on human well-being. Kaplan (1995a) notes, "Fredrick Law Olmsted not only understood the possibility that the capacity to focus might be fatigued, he also recognized the need for urban dwellers to recover this capacity in the context of nature" (p. 170). It was through compiling these systematic observations and empirical work from psychology that the attention restoration theory (ART) emerged.

The empirical evidence supporting ART comes from studies on a wide variety of mental tasks. It has been demonstrated that performance on demanding cognitive tasks is improved by time spent in natural settings (Hartig, Mang, & Evans, 1991). Cimprich (1992a, 1992b, 1993) found that even very modest contact with nature can restore the mental effectiveness of recovering cancer patients. Furthermore, not all contact need be direct. In a study relevant to professional settings, Tennessen and Cimprich (1995) found that a view of nature from one's window, even a partial view, enhances mental effectiveness.

Research done at the Landscape and Human Health Laboratory at the University of Illinois has documented the positive effect that the mere presence of natural vegetation has on the mental effectiveness and behavior of people living in urban areas (see for instance, Kuo, 2001; Kuo, Bacaicoa, & Sullivan, 1998; Kuo & Sullivan, 2001; Taylor, Kuo, & Sullivan, 2001).

In four studies relevant to the "kindness under pressure" notion mentioned earlier in the Thomas (2008) review, Weinstein, Przybylski, and Ryan (2009) report that exposure to nature significantly enhances our prosocial inclinations. Finally, Pretty argues that green exercise, defined as physical activity in natural settings, is an effective means of improving human wellness (Pretty, 2004, 2006; Pretty, Peacock, Sellens, & Griffin, 2005). Thus the likelihood that sustainable living will entail considerably more physical activity outdoors (e.g., walking, biking, gardening, working our share at civic agricultural sites) might be the very tonic needed to aid our coping as we reskill ourselves for a resilient society.

A Prescription to Aid Coping

The general prescription presented here is to spend more time in natural settings regardless of what other activities we are pursuing during our day. However, theory and research allow us to be somewhat more specific. Because at this time most of us would benefit from doing more walking, we can use it as a prototype behavior. Soon we may need to walk not just for contemplation and restoration, but for basic locomotion. The prescription below is likely relevant for either circumstance.

Clearly this prescription contains many researchable issues with important theoretical and practical implications, but they are derived from a central question: what are the conditions under which walking effectively revitalizes the mind? More specifically, where, how, and with whom should we walk?

What to do

The prescription is simply to walk in a natural setting. Nothing extreme, neither grand nor distant, is required. A walk during lunch down tree-lined streets, a restful interlude in a vest pocket park, or an evening stroll through neighborhood nature will suffice. Certainly the choice of what walking route to take does matter. In a study that validated aspects of attention restoration theory, a walking route through an arboretum that was tree-lined and separated from traffic significantly improved mental effectiveness when compared to a route in the same area and of the same length but more urban in character (Berman, Jonides, & Kaplan, 2008).

Walking is a deceptively simple yet apparently effective means of promoting deep contemplation (Loehle, 1990). Regular walks, which are rare today, were used to great effect by generations of thinkers. Darwin is known to have walked on a planned route while he worked on some of his more difficult problems. The familiarity of the route he walked likely minimized the attentional demands of navigation. The natural setting with its quiet fascination may have allowed him to feel quite far away from everyday concerns and distractions thus allowing for the deep reflection needed to gain his insights. As a result, his name is now given to walks that have a deeply engrossing effect on the mind.

Who to walk with

Generally, solitary walking is preferable to an absentee partner on a cell phone, or to the hyper-vigilance necessary when walking with young children. However, having a walking partner may provide benefits.

Choosing between solitary and social walking becomes easier once it is understood that social interaction can be intense or gentle and can have an inward or outward focus. The first thing to note is that it is a rare walk that consumes no directed attention since basic navigation alone is demanding. The concern here is how to keep the attentional demand from growing beyond basic information processing. If the social interaction is riveting with a lively back-and-forth conversation, then it is likely that additional directed attention will be consumed through the process of ensuring a civil discourse (e.g., not interrupting, following streams of

thought, keeping up your end of the conversation). A more gentle conversation, perhaps one that is accepting of extended periods of silence, will make less additional demand on directed attention. It may be that the latter situation is similar in attentional demand to a solitary walk where we carry on an internal dialog.

In contrast, if the social interaction is itself engaged in noticing nearby nature, then the conversation might help both individuals to dwell more deeply in the setting and thus gain additional restoration. Again, the more tranquil the conversation, the less additional directed attention will be needed to ensure civility.

How to walk

Whether walking alone or with a partner, if we seek mental restoration, then we should direct our perception toward the surrounding natural features. Having an environmental engagement plan may help keep our thoughts from taking up the work we would be advised to leave behind. An environmental engagement plan is a strategy designed to influence how we engage in and interact with the physical environment (Leff, 1984; Leff & Gordon, 1979; Leff, Thousand, Nevin, & Quiocho, 2002). They often draw on a variety of senses (e.g., listen for bird songs, sense weather changes, notice scents), involve making inferences (e.g., think how an edible landscape would alter the area), or employ whimsy (e.g., what three things would you change in the setting to ease the transition to sustainable living). Such a plan can encourage greater engagement with nearby nature, enhancing the restorative effect of the walk even in a setting with only modest natural features. The power of an engagement plan is based on the realization that the restorative potential of a setting results from the interaction of our mind with the physical attributes of that setting.

Meditation also has been suggested as an activity that may restore the capacity to direct attention (Kaplan, 2001; Tang et al., 2007). This makes the practice of walking meditation particularly useful for enhancing our coping (see Kabat-Zinn, 2005). However, it raises for us the question of where to look while walking, inward on the body or outward on the environment, and if on the environment, then whether to be vigilant or just gently mindful. Research exploring this issue is needed, but we can speculate that both approaches may work, albeit for different reasons. If we allow the quiet fascination of nature to fill our mind, then the capacity to direct attention can rest and thus be restored. It is likely that too vigilant a focus on the environment will be counter-productive as vigilance is another name for employing directed attention through visual scanning.

Gentle mindfulness might also enhance mental recovery but perhaps in an indirect and delayed fashion. One goal of mindfulness-based modalities is the facilitation of self-awareness. Socrates famously said that the unexamined life is not worth living. This partly may be due to the fact that an unexamined life may be mentally fatiguing. One can be burdened by distractions that are internal. Having to function despite internal anguish and confusion (e.g., muddled set of priorities, nagging sense of helplessness or foreboding, uncertainty about next steps to take) saps mental vitality. Mindfully examining one's life will consume some directed attention, but for a worthy goal. The self-awareness gained may help to reduce internal noise, reducing the frequency of future internal distractions and thus increasing the possibility of future mental effectiveness.

Finally, walking is unlikely to be restorative if we allow electronic gadgets to interrupt our restorative outing. Neither should we imagine that we can multitask our restorative walk with a phone call or tweet.

When to walk

The capacity to direct attention is diminished continuously by everyday mental activity, which suggests the need for a restoration routine. Furthermore, because we are terrible judges of when we need restoration, we should take regular restorative breaks; since by the time we think we need a break, it is well past due.

Clearly, daily outdoor walking helps as does the ancient notion of following a weekly restorative ritual, particularly those that involve being away from our occupation. But if we accept that year-round mental effectiveness matters, then we also must pursue outdoor revitalization year-round. To the extent that we follow this prescription of getting a frequent dose of nature, we encounter difficulties in most parts of North America where signs of nearby nature diminish in winter. While two small studies suggest that people do find winter walks restorative and can find signs of nature even in the dead of the season (Metz, Boggs, King, & De Young, 2002; Pine, Thomas, & De Young, 2001), this is clearly a difficult task.

This brings up an important subject: what quality and dose of nature is needed to restore directed attention. More research is needed to answer this question but findings suggest that restoration may result from exposure to very limited amounts of nature. Kuo has suggested that isolated pockets of nature may suffice (Kuo, as cited in Clay, 2001) which might make possible the full restoration of directed attention in stark winter environments. Nonetheless, it would be important to seek out the many veiled

forms of winter nature and to appreciate its more ephemeral character, and for this the engagement plans mentioned earlier would help.

How to reduce the need for walks

While mental fatigue is the inevitable outcome of meaningful effort, working environments are not inevitably hostile to mental effectiveness. Better outcomes can be achieved through the design and selection of where we do our thinking.

The issue here is the need to match opportunities provided by the environment to human intentions, an example of the compatibility notion discussed earlier. A setting that may serve the goal of restoring directed attention through a riot of involuntarily fascinating stimuli is also a setting that will make a goal of doing important but mentally taxing work difficult. An explosion of involuntarily fascinating stimuli will distract from weak though important thoughts, causing us to employ directed attention to bring our focus back to the weak thought after the fascinating event has passed.

To be supportive of contemplation, two needs should be fulfilled. The first is for the setting to not distract by overwhelming us with sensory input that is boisterously fascinating and therefore unavoidable. People know this instinctively and avoid contemplation while at an autumn football game, viewing an action-packed movie, or bird-watching during spring migration (although of late we seem to believe that working within the liveliness of a coffee shop comes at no cost). The second need is to be able to function in the setting without having to pay close attention. The former need is fulfilled by settings that contain what is called soft fascination, the coupling of aesthetic design with gently fascinating stimuli (Kaplan, 1993; Kaplan & Kaplan, 1989). The latter need is provided by a familiar and safe environment; with familiarity we can function competently and still have mental capacity available for reflection.

Finally, we are well advised to structure our work so as to minimize the ability of others to burden our attentional resources with their interruptions. A considerable amount of directed attention is required to maintain focus in the presence of others' ingenious efforts to get our input. Whatever benefits there are to instant communications, the result is to allow interruptions ad hoc, consuming our scarce and precious mental resources to attend to that which has been brought to our attention. Sometimes an interruption can serve as a welcomed mental break, sometimes the issue is truly worth our attention, and sometimes an office gadget can simplify communications, but our ubiquitous technological

tethers can quickly negate supportive environments. If we value mental effectiveness, successful coping, and want greater civility in ourselves and our community, then we might rethink such modern marvels as cell phones, PDAs, and always-on e-mail.

A cautionary note is in order. No matter how successful we are at dwelling in supportive environments, we will still fatigue our capacity to direct attention. Seeking supportive environments is wise, but spending time in restorative settings is essential, a routine for which there is no substitute.

Conclusion

Given the reality of a climate-disrupted planet and a decline in resource abundance, it is crucial that we maintain our ability to cope. The urgency of getting started with the transition to sustainable living might have us think that taking time for mental restoration is self-indulgent. In fact, the opposite is true. The transition must be done well the first time; it is unlikely we will get a second chance. Thus it is essential to allocate adequate time for restoration in order to create the mental conditions under which the hard work of crafting a sustainable existence is accomplished swiftly and effectively.

This article has suggested that the coming transition will sorely test our ability to maintain emotional stability, clear-headedness, prosocial inclinations, and behavioral continuity despite numerous fascinating distractions. What at first glance seems like a list of independent abilities was shown to share an underlying resource, the capacity to direct attention. It is unfortunate that such a vital resource should fatigue with normal use. But by outlining the circumstances and actions that bring on fatigue, and identifying the settings and behaviors that allow for its restoration, it was shown how to better manage our mental vitality.

The need to live lightly on the planet is not optional. But with directed attention playing a central role in our coping with this new reality, its restoration also is not optional. It is indeed fortunate, then, that restoration of this capacity requires nothing more than walking, if we are careful to select natural settings. There is no need to seek out stunning environments with picture-perfect vistas since everyday nature will suffice. Thus, a prescription for enhancing mental vitality is simply to walk, to walk outside, to walk regularly, and to walk surrounded by and mindful of everyday nature.

In conclusion, the next time colleagues show up at our door unbeckoned, possibly acting rude and irritable, interrupting our efforts to complete important work, we should probably tell them to take a hike. Then, go take one ourselves.

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