

A PLANT A DAY
KEEPS THE DOCTOR AWAY
- the case for an RDA for plants

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Your Inner RDA

As a society we have never been so health literate. Even Bob the Builder talks about cholesterol levels and margarine, while his wife knows which foods are high in anti-oxidants and the importance of smothering their children in factor 30 sunscreen. The concept of 'units of alcohol per day' has been absorbed. We've recently been advised by the Government's Chief Medical Officer to exercise for at least thirty minutes per day. And the Department of Health's recommended '5-a-day' consumption for fruit and vegetables is becoming common knowledge.

While some see these developments merely as evidence of a nanny state 'telling people what's good for them', most of us find these simple recommendations a useful way to make sense of health issues and how they relate to our lifestyle. After all, we now have to make more decisions in a single day than a caveman did in a lifetime. Each decision – whether to take your holiday in Benidorm or Bolivia or which anti-dandruff shampoo to buy – is an act of *information processing*. But as we taking more decisions, we have *less* time to take them in.

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So in a culture suffering from information overload, it is more important than ever to make health recommendations as easy to understand and implement as possible. And with so much health advice vying for our attention it's natural that we prefer to take our health advice in shorthand. The idea of a Recommended Daily Allowance (RDA) fits neatly into this mindset. The RDA enables anyone to easily incorporate a health practice into his or her life without having to think too much about it. Ultimately we are far more likely to live more healthily if the instructions are made easier for us.

And unlike other health advice, which stresses the need to avoid or limit our consumption or exposure to something – sex, the sun, saturated fat – stressing the need for *more* exposure to something we enjoy anyway but never considered a health practice is a positive message.

An Exact Science?

While some may question the viability of formulating an RDA for greenery in the way that it has been applied to fruit and vegetable consumption, they should be aware that the RDA for fruit and vegetable consumption is not without fault. Eating celery, iceberg lettuce, apple, cucumber and a pear may constitute '5-a-day' but is vastly inferior to eating blueberries, red pepper, broccoli, watercress and kiwi fruit. Fruits and vegetables are not equal in vitamin content, and so despite the call for us to take 30 minutes of exercise a day, all forms of physical exercise are not equal. While weight lifting and volleyball burn up around 215 calories per hour, swimming burns up almost four times that amount. **But health experts do agree on one thing: It's more important to have an inexact RDA than not to have one at all.**

Most importantly, referring to our exposure to plants and greenery in terms of an RDA will elevate the issue beyond clichéd images of tree-hugging alternative therapy. The message is more likely to be taken seriously. Horticulture and health will change from art to science, from complementary to elementary medicine.



Plant scientists have an open mind on the issue. Dr Ross Cameron, of the Plant Sciences Department at the University of Reading, comments: "Even though gardening is not entirely risk free (some very keen gardeners can be prone to backpain and repetitive strain injury through digging activities) medical experts believe that the advantages associated with gardening vastly outweigh any possible disadvantages. Like many forms of activity, little and often appears to be the name of the game."

He continues: "A wealth of published research on the benefits of exposure to plants suggests that depriving ourselves of it could lead to increased stress levels, low concentration, lower productivity – even feeling physically a bit below par. For a feeling of genuine well-being, a human being needs some exposure to plants or other green space for at least a couple of hours each week. Realistically, it's not a huge effort to get involved with plants for 20 minutes a day."

Plants and Trees: A New Branch of Medicine

For most people, horticulture’s effects on our well being are perhaps accepted but thought of in vague terms. We may generally assume that indoor plants give a house or building a living atmosphere and that a bit of gardening or a walk in the park is good for us – but our analysis stops there. But concepts such as stress and relaxation were at one time also considered in similarly vague terms until scientists began piecing together the hormone and immune system changes that accompany them. And the field of *psychoneuroimmunology* is now fully established. The route from seeing green to medical benefits may be complex but an increasing number of scientists believe that it does exist. Large-scale studies are extremely expensive and time consuming... and unlike the pharmaceutical industry nature does not have rich benefactors to study and lobby her case. But here are some diverse examples of what plants can do for us.

20 minutes spent in 'green' settings such as gardens or parks reduces ADHD symptoms, compared to time spent in concrete recreation areas

Paying Attention to Green

Greenery exerts a direct effect on our brain. Seven per cent of children suffer from attention deficit hyperactivity disorder (ADHD). The rate of diagnosis seems to be increasing and the origins are thought to be neurological. A new study about to be published has found that relief may come in the form of exposure to plant life. Spending only 20 minutes in ordinary ‘green’ settings such as the back garden or the park reduces the symptoms of ADHD when compared to time spent in non-green indoor playgrounds or man-made concrete and asphalt recreation areas. **‘The greener the setting, the more the relief’**. Even views of green through a window reduce ADHD symptoms. The findings were consistent regardless of the child’s age, gender, family income, geographic region or severity of diagnosis. The research scientists conclude: “ADHD is a public health problem. If doctors eventually prescribe “green time” for the treatment of ADHD, it has the advantage of being widely accessible, free of side effects, non-stigmatising and inexpensive.” ¹

For the love of gardening

The British love of gardening may be saving their lives and extending them. Not only is gardening now considered to be of medical benefit in terms of exercise, it also involves contact with plant life increasing the benefits even further. For example, regular gardening (1-2 hrs per day) along with other forms of moderate physical leisure activity can help reduce coronary heart disease and other chronic illnesses. Even 30 minutes a day on most days of the week that doesn't produce a noticeable improvement in physical fitness has been shown to protect gardeners from certain chronic diseases²³. And in the United States where the high cost of medical care is of tremendous concern, activities such as gardening have actually been found to reduce medical care expenditure.⁴

In offices and factories, having a green view out the window has been found to buffer the effects of work-related stress on a person's intention to leave their job

And with the garden providing a far pleasanter environment than the gym to sweat off those pounds, there has never been a better time start pushing that lawn mower or to tend that neglected border:

30 minutes' moderate work in the garden can equate to significant calorie loss:

- ✓ Digging the garden: burns 250 calories
- ✓ Mowing the lawn: burns 195 calories
- ✓ Weeding: burns 105 calories
- ✓ Raking: burns 100 calories

A Plant a day Keeps Pain at Bay

And even if someone does fall ill, there is mounting evidence that seeing green while you are in hospital will speed your recovery and reduce the amount of severe post-operative pain you feel. One study showed that even a *painting* of a nature scene produced these benefits as opposed to abstract paintings which made patients feel even more anxious than if they saw nothing at all⁵.

Pruning the Fat of the Land

At a time when Britain is the most obese country in Europe, and the Government's Chief Medical Officer is concerned that the UK has the lowest level of physical activity for children in all of Europe – many children do not move at all for 80 per cent of the day – luring people away from passive indoor electronic distractions to gardening or the outdoors is vital⁶.

Gravitate to Green



Cross-cultural observations find that humans gravitate toward greenery. This inclination seems to be hard-wired into our psyche, the result of natural selection⁷. Those who sought green areas or lived as subsistence hunters, gatherers and farmers were more likely to eat, drink and *survive*. Our evolutionary psychology is still strongly shaped by this ancient basic reliance upon and relationship with nature's plants. And a theory *biophilia*⁸ which describes this human link to seeing natural surroundings, is now gaining significant empirical support. It seems that many of the benefits – from medical to financial – associated with our exposure to greenery are part of an evolutionary reward system reinforcing the very thing that kept us alive for hundreds of thousands of years. **Is it therefore surprising that giving people flowers in hospital is so wide spread? For the convalescing, plants are life giving. Horticulture heals.**

EcoPsychology

The most robust research is on the effects of horticulture on our psychological state. Again and again, nature is being found to lift our spirits, making us calmer and happier. But plant life provides further benefits.

A group of American scientists concluded, “Views of green help girls foster life success.” In their study, they found that the greener and more natural a girl’s view from home, the better she scores on tests of concentration, impulse inhibition and self-discipline – a predictor of delinquency, drug abuse, poor school grades, and teenage pregnancy.⁹ In older people gardening has been found to help retain mental stimulation. By getting involved in short-term gardening projects of 3 months or less, the psychological well being of older people from all walks of life has been significantly improved.¹⁰



Those of us who exercise outdoors instead of the gym feel better for it. Furthermore, from clinical anxiety to addiction recovery, looking at plant life has been found to improve conditions. Putting up with your job – even your boss – appears to be easier through green tinted lenses. In offices and factories, having a green view out the window has been found to buffer the effects of work-related stress on a person’s intention to leave their job¹¹. The green view is also linked to an improvement in general well being at work.

Even deep within our subconscious, visualising pictures of plants may improve wellbeing. Just thinking about plants affects our physiology for the better. Students instructed to visualise images of nature scenes exhibited significantly greater relaxation including a lower heart rate, than in response to non-nature scenes. While students exposed to plants during lab-based horticultural classes for 40 minutes per week were found to experience consistently increased positive emotions and displayed better group interactions compared to the more passive form of lecture.¹²

Environmentally sound

Plants play an essential part in protecting us within our own environment, too. They absorb the effects of air-borne pollution, provide wind breaks and can act as noise reducers against planes, trains, motorways etc. Shade from trees and shrubs also protect us from harmful UV rays.

Green Streets, Not Mean Streets

In 1285, King Edward I decreed in the Statute of Winchester that highways be cleared by a width of 200 feet on either side "... so that no cover for malefactors should be allowed..." For centuries, authorities have cleared trees and shrubbery from crime prone areas to remove hiding places for criminal activity. Yet new studies are showing the opposite effect of greenery. Apartment buildings surrounded by trees and greenery are dramatically safer than buildings without greenery. And **the greener the surroundings, the fewer crimes are committed against people and property**. Compared with apartment buildings that had little or no vegetation, buildings with high levels of greenery had 52 % fewer total crimes, including 48 per cent fewer property crimes and 56 per cent fewer violent crimes¹³.

Horticulture and Aggression

Features of the physical environment such as over-crowding, high temperatures and noise have all been linked to aggression and violence. In a further study, researchers asked whether there are features of our physical environment that can *diminish* levels of aggression and violence. Can natural elements such as trees and grass decrease aggression? They found that residents randomly assigned to blocks of flats with no greenery experienced significantly more aggression and violence and domestic violence than did their counterparts in greener buildings¹⁴. Levels of mental fatigue were higher in the non-green buildings and aggression accompanied this mental fatigue. Britain now has the highest murder rate since records began over 100 years ago and violent crime in general has risen dramatically. "Perhaps cities should be designed with nature at every doorstep."

Attentional Restoration Theory

Much thought has gone into precisely *how* plants actually exert their psychological effects on people. The explanations seem to revolve around the way plants effortlessly engage our attention, allowing us to attend without paying attention.¹⁵ We spend an increasing amount of our time and effort responding to external distractions imposed on us. The information-processing demands of everyday life – traffic, telephones, conversations, problems at work, increasing choices – and associated decisions – take their toll on our intellectual and emotional resources. This leads to weariness, mental fatigue, which in turn translates into many of the social and emotional problems mentioned above. In fact economists now talk in terms of an *Attention Economy* – what we’re able to pay attention to – as if our attention were a limited resource to be spent. And so, our contact with plants keeps our attention ‘balance’ in credit as opposed to debt. Greenery provides a respite from deliberately directing our attention all day. This leaves us less irritable and potentially aggressive and better able to cope.



The Potting Shed Effect

Gardening has other positive rebound effects. It has been found to be an effective personal coping method for people suffering secondary trauma. While children learn caring and responsibility and the ability to defer gratification by thinking more long-term through the development of the plant. A study of 120,000 children found benefits to children’s self-esteem and a reduction in levels of stress experienced.¹⁶ Plant care could be likened to DIY but better for you in that the materials you are working with possess health-giving qualities in their own right. In a globalised world of multi-media, where we may feel a sense of helplessness over world events or the economy which are beyond our control, the simple act of gardening can restore our *locus of control* helping us put things in perspective.

Refining the Green Agenda

In the past, much of the justification for maintaining green areas has been based on environmental rationale or in an attempt to maintain biodiversity. Only recently are we realising that one of the main benefactors may actually be *Homo sapiens* himself. As the physical and psychological health benefits associated with access to green space and the natural environment become much more evident, then it raises the prospect of green space being economically justifiable in its own right. Savings in health expenditure, reduced sick leave from work, domestic harmony, and lower crime rates are all part of the economic equation. The day may be near when the old piece of Victorian Parkland may prove to be more economically viable than the proposed new concrete car park. If so, it behoves us all to think even more seriously about well-designed green space and the ability for the population to access it.

REGULAR CONTACT
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CONCLUSION

The growing interpretation for the apparent effects of plants on outcomes ranging from blood pressure and heart rate, our mood and day-to-day effectiveness, levels violence and crime as well as our cognitive functioning and work performance – is that nature is an essential component of a fit human habitat.

Considering the wide range of positive effects that are now being linked to our contact with plants – and the negative consequences of having little contact – it would seem irresponsible not to act. A concrete RDA for greenery now seems an eminently sensible idea.

References

- ¹ Faber -Taylor, A., Kuo, F.E. (2004) American Journal of Public Health, (In Press)
- ² Kaplan, S. (1995) The Restorative Benefits of Nature: Toward an Integrative Framework. *Journal of Environmental Psychology*. Vol. 15, 169 - 182;
- ³ Magnus, K., A. Matroos, and J. Strackee. 1979. Walking, cycling, or gardening, with or without seasonal interruption, in relation to acute coronary events. *American Journal of Epidemiology*. 110: 724-733
- ⁴ Stearns et. al, The economic implications of self-care: the effect of lifestyle, functional adaptations, and medical self-care among a national sample of Medicare beneficiaries, *Am J Public Health* 2001 Jan;91(1):158
- ⁵ Ulrich, 2002 Health Benefits of Gardens in Hospitals. Paper at International Horticultural Exhibition, Floriade.
- ⁶ Reilly et al., 2004; Royal College of Physicians, Royal College of Paediatrics and Child Health, 2004
- ⁷ White, R. and Heerwagen, J., (1998) Nature and mental health: Biophilia and biophobia in The Environment and Mental Health: A Guide for Clinicians
- ⁸ Wilson, (1984, 1993) *The Biophilia Hypothesis*
- ⁹ Kuo, F.E. (2001) Coping with Poverty: Impacts of Environment and Attention in the Inner City; *Environment and Behaviour*; January 2001, 5 - 33.
- ¹⁰ Heliker et al, The Meaning of Gardening and the Effects on Perceived Well-Being of a Gardening Project on Diverse Elderly Populations, *Activities, Adaptation & Aging* 24(3), 1999
- ¹¹ Leather, P., Pyrgas, M., Beale, D. and Lawrence, C. (1998). Windows in the workplace: Sunlight, view, and occupational stress. *Environment-and-Behavior*, 30: 739-762
- ¹² Cho, No frills Explanation for Fancy Foliage? *Science Now* 2003
- ¹³ Kuo, F.E. & Sullivan W.C., 2001a, Environment and Crime in the Inner City: Does Vegetation Reduce Crime; *Environment and Behavior*, Vol. 33 No. 3. 343 -367.
- ¹⁴ Kuo, F.E. & Sullivan W.C., 2001b, Aggression and Violence in the Inner City: Effects of Environment via Mental Fatigue; *Environment and Behavior*, Vol. 33 No. 4 543 -571
- ¹⁵ Kaplan S. (1995) The restorative benefits of nature - Toward an integrative framework. *Journal of Environmental Psychology*. 15:169-182; Sigman et al, 1985
- ¹⁶ Waliczek et al., Psychological benefits of community gardening. *Journal of Environmental Horticulture*. 2000



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