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Don't Neglect The Obvious: Sleep, Nutrition, and Exercise

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You know as well as we do that you need to sleep well, eat right, and exercise for your brain to be in peak condition. We're not going to scold you, but we are going to present some information you may not have known about your brain's relationship to your body.

Many tips for mental performance concentrate on extending productivity for a short while after tiredness kicks in, or aiming for a slightly higher “peak” during a work period. Importantly, all these increases in performance are relative to your “normal” or baseline level of functioning. More substantial and more widely effective gains in mental ability can often be obtained by making sure that your baseline performance is at an optimum. Tuning sleep, nutrition, and exercise is one effective way of doing this.

The brain, like any other organ in the body, works best when it is optimally fuelled and given adequate time to recover after periods of extended exertion or effort. Here, “fuel” does not just mean energy in the form of foods that get broken down into glucose, but also those that provide essential nutrients needed for a wide range of complex functions. Neuroscience research has now identified a number of brain nutrients that can result in varying degrees of mental impairment if a deficiency exists.

On the other hand, sleep is still a bit of a mystery. Despite the fact that it takes up about a third of our time, surprisingly little is known about why we sleep. The nearest to a current consensus among scientists is that sleep, and particularly REM sleep, makes sense of disparate, emotionally fragmented or weakly coupled memories into a coherent structure that the brain can use more effectively during wakefulness. It is not clear, however, whether this theory is popular because memory is easy to test and so provides plenty of supporting evidence, or whether the function of sleep might be much broader, but evidence for the other functions has, as yet, been harder to come by. Either way, it is clear that lack of sleep causes a whole range of cognitive problems, suggesting it fulfills an important role in maintaining the mind and brain at their peak.

Exercise is known to have beneficial effects on mental performance, both for the short-term oxygen boost it provides to the brain, and for the important role it plays in maintaining a healthy and efficient blood supply to the brain. The system of arteries and veins is important for providing essential nutrients and for removing dangerous toxins, and is so highly tuned that it can adjust in under a second to take account of changing mental demands. This, however, requires an efficient, smoothly operating transport system (known as the ‘cerebrovascular system’), which is maintained and improved by regular exercise.

In Action

Sleep—A lack of sleep produces some of the most striking impairments in mental performance, as anyone who has pulled an ‘all-nighter’ will know. A good night’s sleep is particularly important for memory¹ and there is now increasing evidence that things learned shortly before sleep are remembered better than those learned earlier in the day. It also seems that as something becomes

more complex, the role of sleep is more important in efficiently remembering it. This applies equally to skills involving body movements (for example, learning to juggle) and to remembering verbal or purely mental information.

The corollary of this, that sleep deprivation can negatively affect mental performance and muscle control, has been borne out by a number of studies, which have shown that sleep deprivation can also result in disturbances of mood². This suggests that skimping on sleep to give more time to learn can be counterproductive, as each hour spent sleep-deprived is only worth a part of an hour fully rested.

One of the more surprising findings is that lack of sleep does not just affect mental function, but is related to a decrease in almost all measures of long-term health—including risk of heart disease, diabetes, high blood pressure, and inflammation, to name but a few³. These studies have led doctors to suggest that sleep should not be considered a luxury, but an important component of a healthy lifestyle, and therefore essential as a factor in maintaining cutting-edge brain function.

Nutrition—Following an all-round healthy diet ensures that an organ as sensitive as the brain has all the available resources to work at an optimal level. There are some nutrients and diet options that have been particularly linked to maintaining a sharp mind. Some of the more unusual ones are discussed in the section on cognitive enhancers [Hack #Know The Facts About Cognitive Enhancers]. Here, however, are some of the more well-known nutrients, although not everyone is aware of their importance.

1. Vitamin B12 and folic acid (also known as folate) are known to be important in mental performance⁴. Adequate levels of these nutrients are vital, as they play a role in the functioning of the nervous system, including the creation of neurotransmitters (the catecholamines—dopamine, epinephrine and norepinephrine), as well as keeping levels of a risky amino acid, called homocysteine, to a minimum. High levels of homocysteine are now thought to be a major risk factor for poor health, with consequences including impaired brain function and possible damage to the heart, which can lead to a double whammy if the brain's blood supply is affected.
2. Various fats are now known to affect how the brain works. A diet low in saturated fat (which is most commonly present in meat and dairy products, coconut and palm oil) and high in cereal and vegetable foods is known to promote good cognitive function, as is a diet high in certain Omega-3 fatty acids, which are present in flax seed, walnuts and oily fish⁵. These fatty acids are now thought to be so important that Omega-3 supplements are now being tested as effective ways of improving mood and cognition in certain types of mental illness.
3. Antioxidants prevent the oxidation of other chemicals, a process known to produce tissue damaging substances called “free radicals”. Several essential nutrients are antioxidants, including vitamins A, C, E, and the trace element selenium (present in Brazil nuts). Low levels of antioxidants have been linked to an increased risk for a number of brain disorders, including Alzheimer's disease, but it is not clear whether there is a clear link to mental function in healthy young people. It does seem, however, that a good intake of these nutrients protects against cognitive decline in later life⁶.
4. Breakfast is often called the most important meal of the day, and there is some evidence to support this claim. Missing breakfast has been consistently linked to poor mental performance, particularly on memory and visual recognition tasks⁷, at least in children, on whom most of this research has been carried out. There is some evidence that high-fiber foods that release energy slowly, such as cereal, may be particularly good for keeping your edge throughout the morning.

Exercise—Walking for 30 minutes a day, five days a week, is typically recommended as adequate exercise for significantly improving all-round health. In the medium to long term, this strengthens the heart, reduces blood pressure and even lifts mood. All this is good news for sharpening the mind, which does better with a healthy brain and positive outlook. In the short-term, any activity that boosts oxygen intake will immediately affect mental performance for the better⁸, so as long as it is not too distracting, any light exercise should help you learn while you take part.

In Real Life

The link between brain function and sleep, nutrition, and exercise is still only partially understood, so the recommendations for healthy daily amounts change over time as new research emerges. Keep up with the latest in health advice to make sure you can tune your life for optimal brain function. One consistent finding is that middle-aged and older adults tend to show a greater detriment in mental function due to poor diet, sleep patterns, and exercise, than younger adults do. If you are middle-aged or more senior, paying particular attention to these will ensure you keep your edge well into old age.

End Notes

1. Stickgold R, Hobson JA, Fosse R, Fosse M (2001) Sleep, learning, and dreams: off-line memory reprocessing. *Science*, 294, 1052-7.
2. Durmer JS, Dinges DF. (2005) Neurocognitive consequences of sleep deprivation. *Seminars in Neurology*, 25, 117-29.
3. Alvarez GG, Ayas NT (2004) The impact of daily sleep duration on health: a review of the literature. *Progress in Cardiovascular Nursing*, 19, 56-9.
4. Stabler S (2003) Vitamins, homocysteine, and cognition. *American Journal of Clinical Nutrition*, 78, 359-360. <http://www.ajcn.org/cgi/content/full/78/3/359>
5. Kalmijn S, van Boxtel MP, Ocke M, Verschuren WM, Kromhout D, Launer LJ (2004) Dietary intake of fatty acids and fish in relation to cognitive performance at middle age. *Neurology*, 62, 275-280.
6. Gray SL, Hanlon JT, Landerman LR, Artz M, Schmader KE, Fillenbaum GG. (2003) Is antioxidant use protective of cognitive function in the community-dwelling elderly? *The American Journal of Geriatric Pharmacotherapy*, 1, 3-10.
7. Rampersaud GC, Pereira MA, Girard BL, Adams J, Metz J. (2005) Breakfast habits, nutritional status, body weight, and academic performance in children and adolescents. *Journal of the American Dietetic Association*, 105, 743-60.
8. Scholey A. (2001) Fuel for thought. *The Psychologist*, 14, 196-201. http://www.bps.org.uk/_publicationfiles/thepsychologist%5CScholey.pdf

See also

1. BBC Health information: <http://www.bbc.co.uk/health/>