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On The COVER

Are You Mentally Fit? How Brain Exercises And Nutrients Can Keep Your Mind Sharp And Incisive

By Saul Kent
President, Life Extension Foundation

The ancient Greeks knew that maintaining a sound mind and a sound body is essential for good health. In the 20th century, pioneering nutritionists such as Dr. Roger Williams (the discoverer of pantothenic acid, or vitamin B-5) paved the way to our understanding of the role of diet in health and longevity. At the same time, innovative physicians such as Kenneth Cooper and epidemiologists like Ken Paffenbarger Jr. demonstrated that regular aerobic exercise helps to prevent heart attacks and strokes, and improves the quality of life.

When you add stress-reduction to the equation, as defined by Nobelist Hans Selye, and weight-bearing anaerobic exercise, you have the modern prescription for optimal health.

BRAIN-BOOSTING NUTRIENTS AND DRUGS

But in the 1970s, evidence began to accumulate that certain nutrients and drugs can improve mental functions as well, functions such as concentration, learning, memory and general thinking ability. There were findings that nutrient supplements such as choline, phosphatidylcholine, gingko biloba, dimethyl-aminoethanol (DMAE) and phosphatidylserine, as well as such drugs as hydergine, piracetam and centrophenoxine can boost brain power as measured by brain cell structure and activity, and the ability to perform on standardized IQ and other cognitive tests.

Before long, these brain-boosters had been dubbed "smart nutrients" and "smart drugs" and were being featured in best-selling books and mass-market publications, and on national radio and TV shows. Soon smart nutrients were being offered in every health food store and pharmacy in the country, bars were selling "smart drinks," and smart drugs were being sold to Americans through the mail by offshore companies.

THINKING UNDER PRESSURE

Now that we've discovered how to improve cognitive function by nutritional means, we have the next advance in fitness-brain exercises to help you think faster and better in a tight situation.

Mental pressure comes under many different circumstances: While being tested in school, trying to meet a deadline at work, having to deal with a health emergency at home, being confronted suddenly with a difficult question, or having to make a split-second decision in the throes of competition.

One of the best measures of cognitive function is reaction time...how quickly you can make a decision under pressure or in a crisis. How many times have you kicked yourself about what you could have said or done under pressure? How many times have you felt that you missed out on a business opportunity because you didn't think fast enough? How many times have you hurt someone you love because you said something you didn't really mean?

These kinds of "mistakes" usually occur because we don't think quickly enough, or because we let our emotions interfere with our ability to think clearly. Either we are in a mental fog because there are too many cobwebs in our mind, or we let our emotions block the mental pathways to calm rational thought.

The ability to think fast and effectively is a problem for many people at any age. It becomes a problem for all of us, however, as we grow older. As our bodies slow down with advancing age, our minds follow suit. The best way of demonstrating the difference between a young and an old person is under stress. At rest, there is only a small difference between a 25-year-old and a 75-year-old, but in an emergency requiring lightning-quick physical or mental response, the 25-year-old can run rings around the 75-year-old.

BRAIN EXERCISES TO IMPROVE MENTAL PERFORMANCE

Cognitive and computer scientists have begun to develop computerized brain exercises to measure and help improve cognitive reflexes that take place at a faster rate and at a deeper level than conscious thought. Before you can formulate the simplest thought enabling you to speak or act, your brain has to process a great deal of information, including the accessing and retrieval of memories, the correlation of different types of data, assigning value or importance to data, and the creation of a coherent thought that enables you to speak or act.

One of the first computer programs designed to improve your mental performance is THINKfast, which includes six entertaining brain-exercise games that challenge your mental acuity, prowess and ability to learn. THINKfast also includes a self-evaluation scale, which allows you to describe how you feel (excited, tired, angry, etc.) before each game, and tracks these emotional factors so you can see how they affect your performance.

TRAINING YOUR ABILITY TO FOCUS

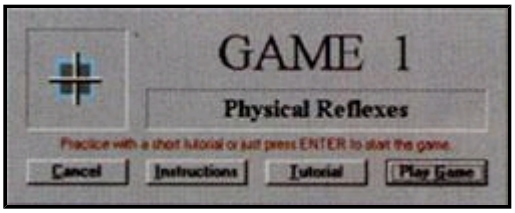
Perhaps the most common mental deficiency that affects people of all ages is the inability to focus, or concentrate, on the task at hand. Great athletes, musicians, actors, writers, physicians, business people and scientists all have an uncommon ability to focus all their mental powers on the decisions they have to make in order to be successful. Most people, however, have difficulty in focusing their mental powers for long periods of time. This inability to maintain focus and intensity is one of the main reasons for failure, whether it's in sports, business, the creative arts or relationships.

When playing the THINKfast brain exercise games, it is necessary to focus all your attention on each game in order to score well. In fact, it is difficult to play at all without a considerable degree of focus. Thus, if you improve mentally in nothing other than your ability to maintain focus for a longer period of time, you will improve in a critically important skill for every phase of your life.

THINKfast can run on Windows 3.1, Windows 95 or Windows NT 3.51/4.0, on a 386 CPU, 486 CPU, or Pentium Chip. It requires VGA graphics or better, 4MB RAM, 2 MB of hard drive disk space and, for sound capabilities in game 4, either a sound card or an alternate visual cue via Windows Preferences. A Macintosh version of the program is soon to be introduced.

THINKFAST'S BRAIN EXERCISE GAMES

The six brain exercise games in THINKfast attempt to measure and improve the speed and efficiency of your brainpower. Here is a short description of the brain exercise games in THINKfast:



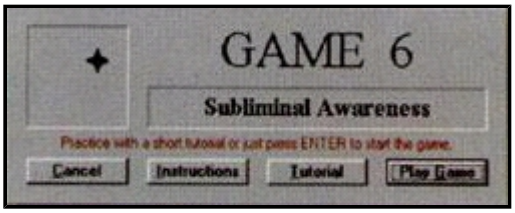
Game 1: Physical reflexes. This is a simple reaction-time test of how fast you can respond to the brief appearance of a random stimulus on the screen. You are scored on the speed, consistency and accuracy of your response, i.e., how accurate and consistent your responses are. Combined with game 2, below, it is a good measure of how fast your brain and body can respond to anything that happens unexpectedly in your environment.

Game 2: Perceptual reflexes. This is an interactive test that measures your alertness and visual acuity (it's expressed as your "perceptual threshold," or PT, at the bottom of the performance screen that comes up after you play the game). It measures how fast you see and then react to a briefly presented stimulus-the single light out of eight that turns on a split second before the others. If you make too many errors, the program automatically lengthens the duration of the stimulus. However, as long as your responses are accurate, the program shortens the duration the stimulus is presented until you reach your perceptual threshold. Here, your perceptual threshold is measured as the minimum time (in milliseconds) between the flashing of the "lead" light and the flashing of the other seven lights that you can perceive accurately.

Game 3: Cognitive reflexes. This is a response-time test that includes making a choice. It reflects your brain's data processing speed and efficiency in making a decision. In game 3, a figure appears that lights up on either of the four sides of a square-left, right, top or bottom. First you have to respond by pressing the appropriate arrow-key on the keyboard of the computer as fast as possible. However, if the interior of the figure lights up at the same time, you must simultaneously press the shift-key to reverse this event. This game trains your brain to handle unexpected interruptions and changes.

Game 4: Working memory speed. According to neuroscientist Stephen Kosslyn, working memory is the "activated" information drawn from long-term memory, along with the information held in short-term memory (relating to the task at hand), and the decision-making process that manages access to both types of memory. Game 4 measures how fast your brain can judge whether a picture represents a word by pressing the right or left arrow-keys to render a yes or no decision. If a tone sounds, you must make the opposite response. To do this correctly, your brain must access information stored in longer-term memory and in both left (word identification) and right (picture identification) brain hemispheres.

Game 5: Working memory capacity. While game 4 is about speed and efficiency, game 5 also measures the amount of information you can consistently and accurately process at one time. The game player is exposed to a briefly flashed set of letters and symbols; holding this set in very short-term memory, the player then compares it to a second displayed set. Again, the better you do, the harder the game becomes by adding letters and symbols; do poorly, and the number is reduced. As you can see, games 1 through 5 measure brain speed and mental efficiency, which require being focused. The games train this focusing power.



Game 6: Subliminal awareness. This game tests your ability to discern a very brief, random and subtle stimulus. This is another interactive test in which the duration which the stimulus is presented is slowed down or speeded up, depending upon the accuracy of your responses, or if you fail to respond at all. It tests whether you can respond to stimuli beneath the threshold of your conscious mind.

A BUILT-IN COMPUTERIZED 'BRAINTRAINER'

THINKfast contains more than brain exercises to help improve your mental abilities. It also has a built-in computerized mental trainer called Mentor, which monitors every one of your six-game THINKfast sessions to compile a record of your results. Mentor uses these results to guide you in using the brain exercises to train your brain in optimal fashion.

After you've taken the six-game series of brain exercises four times, THINKfast establishes a database of your average scores. Thereafter, each time you play the games, the Mentor function will provide you with an evaluation of your current mental condition. It will even speak to you; Mentor's favorite word when your scores are really off is "break." You may be advised to do some stretching exercises, meditate, or take a "power-nap." Mentor's comments on your performance shouldn't be taken literally, but should be used to help you perform better, or as a stimulus to activate your feelings and/or judgement about your performance.

ACCESSING YOUR PERFORMANCE HISTORY

Whenever you want to see how your current mental performance compares with your past performance, you can access data on past performances by clicking on History in the main menu or on the data screen above the record of your current performance. History displays your performance patterns over days, weeks or months. It also tracks your responses on the Mood Scale option presented before you start playing.

THINKfast enables you to review the history of your performances according to speed, errors efficiency and total performance. You can look at the history of any one game or all six games. The program also allows you to zoom to any portion of any graph in the history section. Accessing your performance history will enable you to evaluate the effects of mood, diet, supplements, physical workouts or any other factor on your ability to perform.

The history section also enables you to compare your performances with the scores of others. Up to 20 users can play the THINKfast brain exercise games and record their personal histories on the same computer.

EVALUATING THE ACUTE EFFECTS OF BRAIN NUTRIENTS

One way you can use THINKfast is to evaluate the acute effects of brain nutrients on cognitive function. Studies have demonstrated that brain nutrients can improve mental function as measured by standard cognitive tests; now, you can determine if your performance on the THINKfast games can be improved after taking supplemental brain nutrients.

The degree of improvement may be difficult to determine because the games themselves are designed to improve cognitive ability. If you improve significantly after taking brain-boosting supplements, it may be hard to separate the effects of the nutrients from the effects of exercising your brain regularly.

One meaningful exercise is to see if you can detect significant cognitive benefits shortly after taking a high dose of one or more "smart" nutrients or drugs. An example of this would be to take a high dose of several grams of choline upon rising in the morning, and then play the THINKfast games an hour or two afterward. If your scores are significantly higher than your previous scores, it's likely the choline contributed to the higher scores.

Another experiment would be to test yourself on THINKfast after taking several grams of a multinutrient brain formula such as Cognitex with Pregnenolone, which contains choline, an acetylcholine (Ach) precursor (Ach is a brain neurotransmitter involved in learning and memory); pantothenic acid, which helps to convert choline to acetylcholine; phosphatidylcholine, which boosts Ach levels and stabilizes cell membranes; phosphatidylserine, which stabilizes cell membranes and strengthens neurons; and the "memory-enhancing hormone" pregnenolone alone, which synchronizes cognitive function.

The purpose of discovering whether an acute dose of a brain nutrient or nutrient formula, or perhaps several high doses, can boost your THINKfast scores significantly is to determine the optimal dose of the right brain nutrients and drugs to take prior to an important test if you are in school, or an important meeting at work. If your brain is performing faster and more efficiently while taking a test or at a business meeting, it's likely that your performance will be better.

EVALUATING THE CHRONIC EFFECTS OF BRAIN NUTRIENTS

High doses of brain-boosting nutrients should only be taken before an important test, business meeting or other special event. For long-term use, considerably lower doses of brain-boosting nutrients and drugs should be used. The purpose of taking chronic doses of brain-boosters is to help prevent or reverse the progressive decline in mental function that occurs as we grow older and our brains deteriorate. THINKfast can help to evaluate both the acute and chronic benefits of brain nutrients because it provides you with instant access to your performance history.

There have been no studies in recent years to assess the effects on aging of brain-boosting nutrients, but an important study was performed by Dr. Raymond Bartus, as reported in the first issue of The Foundation's Anti-Aging News in 1980. Dr. Bartus found that long-term (4½ months) dietary enrichment with choline-ranging from 2.7 to 15 times the amount of choline in the normal diet-greatly improved the ability of C57Bl/6 mice to repeat learned behavior. When tested five days after learning, 13-month-old, choline-enriched mice performed 58 percent better than mice of the same age on a normal diet. They also performed slightly better than young, vigorous 3-month-old mice, and more than three times better than choline-deficient 13-month-old mice. (Science, 209 [4453] 301-3, July 11, 1980).

The hottest new brain-boosting nutrient is gingko biloba, an herb that scientists are finding has potent cognitive-enhancing effects.

In order to evaluate the effects of brain nutrients on the cognitive decline of aging, it would be necessary to play the THINKfast games regularly for at least several years and, if possible, to compare your results with THINKfast users of your age who have not been taking supplements. If you are 60 years of age, for example, you can expect a gradual decline in cognitive function as you grow older. If your THINKfast scores show no decline with advancing age or, even better, if you show improvement in your scores, it will suggest that your brain-boosting regimen may be slowing, or reversing, neurologic aging.

OPTIMAL COGNITIVE FUNCTION: A NEW APPROACH

THINKfast makes it possible to combine simple, easy-to-engage-in brain exercises with a brain-food enriched diet, brain-boosting supplements, physical exercise and stress reduction aimed at the achievement of optimal cognitive function. It provides another piece of the puzzle in our quest for a longer, healthier lifespan in which our minds remain sharp and incisive regardless of our age.

May Cover Story Continued

Back to the Magazine Forum

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Back to the Magazine Forum