

Academy Helps Army Be All That It Can Be

Report on technologies to enhance performance advises a new look at sleep learning; sees little or no promise in parapsychology research

At the request of the Army Research Institute, a committee of the National Research Council has spent the past 3 years trying to sort the wheat from the chaff in the multitude of "human potential" technologies and training programs that are increasingly being marketed in both the public and private sectors.

The report, "Enhancing Human Performance," concludes that sleep learning and mental practice of motor skills deserve attention, but it turns thumbs down on neurolinguistic programming and parapsychology. Says David Goslin, who until this year was director of NRC's Commission on Behavioral and Social Sciences and Education, "we found more than we expected to."

The NRC Committee on Techniques for the Enhancement of Human Performance, headed by John Swets of Bolt, Beranek and Newman Inc. of Cambridge, Massachusetts, made quite an effort to look at things first hand. This included, for example, a visit to the laboratory of Cleve Backster, a former government intelligence specialist who claims that after leukocytes are removed from an individual's mouth they can be shown to register electrical activity when the donor experiences emotional arousal. (The committee was not impressed.)

The military sorely needs guidance on how to evaluate the claims made for various techniques alleged to enhance human potential, most of which are based on testimonials and few of which have been subjected to rigorous research. The report should also be of considerable interest to private companies, which, according to the committee, spend at least \$30 billion a year on this sort of thing.

The Army has been flirting heavily with the human potential movement in its search for ways to improve morale and performance. In the 1970s some officers became extremely enamored of the possibilities of "New Age" human technologies. One popular concept was the "First Earth Battalion," spawned by a Fort Leavenworth lieutenant colonel (now a consultant to private industry) which was to be a futuristic ecologically-minded peacekeeping force of "New Age

Samurai" who might ultimately be trained in such feats as walking through walls.

Nowadays, the extremists are not so much in evidence, but the Army has gotten increasingly involved in various programs designed to improve stress management, interpersonal skills, and skills acquisition. Most of these technologies have been poorly evaluated scientifically.

The NRC committee observed that the motivation behind enhancement techniques in the 1980s "may be primarily entrepreneurial, not ideological, as it was in the 1960s." Those anxious to sell programs to the military tie their wares to the enhancement of specific tasks, "such as marksmanship, foreign language acquisition, fine motor skills, . . . and even combat effectiveness."

Following are some of the approaches the

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committee looked at:

■ **Sleep learning.** Looking at the best available research is "discouraging," reports the committee, since there has been virtually none since the early 1970s. Yet it does appear that when simple material—such as foreign words or codes—is presented to subjects in lighter stages of sleep this bolsters their ability to learn while awake. One of the most compelling studies was conducted in 1916 by L. L. Thurstone, who reportedly shortened Morse Code training of sailors by 3 weeks by giving additional training during sleep.

■ **Accelerated learning.** Various programs combine instruction with such things as relaxation, guided imagery, and music. The committee found this produced very modest improvements that may have more to do with the traditional aspects—such as

repetition and frequent testing—than innovative aspects of the program. The few independent evaluations of one program, Suggestive Accelerated Learning and Teaching Techniques, do not support the claims made for it, says the report.

■ **Mental practice.** Mental practice or guided imagery, a popular practice for improving athletic performance, "is effective in enhancing the performance of motor skills." It works best when skills have a significant cognitive component and when complemented by physical practice. The technique does not work for improving cognitive and behavioral skills.

■ **Biofeedback.** In contrast with the other approaches, there is a great deal of scientific literature on biofeedback. The report says it is effective for muscle relaxation but, contrary to some claims, there is no evidence that the technique reduces general mental and emotional stress. The effectiveness of biofeedback for enhancing skills remains to be determined. Part of the problems is that no one knows what the optimal brain waves, heart rates, or muscle tension levels are for given tasks.

■ **Group cohesion.** The report says the Army should study the effects of the COHORT system, introduced in the 1970s, which entails keeping the same group of recruits together from training throughout their enlistment period. Although intuitively attractive, research findings on group cohesion "fail to provide unequivocal evidence" that high cohesion leads to better group performance, according to the report, which says there is also a need to look at the possible negative effects of cohesion such as "groupthink"—rejecting any ideas that come from outside the group.

■ **Split-brain effects.** Some programs claim great benefits from techniques designed to integrate the activity of the two sides of the brain. But a review of the literature "refutes claims that link differential use of the brain hemispheres to performance," says the report. "Attempts to increase information-processing capacity by presenting material separately to the two hemispheres do not appear to be useful."

■ **Altered mental states.** The report says there is "little support for the existence of a general state of consciousness that will improve performance over a wide range of skills. . . ." However, it encourages the Army to further explore the potentials of hypnosis and meditation.

■ **Influence strategies.** The Army has put several hundred generals through the popular training called Neurolinguistic Programming, which is based on the idea that each individual operates primarily out of a particular "representational system"—either visu-

al, auditory or kinesthetic. The report says that while the training "may increase self-confidence," there is "no scientific evidence to support the claim that neurolinguistic programming is an effective strategy for exerting influence."

■ **Parapsychology.** This is the area where the committee draws its "strongest conclusions." It found "no scientific justification from research conducted over a period of 130 years for the existence of parapsychological phenomena." Committee member Ray Hyman, psychologist at the University of Oregon, said at a press conference that the poor quality of psi research was "a

surprise to us all—we believed the work would be of much higher quality than it turned out to be." Work by the Soviets is "even less convincing," he added. Notes the committee: "the very conditions that are specified as being conducive to the appearance of paranormal phenomena are almost always precisely those that are conducive to the successful performance of conjuring tricks." So much for the use of mind rays to befuddle enemy technology.

The upshot of the report is that there are no quick fixes to enhancing human performance: "Effective interventions are those that are continuous and self-regulating and

take account of both context and person." The committee recommends that the Army move "vigorously, yet carefully" to implement techniques known to be of some value. It is quite critical of the Army's evaluation methods, saying it has no guidelines, does not use state-of-the-art methods, and makes little effort to get independent evaluations. "The pilot programs we saw and evaluation materials we read were usually disappointing." The Army Research Institute is advised to "formalize" its methods for getting advice and to set up a committee to ensure scientifically sound evaluation procedures. ■ **CONSTANCE HOLDEN**

Gossip and Peer Review at NSF

Jon Kalb, a Texas geologist, recently won an out-of-court settlement from the National Science Foundation (NSF) in which NSF admits that it gossiped about him in a peer review meeting in 1977, passing along malicious tales from his competitors. NSF then rejected Kalb's request for a grant, favoring his competitors instead with \$600,000 for work in the same area. Kalb was never given a chance to rebut the gossip, which made him out to be an agent of the CIA. (He was not.)

Having failed at an in-house appeal and feeling ill-used, Kalb took the case to Public Citizen, a legal center in Washington, D.C., founded by Ralph Nader. Litigation began a year ago, and on 3 December NSF agreed to a stipulated settlement with Kalb. In it, NSF apologizes for repeating the gossip and promises \$20,000 to cover Kalb's attorney's fees and other costs. The agency denies Kalb's charge that in promoting the gossip it ruined his career.

When this case began, Kalb was an active researcher on African fossils in the field; today he is an unpaid research assistant at the Texas Memorial Museum in Austin. Although he has never received a Ph.D., he was among the early investigators of human fossils in part of the Rift Valley in Ethiopia called the Middle Awash region. Since his loss of NSF support in 1977 and his expulsion from Ethiopia in 1978, Kalb has devoted most of his time to clearing his name.

The trouble began in 1973 and 1974 when Kalb had a dispute with Donald Johanson, discoverer of the early hominid known as "Lucy." The dispute spread within the archeo-anthropological community as associates of Johanson at the University of California at Berkeley took up cudgels against Kalb, repeating the story that he was a CIA agent. According to Kalb, the net effect was to shut him out of the fossil-rich area in Ethiopia where he had been a pioneer investigator. Because of NSF's one-sided handling of the case, Kalb argues, he failed to win a grant in 1977 that could have kept his research going. In 1978, the security forces of the new socialist government in Ethiopia expelled him. Berkeley scientists then took over his research grounds, with NSF's support. Finally, as the dispute simmered on, Ethiopia decided to shut out the Berkeley group as well (*Science*, 14 January 1983, p. 147).

NSF's deputy general counsel, Robert Andersen, claims the agency based its action on the quality of Kalb's work, not on the extensive in-house chatter about his person. The agency apparently was not showing a bias when the head of its anthro-

pology program and chair of the peer review panel, Nancie Gonzalez, announced during a meeting that Kalb was suspected of being a CIA agent. The agency maintains that Gonzalez acted neutrally in passing along rumors from the Berkeley group, although it agrees she ought not to have done so.

The peer reviewers were never asked to reconsider Kalb's proposal after that gossip session. Instead, his application and two from his colleagues were officially set aside while Gonzalez investigated. She was unable to find evidence that Kalb worked for the CIA. She nevertheless rejected the requests, according to NSF, because they were below par.

It is difficult to demonstrate exactly what happened, Kalb says, because the agency has lost some of the paperwork. "NSF destroyed portions of the file, and we've argued back and forth whether this was done intentionally or not." Despite "blanket applications" for material under many provisions of information law, Kalb has been unable to reconstruct a full paper trail of NSF's review. He claims that the CIA gossip was the main topic discussed in the peer panel. But there is no mention of it in the panel's summary report or in the more extensive files kept by Gonzalez. The records of NSF's internal investigation are missing.

"NSF has built a moat around its decision making and calls it the 'peer review process,'" Kalb grumbles. It "protects itself from public scrutiny in innumerable ways." Kalb says that each granting agency uses "peer review" to mean something different. He prefers by far the version used at the National Institutes of Health, which includes what he calls a "full, 100% bona fide appeals process." He thinks applicants are entitled to know when "extra-scientific" information is quoted against them and that they should be given a chance to respond. Furthermore, he says he has learned that gossip has played a crucial part in cases other than his own at NSF. He intends to petition the agency to change its peer review system.

Deputy NSF counsel Andersen does not think the misstep in Kalb's case is representative of an underlying problem. No broad adjustment of procedures is required. This was the "sole instance" in which scholars' gossip has disrupted the peer review system in the agency's 37 years of operation, he says. Asked to explain exactly what went wrong in this case, he responded: "Nothing, except that an individual program officer made a statement to a review panel that was inadvertent and ill advised—nothing more, nothing less." ■ **ELIOT MARSHALL**