How Sleep Learning Works

The Foundation of Sleep Learning

We have now reviewed the three major human components related to sleep learning: the subconscious mind, the process of learning and memorizing, and sleep. Before proceeding, let us assemble and summarize the most relevant facts from the previous chapters. They will serve as a foundation on which to build a successful sleep learning program. Then we will examine how sleep learning will work for you, and look at successful examples of sleep learning.

Fact 1. Information channelled into our memory through our subconscious remains with us indefinitely.

Fact 2. In a state of deep relaxation, the discriminatory power of our conscious mind is greatly reduced.

Fact 3. While we're asleep, that roadblock is reduced even further.

Fact 4. Activity during the latter part of the day interferes with memorizing what had been learned earlier in the day.

Fact 5. This interference does not take place during normal sleep.

Pact 6. Repetition is a major key to memorization.

Fact 7. REM sleep is the time that learned information is processed into our memory.

Fact 8. Susceptibility to suggestion while in deep relaxation and light sleep is similar to being under hypnosis.

When we learn while we sleep, we avoid the roadblocks erected by the conscious mind (Facts 2 and 3) and channel our lessons through our subconscious (Fact 1) where they are better retained. Learning while asleep eliminates the problems of interference or distraction from me learning process (Facts 4 and 5). Memorization is aided by the reliance on repetition of the sleep lessons (Fact 6). When we learn while asleep, we're learning at what may well be the best time, when information is being processed (Fact 7) and when we ,are receptive to the lessons, (Fact 8).

To consolidate these facts into one sentence: Sleep is the best time to learn because of the absence of interference, the availability of the subconscious mind, and the information processing function sleep serves.

The facts we've established in the preceding chapters now raise the important question, "Can we really hear clearly while we sleep?" It will surprise those who continue to insist that sleep is a period of mental inactivity, but not only can we hear while we sleep, we can also discriminate between important and unimportant sounds. More importantly, we have the ability to react, even physically, to what we hear.

Listening While We Sleep

Scientific method has validated the efficacy of sleep learning. In this chapter, and those that follow, we will review the evidence and compare it with some of the numerous practical uses of sleep learning.

There is a substantial body of evidence concerning our ability to hear and relate to things while asleep. This is, of course, a key to sleep learning. This evidence comes not only from scientific research such as laboratory experiments, but also from the actual everyday experiences of most people. A humorous example is that of the snoring professor who developed the habit of falling asleep while attending meetings and conferences. Although a speaker at one of these meetings might be insulted to find him sound asleep in the middle of a presentation, the good professor made matters even worse. He snored, loudly! Not only would he fall asleep in the middle of a speech, but he provided competition for the speaker through his persistent snoring.

To the great surprise of others in the audience, the professor would often suddenly stop snoring, come fully awake, and correct some minute error made by the speaker. This became a disconcerting aspect of the mathematician's personality and provoked one of his colleagues to remark: "He'd snore in your face as you talked, but if you made a mistake he would wake up and correct you."

Another example of man's ability to hear and absorb information while in deep relaxation and sleep comes from Dr. Anthony R. Ruffino. Dr. Ruffino's experience occurred while a student at the Dental College of New York University. It is an experience not unfamiliar to many, especially those who attended schools of higher learning where the practice of "cramming" for an important examination is part of a student's life.

"While studying for an anatomy exam which was part of the freshman year of dental school, my friend Artie and I decided that we would need the whole night to study in order to be adequately prepared. Staying up all night was certainly not unknown to us, for the normal rate of "plugging" often demands it. But on this night, having recently completed several other exams, we were really too tired to endure the whole night; at least I was— Artie was more accustomed to these marathon sessions.

"Toward about 4 a.m., when we were covering subjects like the detailed anatomy of the middle ear, and the course and distribution of the seventh cranial nerve, I found myself in a stupor that was very much akin to sleep. Artie continued to read, and when he asked me a question I was not awake enough to respond. After several hours of the routine of sleeping for a few minutes alternating with periods in which I was more asleep than awake, I remember being able to hear Artie's voice but sensing a great confusion regarding what he was telling me. Several times he repeated mnemonic devices to aid in the remembering of certain progressions of anatomic facts. Finally, I fell dead asleep and was awakened by Artie at 7 a.m. with just enough time to get to school for the exam. The results of that night's studying still amaze me. Although I felt, at the time I was awakened, that I was confused and did not have command of the topics covered during my stupor, I did very well on the exam and several questions that I gave correct answer5 for were topics that I had no conscious memory of having studied. The test was comprised of fifty questions, and I would guess that at least fifteen of the answers came from some semi-conscious source, most probably the retention of Artie's words even though I was asleep."

A strikingly similar experience was reported by Professor A. M. Svyadoshch. Answering a questionnaire circulated by the professor, a neuropathologist wrote that she experienced what she called "incidental learning" while studying for an exam with a group of classmates. While one of them was reading aloud, the woman fell asleep. When she awoke, she was able to recall everything that was read while she slept.

Further evidence comes to us from a less obvious source, the anesthetized patient. Anesthesia not only causes loss of pain sensation, but can also induce a state of unconsciousness similar to sleep. In her book **The Brain Changers,** Maya Pines relates an incident involving a woman anesthetized for a hysterectomy operation. During a post-operative visit, the surgeon detected a distinct coolness in her attitude. It was obvious the patient was angry with him. It turned out that during the operation, while the patient was "asleep," the doctor made the comment, "Well, that takes care of this old bag." To the surgeon's chagrin, the patient heard him and, despite his protestations that he was not referring to her but to the organ he had just removed, the woman never forgave him.

We know we respond with voluntary and involuntary reactions to external stimulation while awake. We experience such stimulation through our senses, by seeing, hearing, smelling, or touching. Our reactions are sometimes instinctive, while other times we're required to consider possible reactions, select one, and make a voluntary response to the stimulation. A response can take numerous forms. The type of response with which we are concerned here is that which causes the formation of mental images or visualizations. By comparing our visualization response to outside influences, both while awake and asleep, we will understand more clearly the fallacy of a popular this conception about sleep.

Many people believe their mental functions require rest periods much like their physical need for rest. How often have we heard a person say, "I can't study anymore, I'm too tired, my mind won't function properly," or, "My mind needs a rest," or, "My brain is too tired"? References to the mind and brain are intended for the mental processes we associate with them. As we saw in the previous chapter, the mind's processes continue to function twenty-four hours a day, regardless of whether we're awake or asleep.

Mental images can be formed under myriad circumstances. If we have a telephone conversation with someone we've never met, it's natural for us to try to develop a "mental picture" of what we think that person may look like, try to give the voice a face. When we do this, we're creating a visualization response (the mental picture) to an external stimulation (the person's voice). The same thing happens while we sleep.

A similar reaction to verbal stimulation is triggered when we hear a key word or phrase that arouses our memory. To understand how this happens, let's assume a hypothetical situation in which you've just met an old friend who recently returned from a distant city you also visited several years ago. Your friend tells you about his trip and, as the conversation develops, he mentions several places that you also had visited. The names of these locations are trigger words to which you react with a visualization. One trigger word is the name of a famous monument. Immediately your mind begins to search its data bank. Presently the correct image is retrieved and your response to the mention of the monument is a "mental picture" of the monument as you saw it several years earlier. Such responses can be based on actual knowledge, such as in this example, or can be created by imagination or assumptions, such as relating an image of how we visualize how people look based on the sound of their voice on the telephone. A novelist creates "mental pictures" in the minds of readers by supplying just the right amount of

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information about a character or location to engender a visualization response.

Despite persistent "mind needs rest" comments, our reactions to external stimuli continue while we sleep. A common example is the sleeping person who brushes away a fly that's landed on his cheek. It is an involuntary reaction that produces a physical movement. Another common example demonstrating that our mental functions operate while we sleep is the reaction of a mother to her crying child. She may be a sound sleeper who is rarely disturbed by sounds in the night, but the moment her child begins to cry she wakes up. Not only are the mother's mental functions alert while she sleeps, they are capable of discriminating between unimportant sounds and those of great importance where her child is concerned. A sound such as her baby's cry requires her to awaken, so she does.

Physical responses such as chasing away a fly or waking aren't the only reactions of which we arc capable during sleep. Even more significant to our examination of sleep learning is the visualization reaction that occurs during sleep. Realizing that this occurs and understanding its importance to the memory process gives us a better appreciation of how sleep learning works.

Freud believed that visualized responses to sounds we hear while asleep can be incorporated into our dreams, which are, after all, mental images themselves. He cited an incident that took place in 1865. While asleep, a person received an unusual external stimulation when a bedpost fell across his neck. His reaction was transformed into a dream in which he was guillotined during the French Revolution. Hundreds of experiments conducted since then support Freud's theory and extend it further. They show that even a person's name spoken to him while he sleeps can cause a visualization response that could be included in his dreams.

During the past twenty years there have been dozens of professionally controlled programs dealing with the ability of humans to hear while they sleep. A continued review of these experiments would be redundant. It is more beneficial to learn how to use the information we absorb during sleep. The studies done in this area are sufficient proof that sleeping people are capable of hearing what is said to them. These same studies also prove that not only can we hear while we sleep, but we also comprehend the meaning of what is said.

Reacting to What We Hear

Knowing that we can hear and understand what is said while we sleep prompts the question of whether what we hear actually has any real meaning for us.

Many people have trained their subconscious to ignore familiar or routine sounds that occur while they sleep. People who live close to a railroad track do this to avoid having their sleep disturbed by passing trains. Yet the same person will quickly awaken at the unfamiliar sound of screeching automobile tires, even though the train noise may be louder.

Evaluating the sounds or information we hear during sleep isn't limited to those sounds which are distinctly meaningful or meaningless. This was demonstrated by the snoring professor who slept through the presentation at a conference, awakening only to correct what he felt was an error.

Sleepers who awaken at the sound of a specific stimulus, such as the cry of a child, or the incorrect statement, have successfully taught themselves to respond in this manner. For the mother, it is her desire to care for the infant. For the professor, it is the need to correct an erroneous statement. Because of this, the sleep learner who is highly motivated to learn the material can be assured of success.

In fact, from the examples we've discussed it's clear that most people have already experienced the phenomenon of hearing something while asleep, evaluating its significance or meaning, and, when necessary, responding to what was heard. It's possible this happens to each of us nightly without our being conscious of it. The occasions that we are able to recall are those that provoke a physical response, such as awakening. Our goal is to make productive use of this inherent natural ability. Once we've done this, we'll be able to expand our knowledge and our lives.

Learning While Asleep

There is no doubt we have the ability to hear while we sleep. There is also no doubt we have the capacity to evaluate what we hear while asleep. This was clarified by the findings of two doctors who conducted extensive sleep studies under a grant from the United States Public Health Service. They concluded that the ability of man to discriminate between sounds heard while asleep is "general knowledge.'

If we could not hear and respond, it would be impossible for us to learn during sleep. The question is: "Can real learning take place during sleep?" The preponderance of information available from psychological studies alone makes the answer abundantly clear: Yes, we can learn while asleep. The scientific approach to sleep learning has been conducted with two major uses in mind.

First, sleep learning can exist separate and independent of other learning. Second, sleep learning can be used as an aid to increase or reinforce traditional daytime learning.

Dr. William H. Johnson examined the second use in his work. Dr. Johnson conducted an investigation of sleep learning that prompted him to conclude:"... that hearing material during sleep can facilitate learning the same material in the waking state."

Johnson used eight young men in his study, paying each $45 for participating. As a way of creating motivation, Johnson said he would pay an additional $15 to each of his subjects who successfully passed a test of his recall of what he learned while asleep. Volunteers were selected based on their responses that they: (1) were moderately good to very good sleepers; (2) fell asleep quickly after going to bed; (3) were awakened only by an average to loud sound; (4) generally fell back to sleep quickly after being awakened; (5) functioned well shortly after awakening; and (6) had absolutely no knowledge of the Russian language.

The volunteers spent eight consecutive nights in Dr. Johnson's laboratory. Each night while they slept, they were presented with either the experimental material, Russian words and their English translations, or control material consisting of pairs of random numbers. During half the nights this was presented while they were in REM sleep, arid the other half during non-REM sleep. To assure they were asleep, accurate recording by EEC was maintained whenever material was presented. Following the presentation of material, each man was awakened and tested for what he had learned.

As each man arrived at the lab, he was instructed to routinely prepare for bed. When they were in bed, the following taped message was played to each:

"You know that your ability to learn while you are asleep depends entirely on your willingness to cooperate. Because if you don't want to learn while you are asleep, we won't be able to make you do it. But if you pay close attention to what I say and follow what I tell you to do, it will be very easy for you to learn to fall into a very deep sleep and you will learn. We are confident of your ability to learn while you are asleep, but you must relax and now go to sleep.... Pay careful attention to what I will say and you will go to sleep very soon. You will go into a very deep sleep and you will learn Russian."

Shortly after each participant had fallen asleep, he heard another message:

"This is your Russian teacher. You can hear my voice but you will not wake up. You are asleep and relaxed and you can hear my voice. And you will not wake up. Presently you will hear Russian words and their English meanings. You will hear them clearly but you will not wake up. Listen to them and commit them to memory. Memorize them completely. Learn them tightly, firmly. You will remember these words and their meanings forever."

Following a few more instructions not to awaken and to memorize the material, the lesson began. There were twelve repetitions of a list of ten Russian/English words each night for a total of one hundred twenty combinations. Each nightly lesson lasted approximately one hour.

As each man was awakened, the electrodes were removed from his head and his ability to recall the lesson and to relearn the material was tested. The fact that the subjects were awakened too soon after the presentation of the lessons contributed to the low scores obtained, although the results did lead/Dr. Johnson to say, "... subjects scored higher on the nights upon which they first heard the material to be learned during sleep than when they had not heard the material."

Doctors Clarence Leuba and Dorothy Bateman conducted another investigation of sleep learning. Their subject was Mrs. B., who claimed she could recall information that had been broadcast over the radio while she was sleeping. Mr. B. was in the habit of listening to the radio while his wife slept.

A phonograph was placed in Mrs. B's bedroom. Over nine consecutive nights, three different songs, were played, one song for each three-night period. The phonograph was connected to an automatic timer that turned it on during the night, allowed the song to play five times, and then shut it off. Following each three night period, Mrs. B was tested for her knowledge of the song. The first song was recalled with three minor errors, but the second and third were recalled perfectly. Mrs. B had no prior knowledge of the three songs used.

In a sleep learning program conducted at Duke University, forty students were divided into two groups. Before the study began, two recordings were made, each containing fifteen three-letter words. Each recording had a different list, and each list was repeated five times.

Before sleeping in the laboratory, all forty men were taught the list from one recording. Each was tested and scored on a basis of how many times the list had to be played before he could anticipate all fourteen words after being told the first. The average scores for both groups were similar, which permitted the assumption that they could be considered equal in learning ability for this type of material.

The second recording of fifteen words was played for only one group while its members slept. The following morning, both groups were taught the second list of words and tested on it as they were on the first list. The group that heard this list while they slept had a significantly better ability to master this list than the other group. The researcher concluded that, "The evidence obtained suggests that there is retention of auditory material

presented during sleep."

Doctors Martha Koukkou and D. Lehmann conducted sleep learning experiments on a total of twenty-one volunteers in both Athens, Greece, and San Francisco. Using a recall test procedure, they confirmed the successful teaching of sentences of their sleeping subjects. Two New York City psychologists taught a list of paired associates to several sleeping undergraduates. Paired associates are two words the subject learns as a set. Successful learning is tested by giving the first word in each set and having the subject respond with the matching word.

During each of three nights, the list was presented seventeen times. The work was done in a laboratory and the material presented only during non-REM sleep periods. The results prompted the researchers to conclude:

"Clearly, pre-presentation of a list of meaningful paired associates during the non-REM stages of sleep benefits subsequent learning of that list."

There have been numerous similar studies of sleep learning. The results of all this work provide indisputable evidence of our ability to learn while we sleep. This was substantiated by Dr. Laverne C. Johnson of the United States Navy Medical Neuropsychiatric Research Unit. In summarizing a review of the subject, Dr. Johnson said:

"Information processing during sleep is summarized, and published reports lead to the conclusion that the sleeping brain does receive, process and perhaps even store information presented during sleep.

An extensive review of the scientific work done on sleep learning was conducted by Dr. Louis Aarons of the Illinois Department of Mental Health and Developmental Disabilities. In the review, titled **Sleep-Assisted Instruction,** Dr. Aarons points out the different emphasis in experimental methods used in the Soviet Union and the United States. Where measuring sleep has been a major concern in the United States, the Soviets "have been more concerned with stimulus properties, suggestibility, set and training in hypnopaedia." He questioned the extensive use of EEG monitoring in the United States. "The selection of EEG recordings to define sleep may unduly limit opportunities for the phenomenon of sleep learning."

Soviet studies also differ from American in the type of material used for sleep learning. Most programs conducted by Soviet and other European scientists make use of material that is meaningful to the participants. This results in good motivation and attention. Many American programs have relied on getting the sleeper's attention through such devices as buzzers. There have also been too many American experiments using meaningless material. This must have a negative effect on the motivation of the subjects of these programs.

Successful sleep learning programs rely on both repetition and a longer period of time for the subject to absorb the material. They also require preparation that can consist of simply reading or listening to the material to be learned before going to sleep, or a pre-sleep message such as the one used by Dr. Johnson when he taught students Russian words.

William H. Emmons and Charles W. Simon conducted experiments and wrote several articles on sleep learning. Critics of sleep learning have relied heavily on their results. In evaluating these experiments, their methods and motives appear questionable. In one experiment, twenty-one men were bombarded with ninety-six questions and corresponding answers while they slept. The next morning they were asked the same questions and expected to provide the correct answers. Emmons and Simon stated unequivocally: "Learning during sleep is concluded to be impractical and probably impossible. These researchers overlooked one overwhelmingly important fact: Repetition is as important to sleep learning as it is to learning while awake. In his book **Memory,** Professor of Psychology Ian Hunter said:

"There is no question about the importance of repetition in memorizing. When information is received and must be retained for use in a short time hence, the retaining appears to be accomplished by some sort of repetitive rehearsal of the information.''

The absence of repetition is a common thread that runs through unsuccessful sleep learning programs. Another is the inconsequential nature of the material presented to the sleepers. They run the gamut of random numbers, one-syllable nouns, nonsense words, irrelevant statements, and other assorted disjointed and meaningless information that failed to contribute to the sleepers' motivation to learn.

This raises a serious question concerning a possible difference in how we recall various types of material. Meaningful material is more easily remembered than is unimportant information.

Frequently, researchers attempt to force-feed inane information to subjects, who have absolutely no motivation to learn the material. This deficiency is emphasized when we consider the guidelines used by Professor L. A. Bliznitchenko, who has successfully used sleep learning under scientifically approved conditions. Speaking of the basic requirements for successful sleep learning, he tells us:

"Thus, 'desire' (to learn the material being presented), 'tuning in' (psychologically) and the 'arrangement' (how the material is presented - tone of voice, repetition, etc.) has great significance in hypnopaedia (sleep learning)."

On the subject of repetition, Professor Bliznitchenko states emphatically "... multiple repetition is obligatory in all cases (of sleep learning)." Dr. William C. Dement, whom we discussed earlier, took Emmons and Simon to task for their methodology.

"It should be noted, however, that in one test these experimenters used complex questions and answers and presented each pair only once; in another test they used nonsense material. Some of the complex material might have been learned if it had been presented repeatedly. The nonsense material may have been discarded because it had no relevance for the sleeping subjects."

The evidence is conclusive: Sleep learning is an effective way to learn for many people. We know that certain criteria must be met if sleep learning is to be used successfully. These include motivation to learn and repetition of the material. In the following two chapters, we'll turn our attention to two areas in which sleep learning has been used successfully: the learning of a foreign language and as an aid in therapy. Before moving on, we'll take a look at a collateral area of the overall subject of sleep learning, learning while in deep relaxation.

Relaxation Learning

The question is often raised: "If the subconscious is receptive to suggestion during sleep, is it equally receptive during the pre-sleep relaxation which so closely approximates light sleep?" The beginnings of an answer started to be formulated in the mid-1960s, when two professors at the University of Sverdlovsk began experimenting with what they called the "sleeping method" of learning.

Their early experiments proved so successful that Professor of Psychology Ratmir S. Orlov and Professor of Foreign Languages V. Repin were encouraged to state:

"... a person in a state of relaxation possesses the same enhanced ability in memorizing as a person learning in his sleep following the method of hypnopaedia.

Pre-sleep and post-sleep relaxation, are the conditions experienced either just preceding or following sleep. Because these conditions are similar, we'll concentrate on pre-sleep relaxation only. As an individual progresses through pre-sleep relaxation, alertness begins to wane from wakefulness to relaxation and, finally, to the sleep states.

Proponents of learning during relaxation claim the presence of both early sleep and the gradual decline of alertness combine to achieve an enhanced suggestibility level. Because receptiveness is enhanced by alertness, the state of relaxation offers a prime period for learning and memorizing.

Assembling student volunteers with a desire to learn English, Repin and Orlov used English words in two projects. The first used pre-sleep relaxation. While the students were in this state, fifty unfamiliar English words were read to them through a tape recorder several times over for twenty minutes. When they were awakened, the students were asked what they remembered. They recalled an average of forty-one to forty-four words, or approximately eighty-five percent of the material. They were then given five minutes to rehearse the newly learned words. When they were tested a second time, their memorization improved to an average of ninety-five percent of the words.

Later, this same group spent two to three hours memorizing fifty different English words. Although the results varied widely, with some recalling all the words in this second list and others able to recall less than half, collectively they learned only seventy to eighty percent of the words. The results during relaxation proved far more successful in the memorizing of foreign words than did the traditional method.

With no advance warning, the students were re-tested three months later. They demonstrated a marked decline in the number of words recalled from the list they learned while awake. This time their recall average, dropped to fifty to sixty percent of that list. In contrast, they remembered a much higher percentage of the words they learned while in a state of relaxation. The recall rate dropped only a few percentiles from ninety-two to ninety-eight percent to an average of ninety to ninety-four percent. A factor contributing to both declining rates is the lack of practical use during the intervening period.

Repin and Orlov tested these results in a second program, this time doubling the word groups to one hundred English words each. The students learned one group while in relaxation, the other while awake, just as in the earlier experiment. After a six-month interval the retention of words was exceedingly low in both categories. The researchers concluded that one hundred words of a foreign language were too many to learn and memorize successfully in a short period. A study of the ability of the students in the first group to memorize the material showed that the words learned during relaxation were retained thirty to fifty percent more accurately than those teamed while awake.

In still another program, Repin and Oriov attempted to teach forty foreign words and phrases to students who were in pre-sleep deep relaxation. During the fifteen-minute lessons, the students were able to memorize an average of ninety to ninety-five percent of the material.

In yet another study, a group of students in pre-sleep relaxation received a special suggestion instructing them to

memorize the foreign words they would be taught during the next twenty minutes. The addition of a suggestion to memorize improved the students' ability to commit the words to memory. Without the suggestion they could recall eighty-three percent of the words. following the suggestion they recalled almost eighty-nine percent. This proved that the ability of our subconscious to memorize information is enhanced by the simple suggestion that we do so.

Professor Repin reports that he and his associates were "astonished" by the results they obtained when they used relaxation learning to help students overcome nervous tension before taking exams or participating in important sports events.

(The Soviets aren't alone in recognizing the potential of the deep relaxation state. Similar programs have been conducted in the United States by Thomas Budzynski, an electrical engineer with a Ph.D. in psychology. Dr. Budzynski is Clinical Director of the Biofeedback Institute of Denver, and an assistant clinical professor in the Department of Psychiatry at the University of Colorado Medical Centre. He describes what he calls the "twilight state" (deep relaxation) as a period when people "are hyper-suggestible and capable of learning certain things more efficiently and painlessly than during the day.

Budzynski discovered a means of solving the major difficulty with relaxation learning: i.e., the short time people are in this state. Usually we either quickly gain consciousness and awaken, or fall asleep. Budzynski overcame this with the Twilight Learner, a device developed by him and an another engineer. It helps maintain the presence of theta brain waves during learning activity. According to Budzynski, theta waves are present only during the twilight period. Using biofeedback. Dr. Budzynski and his colleagues have trained people to maintain the relaxation state. The Twilight Learner accomplishes two goals: It warns a properly trained person when he or she is slipping out of the twilight state, and it supplies die audio messages for learning.

Electrodes placed on the scalp of a twilight learning student pick up and transmit me student's brain waves to the recorder. If those waves are theta, the lesson is played on a cassette recorder. If the student's brain waves change to alpha waves, indicating increased alertness, the lesson stops playing. Should the frequency of the theta waves alter, indicating the onset of sleep, the volume of me lesson increases, bringing the student back to the twilight state.

Budzynski used his Twilight Learner to help a student who had previously failed an examination for a Spanish language course. The student was so anxious about failing the exam a second time that he was having difficulty studying. A tape recording was prepared containing positive suggestions that the student would be able to concentrate and remember the Spanish/English material that followed. During the twilight state, the student heard the tape twelve times. He was then able to study effectively and passed the exam.

The Twilight Learner has also been used to overcome "mental blocks" such as those developed by overweight people against dieting. A man who could not be assertive enough to say "no" had a "dramatic improvement" after five weekly sessions of twilight learning. Budzynski also reports successful results using twilight learning to solve problems with insomnia and alcohol abuse.

Twilight or relaxation learning has received considerable attention in other areas. A researcher at Pepperdine University used it to successfully teach 1,800 foreign words to students in 120 hours. Bulgaria's Georgi Lozanov combined a recorded message with background music for relaxation learning or "suggestopedia," as he calls it.

Whether it's called relaxation learning, twilight learning, or suggestopedia, learning while in deep relaxation has a promising future. The day has come when relaxation and sleep are not considered "wasted time." With this recognition, revolutionary new techniques in the educational process may not be far behind.

Sleep Learning Around the World

Sleep learning has attracted the interest of investigators in many countries. The work being done in the field, both scientific and non-scientific, has not yet been coordinated sufficiently to establish a uniform approach to programming sleep learning research. A first step in accomplishing this was the creation of the Sleep Learning Association in England. This group has been responsible for several publications dealing with scientific research. One major accomplishment of the Association was to establish channels of communications between sleep learning researchers in Western Europe and their counterparts in Eastern Europe.

A similar organization was formed in Prague, Czechoslovakia. Under the direction of Professor Cenek Heinz, the Suggestive Hypnopaedia Group conducted a series of experiments summed up in the following comment from Heinz: "Knowledge of the English language can be imparted to students whose intelligence is about the average and who have no previous knowledge of English, within 8 to 10 days. With intensified daytime teaching and intensified hypnopaedia tuition (nocturnal lessons), we have achieved those standards of knowledge of English which are produced by school courses extending over three years."

One course conducted by Professor Heinz and his associates was sponsored by the Institute of Further Education and the Ministry of Chemical Technology. The subject again was English, and the course combined daytime with nocturnal instructions and consisted of twelve lessons. Here arc some comments made by several students who participated in this course.

"One can say with certainty that the effect of this teaching method is of greater magnitude than the classical method." Jaroslav Civin, B.Sc.

"The great difference between this method and that used hitherto, as I know it, became apparent in the first couple of days." A. Hruby, B.Sc.

"I consider this a very original and dynamic method. Even after this short time, the student is saturated with the essence of the English language, which gives the impression that he has been taught much longer than is fact." Milan Vlacil

"I consider this the only usable system for teaching languages to overworked personnel." S. Razi

There have been other foreign language sleep learning programs in Czechoslovakia, attended by government officials from various agencies throughout the country, including the Department of Foreign Trade in Liberec, Northern Bohemia; the Director of the Administration of Home Trade Training Institutes, Prague; the Economic University at Bratislava, Slovakia; the Slovakia Scientific Trade Institute; the Director of the National Rubber Company, Central Bohemia; the Director of the Training Institute of the Ministry for the Chemical Industry, and the Director of the Slovakian Shipyards. Most of these officials participated in sleep learning courses to learn English.

In Budapest, Hungary, a student named Kohalmir conducted a self-administered sleep learning program in an attempt to quickly learn enough English to win a BBC contest. Kohalmir recorded English words matched by their Hungarian equivalents. Six nights a week for six weeks, he played the two-hour lesson on a self-repeating tape during the entire night. His average nightly intake was thirty-five words or short phrases. Of the 1,284 words and phrases he recorded, Kohalmir successfully memorized 1,026. He won first prize, which was an all-expense-paid trip to the United Kingdom. The desire to travel is credited with providing the motivation to learn. Sleep learning of a stricter scientific nature has been conducted in Hungary by Professor Otto Stabel, who has served as a consultant to the Sleep Learning Association. Professor Stabel began his work with sleep learning in the late 1960s. Working with grade school children, he used nocturnal lessons as an adjunct to regular schoolroom teaching. One approach was to teach sleeping students material they would soon be learning in class.

"I would like to mention that when pupils have had to learn at school the material given during sleep learning, they have learned it very well and quickly."

In another study, Professor Stabel undertook to teach Morse code signs to a group of fourteen boys and girls between the ages of twelve and fourteen. The results led to this report:

"As learning the Morse code in such a short time, at the rate of 40—50 signs per minute, was a considerable achievement on the part of these children, the test proved to us the effectiveness of sleep learning and the value of this teaching method.''

In France, sleep learning work has been done by Dr. Jacques Genevay, Director of the Laboratory of Applied Psychology in Paris. Dr. Genevay expressed his views on sleep learning in this way:

"Hypnopaedia not only provides the memory with general working knowledge, but develops that facility of memory which becomes increasingly organized and which makes for increasing suppression of useless effort."

Sleep learning programs have also been successfully conducted in West Germany, Japan, and many other countries throughout the world! In Japan, the sale of sleep learning supplies, including pre-recorded tapes, has produced a thriving industry. However, of all the work being done around the world with sleep learning, none can equal in volume or success that conducted in the Soviet Union. The Soviets are the leaders in sleep learning, both experimental and practical. Perhaps one reason for this is the government's involvement in sponsoring sleep learning research programs.

A team of researchers working for the United States Library of Congress concluded that "the Soviet sleep learning research program is extremely well organized and sophisticated. The outstanding feature of the Soviet sleep learning program is the caution and pragmatism exercised by its leaders."

On the subject of American sleep learning programs, the same researchers said: "Apparently, no past or present American research on sleep learning has approached the scope and depth of the current Soviet sleep learning program. Past American efforts have been sporadic, rather poorly organized and inconclusive.

Sleep learning has a long history in the Soviet Union. For over fifty years. Soviet scientists and educators have conducted programs based on the learning of information while asleep. According to a report of the Eighteenth International Congress of Psychology, over five hundred official sleep learning programs have been conducted in the U.S.S.R

The leading personalities of Soviet sleep learning are Dr. Leonid Andreyevich Bliznitchenko, Director of the Department of Experimental Phonetics at the Potebni Institute of the Ukrainian Academy of Sciences, and Dr.

Abram Moiseyevich Svyadoshch, a psychoneurologist who holds a chair in psychiatry at the Karaganda State Medical Institute in Kazakhstan. Svyadoshch is credited with conducting the first scientific experiments with sleep learning in the Soviet Union. His thesis on the subject, "Speech Perception During Natural Sleep," written in 1937, is considered the foundation stone of Soviet sleep learning. His interest in sleep learning began in 1936 after listening to a patient relate an incident in which she learned the lyrics to a song that was played while she slept. After hearing this, he set about researching whether it was possible for a person to perceive and remember speech that was heard while asleep.

He gathered together one hundred men and women of various ages. All were of normal health. None were told that information would be imparted to them while they were sleeping. During the night, a short story was read twice to each sleeper. Several of them were awakened by the reader's voice, but most remained asleep. The following morning, those who had slept through the readings were asked if they could recall the story. To Professor Svyadoshch's dismay, not one person recalled anything. So, the first experiment conducted by the man who would be called' 'the father of Soviet sleep learning'' ended in complete failure.

Much has been discovered about steep learning in the years since this experiment. From our vantage point today, we know that Svyadoshch's first attempt failed to include both of the two essential ingredients: constant repetition and motivation to learn. Had even one of these been present, his results would have been more promising.

Disappointed but not discouraged, Svyadoshch arranged for a second sleep learning attempt. This one involved twenty subjects. Each was read a poem twenty times during their sleep. Again, they weren't informed about sleep learning and had absolutely no motivation for learning the poem. The following morning no one recalled it. After the direct recall test failed, he requested each participant to learn and memorize two similar poems. One was the poem used during the sleep learning program.

One person, a twelve-year-old boy, provided a remarkable demonstration of the potential of even such primitive sleep learning methods. He was able to remember the sleep learning poem eight times faster than the other poem. Before entering the program the boy had never heard either poem. Encouraged by this first step toward success, Svyadoshch was joined by other scientists, and before long sleep learning experiments were being conducted at several educational and medical facilities.

These two programs, one ending in failure, the other with partial success, gave Soviet researchers the key that opened the door to sleep learning. The key was obvious. Incidental sleep learning is almost unheard of. People have to be aware of the teaching process going on while they sleep. Later sleep learning programs added motivation as a second vital factor to successful sleep learning.

Svyadoshch's interests changed over the years, and he shifted his research to the related field of auto-suggestion. Professor Bliznitchenko became the dominant personality and spokesman for Soviet sleep learning. Through his determined efforts, sleep learning received official recognition.

Bliznitchenko first became interested in sleep learning through references to the subject in the works of Soviet science fiction writers. As with Svyadoshch, Bliznitchenko's first attempt at sleep learning ended in failure. It was a simple experiment conducted in 1948 in which he attempted to help a student memorize a text. He used a recorder with a speaker placed near the head of the sleeping person. Undaunted by this setback, Bliznitchenko temporarily set aside actual testing and concentrated his efforts on the study of speech and its relation to sleep learning, especially the intonation of speech and how it is perceived by the listener.

Shortly, however, he returned to the development of practical sleep learning. One of his first programs involved a physician named Galina Vasilyevna Pustogorova, who allowed Bliznitchenko to turn her bedroom into a classroom. For twenty-eight nights, Dr. Pustogorova was taught English, a language of which she had no prior knowledge.

At the conclusion of her sleep learning lessons, Pustogorova was examined by a commission from Kiev State University. To the surprise of the examiners, she did remarkably well. "Pustogorova has a knowledge of the spoken language equivalent to the program of the first course,'' the commissioners reported. This meant she had learned as much English in twenty-five hours of sleep learning as was normally taught in a one hundred and twenty hour classroom school course,)

Sleep learning studies and research programs proceed in the Soviet Union with official sanction, although some portions of the work are shrouded in official secrecy. There have been reports that the Soviet government uses sleep learning to teach foreign languages to its diplomats and intelligence agents. Recent reports indicate that work with school-age children has now expanded to include teaching mathematics, chemistry, and biology, as well as languages.

Whatever the level of success the Soviets have enjoyed working with sleep learning, it's obvious they recognize the value and potential applications available to those who take sleep learning seriously, and have proper motivation.

Sleep Learning Over the Radio

The most unusual method yet tried for sleep learning has been to broadcast lessons over the radio. Sleep learning

over the radio has been used in several countries, including the Soviet Union, Czechoslovakia, and the United States. The earliest of these programs took place in September 1965 in the northern Czech city of Pilsen. The radio broadcasts were used to teach English to a group of people selected from the local Lenin Works factory. It was done under the supervision of a linguist, an electrical engineer, a physician, and a lecturer in psychological medicine. The English lessons were broadcast for ten nights. There were three broadcasts of one hour and twenty minutes duration each, starting at 10:15 p.m., 1:15 a.m., and 6:15 a.m. Unfortunately, the results of this program were not made public.

An issue of the journal **Soviet Life** attracted international attention to what may have been the most ambitious sleep learning program undertaken. According to the magazine, sleep learning lessons by radio began in a town not far from Moscow. Working in cooperation with the government agency responsible for radio and television, L.A. Bliznitchenko and a group of scientists from various organizations and institutes directed a program to teach English to two thousand residents of the town of Dubna.

The sleep learners who participated in this program were a cross-section of the population, ranging in age from sixteen to fifty-eight. They included engineers, scientists, students, actors, and factory and office workers. They all agreed to maintain a firm schedule regarding their sleeping habits, since the lessons were to be broadcast over the local radio station during specific times each night.

Each evening, the participants spent fifteen minutes reading a list of the material to be broadcast that night. This was done at 10:30, when each had already settled into bed. At exactly 10:45 they switched on their bedside radios and listened to a voice read the same material. Following each set of Russian/English words that constituted the lesson, the announcer paused to allow the listeners time to repeat the material aloud. This phase ended at 11:00 p.m., when everyone turned their lights off and went to sleep. Soon after, the lesson was repeated by the announcer in a soft voice until 11:55 p.m.

At 6:30 the following morning, each of the radios came to life again, with the announcer repeating the previous night's lesson several times for twenty-five minutes. All participants awoke at 7:25 a.m. and performed the same routine as the night before, repeating the Russian words and their English translations immediately after the announcer recited each set.

The entire program consisted of forty-six lessons and lasted nearly two months. No lessons were broadcast on Saturday and Sunday nights. The results of this program varied, based on the individual participant's background and the almost impossible task of thoroughly testing every participant's progress. Many who had previously studied English found the sleep learning lessons revived their dormant knowledge of the language. Those having no previous experience with the language discovered they were able to converse in English within the confines of the words and phrases they learned while asleep.

As a group, those who had no prior knowledge of English were able to learn the first ten lessons completely, while the second ten were learned to a degree of ninety percent. This performance ratio continued to decline, for they mastered only eighty-five percent of the contents of the third set of ten lessons. Total retention for this group was about eighty percent of the material presented over the entire course.

Broadcasting lessons over the radio is a novel approach to sleep learning. The major problem is the difficulty of measuring the results. In May 1973, the **Hospital Tribune** reported on a sleep learning program delivered by radio with potentially far-reaching results. Under the leadership of David Walonick of the University of Minnesota, three educational radio stations participated in a program aimed at helping people kick the smoking habit.

Each night for one week, people in specific areas of the state could tune their radios to the proper station before retiring and, beginning at 1:00 a.m., they would receive the five-hour program. It consisted of an introductory hour of seashore sounds, soft music, and suggestions for relaxing, with the remainder of the time devoted to the anti-smoking message. As a control against which Walonick could check his results, two areas received only the first hour of the broadcast with no anti-smoking message. When the program was announced, the public was told that only one station (each station was located in a different area) would broadcast the full lesson. They weren't told which station.

One week after the program ended, Walonick reported that nearly seventy-two percent of those who heard the entire message claimed they either quit or cut down on their smoking, while twenty-eight percent of those who didn't hear it cut down or quit. He re-canvassed the first group two months later and found twenty-five percent of the group remained successful.

The following year, four radio stations in California took part in another sleep learning program. This time the goal was to reduce the food intake of some listeners while helping others to stop smoking. Throughout the month of September, thousands of Californians in Los Angeles, San Diego, San Jose, and Sacramento set their clock radios to go off at 1:00 a.m. On nights when the weight reduction messages were broadcast, the sleeping participants heard an announcer's voice softly instruct them:

"Try using small dishes—it makes it look as if there is a lot more on the plate . . . Next time you're tempted by big, scrumptious, gooey desserts, have an apple or an orange instead. Mother Nature makes great desserts, too."

Although scientific methods couldn't be applied to confirm the results, they were impressive. The Los Angeles

station received seventy calls each day from' 'enthusiastic believers" who reported such experiences as, "I woke up this morning and didn't want any breakfast. What did you do to me last night?", or this one from an executive who said:

"Shortly after the program began I made dinner one night and put it on a small plate. Then I looked at it and said to myself 'Why did I do that?' Later I heard that that was what one of the messages said. I couldn't believe it."

Similar results were reported when this anti-smoking message was broadcast:

"Kissing a smoker is like making love to an ashtray. Former smokers tell us life's easier when both husband and wife don't smoke... fewer arguments ... especially with non-smokers in your life."

Using radio broadcasts for sleep learning is a somewhat exotic approach, but the success experienced by those who have used it over the radio confirms the versatility of sleep learning.

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