

**Anomalous Cognition
in
Lucid Dreams**

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I. OBJECTIVE

The objective of this investigation is to determine if anomalous cognition can be observed during a lucid dream.*

* Definitions of terms can be found in Section V (i.e., Glossary) on page 6.

II. BACKGROUND

Dreams involving putative anomalous cognition (AC) have been part of every human culture from the times of ancient Greece to the present. The first serious attempt, however, to examine AC in dreams under controlled conditions began under the direction of Montague Ullman, MD in 1962 at the Community Mental Health Center of the Maimonides Medical Center in Brooklyn, New York. The research of AC in dreams continued until 1972 where the dream protocol was abandoned in favor of a simpler and more rapid approach to the study of AC. Child has summarized and critiqued this body of research in the *American Psychologist*.^{1*}

In these studies, individuals were asked to sleep in a laboratory and be monitored for brain activity and eye movement. From these records, it was possible to tell when they were dreaming. Upon the onset of rapid eye movement (REM), an experimenter notified a sender, who was isolated in a remote laboratory, to begin attending to a randomly selected target. At the end of the REM period, the dreamer was awakened and asked to report the dream content. This procedure was repeated throughout the night using the same target material for each separate dream (e.g., up to ten). The assessment of the AC content was accomplished through independent judges. As described by Child, significant evidence for AC was observed under a variety of conditions.

The dreamers in these studies, however, were not necessarily focused upon the AC task. They slept as usual and, when asked, reported their dream content. In our pilot study we will focus the dreamer explicitly on the AC task using the methods of lucid dreaming.

A lucid dream is one during which the sleeper becomes conscious aware that the experience is a dream as opposed to the waking state. LaBerge et al. (1981) have found that it is possible for dreamers to know when they dreaming and to signal the waking world, through predetermined eye movements, indicating their awareness.² Using this ability, LaBerge et al. (1986 and 1988) conducted a number of psychophysiological studies to determine the differences between waking and dreaming from that prospective.^{3,4} They found that dreaming is similar to the waking state. Motor action is mostly inhibited from the brain stem downward; however, the cerebral cortex appears not to "know" this.

In this preliminary pilot study, we will use the skills developed by LaBerge to teach individuals to lucid dream. Differing from the earlier AC dream studies, our dreamers will be instructed to adopt a proactive attitude to seek out and remember the AC target. In this way, we will determine the degree to which lucid dreaming can facilitate the reception of AC material.

* References may be found at the end of the document and are included in their entirety in the Appendix.

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III. APPROACH

1. Receiver Selection

We will use two specialize populations from which to draw receivers for this pilot experiment:

- (1) Experienced dreamers from LaBerg's research subjects , and
- (2) Receivers who have demonstrated significant ability in other AC studies.

- Currently, five and seven individuals have volunteered, respectively.

2. Target Selection

Targets will be chosen randomly from the standard set of 100 *National Geographic* magazine photographs.

3. Trial Definition

A trial is defined as a successful lucid dream during which the target material was examined and later transcribed in the waking state.

4. Lucid Dream Protocol

All receivers will undertake two forms of training in lucid dreaming: (1) They will complete a lucid dreaming home-study course developed by the Lucidity Institute (i.e., a subcontractor to SAIC), and (2) they will attend two weekend seminars, one at the beginning and one at the end of the proposed three-month pilot study. The first seminar, which was held in December, 1991, introduced receivers to lucid dreaming skills and the the use of the DreamLight, a lucid dream induction device. In previous studies, the DreamLight has been shown to enhance the frequency of lucid dreaming. The DreamLight consists of a sleep mask equipped with lights and eye movement sensors, which are attached to a small battery-operated computer. When the computer detects the eye movements of dreaming (i.e., REM) sleep, it causes the lights in the mask to flash briefly (i.e., either one or two flashes per second). The dreamer frequently incorporates the flashes into the ongoing dream, and thus experiences a cue to indicate that he or she is dreaming. Receivers will have free access to DreamLights during the duration of the study.

5. AC Baseline Measures

Each receiver will be asked to contribute eight trials in a waking state in the Cognitive Sciences Laboratory as an AC baseline series. The targets for this series will be chosen at random from a standardized target set that was developed from an earlier program. Each trial will be conducted as follows: After the

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receiver and an experimenter (i.e., called a monitor) enter the AC laboratory (i.e., an office with a single desk and two chairs), an assistant will use a computer random number generator to select a target from the baseline target pool. Both the receiver and the monitor will be blind to this specific choice. At a pre-arranged time, the monitor will encourage the receiver to draw and write impressions of the target material, which is located approximately 50 meters away. After approximately 15 minutes of casual questioning, the trial will end; the data will be copied; the originals will be secured; and the actual target will be presented as feedback to the receiver. The analysis will be discussed below.

6. Lucid Dream Trial Protocol

During the study, each receiver will attempt to provide six AC trials in a lucid dream state according to the following procedure:

- (1) Each receiver will receive a sealed opaque envelope containing a target photograph chosen randomly from a predetermined set of 100. Receivers will place the target envelope in the room in which they are sleeping.
- (2) Using the DreamLight, they will attempt, while dreaming, to open the envelope, memorize its content, and awaken as soon as possible.
- (3) In the waking state, they will write and draw their impressions in detail.
- (4) During the next day, they will mail the unopened envelope and their response to the principal investigator (PI) for analysis. Upon receipt, the PI will send back a copy of the target photograph as feedback and an additional sealed envelope for the next trial. This procedure will be repeated until six trials are obtained from each receiver.

7. Analysis

Traditional rank-ordering will be the method of analysis. The set of 100 *National Geographic* magazine photographs have been divided into 20 packets of five targets each. Within each pack, the targets have been selected to be as visually different from one another as possible. (A series of fuzzy sets were used to provide a quantitative method that was "fine tuned" by human judgment.) When a target is chosen from one of the target packs, the remaining four targets are considered as "decoy" targets for an analyst. For each trial, an analyst, is given the AC response and the target pack (i.e., five targets) from which the actual target was chosen. The analyst is required to rank order the targets from best to least match to the given response, regardless of the quality of the matches. The rank that is assigned to the intended target represents the value of the dependent variable for the trial. A sum-of-ranks is then computed for all the trials for each receiver, and effect sizes and p-values are determined from the known sum-of-ranks distribution.

The effect sizes from the lucid dreaming trials will be compared to each receiver's base line data and to historical AC data that is available for the experienced receivers.

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IV. DISCUSSIONS AND CONCLUSIONS

The primary purpose of this pilot study is to determine if AC is possible in the lucid dream state. Because the trials will be conducted in each receiver's home and is unsupervised, it is possible that the target material can be compromised. By using standard enclosure techniques it is possible to determine if any casual attempt has been made to physically open the target material, but an experienced magician could foil the detection precautions. Thus we will be unable to conclude the existence of AC in a formal sense in this experiment.

Knowing the historical effect sizes from other AC studies and from the calibrations of the lucid dreamer population can provide circumstantial evidence of AC. If the the lucid dreaming effect sizes are not significantly smaller than the historical or base line effect sizes, then we will recommend that a careful, laboratory-based study be conducted.

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V. GLOSSARY

Not all the terms defined below are germane to the this study, but they are included here for completeness. In a typical anomalous mental phenomena (AMP) task, we define:

- Anomalous Cognition (AC)—A form of information transfer in which all known sensorial stimuli are absent. That is, some individuals are able to gain access, by an as yet unknown process, to information that is not available to the known sensorial channels.
- Receiver—An individual who attempts to perceive and report information about a target.
- Agent—An individual who attempts to influence a target system.
- Target—An item that is the focus of an AMP task (e.g., person, place, thing, event).
- Target Designation—A method by which a specific target, against the backdrop of all other possible targets, is identified to the receiver (e.g., geographical coordinates).
- Sender/Beacon—An individual who, while receiving direct sensorial stimuli from an intended target, acts as a putative transmitter to the receiver.
- Monitor—An individual who monitors an AC session to facilitate data collection.
- Session—A time period during which AC data is collected.
- Protocol—A template for conducting a structured data collection session.
- Response—Material that is produced during an AC session in response to the intended target.
- Feedback—After a response has been secured, information about the intended target is displayed to the receiver.
- Analyst—An individual who provides a quantitative measure of AC.
- Specialty—A given receiver's ability to be particularly successful with a given class of targets (e.g., people as opposed to buildings).
- Lucid Dream—A dream during which an individual becomes aware of the dream.

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2. S. LaBerge, L. E. Nagel, W. C. Dement, and V. P. Zarccone, Jr., "Lucid Dreaming Verified by Volitional Communication During REM Sleep," *Perceptual and Motor Skills*, Vol. 52, pp. 727-732 (1981).
3. S. LaBerge, L. Levitan, and W. C. Dement, "Lucid Dreaming: Physiological Correlates of Consciousness during REM Sleep," *The Journal of Mind and Behavior*, Vol. 7, Nos. 2 and 3, pp.251-258 (1986).
4. *The Psychophysiology of Lucid Dreaming*, Ed. J. Gackenbach and S. LaBerge, pp. 135-153, Plenum Press, New York (1988).

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APPENDIX

This appendix contains the full reprints of the following three papers:

- (1) "Psychology and Anomalous Observations"
- (2) "Lucid Dreaming Verified by Volitional Communication During REM Sleep"
- (3) "Lucid Dreaming: Physiological Correlates of Consciousness during REM Sleep"
- (4) *The Psychophysiology of Lucid Dreaming*, pp. 135-153

Psychology and Anomalous Observations

The Question of ESP in Dreams

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ABSTRACT: Books by psychologists purporting to offer critical reviews of research in parapsychology do not use the scientific standards of discourse prevalent in psychology. Experiments at Maimonides Medical Center on possible extrasensory perception (ESP) in dreams are used to illustrate this point. The experiments have received little or no mention in some reviews to which they are clearly pertinent. In others, they have been so severely distorted as to give an entirely erroneous impression of how they were conducted. Insofar as psychologists are guided by these reviews, they are prevented from gaining accurate information about research that, as surveys show, would be of wide interest to psychologists as well as to others.

In recent years, evidence has been accumulating for the occurrence of such anomalies as telepathy and psychokinesis, but the evidence is not totally convincing. The evidence has come largely from experiments by psychologists who have devoted their careers mainly to studying these anomalies, but members of other disciplines, including engineering and physics, have also taken part. Some psychologists not primarily concerned with parapsychology have taken time out from other professional concerns to explore such anomalies for themselves. Of these, some have joined in the experimentation (e.g., Crandall & Hite, 1983; Lowry, 1981; Radin, 1982). Some have critically reviewed portions of the evidence (e.g., Akers, 1984; Hyman, 1985). Some, doubting that the phenomena could be real, have explored nonrational processes that might encourage belief in their reality (e.g., Ayeroff & Abelson, 1976). Still others, considering the evidence substantial enough to justify a constructive theoretical effort, have struggled to relate the apparent anomalies to better established knowledge in a way that will render them less anomalous (e.g., Irwin, 1979) or not anomalous at all (e.g., Blackmore, 1984). These psychologists differ widely in their surmise about whether the apparent anomalies in question will eventually be judged real or illusory; but they appear to agree that the evidence to date warrants serious consideration.

Serious consideration of apparent anomalies seems an essential part of the procedures of science,

regardless of whether it leads to an understanding of new discoveries or to an understanding of how persuasive illusions arise. Apparent anomalies—just like the more numerous observations that are not anomalous—can receive appropriate attention only as they become accurately known to the scientists to whose work they are relevant. Much parapsychological research is barred from being seriously considered because it is either neglected or misrepresented in writings by some psychologists—among them, some who have placed themselves in a prime position to mediate interaction between parapsychological research and the general body of psychological knowledge. In this article, I illustrate this important general point with a particular case, that of experimental research on possible ESP in dreams. It is a case of especially great interest but is not unrepresentative of how psychological publications have treated similar anomalies.

The Maimonides Research

The experimental evidence suggesting that dreams may actually be influenced by ESP comes almost entirely from a research program carried out at the Maimonides Medical Center in Brooklyn, New York. Among scientists active in parapsychology, this program is widely known and greatly respected. It has had a major indirect influence on the recent course of parapsychological research, although the great expense of dream-laboratory work has prevented it from being a direct model.

None of the Maimonides research was published in the journals that are the conventional media for psychology. (The only possible exception is that a summary of one study [Honorton, Krippner, & Ullman, 1972] appeared in convention proceedings of the American Psychological Association.) Much of it was published in the specialized journals of parapsychology. The rest was published in psychiatric or other medical journals, where it would not be noticed by many psychologists. Most of it was summarized in popularized form in a book (Ullman, Krippner, & Vaughan, 1973) in which two of the researchers were joined by a popular writer whose own writings are clearly not in the scientific tradition, and the book departs from the pattern of scientific reporting that characterizes the original research reports.

Perceptual and Motor Skills, 1981, 52, 727-732. © Perceptual and Motor Skills 1981

LUCID DREAMING VERIFIED BY VOLITIONAL COMMUNICATION
DURING REM SLEEP¹

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Summary.—The occurrence of lucid dreaming (dreaming while being conscious that one is dreaming) has been verified for 5 selected subjects who signaled that they knew they were dreaming while continuing to dream during unequivocal REM sleep. The signals consisted of particular dream actions having observable concomitants and were performed in accordance with pre-sleep agreement. The ability of proficient lucid dreamers to signal in this matter makes possible a new approach to dream research—such subjects, while lucid, could carry out diverse dream experiments marking the exact time of particular dream events, allowing derivation of precise psychophysiological correlations and methodical testing of hypotheses.

That we sometimes dream while knowing that we are dreaming was first noted by Aristotle. According to accounts of conscious or "lucid" dreaming, as this phenomenon is commonly termed, the dreamer can possess a consciousness fully comparable in coherence, clarity, and cognitive complexity to that of the waking state, while continuing to dream vividly (Van Eeden, 1913; Brown, 1936; Green, 1968; Tart, 1979; LaBerge, 1980b). As a result of theoretical assumptions about the nature of dreaming, contemporary dream researchers have questioned whether these experiences take place during sleep or during brief periods of hallucinatory wakefulness. The purpose of the present study was to give an empirical answer to this question by determining the physiological conditions in which lucid dreaming occurs.

Our experimental approach was suggested by previous investigations (Antrobus, *et al.*, 1965; Salmay, 1970; Brown & Cartwright, 1978), showing that sleeping subjects are sometimes able to produce behavioral responses highly correlated with dreaming. Since these subjects have not, according to Cartwright (1978), been conscious of making the responses, these earlier studies do not provide evidence for voluntary action (and thus, reflective consciousness) during sleep. However, we reasoned that what could be done unconsciously could also be done consciously.

The experience of one of us (S.P.L.) indicated that, if subjects became aware they were dreaming, they could also remember to perform previously

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intended dream actions. Because dreamed gaze and limb actions have sometimes shown very good correlations with polygraphically recorded eye movements and muscle activation (Rechtschaffen, 1973), it seemed plausible that lucid dreamers could signal that they knew they were dreaming by means of intentional dream actions having observable physiological correlates.

METHOD AND RESULTS

Five subjects, trained in the method of lucid dream induction (MILD) described by LaBerge (1980c), were selected on the basis of their claimed ability to have lucid dreams on demand, and studied for 2 to 20 nonconsecutive nights (see Table 1). Standard polysomnograms (Rechtschaffen & Kales, 1968), i.e., electroencephalogram (EEG), electro-oculogram (EOG), and chin electromyogram (EMG), were recorded, as well as left and right wrist EMG (for signaling). The subjects attempted to follow a predetermined procedure of signaling whenever they became aware that they were dreaming. A variety of signals were specified, generally consisting of a combination of dreamed eye movements and a pattern of left and right dream-fist clenches. The subjects demonstrated the signals during pre-recording calibrations but were asked not to practice further while awake.

In the course of the study, 35 lucid dreams were reported subsequent to spontaneous awakening from various stages of sleep as follows: rapid-eye-movement (REM) sleep in 32 cases, non-REM (NREM) Stage 1 twice, and during the transition from NREM Stage 2 to REM once.

The subjects reported signaling during 30 of these lucid dreams. After each recording, the reports mentioning signals were submitted along with the respective polysomnogram to a judge uninformed of the times of the reports.

TABLE 1
SUMMARY OF LUCID DREAM SIGNALING EXPERIMENTS

Subject (age, sex)	Nights recorded	Lucid dreams reported (sleep stage)	Lucid dream signals verified*/reported
S.L. (32 yr., M)	20	17 (REM)	14/15
R.K. (28 yr., M)	4	5 (REM)	3/5
L.L. (34 yr., F)	2	1 (REM)	0/0
		2 (NREM-1)	0+/1
B.K. (27 yr., F)	6	6 (REM)	5/6
		1 (NREM-2/REM) ++	0/0
S.P. (26 yr., M)	2	2 (REM)	2/2

*Blindly matched for correspondence between reported and observed signals.
+On awakening from NREM Stage 1 sleep (2 min. after having awakened from REM), the subject reported performing the agreed-upon signal during a vivid and lengthy lucid dream. However, neither her EOG nor wrist EMG showed any sign of the reported signals, as might be expected from the normal lack of correspondence between dream gaze and eye movements during descending Stage 1 sleep (Rechtschaffen, 1973).
++ The subject awoke, in this case, during the transition from NREM Stage 2 to REM.

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The judge was asked to determine whether one (or none) of the polysomnographic epochs corresponded with the reported lucid dream signal. In 24 cases, the judge was able to select the appropriate 30-sec. epochs (out of about 1000 per polysomnogram) on the basis of correspondence between reported and observed signals (Table 1). The probability that the selections were correct by chance alone is astronomically small. All signals associated with lucid dream reports occurred during epochs of unambiguous REM sleep scored according to the standard criteria (Rechtschaffen & Kales, 1968). The lucid dream signals were followed by an average of 1 min. (range: 5 to 450 sec.) of uninterrupted REM sleep.

Inspection of the polysomnographic epochs preceding the lucid dream signal reports suggested the failures with blind matching (the "false negatives") were due to high baseline EOG and wrist EMG activity, resulting in an unfavorable signal-to-noise ratio. However, no clear instances of signals were observed except where reported, i.e., there were no "false positives." On the other hand, in many cases, the reported signals were unequivocal (see Figs. 1 and 2). The most reliable signal was a series of extreme horizontal eye movements (left, right, left, right.)

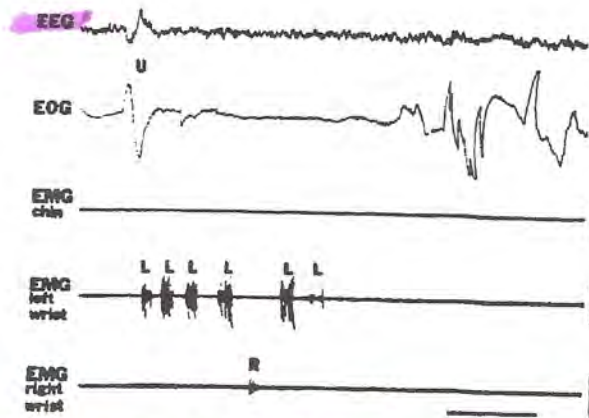


FIG. 1. Polygraph record of a subject signaling that he knows he is dreaming. The subject awoke approximately 20 sec. after this excerpt and reported recognizing that he was dreaming and performing the agreed upon signal in the dream, i.e., he directed his dream gaze upwards momentarily (U) and then executed a sequence of dreamed left (L) and right (R) fist clenches, Morse code for S.L., the subject's initials. Note that unlike the predominantly horizontal eye movements (above right), the extreme upward eye movement (U) produces characteristic artifact in the EEG channel. All three of the scoring criteria for REM sleep are met: low amplitude chin EMG, episodic REMs, and low-voltage, mixed-frequency EEG (Rechtschaffen & Kales, 1968). The EEG shows occasional 10-Hz (alpha) activity as is normal during REM sleep (Rechtschaffen, 1973); integration of the alpha band-pass filtered EEG showed the amount of alpha activity during the lucid dream did not significantly differ from that during the preceding non-lucid portion of the REM period. (Calibrations: 50 μ V; 5 sec.)

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10Hz Alpha activity normal during REM sleep

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S. P. LA BERGE, ET AL.

The most complicated signal (shown in Fig. 1) consisted of a single upward dream-eye movement followed by a series of left (L) and right (R) dream-fist clenches in the order "LLL LRL." This sequence is equivalent to the subject's initials in Morse code (LLL = . . . = S; LRL = . - . = L). The complexity of this signal argues against the possibility that the EMG discharges might be spontaneous.

That all cases of lucid dream signaling occurred during epochs scored as REM sleep specifies, to a certain extent, the physiology of lucid dreaming as "a relatively low voltage, mixed frequency EEG in conjunction with episodic REMs and low amplitude electromyogram (EMG)" (Rechtschaffen & Kales, 1968). This definition allows variation in the three parameters, the details of which will be reported elsewhere. In brief, the variations in the EEG patterns of the lucid dream polysomnograms were typical of REM sleep, i.e., sporadic "saw-tooth" waves as well as alpha and theta rhythm, and not wakefulness. The occasional, but normal, appearance of alpha rhythm (a brain wave usually associated with wakefulness), in the EEG during REM periods raises the possibility that lucid dreaming could occur during momentary partial arousals or "micro-awakenings" (Schwartz & Lefebvre, 1973). However, alpha rhythm need not be present during lucid dream signaling, as is shown by Fig. 2. Furthermore, some of the lucid dreams were several minutes long, ruling out any explanation based on the notion of brief intrusions of wakefulness.

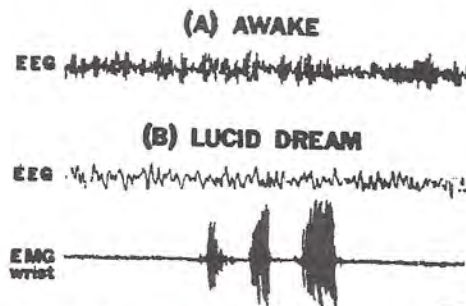


FIG. 2. Comparison of EEG (C3/A2) during lucid dream signaling (B) and immediately after awakening (A). The continuous waking alpha (10 Hz) activity for this subject is clearly distinct from the mixed frequency patterns during REM sleep. Although other EEG patterns are compatible with wakefulness, the tracing illustrated is the pattern normally exhibited when subjects awaken from sleep. The 2- to 4-Hz EEG activity prominent in the lucid dream sample (B) is highly characteristic of REM sleep. (Calibrations: 50 μ V; 1 sec.)

DISCUSSION

How do we know that the subjects were "really asleep" when they communicated the signals? If we allow perception of the external world as a

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2-4Hz Lucid Dreams

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criterion of being awake, we can conclude the subjects were indeed asleep: Although they knew they were in the laboratory, this knowledge was a matter of memory, not perception; upon awakening, they reported having been totally in the dream world and not in sensory contact with the external world. Neither were the subjects merely not attending to the environment, e.g., as when absorbed in reading or daydreaming; according to their reports, they were specifically aware of the absence of sensory input from the external world. If subjects were to claim to have been awake while showing physiological signs of sleep, or vice versa, we might doubt their subjective reports. However, in the present case, the subjective accounts and physiological measures are in clear agreement, and it would be extremely unparsimonious to suppose that subjects who believed themselves to be asleep while showing physiological indications of sleep were actually awake.

The two principal conclusions of this study are that lucid dreaming can occur during REM sleep and that it is possible for lucid dreamers to signal intentionally to the environment while continuing to dream. These findings have both theoretical and practical consequences. The first result shows that under certain circumstances, dream cognition during REM sleep can be much more reflective and rational than has been commonly assumed. Evidence indicating that lucid dreaming is a learnable skill (LaBerge, 1979, 1980a, 1980b, 1980c), taken with the second result, suggests the feasibility of a new approach to dream research: lucidly dreaming subjects could carry out diverse experiments marking the exact time of occurrence of particular dream events, which would allow the derivation of precise psychophysiological correlations and methodical testing of hypotheses.

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remaining 21 (28%) as WILDs. WILDs were more common than WILDs (binomial test, $p < .0001$). Compared to DILDs, WILDs were more frequently immediately preceded by physiological indications of awakening (Chi-squared = 38.3, 1 *df*, $p < .0001$), establishing the validity of classifying lucid dreams in this manner. See Figures 2 and 3 for illustrations of these two types of lucid dreams.

The distributions of DILD and WILD latencies from the onset of REM are significantly different (LaBerge, Levitan, & Dement, 1986). A Wald-Wolfowitz test demonstrated that WILDs do not occur as early or late in REM periods as DILDs do ($p < .0015$). This difference may be simply explained: As a matter of definition, a necessary condition for a WILD to occur is a transitory awakening followed by a return to REM sleep. If the awakening were to happen too near to the beginning of REM, the REM period might simply be aborted. Similarly, if the awakening were to occur too near to the "natural" end of the REM period, it would be more likely that REM would not resume but that wakefulness would persist or a NREM sleep stage would ensue.

To summarize, an elevated level of CNS activation seems to be a necessary condition for the occurrence of lucid dreams. Were this condition unnecessary,

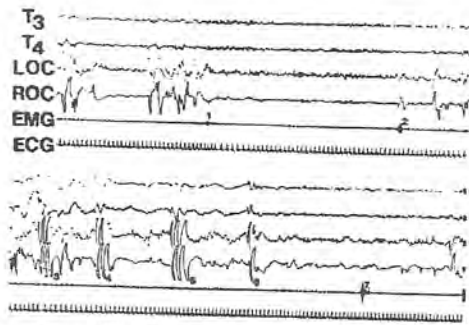


Figure 3. A typical lucid dream initiated from a transient awakening during REM (WILD). Six channels of physiological data (left and right temporal EEG [T_3 and T_4], left and right eye movements [LOC and ROC], chin muscle tone [EMG], and electrocardiogram [ECG]) from the last 3 min of a 14-min REM period are shown. The subject awoke at 1 and after 40 seconds returned to REM sleep at 2, and realized he was dreaming 15 s later and signaled at 3. Next he carried out the agreed-upon experimental task in his lucid dream, singing between signals 3 and 4, and counting between signals 4 and 5. This allowed comparison of left and right hemisphere activation during the two tasks (LaBerge & Dement, 1982b). Note the heart-rate acceleration-deceleration pattern at awakening (1) and at lucidity onset (3) and the skin potential artifacts in the EEG (particularly T_4) at lucidity onset (3). Calibrations are 50 μ V and 5 seconds.

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lucid dreams were distributed within REM periods and perhaps every stage of sleep. Why then is CNS activation necessary for lucid dreaming? Evidently the high level of cognitive function involved in lucid dreaming requires a correspondingly high level of neuronal activation. In terms of Antrobus's (1986) adaptation of Anderson's (1983) ACT* model of cognition to dreaming, working memory capacity is proportional to cognitive activation, which in turn is proportional to cortical activation. Becoming lucid requires an adequate level of working memory to activate the presleep intention to recognize that one is dreaming. This level of activation is apparently not always available during sleep but normally only during phasic REM.

THE TEMPORAL DISTRIBUTION OF LUCID DREAMS

St. Thomas Aquinas mentioned "that sometimes while asleep a man may judge that what he sees is a dream, discerning as it were, between things and their images" and that this happens especially "towards the end of sleep, in sober men and those who are gifted with a strong imagination." (Aquinas, 1947, p. 430). Van Eeden (1913) stated that his lucid dreams invariably occurred between 5 and 8 o'clock in the morning. By way of explanation, he quoted Dante's characterization of these hours as the time "when swallows begin to warble and our mind is least clogged by the material body." Garfield (1975) exactly agreed with van Eeden's observation, though perhaps not with his poetic explanation. LaBerge (1979) plotted the times of 212 of his lucid dreams and found their pattern of occurrence closely fit the usual cyclic distribution of REM periods. He suggested that the fact that most REM sleep occurs toward the end of the night provided a plausible explanation for Van Eeden's and Garfield's observations. Later, LaBerge (1980a) tested this hypothesis by comparing the temporal distribution of his lucid dreams with that expected on the basis of normative data from Williams, Karacan, and Jursch (1974). A chi-square test indicated that the observed distribution of lucid dreams in the first three REM periods was not significantly different from what would be expected on the basis of mean REM period lengths at different times of the night.

Cohen (1979) argued that the left hemisphere shows a gradual increase in dominance across the night (but see Armitage, Hoffmann, Moffitt, & Shearer, 1985). Since left-hemisphere abstract symbolic functions are undoubtedly crucial for lucid dreaming, Cohen's GILD hypothesis led LaBerge (1985b) to predict that the probability of dream lucidity should increase with time of night.

This hypothesis was tested by LaBerge *et al.* (1986). For each of their 12 subjects, a median split for total REM time was determined; 11 of their subjects had more lucid dreams in the later half of their REM than in the earlier (binomial test; $p < .01$). For the combined sample, relative lucidity probability was calculated for REM periods 1 through 6 of the night by dividing the total number of

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lucid dreams observed in a given REM period is the corresponding wake time in stage REM for the same REM period. A regression analysis clearly demonstrated that relative lucidity probability was a linear function of ordinal REM period number ($r = .98, p < .0001$). No measure of activation (EM, RR, HR, SP) even approached significance when entered into the regression equation, indicating that the increase in lucid dream probability is not explained by a general increase in CNS activation across the night. These results strongly support the conclusion that lucid dreams are more likely to occur in later REM periods than in earlier ones—provided, of course, that sleep is continued long enough.

Another factor influencing the temporal distribution of lucid dreams is initiation type. LaBerge's (1987) personal record of lucid dreams indicates that, for him, W-type lucid dreams are over 10 times more frequent during afternoon naps than they are during the first REM period of the night ($p < .0002$).

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(1982) conclusion that lucid dreams are associated with high alpha activity. One is that the differences found between low and high alpha reports were based primarily on the degrees of prelucidity in the reports. Even more important, we have no assurance of whether, in either condition, the episode of prelucidity or lucidity occurred in association with the final 20 to 30 second period of either high or low alpha activity that determined the awakening condition. Moreover, because none of the dreams classified as lucid were marked by any signals, we have no proof that they were in fact lucid dreams, nor in any case do we have any way of determining what the degree of alpha activity was during the frequently brief episodes of lucidity.

Because of Ogilvie *et al.*'s (1982) design, we cannot exclude the possibility that what their study may actually have demonstrated is that the tendencies of subjects to retrospectively judge themselves to have been briefly or partially lucid vary with the amount of alpha activity either just before or during the process of awakening. Support for this interpretation comes from an earlier study, which concluded that mentation reports collected from REM periods showing EEGs with a high proportion of alpha waves were associated with "some feeling of control over the content" and were frequently labeled by subjects as "thoughts" rather than "dreams" (Goodenough, Shapiro, Holden, & Steinschreiber, 1959).

There is another possible design problem with the Ogilvie *et al.* (1982) study that seems serious enough to merit mention: The judges' lucidity ratings were based not upon the spontaneous dream reports but on the subjects' answers to rather leading questions subsequently posed by the interviewer, such as "Was there any point when you wondered whether or not you might be dreaming?" and "Was there any point at which you knew you were dreaming while the dream was going on?" The demand characteristics should be obvious. Additionally, there is a problem that retrospective judgments about earlier states of mind are likely to be confounded by our current mental state. Cognitive capacities we currently possess are likely to be mistakenly remembered as having been present in an earlier state. A conservative approach should perhaps put more weight on the original dream reports; in the present context, one would like to know how many subjects spontaneously mentioned in their reports that they had been prelucid or lucid.

In a more recent study, Ogilvie *et al.* (1983) remedied several of these methodological problems and arrived at a conclusion regarding alpha activity and lucidity unopposed by their earlier work. They studied eight lucid dreamers for 1 to 4 nights in a sleep lab. The subjects were awakened from REM following spontaneous or cued eye movement signals. The cue buzzer sounded after 15 minutes of REM during periods of either high or low alpha activity. The subjects were to signal at the cue and again 30 seconds later if in a lucid dream. Reports were elicited 30 to 60 seconds after cued or spontaneous signals and rated for lucidity. Contrary to their earlier findings, the low-alpha condition yielded

EEG ALPHA ACTIVITY DURING REM LUCID DREAMS

The fact that lucid dreaming occurs during REM sleep partially defines the sort of EEG activity characteristic of lucid dreams. However, the standard criteria for determining REM sleep (Rechtschaffen & Kales, 1968) are quite general when referring to the EEG, being simply "relatively low voltage, mixed frequency," without specifying how much of which frequencies might be mixed. As noted previously, REM sleep is a labile and heterogeneous state. For example, during REM, the EEG sometimes shows predominant 2 to 3 Hz "sawtooth" waves, whereas at other times it may exhibit prominent 8 to 10 Hz alpha waves. Consequently, the question arises: Does the range of EEG activity characteristic of lucid dreams reliably differ in any way from that of nonlucid dreams?

In a series of studies, Ogilvie and colleagues have pursued the hypothesis that lucid dreams are associated with high levels of alpha activity. In the first of these investigations, they came to the initial "impression that alpha is the dominant EEG frequency during lucid dreams" on the rather shaky grounds of a comparison of "percent alpha in the EEG" of just two lucid dream REM periods with percentage alpha for six nonlucid dream REM periods for a single subject (Ogilvie, Hunt, Sawicki, & McGowan, 1978, p. 165).

Ogilvie, Hunt, Tyson, Lucescu, and Jeakins (1982) followed up their preliminary work with a larger study in which 10 subjects (all good dream recallers, with a wide range of lucid dreaming ability) were recorded 2 nights each in the sleep laboratory, during which they were awakened four times per night from REM sleep: half of the time during periods of relatively high alpha and half of the time during relatively low alpha. Dream reports were collected and rated on a lucidity scale by a judge blind to the awakening condition. Significantly higher lucidity ratings were obtained for high-alpha compared to low-alpha awakenings.

Several methodological problems of this study cast doubt on Ogilvie *et al.*'s

2-3 Hz
8-10 Hz

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slightly more lucid dreams than the high-alpha condition; however, this difference was not statistically significant. Addressing this same issue, LaBerge (1980b) performed a Fourier analysis on EEG activity (C3/A1) for a single lucid dream REM period. Comparison of the spectral profiles for the lucid and non-lucid portions of the REM period revealed alpha activity for the nonlucid portion to more closely resemble the waking EEG spectrum than did that in the lucid portion; however, the two REM samples did not significantly differ.

In summary, it would seem that at this point no reliable association of lucid dreaming with alpha activity (whether high or low) has been established. A more productive approach to the question of EEG in lucid versus nonlucid REM would probably involve quantifying whole-band EEG frequency spectra from several electrode placements and comparing signal-verified lucid dreams with nonlucid controls.

NREM LUCID DREAMS

The findings summarized here indicating that lucid dreams typically occur in REM sleep should not be misconstrued to suggest that lucid dreams never occur in NREM sleep. In fact, in LaBerge, Nagel, Dement and Zarcone's initial study (1981), lucid dreams were reported by two subjects after spontaneous awakening from NREM sleep (Stage-2 once; Stage-1, twice). The Stage-2 report indicated only a brief moment of lucidity before awakening; because the subject was unable to signal while lucid we cannot be certain that her experience took place during Stage-2 sleep and not while awakening. As for the NREM Stage-1 reports, although the subject reported signaling before awakening on these occasions, no signals could be verified on her polysomnogram.

LaBerge (1980a) polysomnographically recorded a single trained subject during sleep onset on 3 consecutive nights. The subject reported a rich history of hypnagogic imagery. On the experimental nights, she made an effort to retain consciousness while entering sleep-onset dream states. "Dreaming" was distinguished from other sleep-onset mentation by the two requirements that (1) the subject was subjectively asleep (i.e., unaware of the actual position of her body in bed) and (2) that she hallucinated her body within the dream scene.

On each of the experimental sessions (lasting about 2 hours), the subject repeatedly rested quietly, but vigilantly, and while drifting off to sleep counted to herself ("One, two, three, . . .") until she began to dream, at which point she awakened and tape-recorded a mentation report. In 25 of the 42 resultant dream reports (all of which were very short), the subject claimed to have been lucid. The following is a typical report: "I am in the grocery store, going down an aisle; only I am standing on a cart. It is whizzing real fast. As I go by the Coke and Pepsi bottles, I realize that I am dreaming. I think to look at my hands, but they won't move up to eye level" (p. 101). Note the absence of voluntary control over the body image, a very unusual condition for REM lucid dreams. Visual

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inspection of the polygraph record shows all of these "dreamlets" to have occurred during Stage-1 sleep, with slow eye movements.

This pilot study makes it clear that the observed frequency of NREM lucid dreaming will depend on experimental demand characteristics. The same point is made by Dane (1983), who found a high proportion of lucid dream reports deriving from NREM under conditions of heightened attention during sleep onset and explicit instructions that "dreams occur during NREM as well as during REM sleep" (p. 249). A comparative study of REM versus NREM (and "waking") lucid dreaming clearly needs to be done.

PSYCHOPHYSIOLOGICAL RELATIONSHIPS DURING REM SLEEP

One of the major obstacles impeding the development of human consciousness as a topic of rigorous scientific study has been that the only direct account available of the private events occurring in a person's mind is his or her own subjective report. Subjective reports, unfortunately, are not subject to objective verification—at least not directly. To make matters worse, of all the "bad witnesses"—as Heraclitus called the senses—"introspection" appears to be the least reliable. Introspection is not really even a sense: We do not simply "look and see" the contents of our minds; what we "see" there is largely dependent on what we expect to see based on our theories of ourselves. These theories tend to portray ourselves as more consistent and rational than we really are (Nisbett & Wilson, 1977). Given that the only witness is of uncertain reliability, what we need in order to study consciousness more objectively is a means of corroborating the testimony of the "I-witness," and this is precisely the role of the psychophysiological approach. A key element in this new strategy is the idea of making full use of the subject's cooperativeness and intelligence. A frequent practice in experimental psychology requires the deception of subjects about the true nature of the experiment. This has the advantage of minimizing the effect the subject's knowledge might have on the experiment. But this particular methodology is inappropriate when the object of the investigation is the subject's own consciousness. In this case, a more suitable approach is one in which the dichotomous subject/experimenter relationship is modified: Perhaps subjects should be regarded as—to borrow an anthropological term—participant-observers.

What about the problem of the uncertain reliability of introspective accounts of consciousness? There are two strategies likely to increase our confidence in the reliability of subjective reports: In the first place, it helps to study highly trained (and lucid) subjects who are skillful reporters. Second, we can make use of the fact that the convergent agreement of physiological measures and subjective reports provides a degree of validation to the latter (Stoyva and Kamiya, 1968).

The fact that lucid dreamers can remember to perform predetermined ac-

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tions and signal to the laboratory. LaBerge proposed a new approach to dream research: Lucid dreamers, he proposed,

could carry out diverse dream experiments marking the exact time of particular dream events, allowing the derivation of precise psychophysiological correlations and the methodical testing of hypotheses. (LaBerge, Nagel, Dement, & Zarcone, 1981, p. 727)

This strategy has been put into practice by the Stanford group in a number of studies summarized by LaBerge (1985a).

LaBerge first of all pointed out that the data reported in LaBerge, Nagel, Dement, and Zarcone (1981) and LaBerge, Nagel, Taylor, Dement, and Zarcone (1981) indicate that there is a very direct and reliable relationship between gaze shifts reported in lucid dreams and the direction of polygraphically recorded eye movements. It should be noted that the results obtained for lucid dreams (see also Dane, 1984; Fenwick *et al.*, 1984; Hearne, 1978; Ogilvie, *et al.*, 1982) are much stronger than the generally weak correlations demonstrated by earlier investigations testing the notion that the dreamer's eyes move with his or her hallucinated dream gaze, which had to rely on the chance occurrence of a highly recognizable eye movement pattern that was readily matchable to the subject's reported dream activity (e.g., Roffwarg, Dement, Muzio, & Fisher, 1962). This would seem to illustrate the methodological advantage of using lucid dreamers.

LaBerge (1980a, 1985a) reports having straightforwardly approached the problem of dream time by asking subjects to estimate various intervals of time during their lucid dreams. Signals marking the beginning and end of the subjective intervals allowed comparison with objective time. In all cases, LaBerge reported, time estimates during the lucid dreams were very close to the actual time between signals.

In another study, LaBerge and Dement (1982a) demonstrated the possibility of voluntary control of respiration during lucid dreaming. They recorded three lucid dreamers who were asked to either breathe rapidly or to hold their breaths (in their lucid dreams), marking the interval of altered respiration with eye movement signals. The subjects reported successfully carrying out the agreed-upon tasks a total of nine times, and in every case, a judge was able to correctly predict on the basis of the polygraph recordings which of the two patterns had been executed ($p < .002$).

Evidence of voluntary control of other muscle groups during REM was found by LaBerge, Nagel, Dement, and Zarcone (1981) while testing a variety of lucidity signals. They observed that a sequence of left and right dream-fist clenches resulted in a corresponding sequence of left and right forearm twitches as measured by EMG. However, the amplitude of the twitches bore an unreliable relationship to the subjective intensity of the dreamed action. Because all skeletal muscle groups except those that govern eye movements and breathing suffer a profound loss of tone during REM sleep, it is to be expected that most muscular responses to dreamed movements will be feeble. Nonetheless, these responses

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to an original dream. One might say that the dreamer's body responds to dreamed actions with movements that are but shadows of the originals.

Further support of this notion comes from a study (Fenwick *et al.*, 1984) of a single highly proficient lucid dreamer (Alan Worsley, who had also been Hearne's [1978] subject) who carried out a variety of dreamed muscular movements while being polygraphically recorded. In one experiment, Worsley executed movements during lucid dreams involving finger, forearm, and shoulder muscle groups (flexors) while EMG was recorded from each area. The results were consistent: The axial muscles showed no measurable EMG activity, whereas the forearm EMG consistently showed lower amplitude and shorter bursts compared to the finger EMG. A similar experiment with the lower limbs yielded similar results. In addition to the finding that REM atonia shows a central-peripheral gradient with motor inhibition least for the most distal muscles, Fenwick *et al.* reported that similar experiments comparing EMG response to dreamed arm and leg flexions and extensions suggested that flexors were less inhibited than extensors. In addition to EMG, an accelerometer was utilized in several experiments demonstrating that Worsley was able to produce minor movements of his fingers, toes, and feet during REM, though not of his legs. Fenwick *et al.* also presented the results of a single experiment suggesting that dream speech may be initiated in the expiratory phase of respiration just as it usually does during waking. In still another experiment they demonstrated the voluntary production of smooth pursuit eye movements during a lucid dream. LaBerge (1986) has carried out related experiments in which two subjects tracked the tip of their fingers moving slowly left to right during four conditions: (1) awake, eyes open; (2) awake, eyes closed mental imagery; (3) lucid dreaming; and (4) imagination ("dream eyes closed") during lucid dreaming. The subjects showed saccadic eye movements in the two imagination conditions (2 and 4), and smooth-tracking eye movements during dreamed or actual tracking (conditions 1 and 3).

Fenwick *et al.* also showed that Worsley was able to perceive and respond to environmental stimuli (electrical shocks) without awakening from his lucid dream. This result raises a theoretical issue: If we take perception of the external world to be the essential criterion for wakefulness (LaBerge, Nagel, Dement, & Zarcone, 1981), then it would seem that Worsley must have been at least partially awake. On the other hand, when environmental stimuli are incorporated into dreams without producing any subjective or physiological indications of arousal, it appears reasonable to speak of the perception as having occurred during sleep. Furthermore, it may be possible, as LaBerge (1980c) has suggested, for one sense to remain functional and "awake" while others fall "asleep." As long as we continue to consider wakefulness and sleep as a simple dichotomy, we will lie in a Procrustian bed that is bound at times to be most uncomfortable. There must be degrees of being awake just as there are degrees of

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being asleep (i.e., the conventional sleep stages). Before finding our way out of this muddle, we will probably need to characterize a wider variety of states of consciousness than those few currently distinguished (e.g., dreaming, sleeping, waking, and so on).

Because many researchers have reported cognitive task dependency of lateralization of EEG alpha activity in the waking state, LaBerge undertook a pilot study to determine whether similar relationships would hold in the lucid dream state. The two tasks selected for comparison were dreamed singing and dreamed counting, activities expected to result in relatively greater engagement of the subjects' left and right cerebral hemispheres, respectively.

Integrated alpha band EEG activity was derived from electrodes placed over right and left temporal lobes while four subjects sang and counted in their lucid dreams (marking the beginning and end of each task by eye movement signals). The results supported the hypothesized lateralization of alpha activity: The right hemisphere was more active than the left during singing, during counting the reverse was true. These shifts were similar to those observed during actual singing and counting (LaBerge & Dement, 1982b).

Sexual activity is a rather commonly reported theme of lucid dreams (Garfield, 1979; LaBerge, 1985a). However, at this point, only a single physiological investigation of lucid dream sex has been published. LaBerge, Greenleaf, and Kedzierski (1983) undertook a pilot study to determine the extent to which subjectively experienced sexual activity during REM lucid dreaming would be reflected in physiological responses. Their subject was a highly proficient lucid dreamer who spent the night sleeping in the laboratory. Sixteen channels of physiological data, including EEG, EOG, EMG, respiration, skin conductance level (SCL), heart rate, vaginal EMG (VEMG), and vaginal pulse amplitude (VPA), were recorded. The experimental protocol called for the subject to make specific eye movement signals at the following points: when she realized she was dreaming (i.e., the onset of the lucid dream); when she began sexual activity (in the dream); and when she experienced orgasm. The subject reported a lucid dream in which she carried out the experimental task exactly as agreed upon. Data analysis revealed a significant correspondence between her subjective report and all but one of the autonomic measures; during the 15-second orgasm epoch, mean levels for VEMG activity, VPA, SCL, and respiration rate reached their highest values and were significantly elevated compared to means for other REM epochs. Contrary to expectation, heart rate increased only slightly and nonsignificantly.

LaBerge (1985a) reports replicating this experiment using two male subjects. In both cases, respiration showed striking increases in rate. Again, there were no significant elevations of heart rate. Interestingly, although both subjects reported vividly realistic orgasms in their lucid dreams, neither actually ejaculated, in contrast to the "wet dreams" commonly experienced by adolescent

males. The mechanism of nocturnal emissions is probably local reflex irritability because wet dreams do not necessarily involve dream content of a sexual nature, again in contrast to lucid dream orgasms, which are obviously sexual; it appears we have two extreme cases: "bottom-up" versus "top-down" orgasms.

All of these results support the conclusion that the events we experience while asleep and dreaming produce effects on our brains (and to a lesser extent, bodies) remarkably similar to those that would be produced if we were actually to experience the corresponding events while awake. The reason for this is probably that the multimodal imagery of the dream is produced by the same brain systems that produce the equivalent perceptions (cf. Finke, 1980). Perhaps this is why dreams seem so real: To our brains, dreaming of doing something is equivalent to actually doing it.

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PSYCHIC WARFARE:
EXPLORING THE MIND FRONTIER

by

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Lieutenant Colonel, USAF

A RESEARCH REPORT SUBMITTED TO THE FACULTY
IN
FULLFILLMENT OF THE RESEARCH
REQUIREMENT

Research Advisor: Colonel Donald N. Panzenhagen

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AIR WAR COLLEGE RESEARCH REPORT ABSTRACT

TITLE: Psychic Warfare: Exploring The Mind Frontier

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Man's greatest potential remains a prisoner of man. Vast untapped mental capabilities create an entirely new battlefield dimension which, if ignored, pose a threat to self and country more serious than nuclear weapons. This threat starts from within. Our fears and cynical attitudes towards psychic capabilities make us our own worst enemies. The Soviets, on the other hand, take psychic research very seriously at all levels, particularly for its military application. Exploring the mind frontier is essential and the key to successful exploration is a greater psychic awareness. The mind is rich in unfathomed resources ripe for exploration, a limitless source of treasures for advancing all mankind, and a serious threat to those who ignore its potential. We must overcome our psychic inhibitions, stop denying the existence of paranormal events, and start trying instead to understand the nature of these phenomena. We must shed the super secret cloaks and educate our leaders at all levels on the real psi military potentials and threats so we can adequately focus and prioritize national resources. Only thru greater openness and awareness to the truth can we adequately prepare.

BIOGRAPHICAL SKETCH

Lieutenant Colonel Dolan M. McKelvy, USAF, received a B.S. from the United States Air Force Academy and a M.S. from Kansas State University. His extensive computer science and systems engineering background have taken him from vacuum tubes to integrated circuits, from slide-rules to world-wide computer networks, and from human senses to high tech space based sensors. He recognizes the existence and tremendous potential inherent in extended mental capabilities and is concerned that their potential impact on the military and a computer-dependent world is grossly underestimated in Western society. He is a graduate of the Air Force Squadron Officers School, the Air Command and Staff College, the Armed Forces Staff College (Class 75), and the Air War College, class of 1988.

PSYCHIC WARFARE: EXPLORING THE MIND FRONTIER

Man's greatest potential remains a prisoner of man. Only a fraction of the human mind is currently used. Limitless mental capabilities are just waiting to be accepted, developed and understood. With this tremendous power comes an entirely new battlefield dimension which, if ignored, poses a threat to self and country more serious than nuclear weapons. This tremendous threat starts from within. Our fears and cynical attitudes towards psychic capabilities make us our own worst enemies. Coordinated military exploration of the mind frontier is essential. And key to successful exploration is a greater awareness of psychic phenomena. To support this thesis I will examine some of the mind's great treasures, discuss their potential use and feasibility as instruments of power, highlight major self-imposed obstacles to developing extended mental capabilities, and recommend future actions.

INTRODUCTION

In December 1980 Lieutenant Colonel John B. Alexander, US Army, authored an article in Military Review entitled "The New Mental Battlefield: Beam Me Up, Spock." In this article he challenged the imagination of his readers when he stated, "To be more specific, there are weapons systems that operate on the power of the mind and whose lethal capacity has already been demonstrated" (3:47). He discussed psychotronic weaponry and provided eye-opening, unclassified information on both Soviet and American

research into parapsychological phenomena. He concluded:

The impact that psychotronic weaponry and other paranormal applications will have in the future is difficult to determine at this time... whoever makes the first major breakthrough in this field will have a quantum lead over his opponent, an advantage similar to sole possession of nuclear weapons... The intent here is to emphasize the need for more coordinated research in the realm of the paranormal. Additionally, there is a need to provide leaders at all levels with a basic understanding of weapons systems they may encounter in the not too distant future (3:52).

A response came almost immediately. In January 1981, columnist Jack Anderson of The Washington Post was quick to demonstrate American skepticism of psychic research in an article entitled "Pentagon Invades Buck Rogers' Turf." Anderson's one-sided derogatory prose was filled with terms like "futuristic fantasies," "hogwash" and "voodoo warfare" (4:D16). A month later Anderson was back reinforcing psychic skepticism. This time he began, "The brass hats are, indeed, dabbling in the dark arts." Other carefully chosen phrases included "evil eye," "comic-strip," "Ouija board warriors" and "voodoo warriors arsenal" (5:DC11). Within weeks he returned to the subject by referring to "wacky projects" of the CIA, or studies "like a Haitian witch doctor might try" (6:B13).

Maclean's magazine reported in 1981 that President Reagan and Defense Secretary Weinberger had to decide:

Whether to continue funding the top-secret project which, according to Jack Anderson of The

Washington Post, is currently allotted \$6 million annually (30:38).

Between 1981 and 1984 numerous articles appeared in periodicals revealing an astonishing amount of research in the psychic field and reflecting great skepticism amongst the scientific community. In January 1984, columnist George Hebert wrote an article entitled ". . . but a peek at ESP is justified" in a Norfolk, Virginia, newspaper. He focused attention on U.S. Defense Department denials that the government was supporting psychic research. He suggested and hoped the denials were based on security concerns. Even as a skeptic he noted:

If, on the other hand, the denial reflects a true military disinterest in the psychic possibilities--our own and the Soviet Union's--that would be reason for worry (25:A8).

An NBC Nightline program in February 1984 discussed the possibility of "mind wars." Researchers, scientists and government consultants were interviewed. Especially noteworthy was the general skepticism of government advisors compared with the positive convictions of researchers.

And most recently, in the 11 May, 1987 issue of Newsweek, Senate Foreign Relations Committee chairman Claiborne Pell invited psychic Uri Geller for a reception and dinner in Geneva during Soviet arms negotiations. He had previously arranged for Geller to give a briefing on Capital Hill--in a special bugproof room. Most of the spectators were Hill and Pentagon aides. House Foreign

Affairs Committee chairman Dante Fascell came away impressed (22:5).

Was Lt. Col. Alexander's message taken seriously? Is the Defense Department conducting more coordinated parapsychology research? Do leaders at all levels have a basic understanding of these psychic weapons systems we may soon encounter? What is the potential threat to the electronic components which form the basic foundation of all our sophisticated weapons systems? In light of future Defense Department funding limitations, does parapsychology (the mind frontier) really offer a new battlefield dimension which warrants continued military exploration? This paper attempts to answer these questions by providing an unclassified status update on LT. COL. Alexander's 1980 concerns. It is not a research report to identify everything the government is doing. By researching events and literature in the 1980s, particularly those involving military personnel and government programs, this paper shows that too much is happening in the parapsychology field to ignore, and too little information is disseminated to know how to treat it properly.

DEFINING PARAPSYCHOLOGY PSI

Paranormal phenomena are observable facts or events which are not scientifically explainable at this time. Psychic research includes such phenomena as telepathy (mind-to-mind communication), precognition (knowledge of future events), dowsing (clairvoyant ability to find water,

minerals, and so on, by means beyond known sensory or perceptual faculties), remote viewing or out-of-body experiences (seeing locations, objects or events shielded from ordinary perception in a spatial location separate from one's physical body) and psychokinesis (movement of matter by mental means without using any known physical force). These types of psychic functioning are also referred to as psi, which is frequently preferred by researchers to dispel the misconception that these capabilities are outside the realm of normal human experience. Researchers contend psychic functioning "occurs naturally in the everyday experiences of many people" (41:11). Psi is further subdivided into two categories. The term extrasensory perception (ESP) refers to telepathy, dowsing, precognition and remote viewing, while the term PK refers to psychokinesis (33:27). Psychotronics is the term used to describe "the amplification of psychic energies by electronic devices" (33:125).

The first recorded experiment of psi involved a military intelligence application of remote-viewing. Back in 550 B.C. King Croesus of Lydia felt threatened by the increasing power of the Persians. He needed to know what they were planning. Historians give us a detailed account of just what happened. Croesus sought an oracle who could somehow perceive his enemies plans; an oracle with proven psychic abilities. So he devised a simple test. He dispatched messengers throughout the ancient world to visit

One of the conclusions of our decade of research at SRI is that we found no bounds for psychic functioning. As physicists, we always try and look for the limits of phenomena, but what we found is that electro-magnetic shielding does not interfere with psychic functioning. We even went to the extent of having remote viewing experiments conducted with the viewer submerged in a submarine under 500 feet of sea-water. That greatly alters even the lowest frequency of electro-magnetic waves. But we found the viewers perfectly able to do remote viewing from the submarine, just as they had done on dry land. We also found that they were to look across distances up to thousands of miles. So from our experiments we found that neither distance nor electro-magnetic shielding interfered with psychic functioning (39:86).

Bearden goes even further. He postulates that through the use of psychotronic electromagnetic scalar weapons all forms of electronic communications are vulnerable. He supports an emerging theory of local general relativity (LGR), which does not assume that local spacetime is always flat, but rather allows the individual conservation laws to be violated locally. "The major implication of this startling new engineering physics is that one can engineer physical reality itself...communication faster than light speed is possible"(9:10).

ELECTRONIC EQUIPMENT

Many researchers are concentrating on tests of low-energy psychokinesis, called micro-PK. "Typically, the psychic subject tries to influence a simple mechanical or electrical system, such as a sensitive thermometer or computer microchip, which can be affected by a very low level of energy." Robert Jahn, Dean of the School of

says such tests have shown consistently positive results (33:54). If a microchip and other electronic equipment can be mentally manipulated, the new high-tech information revolution has just been handed a deadly setback. Financial institutions, businesses, governments, and those dependent on computers are suddenly very vulnerable. This apparent capability has created a paranoia amongst talented psychics in the parapsychology field--perhaps with some justification. "Researcher Jeffrey Mishlove believes that anyone with the ability to jam computers would probably have to be destroyed" (33:55).

How big of a step is it from being able to mentally stop an elevator at will, to manipulating the computer or electronics of a weapon system?

WEAPONS

Through psychotronics Bearden says "almost every weapon system we presently have -- or are developing -- is vulnerable to scalar EM weaponry." Once again we see existing weapons and technology possibly falling prey to a new weapons generation, called psychotronics. He developed this weapons list in 1980.

The following list enumerates all the probable Soviet psychotronic weapons that I am aware of: (1) Electromagnetic Field Canceler; (2) Electron Current Canceler; (3) Death Radiator (De-inceptor); (4) Free Energy Generator; (5) Psychotronic Bomb; (6) Brain link; (7) Brain Probe; (8) Disease Radiator Ray; (9) Emotion Radiator Ray; (10) Antisubmarine Systems; (11) Teleporters (Prototype); (12) Force Generators; (13) Orthoframe Generators; (14) Quark/Antiquark Rays; (15) Distant Telepathy; (16) Nuclear

Radiation Inhibitors; (17) Mental Implantation; (18) ABM Systems, Midcourse and Terminal; (19) Materializer Shields; (20) Sweeps for Nuclear Debris; (21) AAA Systems; (22) Antisatellite Systems; (23) Tesla-effect Weapons; (24) Earthquake Generators; (25) Antivehicle Systems; (26) Weather Control Systems (10:220-221).

He and others have continued monitoring and documenting instances where they believe these weapons have been tested, theorizing the possible effects and matching them up with real world paranormal events. Typical incidents he describes include, a Tesla Weapon at Saryshagan (Scalar Potential Interferometer), "Nuclear" Flashes off the Coast of Africa, the 15 April, 1979 Yugoslavian Earthquake, a Tesla Shield sited in August 1980, a Continuous Tesla Fireball in Lithuania on 10 September, 1976, a Continuous Tesla EMP Globe in Iran, East Coast Aerial Blasts (High Burst Registration?) in 1977 and 1978, Booms in Delaware in 1982, and "Laser" Blinding of U.S. Satellites in 1975, (11:26). More recent incidents include abnormalities during Titan launches, shuttle launches, and even associated weather anomalies.

Think, the ability to manipulate the weather would allow you to literally control the fog of war. But Bearden's 1986 apocalyptic message foretells of an ultimate destructive power,

There is a special time bomb ticking away for all of humanity. For the first time, the total destruction of our entire biosphere -- and perhaps our entire solar system -- is only moments away from the finger on the trigger (9:86).

Just how feasible are these potential military uses

There are three avenues that parapsychologist have long since recognized as possible routes to general acceptance of psi: 1. Through experiments which produce psi upon demand in laboratories so skeptics are convinced that all conditions are correctly controlled. 2. Through mainstream sciences acceptance of new theories which explain psi phenomena. 3. Through finding practical applications that "work" regardless of our limited understanding (33:xii-xiii).

Researchers have traditionally tried to use method one to convince the scientific community, but "prevailing concepts" reign supreme. Method two is also directly dependent on the scientific community and is very unlikely given the limited understanding of psi today. That is why psi practitioners and many researchers have gone to method three in the 1980s. Through practical application they can develop their skills, leaving "prevailing concepts" behind, along with the scientific community. Many researchers point to how the scientific community was the last to accept ~~hypnotism~~—so too researchers feel psi will gain acceptance from society long before the scientific community comes to grips with it.

Operational use of psi is up to the user. King Croesus was content after one test to use the Delphi oracle. World famous psychic, Edgar I. Cayce, advised General John Pershing and accompanied him on European missions. Even General Patton used the psi talents of a

water dowser while in North Africa (33:42).

More recently, according to Barbara Honegger, who worked three years in the White House office of Policy Development for the Reagan administration,

parapsychology played a major role in one of the administration's most controversial defense decisions--abandoning the Carter administration's 'shell-game' deployment for the MX missile... In other words, U.S. studies show Soviet psychics could beat the shell game and pinpoint the missiles' (33:17).

These examples show how operational use depends equally on someone taking the risk to try unorthodox techniques. Congressman Charlie Rose (D-N.C.) is a respected long-term congressman and member of the House Select Committee on Intelligence. He takes psychic weapons seriously, but in 1984 didn't think we had the technology to build them.

The congressman's personal experience has convinced him such breakthroughs are on the horizon. He has attended classified demonstrations of remote viewing arranged by the CIA. Says Rose, "I've seen some incredible examples of remote viewing--so much so that I think we ought to pay close attention to developments in this field, and especially to what the Soviets are doing. If they develop a capacity to have people mentally view secret centers within this country, we could come to the point where we didn't have any secrets" (33:47-48).

Bearden thinks those breakthroughs have occurred. He has documented evidence that the Soviets are beyond the speculation and research stages, and have deployed psi weapons systems ready to strike. With the threat so near, why are we so unprepared?

SELF IMPOSED OBSTACLES

Despite extensive evidence of psi and its tremendous potential use as an instrument of power, we continue to impede our own progress. Our mind set, extreme secrecy, and disjoint research fuels skepticism and criticism rather than seeking truth.

MIND SET

The history of psi in Western society is filled with distinguished scientist from diverse fields who became maligned and professionally ridiculed for their psychic research. People feared that science would undermine traditional religious beliefs. Even electricity was considered to be an occult and mystical force in the 1850s. Robert Hare, a major American chemist, Alfred Russel Wallace, the cofounder with Darwin of the theory of evolution by natural selection, and Sir William Crookes, the chemist and physicist who discovered thallium and invented the radiometer, were the first of a continual succession of eminent scientists who endorsed paranormal claims based on their own research (27:825). Even today, the 130 years of controversy over psychical research is impeding progress. Robert Jahn, Professor of Aerospace Sciences and Dean of the School of Engineering and Applied Sciences at Princeton related one experience.

I confess that I [discuss parapsychology research] with some trepidation, borne of previous unpleasant experiences. For example, a lighthearted article in the Princeton alumni magazine, in which I attempted to share some of

MEMORANDUM

[Absolutely Outside the System]

THE WHITE HOUSE

WASHINGTON

~~TOP SECRET~~

ACTION

September 4, 1972

MEMORANDUM FOR:

GENERAL HAIG

FROM:

RICHARD T. KENNEDY

SUBJECT:

Psywar

As I mentioned briefly on the phone, Helms' people are still thinking ahead to new steps we can take to turn up the heat in our psywar campaign. Helms, however, does not want to formally submit proposals which are thought to be beyond the pale.

25X1

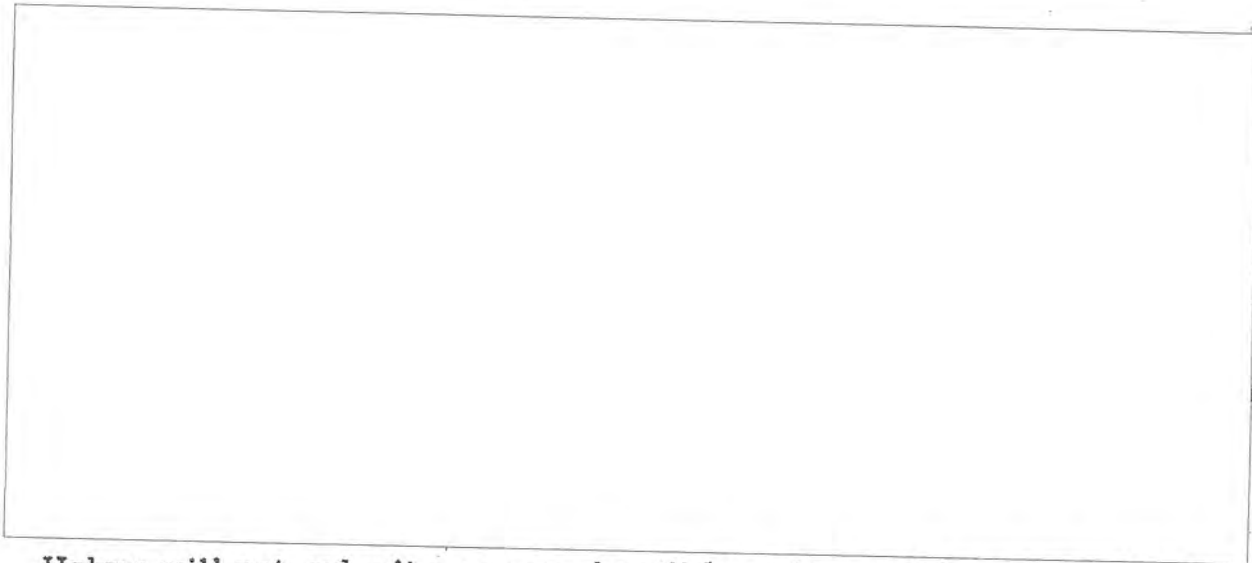
5TH INFO FOR THE COURT CIA
EXHIBIT BK
MEMORANDUM PSYWAR
(2pgs)

~~TOP SECRET~~

NSS Review Completed.

TOP SECRET

- 2 -



25X1

Helms will not submit a proposal until he gets a nod from us indicating that the President's approval is at least within the realm of possibility. Should we tell him to submit his recommendations?

Yes ✓

No

TOP SECRET