
THE ULTIMATE PEAK PERFORMERS: ALPHA FEEDBACK TRAINING FOR US ARMY GREEN BERETS

Advanced Neurofeedback Training Cases
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Peak Performance

Superstar athletes are often considered to exemplify **peak performance**. However, many athletes have an off-season where training goals become lower priority. **US Army Special Forces** have no off-season, and their training goals are always first priority.

Two 12-man teams of **US Army Green Berets** received extensive training in EEG Alpha feedback. Prior to their Alpha EEG training, all 24 Green Berets had 4 channel EEG recordings of their **EEG baselines** under three conditions:

Eyes Open [4 minutes]
Eyes Closed [4 minutes]
Eyes Closed with White Noise [6 minutes].

These baselines recorded **simultaneous integrated amplitude EEG activity from 4 different cortical sites** [O₁, O₂, C₃, C₄]. Each soldier had a private interview following these recordings.

Then all 24 soldiers went on a month-long meditation retreat. [Retreat is a bad word in the Army, so it was called a “meditation encampment”.] Following the month of meditation, the soldiers received the **Biocybernaut Institute** 7-day intensive Alpha **training**.

All trainings involved **simultaneous integrated amplitude feedback** [auditory plus digital scores] on at least two different cortical sites [O₁, O₂], and were conducted at a high security Army base using a group EEG feedback system from Biocybernaut Institute, which had been configured to train 6 soldiers at the same time.

The soldiers took **batteries of personality tests** before and after their Alpha training. These tests included: MMPI, Myers-Briggs Type Inventory, and the Personal-

ity Orientation Inventory [POI], which operationalizes Maslow’s concept of the self-actualizing personality. Also included in this pre-/ post-testing were the trait forms of the Multiple Affect Adjective Check List [MAACL], the Clyde Mood Scale [CMS], and the Profile of Mood States [POMS].

Many of the action-oriented soldiers had a bad experience of the meditation encampment, which they experienced as very stressful. **EEG baselines taken just after the encampment showed large reductions of EEG Alpha activity. In contrast, their subsequent 7-day intensive Alpha training was a very positive experience with both 12-man teams showing large increases in Alpha activity.** The Biocybernaut Institute EEG feedback equipment was available on the army base for 2 1/2 months. After their initial week of intensive Alpha training, the soldiers had continued access to the equipment for “tune ups”. **On voluntary days, when they could choose any activity they wished [swimming, playing ball, sleeping, PX], fully two thirds chose to do additional Alpha feedback training,** finding that it provided significant value to them personally and professionally.

Comparing pre- and post-Alpha training results, both 12-man teams showed **significant reductions of their POMS scores of Depression/Dejection, Fatigue, Confusion/Bewilderment, Tension/Anxiety, and Anger/Hostility and significant reductions in their CMS scores of Sleepy, Unhappy, and Dizzy.** The analyses of the MMPI and POI showed **beneficial changes in personality dimensions that were linked to changes in the EEG Alpha activity** of the soldiers. These mission-relevant changes in personality were produced by learned increases in EEG Alpha activity.

Looking at **before and after** personality changes is not the best way to see the effects of Alpha training. Every

soldier “did” the program, but not every soldier had the same amount of Alpha brain power changes. By **correlating changes in brain power with changes in personality**, we can connect the degree of success in brain power changes with the amount of personality change. This connection gives us a deeper understanding than do group averages or group effects.

Correlating **changes** in Alpha power with **changes** in personality also shows us how to produce the desired personality changes through specific learned changes in Alpha brain waves, thus providing a “How to do it” map or manual.

The results of this work, for the U.S. Army Special Forces [Green Berets] are given below for a number of **personality dimensions**:

Faking: Reductions in MMPI “F” scores were associated with increases of EEG Alpha scores. Significant correlations in the two teams ranged from $-.620$ to $-.676$ [df=9, $p < .03$].

Depression: Reductions in MMPI “D” scores were produced in those soldiers who substantially increased their Alpha scores. Significant correlations in the two teams ranged from $-.612$ to $-.671$ [df=10, $p < .02$]. The more a soldier increased his Alpha activity, the **less depressed** he became.

Paranoia: Reductions in MMPI “PA” scores were produced in those soldiers who substantially increased their **Eyes Open Alpha** scores. The significant negative correlation between Alpha changes and Paranoia changes was $-.662$ [df=10, $p < .02$]. The more a soldier increased his **Eyes Open Alpha** activity, the **less paranoid** he became.

Defensiveness: High Alpha soldiers became **less defensive** about acknowledging their fears and self-doubts. There were significant negative correlations between MMPI “K” scores and Alpha activity. Correlations ranged from $-.625$ to $-.814$ [df=9, $p < .001$].

Mania: If soldiers increased their Alpha in the brain wave training, they **significantly reduced their Manic tendencies**. Significant correlations ranged from $-.582$ to $-.810$ [df=9, $p < .001$].

Sensing vs. Intuiting: If soldiers increased their Alpha power, they **shifted their Sensing vs. Intuiting in the direction of intuiting**. This means that through learned increases in Alpha power, the soldiers became more intuitive. Significant correlations for the two 12-man teams

ranged from $-.597$ to $-.691$ [df=10, $p < .02$].

Inner Directed: If soldiers increased their Alpha power during brain wave training, they became **more inner directed and self supportive**. In relationship to mission objectives, they became less dependent upon the views of others, which suggests they would be more able to function autonomously in isolation and under conditions of the stress of captivity. Significant correlations for the two 12-man teams ranged from $.629$ to $.653$ [df=10, $p < .03$]. **Self-Actualizing Values:** When soldiers increased their **Eyes Open Alpha** during the brain wave training, they **increased their Self-Actualizing Values**. Significant correlations for the two 12-man teams ranged from $.699$ to $.847$ [df=10, $p < .001$].

Feeling Reactivity: If soldiers increased their **Eyes Closed Alpha** during the brain wave training, they became **more highly feeling reactive**. This means they became more aware of and sensitive to their own needs and feelings. This could lead to more accurate assessment of their capabilities in crisis situations. Significant correlations for the two 12-man teams ranged from $.592$ to $.691$ [df=10, $p < .02$].

Spontaneity: If soldiers had high Alpha by the end of their brain wave training, then they were **significantly more likely to be high in Spontaneity** at the end of the training program. Significant correlations for the two 12-man teams ranged from $.582$ to $.592$ [df=10, $p < .05$].

Self-Regard: If soldiers had high Alpha by the end of their brain wave training, then they were **significantly more likely to be high in Self-Regard** at the end of the training program. Significant correlations for the two 12-man teams ranged from $.584$ to $.658$ [df=10, $p < .02$].

Self-Acceptance: If the Alpha power of the soldiers went up during the brain wave training, the soldiers became **more perfectionistic in their attitudes**, demanding more and better performance of themselves. Significant correlations for the two 12-man teams ranged from $-.614$ to $-.666$ [df=9, $p < .05$].

Acceptance of Aggression: If **Eyes Open Alpha** power increased during the program, then the soldiers were **more likely to accept feelings of anger and aggression within themselves**. This would make them more in touch with their own feelings, and more capable of functioning appropriately according to the situation, whether it required low or high amounts of aggression. Significant correlations for the two 12-man teams ranged from $.606$ to $.611$ [df=9, $p < .05$].

Fatigue: If **Eyes Open Alpha** increased during the program, then **Fatigue was significantly reduced**. Significant correlations for the two 12-man teams ranged from -.665 to -.685 [df=8, $p < .05$]. This correlation suggests a method for the soldiers to deal with fatigue. If they have learned how to increase their **Eyes Open Alpha** power, they can summon up this ability when needed to overcome fatigue, and thus give themselves extra energy to deal with necessary action in spite of what fatigue may be present.

Unhappiness: If Alpha power went up during the program, then **Unhappiness went down significantly**. Significant correlations for the two 12-man teams ranged from -.595 to -.744 [df=7, $p < .03$]. All of our previous research has shown that **increasing Alpha power increases one's happiness and effectiveness and reduces UN-happiness**. It is thus entirely consistent to also find this result in soldiers who have learned to increase their Alpha brain power.

Improvements in Personality Dimensions, Summarized

The previous paragraphs are summarized here and sorted according to **statistical certainty (best first)**. The sense

of all the correlations have been made positive and the direction of the dimension reversed as necessary. For the Measure: Alpha = increased Alpha brain waves EOpenA = increased Eyes Open Alpha EClosedA = increased Eyes Closed Alpha

Correlations Involving Changes in the Left/Right Ratios of Alpha Power

It is beyond the scope of this report to detail all of the significant correlations involving **changes in personality** of the soldiers as they relate to **changes in Left/Right Alpha** brain wave power. However, it may be useful to list some of the personality traits which can be changed by the appropriate learned changes in the Left/Right Alpha power ratios:

MMPI Psychopathic Deviancy [PD] Myers-Briggs Feeling dimension POI Time Competency POI Feeling Reactivity POI Self-Regard POI Attitudes About the Nature of Man POI Capacity for Intimate Contact Social Introversion Thinking/Feeling Preference Anxiety Hostility Friendliness

Personality Dimensions	Correlations	Measure	Degrees of Freedom	Uncertainty
More Self-Actualizing Values	.699 to .847	EOpenA	df = 10	$p < .001$
Reduced Defensiveness	.625 to .814	Alpha	df = 9	$p < .001$
Reduced Mania	.582 to .810	Alpha	df = 9	$p < .001$
Less Sensing vs. More Intuiting	.597 to .691	Alpha	df = 10	$p < .02$
More Highly Self-Feeling	.592 to .691	EClosedA	df = 10	$p < .02$
Greater Self-Regard	.584 to .658	Alpha	df = 10	$p < .02$
Reduced Paranoia	.662	EOpenA	df = 10	$p < .02$
Reduced Depression	.612 to .671	Alpha	df = 10	$p < .02$
More Inner Directed	.629 to .653	Alpha	df = 10	$p < .03$
Reduced Faking	.620 to .676	Alpha	df = 9	$p < .03$
Reduced Unhappiness	.595 to .744	Alpha	df = 7	$p < .03$
Higher Spontaneity	.582 to .592	Alpha	df = 10	$p < .05$
More Demanding of Self (Less Self-Acceptance).	.614 to .666	Alpha	df = 9	$p < .05$
Greater Self-Acceptance of Aggression	.606 to .611	EOpenA	df = 9	$p < .05$
Reduced Fatigue	.665 to .685	EOpenA	df = 8	$p < .05$