

THE ADAGIO FLOW MACHINE - A NON-INVASIVE, NON-PHARMACEUTICAL STRESS MANAGEMENT TECHNIQUE FOR MUSIC THERAPY INTERVENTIONS

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Abstract

The biofeedback study *Hemispheric and Autonomic Laterality: Effects of Unilateral Repetitive Activation* [1] was conducted at the Nova University Biofeedback Laboratories.

The experimental group is referred to as the Right Hemisphere Activation (RHA) group. This group, in addition to watching the *Adagio*, also listened to light classical music. The control group, also referred to as the Left Hemisphere Activation (LHA) group, listened to spoken text while also seeing the text projected onto a screen. Several biofeedback measures were recorded on each subject during the sessions.

The results showed a statistically significant stress reduction in the RHA group.

Fig. 1. The original *Adagio Flow Machine* pictured. A video example of the *Adagio* simulating what the subjects in the study saw as they listened to music can be seen at the link provided in References and Notes [2].



Hypotheses

Specifically, three hypotheses were tested:

- Individuals whose right hemispheres are being activated by the processing of repetitive spatial information should demonstrate shorter recovery following induced arousal than individuals whose left hemispheres are being activated by repetitive verbal information
- Individuals whose left hemispheres have been repeatedly activated should score higher on post treatment verbal tasks
- Individuals whose right hemispheres have been repeatedly activated should score higher on post-treatment spatial tasks

Each of 47 female subjects came to the laboratory three times a week for two weeks for a total of six sessions. SCL and HR were monitored for the entire 45 minutes of each session with time samples recorded every minute for each variable. The first 15 minutes of each session was a stabilization period. During sessions

two, four, and six, three disruptions were randomly presented to elicit a startle response, allowing at least five minutes for recovery from each of nine disruptions. Visual startle consisted of turning on an overhead light; auditory startle was elicited by hitting a metal file cabinet with a hammer; and touch startle consisted of two taps on the right forearm by the experimenter. Time for recovery to baseline was noted in seconds.

Results

The RHA Group Recovered from Stress Much More Rapidly than the LHA Group

The resulting data was analyzed using various statistical techniques, and proved conclusive: the subjects watching the Kinescope (the right hemisphere activation group) recovered from startle significantly faster than those in the control group. In other words, after exposure to the Kinescope, the subjects in the RHA group were able to “relax” significantly more quickly than the LHA group.

The RHA group recovered significantly faster from startle than the left hemisphere activation (LHA) group, $F(3, 43) = 20.80$, $p < .001$ as determined by a MRM analysis (see Figures 1 and 2, and statistical data in Table 1).

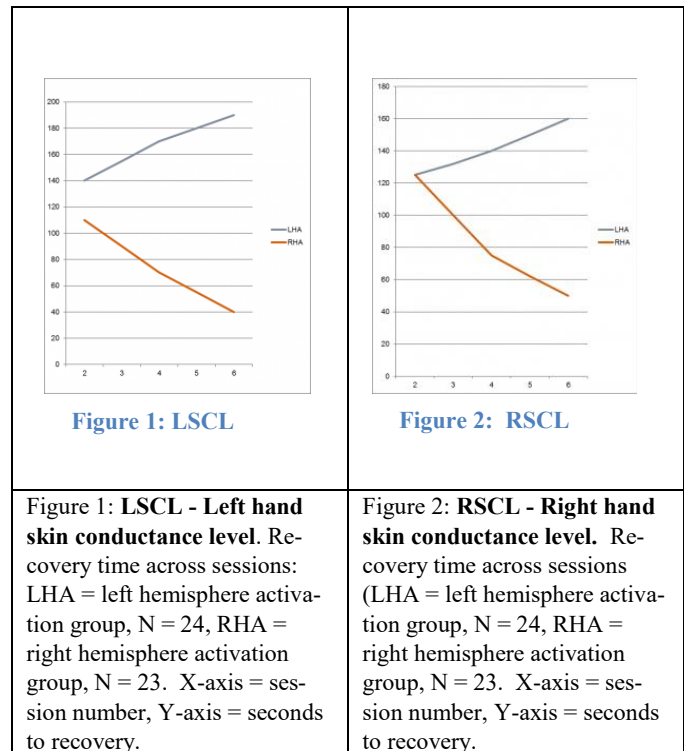


Table 1

GROUP		LEFT SKIN CONDUCTANCE	RIGHT SKIN CONDUCTANCE	HEART BEAT
		LSCLR	RSCLR	HBR
RHA (N = 24)	Mean	70.5	82.6	55.8
	SD	82.5	84.5	31.5
LHA (N = 23)	Mean	166.5	163.6	91.9
	SD	75.4	75.5	37.3

Applications

The practical applications of this finding alone are fairly intuitive as many current diseases are considered to be stress related. The following list of stress related illnesses is taken from an article by R. Morgan Griffin as a WebMD Feature, and was reviewed by Joseph Goldberg, MD [3]:

- Heart disease. Researchers have long suspected that the stressed-out, type A personality has a higher risk of high blood pressure and heart problems.

Doctors do know that sudden emotional stress can be a trigger for serious cardiac problems, including heart attacks. People who have chronic heart problems need to avoid acute stress -- and learn how to successfully manage life's unavoidable stresses -- as much as they can.
- Asthma. Many studies have shown that stress can worsen asthma. Some evidence suggests that a parent's chronic stress might even increase the risk of developing asthma in their children. One study looked at how parental stress affected the asthma rates of young children who were also exposed to air pollution or whose mothers smoked during pregnancy. The kids with stressed out parents had a substantially higher risk of developing asthma.
- Obesity. Excess fat in the belly seems to pose greater health risks than fat on the legs or hips -- and unfortunately, that's just where people with high stress seem to store it. "Stress causes higher levels of the hormone cortisol," says Winner, "and that seems to increase the amount of fat that's deposited in the abdomen."
- Diabetes. Stress can worsen diabetes in two ways. First, it increases the likelihood of bad behaviors, such as unhealthy eating and excessive drinking. Second, stress seems to raise the glucose levels of people with type 2 diabetes directly.
- Headaches. Stress is considered one of the most common triggers for headaches -- not just tension headaches, but migraines as well.
- Depression and anxiety. It's probably no surprise that chronic stress is connected with higher rates of depression and anxiety. One survey of recent studies found that people who had stress related to their jobs -- like demanding work with few rewards -- had an 80% higher risk of developing depression within a few years than people with lower stress.
- Gastrointestinal problems. Here's one thing that stress doesn't do -- it doesn't cause ulcers. However, it can make them worse. Stress is also a common factor in many other GI conditions, such as chronic heartburn (or gastroesophageal reflux disease, GERD) and irritable bowel syndrome (IBS).
- Alzheimer's disease. One animal study found that stress might worsen Alzheimer's disease, causing its brain lesions to form more quickly. Some researchers speculate that reducing stress has the potential to slow down the progression of the disease.

- Accelerated aging. There's actually evidence that stress can affect how you age. One study compared the DNA of mothers who were under high stress -- they were caring for a chronically ill child -- with women who were not. Researchers found that a particular region of the chromosomes showed the effects of accelerated aging. Stress seemed to accelerate aging about 9 to 17 additional years.

Conclusion (taken from the original study [4])

The major finding is that elicited elevations in bilateral skin conductance levels and heart rate return to pre startle baselines more rapidly under right hemisphere activation than when the left hemisphere is activated. This finding lends strong support, for the first hypothesis of the study. The predicted differences were based on the idea of interference between the hemispheres analogous to a competition to control various functions.

Interference is decreased if one hemisphere is busy processing repetitive information mediated by that hemisphere. The data suggest that this phenomenon most probably accounts for the highly significant recovery time differences between the groups. When the right hemisphere was inhibited, or "tied up", processing the music and *Adagio* stimuli, the left more efficiently returned autonomic elevations to a homeostatic state than when the left was busy reading and the right was free to do the task.

Additional Research

Unfortunately the research study conducted at the Nova University Biofeedback Lab only included the skin conductance and heart rate biofeedback measurements. I would hypothesize that the subjects in the experimental group exposed to the *Adagio* while listening to music entered the "Alpha State".

Alpha State is typically defined as "a state of wakeful relaxation that is associated with increased alpha wave activity. When electroencephalograms (EEG) show a brain wave pattern of 9 to 12 cycles per second, the subject is said to be in alpha state, usually described as relaxed, peaceful, or floating."

Many of the subjects in the experimental group described their state-of-mind while watching the *Adagio* similarly. However, to prove this hypothesis scientifically, a similar experiment would need to be conducted using EEG equipment to measure and record the brain waves of the experimental subjects as they watch the *Adagio* along with music.

References and Notes

1. Dr. Joyce Keen, *Hemispheric and Autonomic Laterality: Effects of Unilateral Repetitive Activation*, (Nova University, FL, Doctoral Dissertation, 1978)
2. James Wilson, *The Adagio Flow Machine*, (2021), <<https://youtu.be/hikiscu1KtY>>
3. R. Griffin, *10 Health Problems Related to Stress That You Can Fix*, (2014) < <https://www.webmd.com/balance/stress-management/features/10-fixable-stress-related-health-problems>>
4. Dr. Joyce Keen, *Hemispheric and Autonomic Laterality: Effects of Unilateral Repetitive Activation*, (Nova University, FL, Doctoral Dissertation, 1978)