Historical Archives: The Beginning…

Martijn Arns Senior Editor MSc
Published online: 25 Nov 2010.

To cite this article: Martijn Arns Senior Editor MSc (2010) Historical Archives: The Beginning..., Journal of Neurotherapy: Investigations in Neuromodulation, Neurofeedback and Applied Neuroscience, 14:4, 291-292, DOI: 10.1080/10874208.2010.523356

To link to this article: http://dx.doi.org/10.1080/10874208.2010.523356

PLEASE SCROLL DOWN FOR ARTICLE

© International Society for Neurofeedback and Research (ISNR), all rights reserved. This article (the “Article”) may be accessed online from ISNR at no charge. The Article may be viewed online, stored in electronic or physical form, or archived for research, teaching, and private study purposes. The Article may be archived in public libraries or university libraries at the direction of said public library or university library. Any other reproduction of the Article for redistribution, sale, resale, loan, sublicensing, systematic supply, or other distribution, including both physical and electronic reproduction for such purposes, is expressly forbidden. Preparing or reproducing derivative works of this article is expressly forbidden. ISNR makes no representation or warranty as to the accuracy or completeness of any content in the Article. From 1995 to 2013 the Journal of Neurotherapy was the official publication of ISNR (www.Isnr.org); on April 27, 2016 ISNR acquired the journal from Taylor & Francis Group, LLC. In 2014, ISNR established its official open-access journal NeuroRegulation (ISSN: 2373-0587; www.neuroregulation.org).

THIS OPEN-ACCESS CONTENT MADE POSSIBLE BY THESE GENEROUS SPONSORS

[Images of sponsor logos]
Historical Archives: The Beginning

PART I

In this issue of the Journal of Neurotherapy we introduce a new feature of our journal, the Historical Archives. In any profession it is important to be aware of the historical origins of the field. The field of neurofeedback was conceptualized a long time ago, and in this section we want to share some of the first works so the interested reader can get an idea of where our field came from and how it all started. As with most psychiatric treatments, the field of neurofeedback started as serendipity.

In the early 1940s several studies already demonstrated that the human EEG could be classically conditioned (Jasper & Shagass, 1941a; Knott & Henry, 1941). These studies investigated in great detail the occipital alpha-blocking response and whether alpha blocking with visual stimulation could be conditioned to an auditory stimulus. In addition a range of classical conditioning principles have been successfully applied, and all of the Pavlovian types of conditioned responses could be demonstrated (Jasper & Shagass, 1941a). In a follow-up study, Jasper and Shagass (1941b) investigated further whether participants could also exert voluntary control over this alpha-blocking response. In this study they had participants press a button, which would turn the lights on and off, and use subvocal verbal commands when pressing the button (e.g., “Block” when pressing the button and “Stop” when releasing the button). See Figure 1 demonstrating these effects. In the bottom tracing one can see that after five sessions the participant was able to voluntary suppress the alpha rhythm when the light was off. This is the first study that demonstrated “voluntary control” of the EEG activity and was investigated almost 70 years ago! In 1943 Shagass and Johnson replicated this finding demonstrating that participants also could achieve voluntary control over the alpha-blocking response by clenching their fist. Even though these studies demonstrated “voluntary control” they still relied on classical conditioning principles, and it would take another 20 years before operant conditioning of the EEG would be demonstrated.

In 1962 classical conditioning of brain activity was taken one step further when Wyrwicka, Sterman, and Clemente published their study in Science. It demonstrated that pairing a neutral auditory stimulus with electrical stimulation of the basal forebrain resulted in this auditory stimulus inducing sleep preparatory behavior. Not much later, in 1968, Wyrwicka and Sterman laid the foundation of neurofeedback as we know it today: operant conditioning of EEG activity.

Most of us are aware of what happened after this initial report on conditioning of SMR activity in the cat. However, the original report describing “Sterman’s cats,”
which were resistant to monomethylhydrazine (rocket fuel), was never published publicly given it was part of an assignment with the Aerospace Medical Research Laboratory and deemed confidential for the past 40 years. Therefore, we are hereby now publishing the original study for the public. We hope that in this way interested readers can gain firsthand knowledge of the original findings that laid the foundation of the clinical use of operant conditioning of the EEG. This is an excellent reference of the foundation of operant conditioning of the EEG and the beginning of neurofeedback.

Martijn Arns, MSc
Senior Editor

REFERENCES


