Almost a century ago Ivan Pavlov laid the groundwork for what we now know as classical conditioning. Not long after this first description of classical conditioning, and the first description of the human EEG by Berger (1929), early observations were made that the human EEG (alpha blocking response) could be classically conditioned (Durup and Fessard, 1935; Loomis et al., 1936). This alpha blocking response consists of a desynchronization of the dominant alpha activity, present during an eyes closed (or dark) condition, into a desynchronized low voltage beta EEG (also see Ros et al., 2014, in this research topic). More systematic studies demonstrated that the alpha blocking response fulfilled all of the Pavlovian types of conditioning (Jasper and Shagass, 1941a) and could not be explained by sensitization (Knott and Henry, 1941). Jasper and Shagass took their experiments one step further, showing that using these principles of conditioning, subjects could be taught “voluntary control” over their alpha blocking response, by pairing the light-onset not to an auditory tone, but to a sub-vocal command (“block”; Jasper and Shagass, 1941b). In their most basic form, these can be considered the first demonstrations of “neurofeedback” or voluntary control over the EEG based on basic learning principles. Some years after these initial studies, the first reports employing operant learning principles to EEG were reported by Kamiya [voluntary control of alpha power and alpha peak frequency (Kamiya, 1968)], McAdam et al. [voluntary control of the contingent negative variation (CNV) or slow cortical potential (SCP) (McAdam et al., 1966)], and Sterman (operant conditioning of the so-called sensori-motor rhythm (SMR) in cats, Wyrwicka and Sterman, 1968). Interestingly, from a historical perspective, these EEG parameters are still the focus of intensive study in neurofeedback research, as this research topic nicely illustrates.