

USING NEURAL PLASTICITY TO EXPLAIN RESISTANCE TO NEW MUSICAL STYLES: A CASE STUDY

by William Conte

The aim of this study is to use recent evidence from the scientific community in the area of neuronal plasticity as the basis for a new methodology to reexamine two case studies in music history. In the early twentieth century, a series of premiers were received with adverse criticism and even violent responses to new musical styles. These extreme responses warrant a reexamination behind their motivations and suggest that something is involved in the neural mechanisms of their perception.

Neuronal plasticity is the ability of a neural connection to dynamically adapt functionally and structurally in strength. This concept is seen in a variety of medical conditions. For example, it has been shown that people who are blind or deaf have increased perception through the other senses. Animal histology studies have confirmed that this results in a change in the brain, either by increased neurotransmitter transmission or increased sensitivity to neurotransmitters by the postsynaptic receptors.

While several theories have demonstrated how the brain perceives music, it is presently unclear about the specific neuroanatomy of music perception. There is no doubt, however, that music perception involves several different nuclei across the brain, and several studies have shown that different areas of the cerebral cortex in the temporal lobe are utilized during music perception. Neuronal plasticity is a slow gradual change in the brain, so I therefore hypothesize that only slow gradual exposure to a new style over a long period of time will change the individual's musical preference.

I will apply this scientific methodology to reexamine controversies resulting from the premiers of various works by Stravinsky and Schoenberg. The 1913 premiere of Stravinsky's ballet, the *Rite of Spring*, caused the audience to riot. While Stravinsky did not totally abandon tonality, the *Rite of Spring* used dissonances often and had new abstract forms of rhythm that was not heard in previous styles. In a similar case, Schoenberg, arguably the most influential twentieth-century composer, abandoned tonality in musical composition and pioneered the atonal musical style. From 1908 on his music, including his seminal *Pierrot Lunaire*, was met with similar reception of violence and criticism. These compositions eventually became "classic" examples of new music and are now quite popular. One would question the social influences behind the initial receptions, but the fact that future performances were met with praise and are now considered masterpieces warrants further investigation. After examining the musical structures of these pieces, I will use previous findings from scientific studies that examined the mechanisms behind perception of dissonance and apply it to these compositions. The findings from this study will benefit the music community because it applies to our understanding of acceptance of new music. It also benefits the science community because it provides empirical evidence for the mechanism underlying music perception.