Temporal Coding:
A Basic Neural Mechanism for Language Processing and Beyond

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Cross-language comparisons of reading brains allows cognitive neuroscientists to investigate how a universal reading circuit organizes to meet the unique script/speech relationship embedded in each and every writing system, such that the functional connectivity reflects special patterns to differentiate one language from the others. The key is orthography, which involves knowing the basic orthographic units of a written language and the underlying rules of how orthographic units compose words. The ability to extract the orthographic knowledge is critical for fluent reading, as orthographic knowledge may map onto the linguistic structures of words, such as graphemes and morphemes and how they map onto phonology. The integration of these different types of information generated from quite different modality resources under severe time constraints requires rapid arrangement of the signals from different modality in correct sequence. Hence, specification of the temporal coding mechanism at the neural circuitry level becomes the most important in understanding normal reading and dyslexic problems in the development of reading skills. We will present a research plan to tackle this issue.

Biosketch

Professor Ovid Tzeng is the Chancellor of University System of Taiwan and academician of Academia Sinica. He was the Minister of Education, the Minister Without Portfolio, and the Minister of Council for Cultural Affairs of Taiwan. He is an outstanding researcher in Cognitive Neuroscience and Neurolinguistics and an experienced leader in academic institutions. He serves as a member of the Board of Directors of Haskins Laboratories in the U.S. and an advisory board member of the ARC Centre of Excellence in Cognition and its Disorders in Australia. He has also been elected to be the academician of The World Academy of Sciences (TWAS) since 2010 and active member of The

European Academy of Sciences and Arts since 2017. He has been the Chancellor of University System of Taiwan for several years, which was created by him and established to oversee and integrate the research and teaching developments of Taiwan's four top research universities, namely, Central-, Chiao-Tung-, Tsing Hua- and Yang Ming University. Prior to the Chancellorship, he was the Vice President of Academia Sinica in Taiwan, in charge of International Scholarly Exchange Program as well as the developments of Taiwan's International Graduate Program (TIGP). He is currently an Executive member of the Committee on Human Rights of the NAS, NAE, and NAM, as well as a member of the UNESCO's Inclusive Literacy Learning for All Project.