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Digital Language Learning (DLL): Technology, Data, and the Brain

Human behavior is situated in the environment in which the real-world experience impacts the process of evolution. In an era of rapid developments in digital technology, we have an opportunity to connect human learning experience with digital applications and mind-brain-evolution studies. In this talk, I outline an approach that combines emerging technologies with current neurocognitive theories, with a particular reference to embodied language learning through virtual interactive realities. I highlight the differences in the context of learning between children (learning native language, L1) and adults (learning a foreign language, L2), and suggest ‘social learning of L2’ (SL2) as a new framework for thinking about L1-L2 differences and the corresponding neural correlates. If social and affective cues can be made available through digital tools and platforms to the L2-learning adults, as they are naturally available to L1-learning children, the success of L2 learning may be enhanced. The neural evidence from our work shows that SL2-based learning, as compared with traditional classroom-based learning, can lead to brain network patterns in L2 that are more similar to those underlying L1. Theoretically, this approach can also help us to gain a deeper understanding of embodied learning and its neural mechanisms. More broadly, our studies suggest that different patterns of neurocognitive representations can result as a function of different approaches towards learning. Combined with the power of big data and machine learning, this approach also sheds light into personalized education, thereby informing pedagogical designs and instructional innovations.

Ping LI is Sin Wai Kin Professor in Humanities and Technology, Chair Professor of Neurolinguistics and Bilingual Studies, and Dean of the Faculty of Humanities at the Hong Kong Polytechnic University. He previously served as President of the Society for Computation in Psychology and Program Director at the U.S. National Science Foundation while being a Professor of Psychology, Linguistics, and Information Sciences at the Pennsylvania



State University. Li's research is focused on investigating the neurocognitive and computational bases of language acquisition, bilingualism, and reading comprehension in both children and adults. He uses cognitive neuroscience methods and digital technologies to study neuroplasticity and individual differences in learning and to understand the relationships among language, culture, technology, and the brain. Li is currently Editor-in-Chief of *Brain and Language* and Senior Editor of *Cognitive Science*. He is a Fellow of the American Association for the Advancement of Science (AAAS).