

REPORT

THE 8TH INTERNATIONAL CONFERENCE IN
EVOLUTIONARY LINGUISTICS
August 8-10, 2016, Bloomington, Indiana (USA)

Reported by

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The International Conference in Evolutionary Linguistics held its 8th annual meeting (CIEL8) at Indiana University in Bloomington, Indiana, August 8-10, 2016.¹ It was the first meeting in this series to be held outside of China. The conference was sponsored by many units on campus, including the Office of the Vice President for International Affairs, The College of Arts and Sciences, the Indiana University Ostrom Workshop, the Cognitive Science Program, the Departments of Psychological and Brain Sciences, Linguistics, and Anthropology, the Center for the Integrative Study of Animal Behavior, the East Asian Studies Center, the Australian National University-Indiana University Pan Asia Institute, and the Chinese Flagship Program. In addition, the Stone Age Institute (<http://www.stoneageinstitute.org>) hosted a beautiful dinner/reception, as well as the closing banquet on the last night. The organizing committee chair was Prof. Thomas Schoenemann, Department of Anthropology at Indiana. A total of 92 papers were submitted from researchers all over the world, including Mainland China, Hong Kong, Taiwan, Iran, Turkey, Ethiopia, Austria, France, the United Kingdom,

1. Information about the conference is available from the conference website: <http://www.indiana.edu/~brainevo/CIEL8/>. Abstracts are available there also (as links in the program schedules).

and the U.S.A, of which 53 were accepted for oral presentation and 1 for poster presentation. There were 7 Keynote talks. Papers were presented in both English (37 papers) and in Chinese (17 papers).

The introductory keynote address was presented by William Shi-Yuan Wang of The Hong Kong Polytechnic University, who was also the honorary chairman of the conference. His talk reviewed the challenging concept of *exaptation*. This neologism was invented by biologists Stephen J. Gould and Elizabeth Vrba (1982) and referred to the notion that many evolutionary innovations likely originated with altogether different evolutionary purposes than they now serve, but were modified – sometimes substantially – to serve different purposes today. One example is the evolution of insect wings, whose ultimate purpose is obviously flight (which supports catching prey and evading predators) but whose earliest stages likely functioned instead primarily to control body temperature. Another example (suggested by Darwin himself) is the swim bladder in fish. Originally it functioned for flotation in fish but was later modified to provide a means of respiration, and ultimately became our lungs. Prof. Wang noted that this idea was applied to the question of language origins in man in 1921 by Edward Sapir (1921), who wrote: "Physiologically, speech is an overlaid function, or, to be more precise, a group of overlaid functions. It gets what service it can out of organs and functions, nervous and muscular, that have come into being and are maintained for very different ends than its own." Prof. Wang then connected the idea of exaptation to François Jacob's (1977) proposal of evolution as a tinkerer – making new features from pre-existing parts. Prof. Wang himself noted the importance of these ideas for language evolution as far back as 1979, in his Diamond Jubilee Lectures at Osmania University (Wang, 1982): "Explorations in Language Evolution," where he notes that language "... evolved in a mosaic fashion, with the emergence of semantics, phonology, morphology and syntax all at different times and according to different schedules ... language is regarded as a kind of 'interface' among a variety of more basic abilities." Prof. Wang illustrated how these ideas have found their way into numerous recent discussions of language evolution, including discussions by Macneilage & Davis (2005), Dehaene & Cohen (2007), Mufwene (2013) (also a Keynote speaker at CIEL8), Lieberman (2013), Tomasello (2014), Bickerton (2014), and Levinson

(2014), to name just a few. There is also a connection with Alfred Russel Wallace's famous concerns about natural selection as an explanation for cognitive evolution, and language in particular. Wallace pointed out that humans seem have evolved brains much more powerful than necessary to survive: "It seems as if the organ had been prepared in anticipation of the future progress in man, since it contains latent capacities which are useless to him in his earlier condition." While Wallace thought this meant that natural selection could not explain the evolution of advanced human cognition like language, it seems instead that language simply made use of pre-existing abilities that evolved for other purposes, making these features exaptations. Prof. Wang also reviewed some promising new explorations of how language is processed in human brains, including Huth et al.'s (2012) research on the representation of thousands of object and concept categories widely spread across the cortex. Prof. Wang ended by noting that a promising outline of human language evolution seems to be in place, and that we are likely in store for many exciting and important discoveries in this field in the coming years.

The second Keynote was by Daniel Everett, of Bentley University, who discussed his perspectives on language evolution. He emphasized that language in his view was primarily a tool for communication, not a means of thought expression. He also argued that features found in some (but not all) modern languages, such as hierarchical, recursive grammars, occurred later and are "neither necessary nor sufficient to have human language." He suggested that a "Semiotic Progression" (indexes → icons → symbols → triality) is predicted by C.S. Peirce's views on signs, and that this is likely the best model for the appearance of language in our lineage. He suggested that australopithecines would have already obtained an important level of communication based on "intentional iconicity," with a grammar based on the linear ordering of symbols and gestures, pitch modulation, or triality of patterning. He further suggested that *Homo erectus* likely invented *symbolic* (as opposed to simply iconic or indexical) communication, apparently unique among species alive today.

The third Keynote was by Salikoko Mufwene from the University of Chicago, who discussed the co-evolution of speech and pragmatics. Contrary to some recent perspectives on language evolution, Mufwene does not believe the importance of pragmatics to have decreased with the

evolution of modern languages. Instead, He argued that pragmatics plays a more complex role today than it likely did at the emergence of language. For Mufwene, in the earliest, primitive stages of language evolution, there would not have been any usefulness of ever speaking indirectly, or to have a distinction between polite and impolite expressions as we see in many languages today. These complexities, he argued, would not have been necessary for our early ancestors, because of their simpler mental capacities and simpler social interactions. Mufwene discussed several examples of the complexities of pragmatics in modern languages, and how critical they are to true adult competence. Thus, he concluded that pragmatics would have co-evolved in complexity with the other components of language.

The fourth Keynote was given by Kong Jiangping, from Peking University, who discussed cutting-edge research on the evolution of the human vocal tract. He began by reviewing comparative work on the vocal tract, emphasizing that the human larynx is lower than in chimpanzees and other apes. In addition, the chimpanzee tongue appears to be limited in its ability to create the vowel /i/. Because almost all modern human languages include the vowel /i/ in addition to /a/ and /u/, he argued that the ability to create /i/ should be seen as a milestone in the evolution of the human vocal tract. Kong then reviewed research he has pursued reconstructing the vocal tracts of chimpanzees and humans in 3D, and then using these to simulate the range of possible speech sounds that are possible. He showed that if the evolutionary change in the human vocal tract was approximately continuous across all the different components relevant to speech sounds, human-like speech would have first occurred at around 2.5-3 million years ago. Reconstructing the evolution of human speech anatomy in this way provides another essential window into language evolution.

The fifth Keynote speaker was Jared Tagliatela, from Kennesaw State University, who reviewed research on species differences in socio-communicative behaviors of chimpanzees and bonobos. The neurobiological and genetic foundations for these complex social, cognitive, and communicative behaviors were also discussed. Tagliatela emphasized that bonobos have much richer vocal repertoires than do chimpanzees, and hypothesized that this is related to differences in their feeding ecology, which likely favored bonobos to become increasingly reliant on vocalizations in particular (instead of other modalities) for communication.

The sixth Keynote speaker was Wu Yicheng, of Zhejiang University. Prof. Wu discussed evolutionary processes underlying changes in two types of non-canonical [V + Non-patient NP] Mandarin Chinese expressions. He argued that Construction Grammar was the most appropriate framework for which to analyze these changes, and that from this perspective these expressions should be thought of as grammatical constructions. He then presented evidence that they had undergone a particular type of grammaticalization known as “constructionalization”. He also argued that the intended meanings of these constructions can only be fully understood from their pragmatic inferences, and not solely from their morphosyntax.

The final Keynote speaker was Jackson Gandour, from Purdue University, who discussed the cognitive neuroscience of voice pitch perception. He pointed out that the information bearing component of voice pitch is learned from experience during development, and is critically influenced by the particular features of an individual's linguistic environment. He discussed the importance of research on perception of tone in tonal languages for understanding the neural mechanisms underlying the hierarchical transformation of pitch information from ear to cortex. He reviewed our understanding of pitch processing derived from fMRI and EEG studies, noting that there is laterality in pitch processing depending on the phonological relevance of the information to the listener. He outlined research on the frequency following response (FFR) and the cortical pitch-specific response (CPR), and how manipulations of pitch salience and pitch height lead to increased sensitivity earlier in processing, whereas changing the rate of pitch acceleration leads to increased sensitivity later in processing. He then outlined a theoretical neural network model of pitch processing that emphasized both feedforward and feedback components, resulting in an integrated, distributed pitch processing network. He concluded that understanding how pitch is processed by the brain is an important component of a complete understanding of language evolution.

In addition to these keynote speakers, the conference featured nine special invited talks: Robert Port argued that scholars too often inappropriately equate written language with spoken language, leading them to believe that phonemes – as represented by the International Phonetic Alphabet (IPA) symbols – accurately represent the fundamental

units of spoken language, when in fact he believes speech sound patterns are much messier than this, and that this fundamentally undermines the idea that language is a formal system. David Pisoni reviewed what cochlear implants and hearing loss have revealed about language development and its relationship to other important cognitive skills. Rob Shumaker discussed recent work at the Indianapolis Zoo in which it was shown that orangutans do have volitional control over their vocalizations – which was previously assumed to be a feature limited to humans. Peng Gang discussed the influence of speech variation on L2 tone learning, concluding that the perception and acquisition of non-native lexical tones is affected by both the listeners' native language experience and their strategies in performing the tasks. Tyler Marghetis discussed two studies exploring how humans conceptualize time in terms of space, and how this can be seen not only in spontaneous gestures, but also in conventional language. Shen Zhongwei argued that an analysis of Chinese dialects strongly point to their origins as the result of imperfect learning of the Chinese language throughout history by various groups of non-Chinese speakers in different geographical regions. Charles Chien-Jer Lin discussed negative social attitudes towards nominalized expressions in contemporary Taiwan Mandarin, and how his *head-driven constituent complexity hypothesis* predicts empirical findings that Chinese relative clauses are less complex in actual Chinese than in versions translated into English, and this helps explain the negative stylistic views of these nominalized expressions. Rachel Edwards and Andrew Feeney outlined a theory of co-evolution of language and thought which emphasized the critical role of the need to convey a creative narrative – which they argue is a universal property of human cultures – and not just the simple exchange of useful information. Ljiljana Progovac presented her reconstruction of early human and Neanderthal grammars, which is based on using Chomskian models of human language grammar as a lens to identify possible constructions in present-day languages which might be seen as 'fossils' of early proto-grammars in our ancestors. Shi Feng, from Nankai University and Beijing Language and Culture University, reported his investigations of Mandarin speech in terms of regional difference (Beijingers versus Tianjiners) and the difference in residence time (new Beijingers versus veteran Beijingers). Such investigations help us

understand the current status and development of language in modern metropolises. Finally, Li Dandan, from Jinan University, talked about her research work on the origin of several pronouns in Northern Mandarin.

The other conference talks fell into several different broad topic categories. One involved discussions of particular cases of language change. Dong Hongyuan discussed historical sources of correspondence between an alveolar initial, e.g. t-, and a velar initial, e.g. k-, in Chinese dialects. Liu Jinrong and Qi Zhang discussed the existence of a large number of Chinese loanwords in the Lahu language of the Yi branch of Tibeto-Burman Group. Weng Chuan-Hui reviewed synchronic and diachronic changes (and their interaction) of the permissive, causative and passive *Rang* in Chinese. Valentyna Skybina discussed the dynamics of the transformation of English into a pluricentric language. Gertraud Fenk-Oczlon and August Fenk presented data showing a negative correlation across languages between the number of syllables per clause and number of phonemes per syllable, and suggested this indicates there are temporal limits on clause length. Khadeejah Alaslani presented a glottochronological study of Al-Fayfiyah's position within Semitic and Afro-Asiatic languages. Ahmet Naim Çiçekler reviewed licensing in the genitive case in compound clauses in Old Anatolian Turkish. Lu Xiaoyu discussed the distribution and evolution of the *tə*-type proximal demonstrative in Wu dialect. Wang Hao presented his findings on the origin and formation of Renfu dialect of Southwestern Mandarin. From the second language learners' point of view, Lin Zhu reported an analysis of speech from Chinese English learners, saying that the rhythm pattern of Chinese English is syllable-timed rather than stress-timed like native English speakers.

Another well-represented area of interest was neurolinguistics. Xia Quansheng, Gong Wenxiao and Ly Yong presented findings from a study of noun compounds in Mandarin of the effects of syntactic category of constituent components on sentence processing reaction time. Manson Cheuk-Man Fong, Ivan Yifan Zou, Patrick Chunkau Chu and William S.-Y. Wang presented findings of their EEG study of conceptual priming during old/new judgments and its association with FN400 potentials. Ivan Yifan Zou, Steve Ka Hong Wong and William Shi-Yuan Wang presented a meta-analysis of the dementia research on Chinese populations, in

which they called attention to culture bias in both dementia screening instruments and diagnostic criteria, and also discussed the role of language and music in the treatment of dementia. Mohammad Salehi presented findings from a reaction time study of the effects of ambiguity on processing of garden path sentences. Zhou Changyin presented an ERP experiment on the comprehension of Chinese applied-object structures, which found a sustained anterior positivity related to the complexity of argument structure in Chinese phrases. Yang Ruoxiao presented research showing that fluent readers of traditional Chinese characters tend to use more holistic processing than do readers of simplified Chinese characters, suggesting that experience learning these different writing systems may lead to differences in neural organization.

There were several presentations on different theoretical models of language evolution. Andrew Feeney outlined a model of language evolution he referred to as the Representational Hypothesis, which proposes that there were two key evolutionary breakthroughs that underlay language evolution: 1) the concatenation of symbols (likely associated with *H. erectus*) and 2) the emergence of advanced theory of mind and a fully recursive, creative cognitive capacity. P. Thomas Schoenemann argued that the development of Broca's area was a prime example of exaptation in language evolution, and outlined his ongoing research in apes and humans exploring the hypothesis that Broca's area may have originally evolved for a much more general purpose: to pay attention to (and learn) any kind of sequential pattern information (i.e., 'rules') from the organism's environment, regardless of modality. Gertraud Fenk-Oczlon investigated the parallels between language and music, presenting data showing that cultures with a higher number of vowels also tend to use a higher number of pitches in melody. Lin Chia-Hua presented a philosophical analysis of discussions in the language evolution literature.

There were also several talks on how the evolution of human tool technology – and the cognitive abilities these required – might have been important to language evolution. Lana Ruck reviewed research on Broca's region relevant to possible evolutionary parallels between manual praxis and language, and argued that the neuroscience of stone tool manufacture will help us elaborate the possible co-evolutionary links between these cognitive domains. Guo Chunjie discussed research on

brain activation of subjects thinking about making stone tools vs. assessing the semantic meaning of word classes, in an effort to better understand the extent of overlap of cognitive activation for these two domains. Nicholas Toth and Kathy Schick examined the relationships between the Early Stone Age archaeological record in Africa and Eurasia and the record of hominin species over the same time period, concluding that biological and cognitive evolution is better understood in the context of adaptive and behavioral changes reflected in the archaeological record.

Finally, Colin Allen outlined collaborative work between colleagues at Indiana University and Xi'an Jiaotong University, including Hongliang Luo, Jaimie Murdock, Jianghuai Pu, Xiaohong Wang, Xiaoliang Wang, Wenjing Yuan, Kun Zhao and Yanjie Zhai, which has produced a sophisticated software system that implements topic modeling of the Hàn diǎn (汉典) corpus of ancient Chinese documents, thereby allowing unprecedented exploration and interpretation of these texts.

The conference concluded with summary remarks by Larry Singell, Dean of the College of Arts and Sciences at Indiana University, who underscored the breadth and depth of presentations at the conference, and thanked again the international scholars for traveling so far to attend. Peng Gang then summarized some of the key themes of the conference, including evolutionary change at different levels: shifts within dialects, evolutionary relationships between dialects, and evolutionary change in the biological and cognitive systems underlying language ability. He also underlined the wide range of tools and approaches that continue to be used to advance our knowledge of the process of language evolution at all these levels. Finally, he announced that the 9th International Conference in Evolutionary Linguistics (CIEL9) will be held at Yunnan Nationalities University in Kunming, China, during August 25-27 of 2017.

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