New perspectives on the old data in psycholinguistics

Chairperson
Jongsup Jun
Department of Linguistics and Cognitive Science, Hankuk University of Foreign Studies, Korea
jongsupjun@korea.com

Speakers

Sun-Young Lee
Division of English, Cyber Hankuk University of Foreign Studies, Korea
alohasylee@cufs.ac.kr

Youngjoo Kim
Department of Korean Language, Kyung Hee University, Korea
yjkims@khu.ac.kr

Juno Baik
Department of Asian and Near Eastern Languages, Brigham Young University, U.S.A.
loftyglare@hotmail.com

Hee-Don Ahn
Department of English, Konkuk University, Korea
hdahn@konkuk.ac.kr

Yongjoon Cho
Department of English, Konkuk University, Korea
ychousc@gmail.com

Kisub Jeong
Department of English, Konkuk University, Korea
jeongks1010@gmail.com

Ilkyu Kim
Department of English, Kangwon National University, Korea
81ilkyu@gmail.com

Empirical data in a scientific inquiry hide many things that cannot be uncovered until the field reaches a certain level of maturity. NASA scientists have collected seismic signals from the lunar surface from the 1970s, but they had to wait 40 years before they finally came to learn, thanks to the state-of-the-art technology of the computer analysis, that the moon has a liquid core like the earth. A classic example of applying 'new and *arguably* better' technology to the old data to obtain improved understanding of human language was the Empty Category Principle in the time of Government and Binding theory (Chomsky 1981) that provided principled account for such old data as *that*-trace effects, island constraints, etc.

The primary goal of this symposium is two-fold: (1) To see what we can uncover when we analyze the old data of psycholinguistics by using *new* or *better* methods of inferential statistics; and (2) To draw some consensus from the linguists' community that we must use best-possible statistical methods since advanced statistical analyses can reveal what we normally cannot see with basic statistics.

Unlike theoretical linguists who always attempt to explain old and *well-known* phenomena with *new* and *less-known* frameworks, psycholinguists rarely apply new technology to the old data in the existing studies. What could we find out if we performed log-linear regression analyses of the multiple frequency tables in a journal article whose author carried out just as many Chi-square tests as the number of cross-tabulations? What could we find out if we transformed the raw data so that they could fulfill the crucial assumptions of certain statistical tests? What could we find out if we tested complicated causal models using Structural Equation Modeling for the data that used to be analyzed using basic regression methods?

Papers presented in this symposium focus on applying *new* and *less-known* techniques to the old data in published works. The presenters analyze either their own data set or the raw data in earlier publications of other scholars. Notice

that many papers already present the raw data in such formats as cross-tabulations in the published papers. Whatever data are chosen, we analyze them with *new* and *less-known* techniques to see what we could not see previously.

Rethinking Ionin, Ko & Wexler (2008): how crucial are universal semantic features in the L2 acquisition of English articles?

Jongsup Jun

Ionin, Ko & Wexler (2008, IKW henceforth) investigate how two universal semantic features, i.e. [± definite] and [± specific], constrain Russian and Korean adult speakers' acquisition of English articles. Russian and Korean speakers are of particular interest to IKW, since they are assumed to have full access to the parameters of the universal semantic features as speakers of articleless languages. Based on the frequency counts of written narrative data of these speakers, IKW concludes that such universal semantic features as [± definite] and [± specific] play a crucial role in L2 acquisition. IKW's conclusion is drawn from testing several predictions of their hypothesis by performing a series of Chi-square tests. For this, IKW builds a big cross-tabulation defined by more than three categorical variables, and then splits the big table into many smaller tables of two categorical variables. This is an inevitable move when we resort to Pearson Chi-square test, since Pearson Chi-square test cannot handle a frequency table of more than three categorical variables. One non-trivial problem with this approach is that running 10 Chi-square tests faces the notorious family-wise error rate problem, which raises the value of Type I error from 0.05 to 0.4013. In other words, IKW's conclusion has a very high probability, i.e. 40.13 %, of rejecting the null hypothesis when it is actually true ($\because$ new_α=1-(0.95^10)=0.4013). To overcome this difficulty, we will carry out log-linear regression analyses of IKW's big table without partitioning the cross-tabulation into a number of smaller tables. This way, we will see how new perspectives on the old data reveal hidden generalizations or problems that we could not discover before.

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Looking back upon the data on the cognitive and affective factors in second language acquisition (SLA) using Structural Equation Model (SEM)

Sun-Young Lee

This study investigates cognitive and affective factors in second language acquisition (SLA) using Structural Equation Modeling (SEM). Previous studies on the individual differences in SLA examined the role of learners' cognitive abilities such as intelligence, language aptitude including working memory and phonological sensitivity, and affective variables such as motivation, anxiety and so on. Most of the studies looked at the relationship between each of such factors and the learners' L2 proficiency using correlation analyses, factor analyses and regression analyses. However, such methods can only explain the direct relationships between dependent variable(s) and independent variable(s) without considering the direct effects among the variables, which fails to depict the full picture of L2 learning. On the other hand, SEM can reveal the direct and causal (based on a theory) relationships among the variables to show how the observed data set fit in a model of L2 learning based on the existing theory (Lewis & Vladeanu, 2006). Nevertheless, only a few attempts have been made so far (e.g., Sasaki (1993) with Japanese learners of English for English speaking; Winke (2013) with English learners of Chinese). In this study, we will review previous studies examining cognitive and affective factors in SLA and reexamine the data set using SEM in order to determine how well it fits in a model of L2 learning.

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How individual factors affect language acquisition: evidence from L2 Korean

Kim, Youngjoo, Juno Baik & Sun-Young Lee

This study examines the construct of learning ability in learners of Korean. Unlike previous KFL studies, the present study measures both cognitive and psychological factors, and interprets the whole factors as one dynamic system. The individual factors measured were sound discrimination ability, language analysis ability, working memory (WM), motivation, and anxiety. Both receptive and productive knowledge are measured as learners' linguistic

proficiency. 130 intermediate to high-intermediate learners of Korean from China, France, Japan, and the US take (i) phonological coding and language analysis test with PLAB, (ii) WM span with operation word span task, (iii) motivation level with Attitude-Motivation Test Battery, (iv) anxiety with Foreign Language Anxiety Scale survey, (v) receptive knowledge as vocabulary, grammar, reading, listening with optimized TOPIK test, (vi) productive knowledge as written and spoken language ability upon complexity, accuracy, and fluency. We'll construct a structural equation model (SEM) to explain learners' linguistic achievement. To explain the factors of Korean learning, receptive and productive knowledge scores were set as dependent variables, and period of learning, cognitive, and psychological factors as observed variables. We assume that the cognitive and psychological factors directly affect L2 proficiency mediated by period and psychological factors. Both significant and nonsignificant factors will be discussed, and, as conclusion, the model will explain the dynamic aspect of language acquisition in context of Korean language learning.

Notes on experimental syntax and the variation of acceptability judgments in Korean

Hee-Don Ahn, Yongjoon Cho & Kisub Jeong

Native speakers' introspective judgments of sentence acceptability have been an essential tool for linguistic research. However, this traditional method of data collection has been criticized in various respects, and the crucial criticism concerns its methodological 'informality'; namely, such judgment data cannot evade inter- and intra-speaker variation, as it is not gathered by means of objective and rigid procedures. A number of alternatives have been suggested such as corpus data, but judgment data still function as the primary source of empirical evidence in syntactic research, due to its efficacy. Since the work of Bard et al. (1996) and Cowart (1997), more formal experimental methods have been gaining popularity, in a trend known as 'experimental syntax'. This paper explores the utility of experimental syntax in the area of Korean syntax via a direct comparison of the results of informal judgment collection methods with the results of formal judgment collection methods. Our study presents the large-scale comparison based on a random sample of phenomena from a linguistic journal in Korea. We will test 100 data points from the journal. We will test this sample with more than 800 naïve participants using two formal judgment tasks (Yes-No task and Two-alternative forced-choice) and report five statistical analyses (Descriptive directionality, One-tailed null hypothesis tests, Two-tailed null hypothesis tests, Mixed effects models, and Bayes factor). We will report whether the results suggest a convergence/divergence between informal and formal methods, and discuss the implications of the convergence/divergence rate for the

judgment collection methods in connection to their validity as syntactic methodology.

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Is ANOVA the right way to analyze data from acceptability judgement?

Ilkyu Kim

In experimental syntax, one of the most useful and frequently used ways to support or refute a theory is to conduct acceptability judgment tests. Despite the importance of acceptability judgment in theorizing, however, few researchers in this field have seriously dealt with the issue of how to analyze data from sentence judgments, which are measured in Likert scales (e.g. from 1 to 5, or to 7). In fact, analysis of variance (ANOVA) has been taken for granted by most previous works for the analysis of this type of data (e.g. Cowart 1997; Kush et al. 2013). As far as I know, however, no attempts have been made to evaluate whether using ANOVA is really a correct and proper way to analyze data measured with Likert scales. The purpose of this paper is to discuss the problems of using ANOVA for analyzing data from acceptability judgments and propose a new way of analyzing them; namely cumulative logit model. In so doing, the work of Kush et al. (2013) will be critically examined in detail and the experimental data therein will be reanalyzed. Ultimately, it will be claimed that cumulative logit model is a very useful and efficient way to properly analyze data measured on the basis of Likert scale.

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