

ESF Exploratory Workshop - Scientific Report

Workshop Title

Language Processing in First and Second Language Learners

Convened by

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Date and location of workshop

17-19 December 2004; Wivenhoe House, University of Essex, Colchester CO4 3SQ, United Kingdom

Executive summary

The workshop focused on how child and adult language learners process sentence and word-level information in the target language. Recently, a number of researchers from within Europe have produced new data and interesting findings on both child first language (L1) and adult second language (L2) processing from a range of different languages. The workshop demonstrated that the time has come to bring together the results from various individual European languages for comparative purposes. Even though investigating language processing in language learners is a truly interdisciplinary enterprise that has an obvious cross-linguistic dimension, few collaborative links exist at present between individual European researchers or research teams who are currently working in this area. Building on previous experimental research on native and non-native processing of individual languages, the workshop contributed to reinforcing cross-linguistic comparisons of different languages as well as comparisons between child L1 and adult L2 learners.

The workshop brought together researchers from different disciplines (linguistics, psychology, and cognitive neuroscience) who are examining language processing in language learners using experimental psycholinguistic and/or brain-imaging techniques., with the aim of strengthening inter-disciplinary collaboration in this emerging field of research. Of the participants originally invited only one person (David Swinney) was unable to attend, for health reasons. All other participants followed the invitation. All participants received a conference folder containing the workshop programme and presentation abstracts, ESF brochures, visitor maps, information about internet access on campus, and other relevant information.

The workshop programme comprised 17 presentations by a total of 19 researchers in the field, preceded by a brief presentation by the ESF representative, Arto Mustajoki, on ESF funding opportunities and policies. Each of the main presentations was 45 minutes in length, the last 10 minutes of which were reserved for discussion. We asked the participants not to exceed their allocated time, thus making sure that everything went according to schedule. Further opportunities for discussion were provided at the end of each morning or afternoon session. The Friday afternoon session was intended to 'set the scene', with presenters putting forward specific hypotheses and models of child L1 and adult L2 language processing that were later referred to by many other presenters, and which stimulated a considerable amount of further discussion during the remainder of the workshop. The Saturday morning session focused on phonological and lexical processing, and the Saturday afternoon and Sunday morning sessions on sentence and discourse processing. The presentations were generally of very high quality, and although not everyone necessarily agreed with the way individual results were interpreted, all discussion took place in a friendly and pleasant atmosphere. Joint meals and the Saturday evening party at Martin Atkinson's (Head of Department, Language & Linguistics) house provided ample opportunity for social interaction and informal discussions. The workshop concluded with a final discussion on Sunday, during which we gathered feedback on the workshop from the participants, and also discussed funding opportunities and possibilities for future collaboration.

Scientific content

While much psycholinguistic and neurolinguistic research has been devoted to examining how mature speakers process their native language in real time, only recently have a number of research teams in Europe and North America begun to study the mechanisms language learners employ to process sentence-level and word-level information, by adopting experimental psycholinguistics and brain-imaging techniques to the study of child and adult language learners. These studies have indicated differences in language processing between child and adult learners on the one hand, and between adult native speakers and second language learners on the other. Results from these studies and accounts of how they are to be explained were discussed at the workshop. Essentially, four main issues formed the focus of the discussions.

First, language learners were argued to experience difficulty with the on-line integration of different information sources, in contrast to adult native speakers, who have been shown to rapidly integrate lexical-semantic, discourse-level, prosodic and structural information during on-line processing. Results from several studies revealed differences between adult native speakers and L2 learners in the way they process temporarily ambiguous sentences, and sentences containing syntactic dependencies. One possible explanation for these findings that was discussed at some length was the idea that L2 learners build shallower syntactic representations than native speakers during parsing. Adult L2 learners were also found to be less efficient in using phonological and morphological information during on-line processing than adult native speakers, although it was suggested that L2 phonemic contrasts and morphological cues could be acquired in principle. Children's ability to discriminate native phonemes was shown to develop within the first few months after birth, and their syntactic processing was reported to be essentially adult-like from about the age of six or seven.

Secondly, the question of whether L2 learners transfer processing strategies from their L1 to the L2 was discussed in great detail. Given that adult L2 learners already possess a fully-developed processing system for their L1, it was proposed that processing strategies from the L1 are transferred to the L2. The experimental results currently available on this question, however, were deemed to be inconclusive at this point.

Some participants argued strongly in favour of transfer effects in, for example, the on-line processing of ambiguous sentences by L2 learners, while others disconfirmed a role for transfer in this domain. Clearly, more research is needed to investigate the possible role of transfer in L2 processing.

The third major issue concerned the question of whether language learners process language less rapidly, or in a less automatized way, than adult native speakers. We specifically discussed this question with respect to L2 processing. Results from ERP studies were presented to show that lexical-semantic processing in L2 learners obtained N400 effects for semantic anomalies while morpho-syntactic violations elicited a later language-specific ERP component in adult L2 learners than in native speakers (= the so-called P600), but not the ERP component characteristic of early automatic morpho-syntactic processing (= the so-called LAN, or ELAN). It was also shown that the automatization of L2 processing increases with proficiency.

Fourthly, several presentations discussed brain structures relevant for native language processing and suggested that these are only partially accessible to (adult) language learners. One specific hypothesis as to how L2 language processing might differ from L1 processing argued that while the linguistic representation and processing of one's native language involves two different brain memory systems - a lexical store of memorized words that is rooted in temporal lobe structures, and a mental grammar which includes combinatorial rules and is rooted in frontal brain structures - L2 processing and representation was largely dependent upon the lexical (or 'declarative') memory system. This account was discussed by several other presenters.

While none of the four major issues discussed at the workshop can be regarded as resolved, and further experimental study is clearly required, the picture that has emerged thus far suggests that there are characteristic differences between the way mature monolingual speakers, child L1 learners, and adult L2 learners process the target language, and that we have thus far gained a preliminary understanding of what the sources for these differences might be.

Assessment of the results and contribution to the future research

The purpose of the workshop was to bring together linguists, psychologists and neuroscientists who are currently examining language processing in child and/or adult language learners using experimental psycholinguistic or brain-imaging techniques, but many of whom have not previously had an opportunity to meet one another, or to exchange their findings and ideas. The workshop intended to compare results from studies across different *languages*, different *populations* (monolingual vs. bilingual learners, child vs. adult learners, impaired vs. normally developing children), and across different *domains of language* (sounds, words, sentences), and allowed researchers from different European countries and different disciplines to exchange their knowledge and to explore the possibility of forming inter-disciplinary collaborative links between the various research groups involved. In this way, the workshop contributed to creating a European academic identity in this emerging field of research.

The most important result of the workshop became evident during the final discussion, when we proposed to set up a framework for a sequence of biennial workshops on the topic of language processing in first and second language learners. All participants expressed a strong interest in taking part in this, and it was felt that the group of researchers we brought together could form a basis for a larger collaborative research endeavor. Two participants from the Max-Planck-Institute for Psycholinguistics in Nijmegen (Indefrey, Cutler) volunteered to organise the next workshop in 2006 or 2007, and for the subsequent one, Carreiras put his name down. This response was far more than we had expected and is a clear sign that a forum of the kind we created is much needed.

All responses and feedback that we received for launching the workshop and reactions from participants after the workshop were extremely positive and encouraging:

- Participants welcomed the workshop as a unique opportunity to discuss in detail issues involved in the study of language processing in first and second language learners, and pointed out that such opportunities are not available at mainstream conferences in psycholinguistics, neuroscience, or language acquisition. Many participants reported that they had learnt a lot from

participants from outside their own disciplines, or whose work they had not previously been familiar with.

- Participants were very happy with the way the workshop was organised, especially with the fact that we left ample time for discussion.
- Several participants used the opportunity and agreed to embark on collaborative studies: (1) Friederici and Sorace, (2) Roberts, Duffield and Matsuo, (3) Fodor and Papadopoulou, (4) Avrutin, Clahsen and Felser (with Guasti, U Milan).
- Näätänen invited Clahsen and Felser to Helsinki to explore a potential collaboration, as did Friederici (to Leipzig).

Final programme

Friday, 17 December 2004

12.00-14.00	Welcome and lunch reception
	Presentation of the European Science Foundation (ESF) Arto Mustajoki (Standing Committee for the Humanities)
14.00-14.45	Michael Ullman The contribution of brain memory circuits to first and second language acquisition and processing
14.45-15.30	Angela Friederici Brain responses to phrase structure violations in L1 and L2 learners
15.30-16.00	<i>Coffee break</i>
16.00-16.45	Peter Indefrey Neural correlates of syntactic encoding and parsing in native speakers and second language learners
16.45-17.30	Cheryl French-Mestre Processing of grammatical gender information in French as first and second language: Behavioral and electrophysiological evidence
17.30-18.15	Claudia Felser & Harald Clahsen Child L1 and adult L2 processing of wh-movement
18.15-19.00	Open discussion

Saturday, 18 December 2004

- 09.00-09.45 **Risto Näätänen**
The mismatch negativity as an index of phoneme processing
- 09.45-10.30 **Antoni Rodriguez-Fornells**
Neurophysiological evidences of language acquisition and word-learning
- 10.30-11.00 *Coffee break*
- 11.00-11.45 **Anne Cutler**
From phonological to lexical processing in non-native listening
- 11.45-12.30 **Janet Fodor**
Learning and using L2 prosody
- 12.30-13.00 Open discussion

Lunch break
- 14.00-14.45 **Manuel Carreiras**
Do proficient second language learners agree like natives?
- 14.45-15.30 **Despina Papadopoulou**
S-V Agreement and Case cues in processing subject/object ambiguities: Evidence from native and non-native speakers of Greek
- 15.30-16.00 *Coffee break*
- 16.00-16.45 **Antonella Sorace**
Syntax-discourse coordination in child and adult bilinguals
- 16.45-17.30 **Nigel Duffield & A. Matsuo**
Sentence matching and the competence paradox: how to outperform native speakers
- 17.30-18.30 Open discussion

Sunday, 19 December 2004

- 09.00-09.45 **Sergey Avrutin**
Omissions of functional categories in child speech and newspaper headlines: a cross-linguistic comparison
- 09.45-10.30 **John Williams**
Plausibility effects on L2 sentence processing
- 10.30-11.00 *Coffee break*
- 11.00-11.45 **Heather van der Lely**
The acquisition of non-local dependencies: insight from behavioural and ERP investigations

11.45-12.30	Leah Roberts Pronoun resolution in the L2: An eye-tracking study with Turkish-Dutch bilinguals
12.30-13.00	Final discussion

Final list of Participants

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Information on participants

- Participants came from 7 different European countries (Finland, France, Germany, Greece, The Netherlands, Spain, United Kingdom) and from the US.
- 11 participants were senior academics, most of whom leaders of larger research groups; age range among the latter: 45-60. 8 participants were younger research-active academics; age range: 30-40
- 10 participants were women, 9 men.