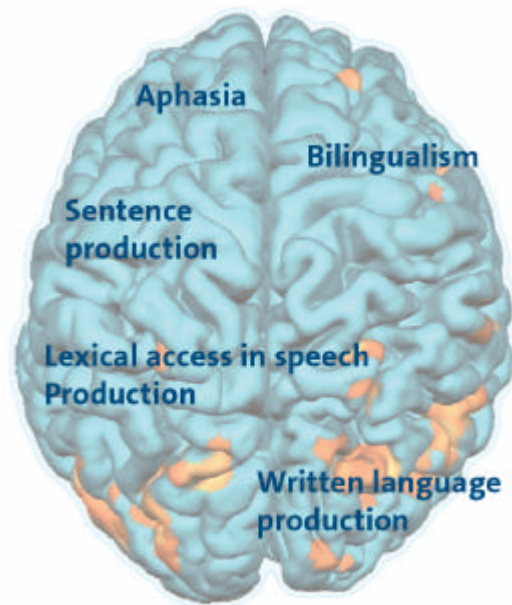


2nd International Workshop on Language Production

*Program
&
Abstracts*



August 28th - 30th, 2005

La Bonbonnière
Maastricht, The Netherlands



Foreword

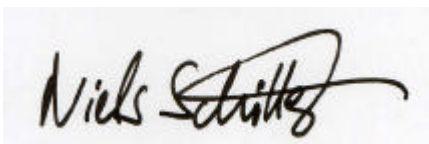
Dear colleagues,

Welcome to the Second International Workshop on Language Production! This meeting, like the previous in Marseille (2004), is designed to provide an informal discussion forum for the exchange of views on how the language production system works.

The program includes both talks and posters on language and speech production from psycholinguistic and neurolinguistic perspectives over a period of three days. The workshop has been made possible by the Faculty of Psychology at Maastricht University who I would like to take the opportunity to thank in this foreword.

I would also like to express my gratitude for the work of the Scientific Committee, Xavier Alario (Université de Provence, France), Albert Costa (Universitat de Barcelona, Spain), Victor Ferreira (University of California at San Diego, USA), and Martin Pickering (University of Edinburgh, UK). Moreover, I would like to thank Alessia Neyndorff for her invaluable effort to deal expertly with details of administrative coordination and for putting together this program booklet. These people made the task of organizing this workshop both easy and fun.

Finally, I would like to thank the presenters themselves for coming to the city of Maastricht to present their latest research and their theoretical ideas, which are summarized in this booklet. Thank you for your participation, and enjoy the workshop!

A handwritten signature in black ink on a light background. The signature is written in a cursive style and reads "Niels Schiller".

Niels O. Schiller

Local organizer

Scientific Committee

| | |
|-------------------------|-------------------------------------|
| F.-Xavier Alario | CNRS, University of the Provence |
| Albert Costa | University of Barcelona |
| Victor Ferreira | University of California, San Diego |
| Niels Schiller | Maastricht University |

Local Organization

| | |
|--------------------------|-----------------------|
| Alessia Neyndorff | Maastricht University |
| Niels Schiller | Maastricht University |

Sponsored by

The Faculty of Psychology, Maastricht University

List of Speakers

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| Michael Vitevitch | mvitevitch@ku.edu |
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| Linda Wheeldon | l.r.wheeldon@bham.ac.uk |
| University of Birmingham, UK | |

Program

2nd International Workshop on Language Production

SUNDAY, AUGUST 28th

- 09.00 - 09.45** Welcome coffee and registration
- 09.45 - 10.00** Address of the Dean of the Faculty of Psychology, Prof. Gerjo Kok
- 10.00 - 12.00** **1. Word Production**
Albert Costa (Universitat de Barcelona, E) - The control of speech production by bilingual speakers
- Fernanda Ferreira (Michigan State University, USA) - Disfluencies: Syntax, prosody, and communication
- 12.00 - 13.30** Lunch
- 13.30 - 15.30** **2. Planning I**
Randi Martin (Rice University, Houston, Texas, USA) - Converging evidence for a phrasal scope of planning
- Ardi Roelofs (Radboud Universiteit Nijmegen, NL) - Cascading of activation in planning the production of spoken words
- 15.30 - 16.00** Coffee break
- 16.00 - 18.00** **3. Planning II**
Antje Meyer (University of Birmingham, UK) - Coordination of speech planning and articulation in young and elderly speakers
- Linda Wheeldon (University of Birmingham, UK) - Planning sentence structure: Speech latency and gaze patterns during the production of word lists and sentences

MONDAY, AUGUST 29th

- 09.00 - 11.00** **4. Phonological Aspects of Word Production**
Michael Vitevitch (University of Kansas, USA) - The influence of phonological neighbors on speech production in English and Spanish
- Manuel Carreiras (Universidad de La Laguna, E) - Syllable frequency in speech production
- 11.00 - 11.30** Coffee break

Program

2nd International Workshop on Language Production

- 11.30 - 12.30** **5. Evolution of Speech Production**
Tecumseh Fitch (University of St Andrew, UK) - The evolution of speech
- 12.30 - 13.45** Lunch
- 13.45 – 14.00** Address of the Rector Magnificus of Maastricht University,
Prof. Gerard Mols
- 14.00 - 15.00** **6. Semantic Aspects of Word Production**
Patrizia Tabossi (Università di Trieste, I) - The production of words:
Semantic effects in the picture word interference paradigm
- 15.00 - 17.00** **Poster session**
- 18.00** Conference Dinner

TUESDAY, AUGUST 30th

- 09.00 - 11.00** **7. Writing and Gestures in Word Production**
Patrick Bonin (Université Blaise Pascal, Clermont-Ferrand, F) - Written and
spoken naming: The issue of shared and non-shared processes
- Asli Özyürek (Max Planck Institute for Psycholinguistics, Nijmegen, NL) -
How do our hands talk? Processes underlying speech and gesture production
- 11.00 - 11.30** Coffee break
- 11.30 - 12.30** **8. Neurocognitive Aspects of Language Production**
Peter Hagoort (F. C. Donders Centre for Cognitive Neuroimaging, Nijmegen,
NL) - To speak or not to speak: That is the question
- 12.30 - 14.00** Lunch
- 14.00 - 15.00** Evaluation

ABSTRACTS SPEAKERS

1. WORD PRODUCTION

Albert Costa

The control of speech production by bilingual speakers

Universitat de Barcelona, Spain

One of the most remarkable abilities of bilingual speakers is that of being able to produce speech in one their languages while preventing massive interference from their other language. Such an ability requires, among other things, to select words from the intended lexicon. Thus, one of the questions that models of language production needs to address relates to the control mechanisms that allow bilinguals to select words from one language in an apparently effortless manner. In this talk I will present the most relevant proposals regarding this issue. Also, I will review the experimental evidence that speaks to this issue, putting special emphasis from the results obtained with the language-switching paradigm. I will argue that the attentional mechanisms that guarantee lexical selection in the intended language are qualitatively different for highly-proficient bilinguals (selection without inhibitory processing) and L2 learners (selection by inhibition). However, I will also argue that in some conditions highly-proficient bilinguals may resort on inhibitory processes to assure lexical access in the appropriated language.

Fernanda Ferreira

Disfluencies: Syntax, Prosody, and Communication

Michigan State University, USA

Disfluencies are now the focus of a great deal of research in psycholinguistics. This development is not surprising, as the study of disfluencies links production and comprehension, syntax and prosody, and competence and performance. In this presentation, I argue that syntactic complexity is one cause of speaker disfluency, and that the correlation between syntactic constituency and disfluency distributions makes it appear that disfluencies affect parsing. But it is critical to distinguish disfluencies and prosody. This task is not trivial because acoustically they can be quite similar: pauses, word lengthening, and loudness differences are all used by the production system to implement prosody and also to produce disfluencies. Nevertheless, I argue that careful analysis allows us to distinguish genuine prosody from disfluency, which is critical for understanding effects of various acoustic manipulations on comprehension processes. I conclude that the jury is still out on whether disfluencies aid communication.

2. PLANNING I

Randi Martin

Converging evidence for a phrasal scope of planning

Rice University, Houston, Texas, USA

Evidence from patients with semantic short-term memory deficits indicates that they have difficulty producing utterances with phrases that contain several content words. For instance, they have difficulty producing adjective noun phrases (“blonde hair”) but do better with copular sentences expressing the same information (“the hair is blonde”) (Martin & Freedman, 2001). They also show greatly exaggerated onset-latency effects relative to normal subjects for the complexity of an initial noun phrase in a sentence (Martin, Miller & Vu, 2004). In contrast, patients with an input phonological short-term memory deficit showed a normal pattern of performance for all utterance types. The results suggest that the minimal scope of planning at a lexical-semantic level is the phrase. The present experiments provided converging evidence for this conclusion, including behavioral and neuroimaging data from neurally intact subjects. The behavioral experiments first replicated the onset-latency effect for initial noun phrase complexity first reported by Smith and Wheeldon (*Cognition*, 1999) supporting a phrasal scope of planning, and then ruled out alternative explanations. The neuroimaging experiment examined activation for the production of adjective-noun phrases vs. copular sentences. We predicted greater activation in the left inferior frontal gyrus for the phrase condition, given that this region appears to be the area damaged in patients with semantic short-term memory deficits and other evidence suggests that this region is involved in maintaining the results of semantic retrieval (Anderson et al., 2003). This prediction was confirmed. A region in the left inferior parietal region, which is implicated in phonological short-term memory deficits, showed no difference in activation for the phrase and sentence conditions but greater activation for both of these than for the production of the individual words in the phrases and sentences. In summary, the results support the conclusion that the planning for speech production involves preparation of the lexical-semantic representations within a phrase and that this planning draws on left inferior frontal brain regions.

Ardi Roelofs

Executive control of spoken word production: Evidence from Stroop-like tasks, task switching, and dual-task performance

Radboud Universiteit Nijmegen, The Netherlands

How are we able to formulate goals and plans for action and to follow these in the face of distraction or temptations to satisfy other goals, called executive control? In my talk, I will discuss the results of three series of experiments that examined the executive control of spoken word production. The first series of experiments examined the control that speakers have over the spread of activation through the mental lexicon, indexed by their performance in the face of distracting information. The second series of experiments examined the control involved in switching between word production tasks such as object naming and word reading. The third series of experiments examined the control involved in dual-task performance, i.e., when speakers have to name pictures while simultaneously performing another task. I will argue that the evidence favors the view of goal-referenced control (Roelofs, 2003, *Psych. Rev.*) over theoretical alternatives such as biased competition (e.g., Botvinick et al., 2001, *Psych. Rev.*; Gilbert & Shallice, 2002, *Cogn. Psych.*).

3. PLANNING II

Antje S. Meyer, Linda Mortensen, and Amy Flavell

Coordination of speech planning and articulation in young and elderly speakers

University of Birmingham, United Kingdom

When speakers name several objects, they usually look at each of them in the order of mention. This is not too surprising since it is often necessary to fixate upon objects to identify them. A more surprising finding is that speakers usually look at the objects until they are almost ready to say their names. The time interval between the shift of gaze from object A to object B and the onset of the name of object A can be as short as 80 milliseconds. This tight temporal co-ordination between eye gaze and speech can be observed under a variety of conditions, e.g., for novel and well- practiced utterances, at slow and fast speech rates, and for young and older speakers. In our multiple- object naming experiments, older speakers typically initiated their utterances only a little later than young speakers, but took considerably more time to complete them. However, the tight speech-to-gaze co-ordination seen in younger people was maintained.

Why do speakers look at the objects for such long periods of time? We propose that speakers fixate upon the objects until they have completed all capacity-demanding processes involved in object naming. This, in our view, includes phonological encoding. We report a set of dual-task experiments supporting this hypothesis.

In other experiments, we have shown that young speakers begin to process objects they are about to name before fixating upon them. This result is best accounted for within a distributed model of visual attention, according to which speakers allocate most of their attention to the fixated object A, but simultaneously allocate some attention to the next object to be named (B). They can shift gaze from object A to B at a late moment and still produce fluent utterances because substantial processing of object B occurs prior to fixation. We report findings suggesting that older speakers are reluctant or less able to distribute their attention in the same way. This may be one of the reasons why their speech is slower and more hesitant than that of younger speakers.

Linda Wheeldon

Planning sentence structure: Speech latency and gaze patterns during the production of word lists and sentences

University of Birmingham, United Kingdom

The processing costs associated with sentence planning were investigated in two experiments which compared the production of word lists and sentences. A novel paradigm was used, which involved tracing the speakers' eye movements while they were describing moving objects. In Experiment 1, they named the objects from left to right (e.g., "apple, fork, cow"), whereas in Experiment 2, they described the movement patterns (e.g., "The apple and the fork move up and the cow moves down"). Sentence production latencies and eye-movements were recorded. As in earlier studies (Smith & Wheeldon, 1999, 2000), the sentence production latencies in Experiment 2 depended on the size of the sentence-initial phrase. The position and duration of the first fixation and the subsequent eye movements differed systematically between the experiments and, in the second experiment, also depended on the structure of the first phrase. The methodological and theoretical implications of these findings will be discussed.

4. PHONOLOGICAL ASPECTS OF WORD PRODUCTION

Mike Vitevitch

The influence of phonological neighbors on speech production in English and Spanish

University of Kansas, USA

Although it is well-accepted that similar sounding word-forms, or phonological neighbors, influence spoken word recognition, only recently has evidence demonstrated that phonological neighbors influence spoken word production. Evidence demonstrating the influence of phonological neighbors on spoken word production will be reviewed and discussed in the context of current models of spoken word production. New findings from a picture-naming task examining the influence of phonological neighbors on spoken word production in Spanish will also be described. The results regarding the influence of phonological neighbors from the Spanish picture-naming task show a pattern of results that is the opposite of what has been previously found in speech production in English. These findings not only challenge specific models of speech production, but they also challenge a fundamental assumption of cognitive psychology: models of mental processing account for the general case of a process regardless of individual variation.

Manuel Carreiras

Syllable frequency in speech production

Universidad de la Laguna, Tenerife, Spain

Models of speech production have given an increasing attention to the syllable as a representational unit. Some relevant empirical evidence has been gathered investigating the frequency of occurrence of the syllables embedded in words or pseudowords. I will present some behavioural experiments that investigated the effects of syllable frequency in Spanish using the naming and the lexical decision tasks. Effects of syllable frequency were facilitatory in naming (e.g., faster reaction times to high frequency syllables than to low frequency syllables) but inhibitory in lexical decision. The facilitatory effects of syllable frequency observed in naming are likely to be located at the production stage, because syllable frequency has inhibitory effects in word recognition tasks (e.g., lexical decision). I will also discuss an fMRI experiment that investigated whether this dissociation of syllable frequency in the two tasks resulted in that syllable frequency activates separate regions of the brain in naming and lexical decision. Low vs. high syllable frequency increased activation in the left anterior insula during naming but not during lexical decision, while high vs. low syllable frequency increased activation in left inferior temporal areas in lexical decision but not in naming. The behavioural and fMRI results of syllable frequency suggest that a) syllables are functional units that need to be accessed when word production is planned, and b) that the left insula seems to be involved in the speech production cortical network.

5. EVOLUTION OF SPEECH PRODUCTION

W. Tecumseh Fitch

The Evolution of Speech

University of St Andrews, United Kingdom

The human speech apparatus is built upon an ancient vocal production system shared by all terrestrial vertebrates. This system, based upon a larynx and supralaryngeal vocal tract, operates upon basic principles codified in the source/filter theory of vocal production. The evolution of this system can be studied using the comparative approach: a biological framework which uses data from living organisms to draw inferences about phylogeny (and characteristics of extinct ancestors) along with adaptive function. From a comparative viewpoint, the human speech apparatus cleaves into two components: a peripheral vocal production system that is largely shared by other mammals, and a neural control system that is in many respects quite unusual. In particular, our ability to imitate complex vocal signals that we hear appears to be unique among primates, though it is shared with a variety of more distantly related species, including birds, whales and seals. Recent advances in our understanding of the genetics underlying human vocal control offer great promise for achieving a deeper understanding of the neural and genetic basis of this critical component of human spoken language.

6. SEMANTIC ASPECTS OF WORD PRODUCTION

Patrizia Tabossi

The production of words: Semantic effects in the picture-word interference paradigm

Università di Trieste, Italy

To date, a commonly used methodology in the experimental study of lexical production is the *picture-word interference paradigm*. The model which has most systematically relies on the findings obtained with this paradigm is WEAVER++ (Levelt et al., 1999; Roelofs, 1992, 2003). A series of experiments explore the adequacy of the mechanisms proposed by the model to explain the semantic phenomena observed with the *picture naming paradigm*. The findings, which cast doubts on the use of the paradigm in the study of lexical production, are discussed with respect to some of the assumptions made by WEAVER++.

7. WRITING AND GESTURES

Patrick Bonin

Written and spoken naming: The issue of shared and non-shared processes

Université Blaise Pascal, Clermont-Ferrand, France

The issue of shared and non-shared processes in written and spoken naming will be addressed in this talk. I will first review the methods which are specifically used to investigate lexical access in written naming. Then, I will present several findings from studies of my own which suggest that written and spoken naming share certain processing levels. I will also discuss about different studies which strongly suggest that written naming is not entirely dependent upon processes and representations used in spoken naming. More precisely, I will provide evidence for the hypothesis that the access to phonological representations is not obligatory for retrieving or computing orthographic representations in written naming.

Asli Özyürek

How do our hands talk? Processes underlying speech and gesture production

Max Planck Institute for Psycholinguistics, Nijmegen, The Netherlands

Most theories of language production aim to explain the underlying processes of speech production at different levels such as phonology, morphology, word, syntax etc (e.g., Levelt, 1989). However, recent research has demonstrated that as speakers talk, they frequently use hand gestures that are tightly coordinated with the information expressed in speech; both semantically and temporally (e.g., Clark, 1996; Goldin-Meadow, 2004; McNeill, 1992). A few production theories have tried to account for how speakers achieve this tight coordination between the two systems. For example, according to some theories, speech and gesture production are non-interactive but parallel processes (Feyereisen, & Lanoy, 1991; Krauss, 2000). However, some others argue that there is interaction and cross talk between the two systems even in the early stages of language production such as at the level of message conceptualization and formulation (De Ruiter, 2000; Kita & Özyürek, 2003; Özyürek, 2002). By presenting data from spontaneous speech and gesture production from speakers of different languages (English, Turkish, Japanese), 2nd language users, and experimental studies, I will discuss the plausibility of these theories and try to give an account of how our hands also talk as we speak.

8. NEUROCOGNITIVE ASPECTS OF LANGUAGE PRODUCTION

Peter Hagoort

To speak or not to speak: That is the question

F. C. Donders Centre for Cognitive Neuroimaging, Nijmegen, The Netherlands

In a recent ERP study we have found that during language comprehension people can use their knowledge of the wider discourse rapidly enough to anticipate specific upcoming words as a sentence is unfolding. I will argue that this finding that listeners/readers can predict upcoming words in fluent discourse, is most parsimoniously accounted for by the recruitment of the language production system during comprehension. In this case, prediction is production. This is further evidence that language comprehension and language production are often intertwined. Even if we don't speak, we produce language. To speak or not to speak is no longer the issue.

ABSTRACTS POSTERS

1. **F.-Xavier Alario, Laetitia Perre, Caroline Castel, and Johannes Ziegler**
Segmental and orthographic effects in the form-preparation paradigm
2. **Cati Brown**
Does ketamine mimic aspects of schizophrenic speech?
3. **Joana Cholin, Gary Dell, and Willem J. M. Levelt**
How are stored phonetic syllables retrieved and processed in Dutch and English?
4. **Ingrid K. Christoffels, Elia Formisano, and Niels O. Schiller**
The neural correlates of verbal feedback: An fMRI study employing overt speech
5. **Marie Delattre, Patrick Bonin, and Christopher Barry**
Written spelling to dictation: Sound-to-spelling regularity affects both writing latencies and durations
6. **Julie Franck and Ulrich Frauenfelder**
Semantic and morphophonological influences on gender agreement: New insights from picture naming
7. **Lesya Ganushchak and Niels O. Schiller**
Effects of auditory distractors on verbal self-monitoring
8. **Reinhild Glanemann, Christian Dobel, and Pienie Zwitserlood**
Event conceptualization in free view and at an eyeblink
9. **Matt Goldrick**
Lexical cascade to phonetic processes: Evidence from errorful and non-errorful speech
10. **Heidi Gumnior, Pienie Zwitserlood, and Jens Bölte**
Morphology in German word production and comprehension
11. **Anna Hatzidaki, Martin Pickering, and Holly Branigan**
Evidence for subject-verb agreement convergence in English-Greek code-switching
12. **Iemke Horemans and Niels O. Schiller**
Do we monitor the verbal outfit [... uhm ...] output of others?
13. **Iva Ivanova, Mikel Santesteban, and Albert Costa**
The Role of L2 / L3 on the production of a subsequent non-dominant language: Evidence from language switching in highly-proficient bilinguals
14. **Annett Jorschick, Jens Bölte, and Pienie Zwitserlood**
Is phonological change in speech reflected in production latencies?

- 15. Christian Kell, Katrin Neumann, and Anne-Lise Giraud**
Prosodic production tasks during fMRI reveal functional deficits in stutterers
- 16. Heidi Koppenhagen and Niels O. Schiller**
Solving Conflict in Lexical Access: an Event-Related Potentials (ERP) study
- 17. Andrea Krupik, Jens Bölte, and Pienie Zwitserlood**
Morphological complexity as an instrument for specifying objects in a referential communication task
- 18. Marina Laganaro, F.-Xavier Alario, and Valérie Schwitter**
On the locus of the syllable frequency effect in speech production
- 19. Eduardo Navarrete, Benedetta Basagni, F.-Xavier Alario, and Albert Costa**
Lexical frequency effects on grammatical gender retrieval
- 20. Rebecca Özdemir, Ardi Roelofs, and Willem J. M. Levelt**
Perceptual uniqueness point effects in self-monitoring of speech
- 21. Cyril Perret, Patrick Bonin, and Alain Méot**
Units for spoken word production: The syllable's problem
- 22. Simone A. Sprenger and Hedderik van Rijn**
Clock time naming: Complexities of a simple task
- 23. Jana Vlcková-Mejvaldová**
Production and perception of emotional prosody. A comparative study

F.-Xavier Alario, Laetitia Perre, Caroline Castel, and Johannes Ziegler

Segmental and orthographic effects in the form-preparation paradigm

Laboratoire de Psychologie Cognitive, CNRS & Université de Provence, Marseille, France

The processes of phonological encoding during speech production have been extensively investigated with the form preparation paradigm (Meyer, 1990). In this paradigm, participants produce words in blocks while the form-similarity between the words is manipulated. Facilitation effects are found when the beginning of words share form properties, compared to when they are unrelated. This result has been used to determine the linguistic units used in the process of phonological encoding, as well as the temporal organization of their retrieval.

In this poster we investigate two effects that have been previously reported:

1. The single-segment effect is the observation of form-preparation for blocks in which only one phoneme is shared across the words. This effect has been found in studies conducted in English and Dutch (Meyer, 1991; Roelofs, 1999, 2003), but not systematically so in studies conducted in other languages (Spanish and Mandarin Chinese: Chen, Chen, & Dell, 2002; Costa & Sebastián, 1996). The differing pattern has been tentatively interpreted as reflecting a cross-linguistic difference in the status of syllables in the process of phonological encoding (Chen, Chen, & Dell, 2002).
2. The orthographic disruption of the phonological effect is the observation that the facilitation effect we just described disappears when the shared segment has different orthographies across the words of a block. This disruption, reported in English (Damian & Bowers, 2003), could suggest an influence of the orthographic system on the processes of phonological encoding, in a situation where no orthographic output is required.

We report 5 experiments conducted in French and in English where we tested single-segment form-preparation and its disruption by orthographic inconsistency. In Experiment 1, conducted in French, we found single-segment phonological facilitation, irrespective of the orthographic properties of the words in the blocks. In the 4 other experiments, we failed to find single-segment facilitation effects and we failed to find differences between phonological and orthographically inconsistent conditions.

We discuss the consequences of these results for 1/ current interpretations of the form-preparation effect, and 2/ the hypothesized role of orthography in speech encoding.

Cati Brown

Does ketamine mimic aspects of schizophrenic speech?

University of Georgia

Speech disturbances are well-known signs of schizophrenia. Subanesthetic doses of ketamine are widely reported to produce a condition similar to schizophrenia. It is therefore of interest to know whether the speech disturbances in both conditions are comparable. The effect of neuropsychiatric disease status on speech is not confined to abnormalities noted by the clinician or casual observer. Quantitative computer-aided analysis of apparently normal language can detect clinically relevant changes. Accordingly, this study used techniques from computational linguistics to compare the effects of ketamine and of schizophrenia on speech. Speech samples from healthy volunteers given ketamine and placebo, and from patients diagnosed with schizophrenia and comparable healthy controls, were analyzed for idea density, verb density, and repetitiousness (perseveration). Significant increases in repetitiousness were found both in schizophrenia and with ketamine, indicating impairment of lexical access and/or of discourse organization. To this extent, ketamine mimics the cognitive impairment of schizophrenia.

Ketamine also produced a marked drop in use of verbs (hypoverbality) which was not observed in our sample of schizophrenia. Hypoverbality apparently reflects a cognitive impairment of a completely different type than repetitiousness, and further investigation is needed to determine whether this impairment occurs in psychosis.

Joana Cholin^{1,2}, Gary Dell¹, and Willem J. M. Levelt²

How are stored phonetic syllables retrieved and processed in Dutch and English?

¹ *Beckman Institute, University of Illinois at Urbana-Champaign, USA*

² *Max Planck Institute for Psycholinguistics, Nijmegen, the Netherlands*

During speech production, speakers encode and retrieve single syllables of multisyllabic words to form an utterance. Effects of syllable-frequency in Dutch and English suggest that syllables are retrieved from a mental syllabary. The mental syllabary is hypothesized to provide abstract motor-programs of syllabic size in order to facilitate the process of phonetic encoding. A crucial question concerns the temporal coordination of the retrieval and integration of syllables in multisyllabic utterances. In four experiments investigating the production of disyllabic pseudo-words, the integration of successive syllables in a language with relatively clear syllable boundaries (Dutch) is compared to a language with less clear syllable boundaries (English). For Dutch, a syllable-frequency effect was found only for the first syllable of disyllabic items. It was concluded that speakers incrementally generate syllable after syllable and that articulation can start when just the first syllable is available, thereby excluding potential effects of the second syllable. In English the syllable frequency of both the first and the second syllable influenced production times. Here, speakers use larger planning units for articulation.

These results suggest that syllables are stored motor-programs, regardless of the transparency of the language's syllables. Transparency, however, may influence the temporal coordination of planning and articulatory units.

Ingrid K. Christoffels, Elia Formisano, and Niels O. Schiller

The neural correlates of verbal feedback: An fMRI study employing overt speech

Department of Cognitive Neuroscience, Faculty of Psychology, Maastricht University, The Netherlands

Speakers are their own listeners: We use external auditory feedback to monitor our own speech. Using fMRI the present study investigates the neural correlates of processing verbal feedback. In a blocked design we compared: (1) overt picture naming, (2) overt picture naming while pink noise was presented to mask external feedback, (3) covert picture naming, (4) listening to the picture names (previously recorded from participants' own voices) while watching scrambled pictures, and (5) listening to pink noise while watching scrambled pictures. Our findings indicate the activation of network of cortical and subcortical regions associated to speech planning, speech-motor control and general performance monitoring. Especially the bilateral insula and the anterior cingulate cortex were more activated in the presence of normal verbal feedback. The latter is often implicated in error processing and conflict monitoring, but also appears to be engaged in ongoing performance monitoring of speech. Furthermore, we found a decrease in activity in the superior temporal gyrus when speaking overtly with normal feedback. This suggests a reduced response to our own voice when speaking. Similar areas in the bilateral temporal cortices respond to speaking aloud (with and without noise) and listening to ones own voice.

Marie Delattre*, Patrick Bonin*, and Christopher Barry**

Written spelling to dictation: Sound-to-spelling regularity affects both writing latencies and durations.

* *LAPSCO/CNRS (UMR 6024), Université Blaise Pascal, Clermont-Ferrand, France*

** *Department of Psychology, University of Essex, Colchester, United Kingdom*

We examined the effect of sound-to-spelling regularity on written spelling latencies and writing durations in a dictation task in which participants had to write each target word three times in succession. We found that irregular words (i.e., those containing low-probability phoneme-to-grapheme mappings) were slower both to initially produce and to execute in writing than regular words. The regularity effect was found both when participants could and could not see their writing (Experiment 1 and 2) and was larger for low-than for high-frequency words (Experiment 3). These results suggest that central processing of the conflict generated by the lexical retrieval and the assembled (or sub-lexical) spelling routes for irregular words is not entirely resolved when the more peripheral processes controlling handwriting begin.

6

Julie Franck and Ulrich Frauenfelder

Semantic and morphophonological influences on gender agreement: New insights from picture naming

University of Geneva

The standard model of language production involves three levels of encoding: semantic, lexical/syntactic and phonological. The model is characterized by limited influences from the semantic and phonological levels on syntactic processes. However, our previous research suggested that semantic and morphophonological factors do play a role on gender agreement. But these experiments were conducted using a sentence completion technique, which requires that the materials first be comprehended before the actual production task takes place. We present two sets of experiments using picture naming that confirm the role of non syntactic factors on agreement: response times to produce noun phrases involving the agreement of a prenominal adjective were (1) faster in the presence of semantic gender information (animate subjects) than in the absence of semantic information (inanimate subjects), and (2) faster in the presence of morphophonological gender information on the subject (gender-marked singular article) than in the absence of morphophonological information (gender-unmarked plural article). On the basis of this new data and of our previous observations, a fine functional decomposition of the agreement operation is suggested in which the specific locus of semantic and morphophonological influences is identified.

Lesya Ganushchak and Niels O. Schiller

Effects of auditory distractors on verbal self-monitoring

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Self-monitoring is one of the processes involved in speech production necessary for error detection and self-repair processes. According to Levelt's (1983) proposal, self-monitoring is a resource-limited process. Therefore, the efficiency of the monitor should decrease under resource-demanding conditions. Here, we created such conditions by presenting native Dutch participants with auditory distractors during a phoneme monitoring task (e.g., "Does the sound /t/ form part of the picture name *table*?"). We investigated the influence of the distractors on the efficiency of the verbal self-monitor by measuring behavioral responses and the Error-Related Negativity (ERN). Participants showed auditory interference effects in reaction times, and we obtained an ERN after verbal (phoneme monitoring) errors. The amplitude of the ERN was largest following semantically related distractors. We suggest that semantically related distractors led to more conflict between possible responses and demanded additional resources than unrelated distractors, thereby increasing reaction time and the amplitude of the ERN.

Reinhild Glanemann, Christian Dobel, and Pienie Zwitserlood

Event conceptualization in free view and at an eyeblink

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Studies of eye movements during speech production suggested the notion of a non-linguistic apprehension phase that precedes the linguistic phase of formulating an utterance (e.g. Griffin & Bock, 2000; Bock et al., 2003). The apprehension phase is characterized by (1) a rapid uptake of perceptual information, resulting in a coarse representation of the event and (2) eye-movements that may already indicate which region of the stimulus will appear as first term in the utterance. We examined this early phase with photorealistic action scenes. We were interested in what information can be extracted / whether role-relations are accessible before participants direct their first gaze into the visual stimulus. In one experiment, participants' task was to indicate by button press the position of the patient in the action. With unlimited exposure, eye-tracking revealed a tendency to fixate agents and action regions first. In this task, near perfect performance was also reached when presentation was brief (150 ms) and masked. In a follow-up experiment with the same exposure conditions, correct naming of the actions was achieved when body posture allowed few alternative actions. Thus, with photorealistic stimuli, visual event recognition is characterized by a rapid uptake of role-, and (often) action-related information.

Matt Goldrick

Lexical cascade to phonetic processes: Evidence from errorful and non-errorful speech

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Two acoustic studies revealed the presence of cascading activation to phonetic/articulatory representations. First, analysis of tongue twister errors revealed that the voice-onset time (VOT) of errors resulting in nonwords (e.g., "kev"-> [gev]) were significantly longer (mean difference: 9.2 msec) than the VOT of correctly produced nonwords (e.g., "gev" -> [gev]), reflecting a "trace" of the acoustic properties of the voiceless target. In contrast, error resulting in words (e.g., "kess"->[ges] 'guess') showed no significant trace of the target (mean difference: 0.7 msec). Cascade can account for these findings. Cascade from lexical representations increases the activation of phonological representations that correspond to words; this activation advantage then cascades to articulatory processes, reducing the influence of target representations (and the size of the trace). Converging evidence comes from acoustic analysis of non-errorful read speech. /p/-initial words that form a minimal pairs with a /b/-initial word (e.g., "pad"), had longer VOTs than matched words that do not form such a minimal pair (e.g., "pal"). This too is consistent with cascade. Target words in minimal pairs are more active because they must suppress the activation of highly similar competitors. This activation advantage cascades to phonetic processes, leading to more extreme values of voicing.

Heidi Gummior, Pienie Zwitserlood, and Jens Bölte

Morphology in German word production and comprehension

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Is morphological complexity coded independently of semantics and phonology?

We present data from a speech production (picture naming) and a comprehension experiment (LDT). To disentangle morphological effects from effects of semantic relatedness and phonological similarity each target (e.g., schlafen – to sleep) was combined with four words: Morphologically related complex verbs which were either semantically transparent (verschlafen – to oversleep) or semantically intransparent (entschlafen – to pass away) and simple verbs that were semantically (ruhen – to repose) or phonologically related (schlackern – to dangle).

1. Production Experiment:

Morphologically related distractors facilitated naming latencies irrespective of semantic transparency. Phonologically related distractors also reduced naming latencies. However, the morphological effect was more than three times larger than facilitation due to phonological similarity. Semantically related simple verbs had no impact on naming latencies.

2. Comprehension Experiment:

Morphologically related distractors (transparent and intransparent) as well as phonologically related primes facilitated lexical decisions, although morphological primes produced reliable more facilitation than phonological primes. As in Experiment 1, semantically related primes had no effect.

Thus, morphological facilitation does not simply result from form overlap and semantic relatedness. Morphological effects independent of semantic transparency are compatible with the assumption that morphological complexity is coded in a decomposed way at the form level.

Anna Hatzidaki, Martin Pickering, and Holly Branigan

Evidence for subject-verb agreement convergence in English-Greek code-switching

University of Edinburgh

An important grammatical difference between English and Greek is that there are nouns whose grammatical number differs between their translation equivalents; e.g., *cash* is plural in Greek but singular in English and *trousers* is plural in English but singular in Greek. Assuming that morphological/notional number clash between two languages may influence the implementation of subject-verb agreement in code-switching (CS), we tested the performance of fluent English bilinguals of Greek L2 on a preamble completion task (Bock and Miller, 1991), by manipulating the number of the nominal subject noun, both in inter-sentential and intra-sentential CS. In both types of CS, when the starting language was bilinguals' native language, most of the time S-V agreement was driven following the morphological features of the L1 subject noun, especially in inter-sentential CS. However, in intra-sentential CS, when the starting language was bilinguals' second language, the verb produced acquired the features of the component that was shared most in the contact between the L2 and L1, namely notional number. Our findings are in line with CS studies that argue that *convergence* may be regarded as a means to reduce the size of feature conflict and cognitive workload during language alternation (Toribio, 2004; Montrul, 2004).

12

Iemke Horemans and Niels O. Schiller

Do we monitor the verbal outfit [... uhm ...] output of others?

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Speakers monitor their own speech for errors. Previous research showed that we also monitor speech of others for semantic and syntactic errors. However, relatively little is known about monitoring the speech of others for phonological errors. We report a study in which we presented participants with line drawings and auditory sentences describing these drawings. Participants were asked to press a button when they detected an error in the description. Errors were either semantic or phonological. Phonological errors were created following actual speech error patterns. In addition to reaction times, event-related potentials were measured. Preliminary data analysis showed that phonological errors were detected significantly faster than semantic errors. ERP analyses revealed differences between semantically, phonologically, and control conditions between 120 and 380 ms as well as between 380 and 600 ms after the onset of the erroneous word. These data suggest that monitoring is different for phonological compared to semantic errors.

Iva Ivanova, Mikel Santesteban, and Albert Costa

The Role of L2 / L3 on the production of a subsequent non-dominant language: Evidence from language switching in highly-proficient bilinguals

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Investigating the speech production control mechanisms of highly-proficient bilinguals, Costa & Santesteban (2004) proposed that with increase in proficiency a language-specific lexical selection mechanism becomes operative, substituting reactive inhibition (Green, 1998). In the present work, using the same language-switching paradigm as in Costa & Santesteban (2004), we attempted at replicating and extending these findings to experimental contexts involving non-dominant languages. In Experiment 1, subjects were required to switch between a dominant L2 (Catalan) and a weak L3 (English), and in Experiment 2, between a non-dominant L3 (English) and an even weaker L4 (French). The main results we obtained are symmetrical switch costs for both languages in Experiment 1, replicating Costa & Santesteban's findings (2004, Exp. 3), but asymmetrical switch costs in Experiment 2, the stronger language showing greater costs than the weaker. Thus, while presenting further proof that highly-proficient bilinguals make use of a language-specific selection mechanism, we also reveal some limits on the functioning of this mechanism. Specifically, highly-proficient bilinguals seem to resort to inhibiting the more dominant language in situations when a very weak language is involved for which they lack robust lexical representations integrated in a lexicon. As an explanation of Experiment 2 we also consider the documented greater influence of a non-dominant language (as compared to the native one) on the production of subsequently learned languages.

Annett Jorschick, Jens Bölte, and Pienie Zwitserlood

Is phonological change in speech reflected in production latencies?

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The variable nature of speech signals complicates the mapping of the acoustic signal onto lexical representations. Non-speech noise is only part of the problem. Language-inherent properties, such as phonological processes, also add substantial variance to the mapping. Deviations may be small, such as /n/ pronounced as /m/. Until recently, investigations concentrated on the *comprehension* of deviating stimuli.

We investigated the impact of deviations on production, by means of the picture-word-interference paradigm. Phonologically-related pseudowords served as distractors for the picture name (*e.g.* /aton/ – *picture of an* ATOM). Deviations were either legal or illegal according to theories of phonological underspecification. We show that minimal changes facilitate picture naming, relative to unrelated pseudowords, but find no easily interpretable effects of phonological legality. Manipulations of SOA between pictures and distractors influenced whether minimal deviations were as effective as identical distractors.

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Prosodic production tasks during fMRI reveal functional deficits in stutterers

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Stuttering can be interpreted as the result of impaired linguistic motor executive function. Previous studies revealed left-hemispheric pathologies in somatomotor and language-related cortices of stutterers. Stutterers seem to compensate their defect spontaneously via an activation of the right frontal operculum. Based on these findings, we sought to preferentially activate either the left or the right frontal lobe.

Prosody perception usually involves lateralized cortical networks depending on whether it emphasises linguistic or emotional features. We hypothesized that a similar functional lateralization should be observed in frontal regions during speech production emphasizing different prosodic features. While production of linguistic prosody should predominantly activate left-hemispheric regions, emotional prosody should reveal a more right-hemispheric network. The production of linguistic prosody should therefore reveal relative left-hemispheric deactivations in stutterers, while production of emotional prosody should not reveal inter-group differences. After confirming functional lateralization of spoken prosody in normal subjects we compared activations in stutterers and controls. In the linguistic prosodic task, we found a very circumscribed deactivation in stutterers in Broca's area. No significant differences in the emotional prosodic task were found between the groups. Our results delineate a focal functional lesion in the stutterers' left language executive network, which may require compensation by Broca's right homologue.

Heidi Koppenhagen and Niels O. Schiller

Solving Conflict in Lexical Access: an Event-Related Potentials (ERP) study

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The verbal monitoring system controls for the correctness of our speech. We hypothesized that the monitor detects situations that involve conflict in information processing. If the amount of monitoring depended on the amount of conflict present, this should be reflected in gradually different amplitudes of a conflict-monitoring ERP-component. The present study investigated speech monitoring during overt picture naming while the amount of conflict at the lexical level was varied. “No lexical conflict” consisted of naming a picture that corresponded to only one lexical entry, “low lexical conflict” referred to naming with its *dominant* name a picture that corresponded to multiple lexical entries, and “high lexical conflict” consisted of naming with its *non-dominant* name a picture that corresponded to multiple lexical entries. Results showed at mid fronto-central electrodes an N450 followed by a positive Sustained Potential (SP) that had significantly higher amplitudes for both conflict conditions relative to the no-conflict condition.

Andrea Krupik, Jens Bölte, and Pienie Zwitserlood

Morphological complexity as an instrument for specifying objects in a referential communication task

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We investigated the question when do we use morphologically complex words instead of morphologically simple ones? Or in different words: “When do we say wine glass instead of glass?”

We used the picture-picture interference paradigm in order to explore the influence of a distractor object on choosing a morphologically complex word as an answer for the target object. A target picture (e.g. wine glass) was combined with a geometric figure (e.g. square), the identical picture, a morphologically simple unrelated object (e.g. stool) or with a conceptually related picture (e.g. champagne glass).

A certain cue whose appearance was varied (SOA) identified the target object. Additionally, participants had to take two different referential perspectives: (1) the identification of the object by the participant or (2) the identification of the object by somebody else. Items were chosen with respect to their (preferable) morphologically simple form. We were able to show that the dominant simple naming of the target objects can be overcome by conceptually related distractors. The presentation duration and the referential perspective were of main importance for producing morphologically complex words while SOA was of limited relevance.

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On the locus of the syllable frequency effect in speech production

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The observation of a syllable frequency effect in naming latencies has been an argument in favor of a functional role of stored syllables in speech production. This effect has been ascribed to the phonetic encoding in Levelt et al.'s (1999) model. However, the direct empirical evidence for locating the effect at this level rather than at phonological level is scarce. To investigate the origin of the syllable frequency effect, we conducted six experiments that used immediate and delayed production with or without interfering tasks. We tested the existence of a syllable frequency effect in standard immediate pseudo-word production and picture naming. Naming latencies were sensitive to the frequency of the syllables composing the produced items. In the delayed naming, participants were asked to produce the same items after a short delay. In one condition, subjects performed an articulatory suppression task. The syllable frequency effect disappeared in the standard delayed naming. By contrast, syllable frequency affected delayed production latencies when the delay was filled with articulatory suppression. The pattern of results for words and pseudo-words were highly similar. Since the articulatory suppression task is thought to disrupt mainly phonetic encoding while leaving major aspects of phonological storing intact, the pattern of results is interpreted as evidence that the syllable frequency effect is located at the stage of phonetic encoding.

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Lexical frequency effects on grammatical gender retrieval

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Models of speech production disagree on how grammatical and phonological properties are represented and accessed. Jescheniak and Levelt (1994) provided empirical evidence that access to grammatical gender occurs independently of the lexical frequency of the nouns. They interpreted this finding as suggesting that lexical frequency mostly affects the retrieval of the phonological properties of nouns, but not their grammatical properties.

In this framework, word-frequency effects should not be observed when the participant's task requires access to grammatical properties of nouns, but not to their phonology. This is the case of pronoun production.

We tested this hypothesis in 2 experiments where Spanish speakers named pictures with phrases (e.g., “*Los/as verdes*”: The_{mas/fem} green ones; “*Este/a es nuevo/a*”: This_{mas/fem} is new_{mas/fem}). The picture names were either of high or low frequency. In both experiments, responses were faster for high than for low frequency nouns (Finocchiaro & Caramazza, in press). This effect was stable across 4 repetitions. A control word-picture matching task excluded that the frequency effect was due to the early stages of picture recognition. In a third experiment, we replicated this frequency effect in a button-press gender-decision paradigm, similar to that used by Jescheniak and Levelt (1994).

The frequency effect observed in tasks where the phonological content of the noun is not uttered is inconsistent with the view that grammatical and phonological properties are accessed independently (Starreveld, & La Heij, 2004) or with the view that lexical frequency mostly affects phonological retrieval.

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Perceptual uniqueness point effects in self-monitoring of speech

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There are different models/accounts in the speech production literature of how speakers monitor their inner speech plan. Production-based accounts assume that the internal monitor resides within the production system (e.g., Laver, 1973). In contrast, perception-based accounts, such as the perceptual loop theory of Levelt and colleagues (Levelt, 1983; 1989; Levelt, Roelofs, & Meyer, 1999), assume that the speech plan is monitored by using the speech comprehension system. A way to differentiate between these two accounts is to test for the presence of perception-specific effects in a self-monitoring task. While the perceptual loop theory predicts perception specific effects in self-monitoring, production-based accounts do not expect these effects in self-monitoring. We ran a series of experiments testing for effects of the perceptual uniqueness point of words (e.g., Frauenfelder et al. 1990). We tested for uniqueness point effects in a picture naming task and in internal phoneme monitoring. Our results showed an effect of the distance of the target phoneme from the uniqueness point of the word in the phoneme monitoring latencies, but no effect of that manipulation in the picture naming latencies. These results are in favor of the perceptual loop theory and are incompatible with production-based monitoring models.

Cyril Perret, Patrick Bonin, and Alain Méot

Units for spoken word production: The syllable's problem

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A crucial issue in spoken word production is to determine the different types of units that are planned before articulation starts. Using a masked priming procedure with short prime durations, Ferrand, Grainger and Segui (1996) found robust syllable priming effects on picture naming latencies: pictures primed with their initial syllable (e.g., “bal” for “balcony”) were processed faster than pictures primed with a string of letters shorter or longer than their initial syllable (“ba” for “balcony”). However, in several studies, these priming effects have not been replicated either in Dutch or in English (Schiller, 1998, 1999, 2000). Instead, Schiller (1998) found segmental length priming effects. The present study was aimed at investigating syllable priming effects in picture naming in French using a masked priming paradigm. A larger number of participants and items than used in the Ferrand et al. study was used here. The syllable priming effect was not replicated but a segmental priming length effect was found. Simulations were then performed to determine the probability of observing syllable/length priming effects.

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Clock time naming: Complexities of a simple task

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Performance in relative clock time naming (e.g., pronouncing 3:50 as "ten to four") has been described as depending on three factors: reference hour determination, minute transformation, and an additional distance component (Meeuwissen, Roelofs & Levelt, 2003). However, this model does not specify the cognitive operations that are responsible for the distance effect. We present three hypotheses about the factors that determine clock time latencies: physical distance, arithmetics, and frequency of the expression. Three experiments and a corpus analysis that test these hypotheses are presented. Regression models of speech onset latencies for an extended set of clock times show clear contributions of all three factors and explain most of the variance associated with this task.

Jana Vlcková-Mejvaldová

Production and perception of emotional prosody. A comparative study.

Charles University in Prague, Institute of Phonetics

The influence of emotions on the production and the acoustic aspect of speech, quality of the separate segments, and on the form of the whole prosodic model, is undeniable. The question is, to which extent the prosodic model of the emotional utterance is determined by physiological changes and to which extent it is related to the prosodic characteristics of the particular language. In our experiment, we have compared prosodic manifestations of 7 emotions (joy, surprise, fury, sadness, admiration, boredom + neutrality as reference prosody) in Czech, Polish, Serbian, French, and Hungarian. Some characteristics were specific for each of these emotions, and thus shared by all of the studied languages. With regard to the fact that the acoustic material was acquired in the experiment in the laboratory conditions, the emotion expressions were controlled. We have assessed by perception tests whether the listeners who do not understand the language are able to identify the emotions on the prosodic base only. It was proved that in certain cases the specific characteristic of the prosodic system of the language (phonological length and stress on the first syllable in Czech, tone characteristic of stress in Serbian) are involved in the emotional prosody so much that the emotion is non-understandable for non-native listeners and the identification of the emotion of the speaker, living the emotion over, is impossible.