



SCUOLA
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Laboratorio di Linguistica

“Giovanni Nencioni”

Scientific Report 2006-10



<http://linguistica.sns.it>

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Mission



The Laboratorio di Linguistica “Giovanni Nencioni” (henceforth LABLIN), named after its initiator, was founded in the late Seventies with the original aim of supporting equipment-based phonetic research. Since its origin, however, it was intended to be (as its very name shows) the nest of broadly-conceived linguistic investigation, rather than of phonetic investigation in the narrow sense. It was thus intended as the natural meeting point of SNS scholars and students in linguistics, whatever their specific interest. The integration of different inclinations and research lines has soon become one of LABLIN’s distinctive features. The side-by-side presence of teachers, students, technicians and visiting scholars creates an intellectually fertilizing atmosphere, very much in the SNS tradition.

Doctoral students play an important role in LABLIN’s activities. This does not mean that they are asked to participate, first and foremost, in strategic LABLIN projects: indeed, the specific inclinations of the individual student are the main source of inspiration in the choice of the dissertation topic. It is to be noted, however, that while the integration of the students’ topics with one of the research lines carried on by LABLIN is obviously encouraged and valued, the reverse is not infrequently the case: i.e., a given dissertation topic may turn out to be the input of a new strategic research line. This also happened in the period under evaluation.

Consistently with the above, the initial LABLIN’s mission (i.e., phonetic research) gradually extended over the time in the direction of psycholinguistic investigation, computational linguistics and (more recently) neurolinguistics and field-work. The laboratory equipment has consequently been adapted to these changing and increasing needs, although great care has always been taken not to go into directions requiring heavy financing. Or else, when this was the case, collaborations have been established with specialized centers, willing to share their equipment and know-how with LABLIN scholars. Details on the collaborations activated in the last five years will be provided in the following sections.

Within the last period, LABLIN has engaged in fund-raising activities, as one should expect from any laboratory of this sort. This was even more necessary, considering that LABLIN has always taken it as a point of honor never to ask SNS to

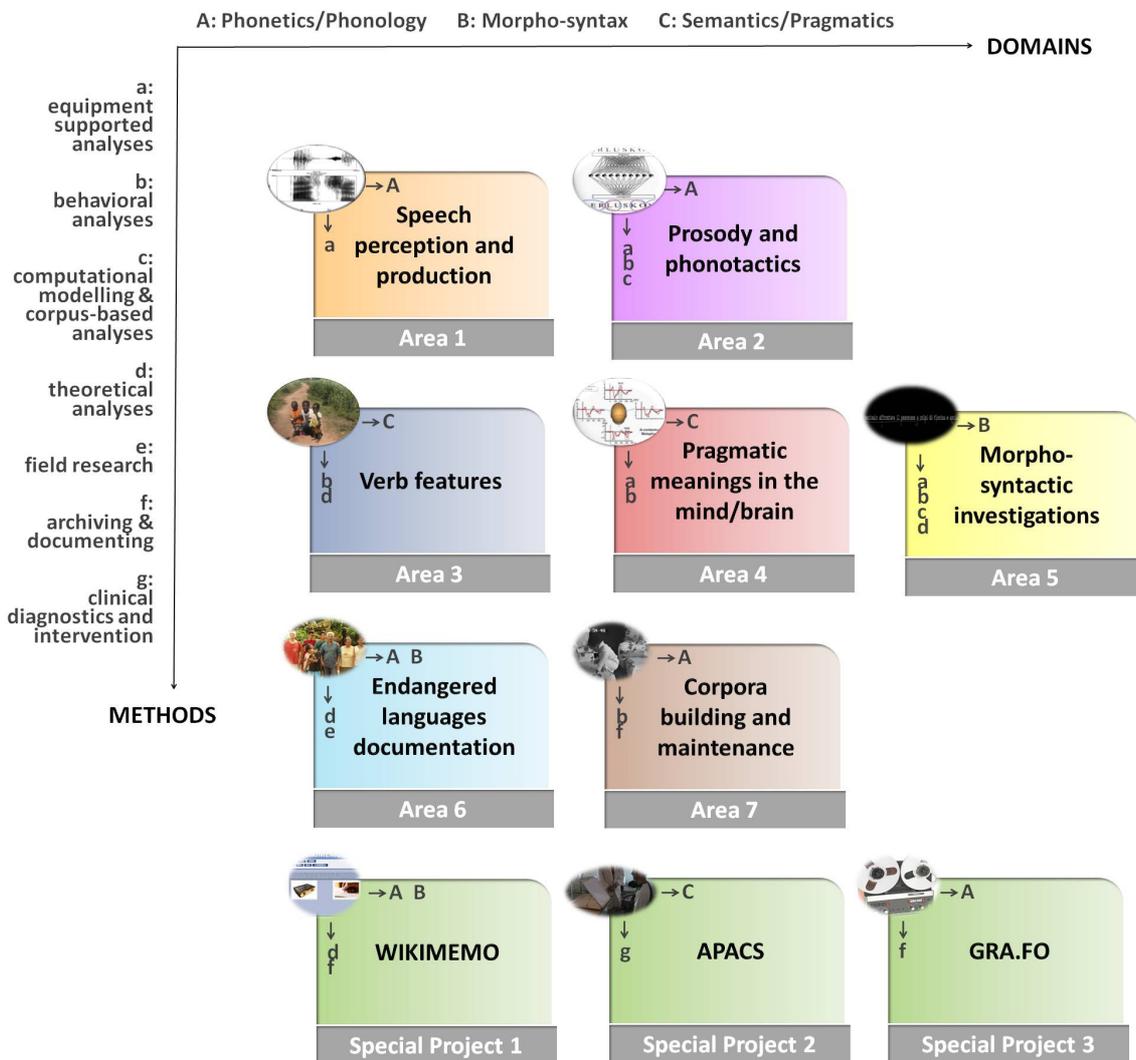
provide anything beyond the strict necessary survival needs. When, at the beginning of this decade, all SNS laboratories were asked to voluntarily reduce their internal subsidizing demands, LABLIN was the only SNS laboratory to adhere to this request (and, consequently, to undergo the effects of such a cut). Within the last 6 years, LABLIN has obtained by SNS no more than an average of € 23000 per year (all in all, € 139000, namely less than the annual subsidy provided to some SNS laboratories). Besides this ordinary subsidizing, LABLIN was able to raise a total of € 377486 from external sources (Ministry of education, Regional government, CNR, international Agencies; see the list in the appendix), plus € 158290 from the Research Committee of Scuola Normale Superiore.

It should be noted that, over and above the obtained subsidies, LABLIN has constantly engaged in the effort of project submission, always receiving very positive evaluations. A project by LABLIN members was admitted to the final round in the first “FIRB Futuro in ricerca” selection, reaching the B rank, namely that of “subsidizable project”. As for the PRIN selections, LABLIN’s proposals, whenever not financed, always got excellent average marks (around 9 in a 10-points scale). This invites the conclusion that, should the Italian general attitude towards scientific research financing be closer to normal, the projects submitted by LABLIN would have got more financial award than it was in practice the case. Incidentally, one has to observe here that the disputable habit of launching projects selections without adequate funding (i.e., without a reasonable ratio between number of applications and allocated resources) yields the perverse result of reducing the general scientific productivity of the whole academic system, trapped into an often useless and frustrating fund-raising activity. It goes without saying that, in normal situations, any project receiving an excellent evaluation (e.g., 9 in a 10-points scale) should be funded.

In the following sections, the various research lines pursued by LABLIN in the past five years (2006-2010) will be briefly described. Each area will be identified by the cross-referencing of two parameters: **RESEARCH DOMAINS** (within linguistics) and **METHODS** used. This is also summarized in the synoptic figure below. All areas include thematically interconnected

projects, accompanied by a selection of the ensuing publications and conference presentations. The picture is in each case completed by a list of the main dissemination initiatives generated by the various projects, mostly consisting of conferences. Detailed info on the conferences organized by LABLIN can be found at: <http://linguistica.sns.it/Congressi.html>. The final section describes LABLIN's future programs – both ongoing research and key-topics to be developed – accompanied by the proposed financial plan.

This report ends with an Appendix listing: (i) the present LABLIN facilities and (ii) the external and internal funding received for specific purposes (no mention is made, instead, of the ordinary funding, which goes without saying). A great deal of the LABLIN scientific production is accessible (mostly in the preliminary versions preceding further revised publication) on *Quaderni del Laboratorio di Linguistica*, since 2009 only available on-line (<http://linguistica.sns.it/QLL/Quaderni.htm>).



Introduction

Organization and research collaborators



LABLIN Scientific Report 2006-10

Advisory Board

- Federico ALBANO LEONI, Università di Roma “La Sapienza”
- Alfonso CARAMAZZA, Harvard University & Università di Trento
- Wolfgang U. DRESSLER, Österreichische Akademie der Wissenschaften
- Olle ENGSTRAND, Stockholm Universitet
- Martine GRICE, Universität zu Köln
- Sarah HAWKINS, University of Cambridge
- Bernard LAKS, Université Paris X Nanterre
- Daniel RECASENS, Universitat Autònoma de Barcelona

Staff

- Pier Marco BERTINETTO (Director)
- Maddalena AGONIGI (Technician; part time, retired in 2009)
- Valentina BAMBINI (Research fellow: “Assegnista di Ricerca” 2008-2010, “Ricercatore a contratto” 2010-2012)
- Chiara BERTINI (Technician; part-time until end of 2009)
- Chiara CELATA (Research fellow; “Assegnista di Ricerca” 2006-2008, 2009-2010; Post-doc 2011)
- Irene RICCI (Technician)

PhD students

- Cristina BERTONCIN (2007-09)
- Basilio CALDERONE (2004-06)
- Luca CIUCCI (2009-11)
- Sara Eco CONTI (2004-06)
- Michelangelo FALCO (2006-08)
- Margherita FARINA (2006-08)
- Marta GHIO (2010-12)
- Anna LENTOVSKAYA (2007-09)
- LIN Yijun (2010-12)
- Clémentine PACMOGDA (2009-11)
- Luca PESINI (2009-11)
- Danica PUŠIĆ (2009-10)
- Emanuele SAIU (2010-12)
- Emanuela SANFELICI (2008-10)
- ZHI Na (2009-11)



Master students involved in LBLIN activities

- Martina JOHNSON (SNS, 2007)
- Jacopo TORREGROSSA (SNS, 2008)
- Alessandra ZARCONE (SNS, 2009)

Visiting scholars/students

- Olga BATIUKOVA 2009 (Facultad de Filosofia y Letras, Universidad Autónoma de Madrid): area 3, project 2
- Lorenzo GUIDUGLI 2009 (Università di Pisa): area 2, project 3
- Zofia MALISZ 2007 (Department of English, Poznan University): area 2, project 1
- Paola PAONESSA 2010 (Università di Pisa): area 3, project 3
- Elena PETROVA 2006 (University of Moscow)
- Carlos QUICOLI (UCLA, 2006)
- Donatella RESTA 2010 (Centro di Ricerca Interdisciplinare sul Linguaggio, Università del Salento, Lecce): area 4, project 2
- Nicola SPOTORNO 2009 (Università Vita-Salute San Raffaele, Milano/CNRS-L2C2, Lyon): area 4, project 3
- Matías Ariel TARANTO 2010 (Università di Pisa): area 2, project 3

External collaborations (last 5 years)**Italy**

- Giorgio ARCARA (Dipartimento di Psicologia, Università di Padova): area 5, project 1a; Special Project 2
- Charles BARONE (Dipartimento di Lingua e Letteratura Francese, Università di Pisa): area 1, project 3
- Claudia BIANCHI (Università Vita-Salute San Raffaele, Milano): area 4, project 5
- Silvia CALAMAI (Facoltà di Lettere e Filosofia, Università di Siena, sede di Arezzo): area 1, projects 1,3,4; Special Project 3
- Sergio CANAZZA (Facoltà di Ingegneria, Università di Padova): Special Project 3
- Jessica CANCELILA (Università per Stranieri di Perugia): area 1, project 2
- Piero COSI (Istituto di Scienze e Tecnologie della Cognizione del CNR, sez. di Fonetica e Dialettologia, Padova): Special Project 1
- Lidia COSTAMAGNA (Università per Stranieri di Perugia): area 1, project 2
- Paola CUTUGNO (Istituto di Linguistica Computazionale del CNR, sezione di Genova): Special Project 1
- Denis DELFITTO (Università di Verona): area 5, project 1
- Luca DINI (CELL, Torino): Special Project 1
- Francesco DI RUSSO (Dipartimento di Scienze della Formazione per le Attività Motorie e lo Sport, Università di Roma "Foro Italico"): area 4, project 2
- Chiara FINOCCHIARO (CIMEC, Università di Trento): area 2, project 1; area 5, project 5
- Oreste FLOQUET (Dipartimento di studi Europei, Americani e Interculturali, Università di Roma "La Sapienza"): area 2, project 3
- Stefania GIANNINI (Università per Stranieri di Perugia): area 1, project 2
- Rosa GIORDANO (Dipartimento di Studi Linguistici e Letterari, Università di Salerno): area 2, project 3
- Mirko GRIMALDI (Centro di Ricerca Interdisciplinare sul Linguaggio, Università del Salento, Lecce): area 4, project 2
- Alessandro LENCI (Dipartimento di Linguistica, Università di Pisa): area 3, project 1
- Lucia MARCONI (Istituto di Linguistica Computazionale del CNR, sezione di Genova): Special Project 1
- Chiara MELLONI (Università di Verona): area 5, project 1
- Sabrina NOCETTI (Dipartimento di Anglistica, Università di Pisa): area 3, project 1
- Gabriella Enrica PIA (assignee of research funds for field-research from Università di Torino and Ministero per gli Affari Esteri): area 6
- Pietro PIETRINI (Dipartimento di Biochimica Clinica e Biologia Molecolare Chimica, Università di Pisa): area 4, project 1
- Vito PIRRELLI (Istituto di Linguistica Computazionale del CNR, Pisa): area 3, project 5
- Carlo SEMENZA (Dipartimento di Neuroscienze, Università di Padova): area 5, project 1a
- Marco TETTAMANTI (Fondazione Centro San Raffaele del Monte Tabor, Milano): area 4

Europe

- Basilio CALDERONE (CLLE-ERSS, Université de Toulouse Le Mirail): area 2, projects 1,2; area 5, project 3
- Katarina DZIUBALSKA KOŁACZIUK (Dept. of English, Poznan University): area 2, project 1



- Lorenzo FILIPPONIO (Romanisches Seminar, Universität Zürich): area 2, project 3
- Eva Maria FREIBERGER (Institut für Sprachwissenschaft, Universität Wien): area 3, project 1
- Luis García FERNÁNDEZ (Dep.to de Lengua Española y Teoría de la Literatura y Literatura Comparada, Universidad Complutense, Madrid)
- Fiona GIBBON (Speech Science Research Centre, Queen Margaret University, Edinburgh): area 1, project 1
- Gordana HRZICA, PhD student (Laboratory for Psycholinguistic Research, University of Zagreb): area 3, project 1
- Alexandra KRATSCHMER (Institut før Sprog, Literatur og Kultur, University of Aarhus): area 3, project 3
- Bernard LAKS (Laboratoire MoDyCo, Université Paris X): area 2, project 1
- Fabio MONTERMINI (CLLE-ERSS, Université de Toulouse Le Mirail): area 2, project 2
- Ira NOVECK (CNRS-L2C2, Lyon) : area 4, project 4
- Sharon PEPERKAMP (Laboratoire de Sciences Cognitives et Psycholinguistique, ENS-CNRS, Paris) : area 1, project 2
- Daniel RECASENS (Phonetics Laboratory, Institut d'Estudis Catalans, Universitat Autònoma de Barcelona): area 1, project 1
- Sylwia SCHEUER (Institut du Monde Anglophone, Université Paris 3): area 2, project 1
- Petra B. SCHUMACHER (Institut für Allgemeine und Vergleichende Sprachwissenschaft, Johannes Gutenberg-Universität Mainz): area 4, project 4

PhD completions

- BAMBINI Valentina: *A metaphorical window into the language-brain.context relations*, 2007 (external supervisors: Bruno G. Bara, Torino; Alfonso Caramazza, Harvard e Trento; Francesco Di Russo, IUSM Roma; Pietro Pietrini, Pisa)
- CALDERONE Basilio: *Unsupervised Learning of Linguistic Structures*, 2008 (external supervisors: Timo Honkela, Helsinki; Bernard Laks, Paris X; Alessandro Lenci, Pisa)
- CAMBI Valentina: *Tempo e aspetto in ittito, con particolare riferimento al suffisso -ske/a-*, 2006 (external supervisors: Giuseppe Delmonte, Pisa; Norbert Oettinger, Erlangen; Calvert Watkins, UCLA, Los Angeles) [*Tempo e aspetto in ittito, con particolare riferimento al suffisso -ske/a-*, L'Orso, Alessandria 2007]
- CELATA Chiara: *Analisi dei processi di retroflessione delle liquide in area romanza, con dati sperimentali dal còrso e dal siciliano*, 2006 (external supervisors: Stefania Giannini, Univ. per Stranieri, Perugia; Michele Loporcaro, Zürich; Giovanna Marotta, Pisa) [http://linguistica.sns.it/tesi/celata/tesi_Celata.htm]
- CONTI Sara Eco: *I tempi nel sistema verbale greco antico e il caso dell'imperativo*, 2010 (external supervisors: Piero Berrettoni, Pisa; Jesús de la Villa Polo, Universidad Autónoma Madrid; Jean Lallot, Paris ENS)
- FALCO Michelangelo: *Deterministic mapping and dependencies. A syntax/semantic interface account of crossover and specificity*, 2010 (external supervisors: Denis Delfitto, Verona; Luigi Rizzi, Siena; Dominique Sportiche, Paris ENS e Los Angeles UCLA)
- FARINA Margherita: *An Outline of Middle Voice in Syriac. Evidences of a Linguistic Category*, 2009 (external supervisors: Piergiorgio Borbone, Pisa; Riccardo Contini, Napoli 'L'Orientale'; Holger Gzella, Leiden; W.T. Van Peursen, Leiden)
- MURZAKU Alexander: *Albanian deictics. A Review of the Meaning and Functionality of Demonstratives and Deictic Adverbs*, 2008 (external supervisors: Paolo Di Giovine, Roma 'La Sapienza'; Victor Friedman, Chicago)



Speech production and perception

Domains: phonetics/phonology

Methods: equipment-supported analyses

Coordinator: Chiara CELATA

Collaborators: Pier Marco BERTINETTO, Chiara BERTINI, Silvia CALAMAI (Siena), Clémentine PACMOGDA, Irene RICCI, Emanuele SAIU



Area 1, together with area 2, identifies the original LABLIN's mission. Although this is no longer the only research domain, it obviously remains a major one. The experimental study of phonetic and phonological aspects of language benefits from a range of instrumental facilities for acoustic, articulatory and aerodynamic analysis. The attainment of high-quality results is guaranteed by the close collaboration with a specifically trained technical staff.

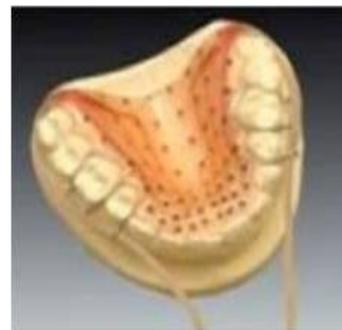
In the domain of speech production and perception, LABLIN intends to characterize itself along two fundamental research goals: (i) the study of fairly rare phonetic features; (ii) the examination of well-known phonetic-phonological problems in the light of the latest advances in experimental and quantitative treatment of phonetic variables, so as to gather new theoretical insights into long-debated issues. Much research is targeted on the segmental aspects of speech (with reference to both vocalic and consonantal systems), but the supra-segmental domain is also investigated (see area 2). Most of the studies carried out deal with the phonetics and phonology of (Italo-)Romance languages/dialects, but non-Romance – including non-Indo-European – languages are also addressed.

With respect to the instrumental equipment, it should be pointed out that LABLIN is currently the only research centre actively working on electropalatography in Italy, and is developing this research line through collaborations with two leading centers in Barcelona (Phonetics Laboratory, Institut d'Estudis Catalans) and Edinburgh (Speech Science Research Centre, Queen Margaret University). LABLIN has recently acquired advanced instruments for nasal airflow measurement and glottis inspection, which complement EPG contact-only data with information on aerodynamic-articulatory coordination, particularly useful in studies on nasals' gestural organization. But besides direct purchase, LABLIN is promoting a policy of gradual enrichment of the instrumental facilities by encouraging a positive attitude towards the possibility of sharing available resources among various Italian partner laboratories (such as those in Arezzo (Siena), Bolzano, Lecce, Perugia).

Project 1: Articulatory perspectives on assimilation

This project started in 2007 and is currently in progress. It benefits from collaborations with renowned international scholars, such as F. GIBBON (Edinburgh) and D. RECASENS (Barcelona). Nasal place assimilation is analyzed through dynamic EPG to address key issues at the interface of phonetics and phonology: namely, the non-categorical nature of assimilatory processes and the (un)balance of anticipatory vs. carry-over effects in cluster coarticulation. In our preliminary studies (BERTINI et al 2008, RICCI et al. 2009), we found sources of variability in Italian lingual gestural patterns for /nk/-/ng/ clusters, as a consequence of contextual and stylistic variables, such as: speech rate, word boundaries, stress position. In subsequent investigations (CALAMAI & RICCI 2009; CELATA et al. under review), aspects of bi-

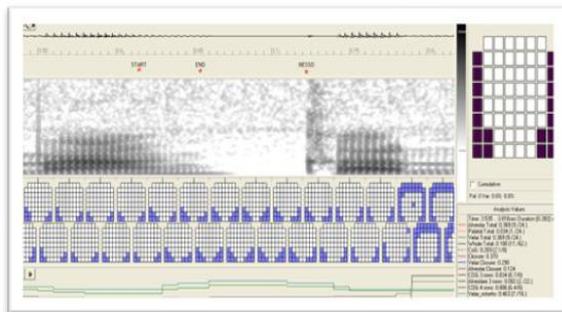
directional interaction were unveiled that could not easily be accounted for in a traditional segment-based approach. A holistic account of



EPG pseudo-palate for the analysis of tongue-palate contact patterns.

assimilation was thus proposed. Current investigation is addressing the problem of the quantitative treatment of EPG variables by boosting the range of observable cross-subject deviations, and developing fitting data reduction functions in order to cope with the relevant parameters of variation. In addition, socio-phonetic variables in Italian nasal place

assimilation are currently under scrutiny (CALAMAI & CELATA 2010).



Waveform, spectral and palatographic output from ArticulateAssistant™

The project benefited from two SNS “Giovani Ricercatori” grants to C. CELATA (“Movimenti articolatori ed esiti acustici: indagine elettropalatografica di sequenze consonantiche e consonante-vocale”, 2006; “An articulatory account of nasal place assimilation in Italian: quantitative issues in the systematic treatment of co-articulatory indices”, 2010).

Project 2: Native and non-native speech perception

LABLIN was involved in research on the phonology of Italian as a second language in collaboration with Univ. per Stranieri, Perugia (J. CANCELA, L. COSTAMAGNA, S. GIANNINI). Past research conducted by LABLIN members provided pieces of evidence in favor of the structural similarity between L2 acquisition and mechanisms of linguistic change (CELATA 2004). A project on phonological attrition in first- and second-generation Italian immigrants living in the USA, also supported by Univ. per Stranieri, Perugia (within the project “L’Italiano degli stranieri e l’italiano all’estero: Osservatorio Linguistico”, 2008), was completed, showing that the behavioral response to the single vs. geminate consonant contrast in the observed population can be predicted on the basis of processing constants accounting for (second) language acquisition, loss, and change (CELATA & CANCELA 2010).

A wide-scale research project on the perception and production of Italian geminates by speakers of several geminating (e.g., Italian), non-geminating (e.g., English) and hyper-geminating languages (e.g., Estonian) is currently under development (CELATA & COSTAMAGNA 2011), thanks to internal funding by Univ. per Stranieri, Perugia; to this aim, LABLIN is providing technical support for the digitalization and manipulation of a large L2-Italian corpus, collected in the past years at Univ. per Stranieri,

Perugia, and now shared by the two partner centers.

The perceptual coté of phonological acquisition was the focus of a 2005-2008 collaboration with Laboratoire de Sciences Cognitives et Psycholinguistique ENS-CNRS, Paris (S. PEPPERKAMP), centered on processing of allophonic and quasi-phonemic consonant contrasts by native and non-native speakers of Italian. Quasi-phonemic contrasts are non-phonemic and non-allophonic relationships among sounds, whose perceptual status is crucial for predicting processes of contrast’s preservation vs. loss in a given language. The study of quasi-phonemes poses important questions about the assumed modularity of phonology and its interface with phonetic implementation. A set of experiments was run to verify how deeply the neutralization of contrasts is represented in the speakers’ perceptual processing, and whether the experience with a contrast neutralization in one’s own native phonology influences the perception of phonetically similar consonant sequences in a given L2 (CELATA 2009). This part of the project was supported by funding from the 2006-08 PRIN project “Dimensioni della variazione linguistica” (for a specific research entitled “From allophonic contrasts to phonological categorization: perception and production experiments”).

Project 3: An EPG study of the palato-velar glide in Italian

This project (carried out in collaboration with S. CALAMAI, Siena, a regular LABLIN collaborator in area 2) aims at shedding light on an unduly neglected feature in phonetic/phonological descriptions, namely the articulatory dynamics of Italian labiovelar glides preceding palatal glides. As claimed in BERTINETTO & LOPORCARO (2005), the phonemically labio-velar glide in *continuiamo* is in fact articulated as the labio-palatal glide [q], due to coarticulation with the following palatal glide. This was experimentally proved in a first EPG experiment (CALAMAI & BERTINETTO 2006a). The next steps in this project will consist in collecting similar data from other speakers and to compare the situation in Italian, where labio-palatal glides have a merely allophonic status, with the situation in languages like French and Mandarin, where they have a phonemic status. The collection of these new data is presently undergoing (in collaboration with Ch. BARONE, Pisa).

Project 4: On the phonetics of Mòoré vowels

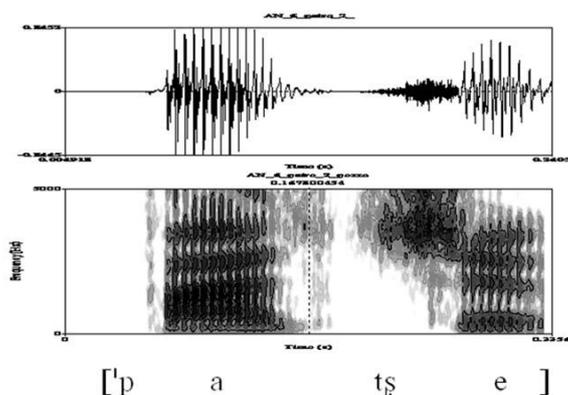
This project was carried out in collaboration with S. CALAMAI (Siena). Many languages spoken in North-West Africa present a peculiar split in their vocalic inventory, known as the “advanced tongue root” feature. Although this phenomenon has been known for a long time, its phonetic implementation is still a matter of debate, despite the seminal work by Ladefoged and other scholars. Mòoré, the main language spoken in Burkina Faso, is one such language. A pilot acoustic study (CALAMAI & BERTINETTO 2006b) was conducted on the elicited productions of three male speakers of Mòoré. More recordings are under way, in order to increase the statistical reliability of the first results.



Mòoré speakers, Burkina Faso.

Project 5: Consonant retroflexion in the Romance domain

Retroflex consonants are often considered to be exotic objects, featuring the sound pattern of distant languages such as Hindi, Toda, or the Pama-Nyungan languages. This is obviously inaccurate: Swedish, for instance, presents a whole series of retroflex sounds stemming from /r/-assimilation. Retroflex consonants have also sporadically developed within the Romance territory as a result of rhotic cluster affrication and delateralization of post-tonic geminate laterals: two processes that favored the emergence of an apical post-alveolar constriction under specific articulatory constraints. This project developed in 2005 within a PhD program in experimental phonetics and sound change (CELATA 2006) and demonstrated that, contrary to some perceptually-based approaches, consonant retroflexion in the Romance varieties has a clear motivation in strategies of coarticulation and blending (CELATA 2010). Mostly developed in terms of acoustic analysis,



Waveform and wide-band spectrogram of a retroflex affricate produced by a Sicilian speaker

the project is now expanding towards articulatory investigation, inaugurated thanks to a SNS “Giovani Ricercatori” grant to C. CELATA (“Analisi elettropalatografica della coarticolazione nelle consonanti retroflesse: arrotondamento vocalico e nasalizzazione”, 2007).

Dissemination initiatives

- The meeting “Language development in time and space” (October 13-14, 2008; invited speakers Catherine T. BEST, Melissa BOWERMAN, Roy C. MAJOR) was organized by LABLIN as a concluding event for the 2006-08 PRIN project “Dimensioni della variazione linguistica”; part of the papers presented by LABLIN members on that occasion were outputs of this research line.
- LABLIN organized two workshops on phonology and phonological acquisition in 2007 “Phonology Workshop” (April 19-20, invited speaker: John GOLDSMITH) and 2008 (“From Phonetics/Phonology to Linguistic Modeling”, invited speakers: Timo HONKELA and Bernard LAKS). Some results of projects 1 and 2 were presented on these occasions.
- LABLIN organized the conference on “Sociophonetics, at the crossroads of speech variation, processing and communication” (Dec. 14-15th 2010), with attendance of close to 100 scholars from all over the world and a list of keynote invited speakers (among whom, William LABOV from Pennsylvania University). The selected proceedings are expected to be published by one of the major European publishers.

Selected publications and presentations

- BERTINETTO Pier Marco & Michele LOPORCARO 2005. The sound pattern of Standard Italian, as compared with the varieties spoken in Florence, Milan and Rome. *Journal of the International Phonetics Association* 35. 131-151.
- BERTINI Chiara, Silvia CALAMAI, Chiara CELATA & Irene RICCI 2008. Assimilation in Italian nasal-velar clusters: An EPG study. *V Int. Symposium on Electropalatography*. Edinburgh. September 1-2, 2008.
- CALAMAI Silvia & Pier Marco BERTINETTO 2006a. Per uno studio articolatorio dei *glides* palatale, labio-velare e labio-palatale dell'italiano. In GIORDANI Veronica, Valentina BRUSEGHINI & Piero COSI (eds.). *Scienze vocali e del linguaggio. Metodologie di valutazione e risorse linguistiche*. 3° Convegno Nazionale dell'Associazione Italiana di Scienze della Voce. Università di Trento.
- CALAMAI Silvia & Pier Marco BERTINETTO 2006b. Indagine sul vocalismo orale della lingua mòoré. In SAVY Renata & Claudia CROCCO (eds.). *Analisi prosodica. Teorie, modelli e sistemi di annotazione*, 2° convegno internazionale dell' AISV. Università di Salerno.
- CALAMAI Silvia & Chiara CELATA 2010. "Towards a sociophonetic explanation of progressive and regressive assimilation in nasal clusters". Poster presented at *Sociophonetics, at the Crossroads of Speech variation, Processing and Communication*. Pisa. December 14-15, 2010.
- CALAMAI Silvia & Irene RICCI 2010. *Speech rate and articulatory reduction in Italian alveolar and velar nasal + stop clusters*. In RECASENS Daniel, Fernando SANCHEZ MIRET & Kenneth J. WIREBACK (Eds.). *Experimental phonetics and sound change*. Muenchen. Lincom Europa.
- CELATA Chiara 2004. *Acquisizione e mutamento di categorie fonologiche: le affricate in italiano*. Milano. Franco Angeli.
- CELATA Chiara 2006. *Analisi del processo di retroflessione delle liquide in area romanze, con dati sperimentali dal corso e dal siciliano*. Pisa: Scuola Normale Superiore. Tesi di Perfezionamento. http://linguistica.sns.it/tesi/celata/tesi_Celata.htm
- CELATA Chiara 2009. *The impact of allophonic variation on L2 speech perception*. In WATKINS Michael W., Andrea S. RAUBER & Barbara O. BAPTISTA (Eds.). *Recent Research in Second Language Phonetics/Phonology: Perception and Production*. Newcastle-upon-Tyne. Cambridge Scholars Publishing.
- CELATA Chiara 2010. *Rhotic retroflexion in Romance. Acoustic data for an articulation-driven sound change*. In RECASENS Daniel, Fernando SANCHEZ MIRET & Kenneth J. WIREBACK (Eds.). *Experimental phonetics and sound change*. Muenchen. Lincom Europa.
- CELATA Chiara & Jessica CANCELILA 2010. Phonological attrition and the perception of geminate consonants in the Lucchese community of San Francisco (CA). *International Journal of Bilingualism* 14 (2). 1-25.
- CELATA Chiara & Lidia COSTAMAGNA 2011 *submitted*. Types of geminates, types of vowel, types of words in L2 Italian. Submitted to *Prosodic and rhythmic aspects of L2 Italian*. Napoli. 5-6 Maggio, 2011.
- CELATA Chiara, Silvia CALAMAI, Irene RICCI & Chiara BERTINI *under review*. Nasal place assimilation between phonetics and phonology: an articulatory study of Italian nasal-to-velar clusters. Submitted to *Journal of Phonetics*.
- RICCI Irene, Silvia CALAMAI, Chiara BERTINI & Chiara CELATA 2009. Studio elettropalatografico dell'assimilazione nei nessi di Nasale + Velare in italiano. *V Convegno Nazionale AISV "La dimensione temporale del parlato"*. Zurigo. Febbraio 4-6, 2009.

Prosody and phonotactics

Domains: phonetics/phonology

Methods: equipment-supported analyses, behavioral analyses, computational modeling & corpus-based analyses

Coordinator: Pier Marco BERTINETTO, Chiara CELATA

Collaborators: Chiara BERTINI, Basilio CALDERONE (Toulouse), Oreste FLOQUET (Roma), Lorenzo GUIDUGLI (Pisa Univ.), Zofia MALISZ (Poznan), Matías TARANTO (Pisa Univ.), ZHI Na



As mentioned above, this research area should be viewed as belonging to the original core of the LABLIN's mission. By keeping it apart from area 1, we merely follow a long-established tradition, isolating segmental from suprasegmental (or prosodic) features.

The syllable is one of the major prosodic components of natural languages: any linguistic utterance is composed of syllabic chunks, whose internal structure depends on language-specific as well as universal constraints. Despite its pervasive presence, the syllable is nowadays considered, by many scholars, as an epiphenomenal structure, rather than a basic unit of the phonological component. In other words: it is viewed by many as an "emergent" structure, both necessitated and constrained by phonotactic pressure.

A LABLIN project addressing the syllable was started in the early years of this dying decade and is still in progress. In the first phase, the goal was to investigate the cognitive representation of the syllable, by means of psycholinguistic techniques. The results obtained suggested that the build-up/decay of the syllable representation may exhibit a different time-course in different languages (BERTINETTO & FINOCCHIARO 2003). By hypothesis, in languages with a relatively simple phonotactics – like Italian as compared to English – the on-line cognitive processing of the syllable has a comparatively more rapid decay. This might explain the lack of any syllabic effect in Italian, as opposed to English, in a number of long-latency tasks (e.g., syllable monitoring, primed masked naming), in contrast to the effects detected in early-tapping tasks (e.g., syllabic induction, time-compressed blending preference). It was thus hypothesized that the syllable's representation takes place at two levels: (a) on-line processing, with language-dependent time-course as for build-up/decay; (b) long-term representation, whereby metalinguistic reasoning on syllabic organization may be elicited.

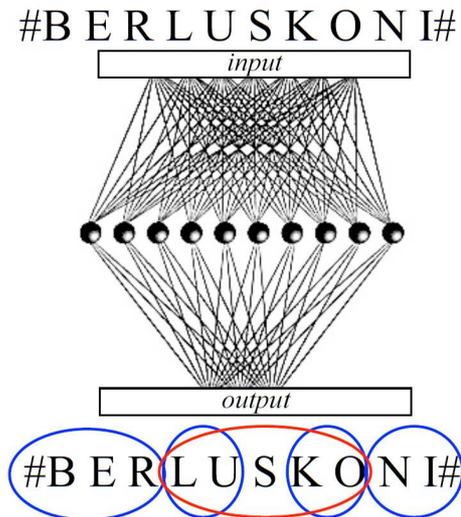
The next steps focused on the following interrelated targets. Project 1 (the direct continuation of the previous line of research) evolved in two directions. First, we wanted to extend the analysis to languages typically characterized by heavy syllabic complexity, in order to check the degree of syllable internal cohesion by means of metalinguistic tasks indirectly involving the syllable organization. Second, we wanted to try and model, by means of computational techniques, the phonotactic constraints exerting their pressure on the syllabic organization. The same techniques were exploited (project 2) in an attempt to model the process of phonological and morphonotactic acquisition, on the assumption that both phenomena (syllable structure and phono-morphological acquisition) essentially obey the same phonotactic constraints. Finally (see project 3), under the assumption that phonotactic structure has a strong impact on "rhythm", a series of corpus-based analyses were planned, with the aim of modeling the rhythmical behavior of natural languages.

Project 1: Cognitive representation and computational modeling of syllabic structures

In previous work (see above), a number of metalinguistic tasks indirectly involving the syllable organization were applied to Italian and Spanish – following the example of similar works done on English and other languages – in order to check the internal cohesion of the syllable components (BERTINETTO 1999, BERTINETTO & FINOCCHIARO 2003). This type of analysis was

extended to Polish, a language characterized by heavy syllabic complexity (this was a joint work with S. SCHEUER and K. DZIUBALSKA KOŁACZIUK, Poznan; BERTINETTO et al. 2007). It was shown, as predicted, that Polish speakers are much more tolerant to syllable internal manipulations. This is further evidence that the degree of syllable complexity is a major factor in the issue of syllable-internal cohesion. In order to further understand the effect of phonotactics on

the “emergent” syllable’s organization, a new research line was initiated in collaboration with B. CALDERONE (Paris/Toulouse) and B. LAKS (Paris), aiming at modeling, by means of computational techniques, the competing forces of attraction exerting their effect within a phoneme sequence.



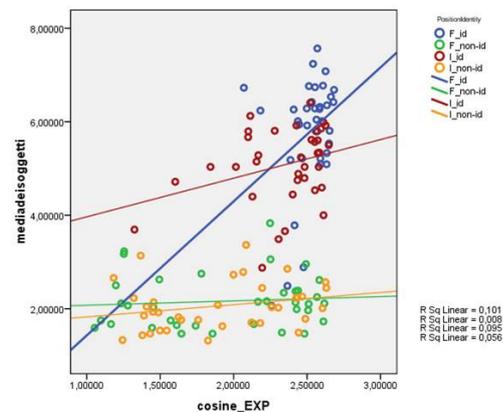
As a result of the neural network computation (measuring the mutual attraction among the various phonemes), /s/ crucially appears to be equally attracted by the preceding and the following phonemes. This suggests that neither the heterosyllabic nor the homosyllabic view of the internal /sk/ cluster are appropriate in Italian: the cluster syllabification is undecidable.

The first results obtained on Italian, English and Finnish (CALDERONE & BERTINETTO 2009) encouraged to pursue this investigation, initially supported by Università Italo-Francese / Université Franco-Italienne (Progetto Galileo / Projet Galiléo, “Modellizzazione concessionista della sillaba” 2007). Further refinements are currently under development.

Project 2: Computational models of phonological and morphonotactic acquisition

The representation of the phonological word in the mental lexicon is a crucial issue in recent cognitive linguistic research. LABLIN researchers are interested in unveiling the fundamental processing mechanisms accounting for the cognitive representation of the phonological word, conceived of as a string of language-specific phonological units (the phonemes) undergoing phonotactic constraints, and regulating the speaker’s production and perception in a given language. In collaboration with B. CALDERONE (Paris/Toulouse), we

investigated the emergence of “wordlikeness” effects and the role of phonotactic and statistical regularities – within and across the word – in the acquisition of Italian and French phonology. The investigation was carried out by correlating the native speakers’ grammaticality judgments (or formal similarity judgments) with the computational simulations’ output in response to the same linguistic input. The computational model used in these experiments is PhonotActiv, a topological activation-based algorithm developed at LABLIN in collaboration with Laboratoire MoDyCo at Université de Paris X (CALDERONE 2009, CALDERONE et al. under review). The system’s sensitivity to micro- and macro-phonotactic regularities (as determined by the string’s segmental content and the positional information within the word) was also tested to simulate the emergence of basic morphonotactic knowledge based on purely distributional grounds. The preliminary results showed that quantitative and positional variables at the sub-lexical level are salient pre-conditions for the morphological parsing of complex words in inflecting languages such as Italian (CELATA & CALDERONE 2010, CALDERONE & CELATA in press, CALDERONE et al. in press).



Human/machine correlation in response to the same sets of phonological data. The experiment aimed at testing the psycholinguistic plausibility of the PhonotActiv’s output in recovering micro- and macro-phonotactic effects in Italian phonological words.

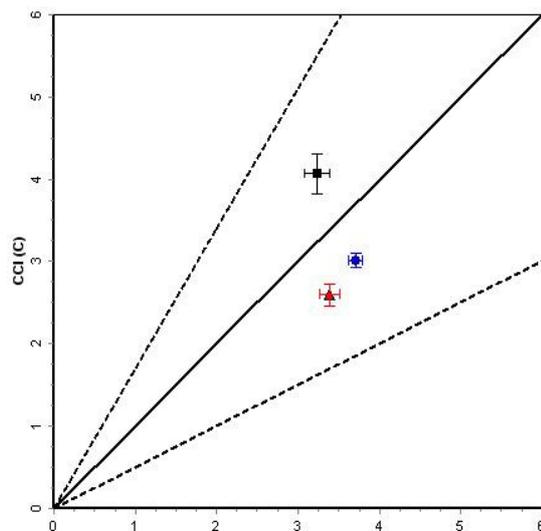
Financial support was provided by Università Italo-Francese / Université Franco-Italienne (Progetto Galileo / Projet Galiléo, “Variabilità fonetica e categorizzazione fonologica: modelli computazionali”, 2008 extension). In 2009 this project was also awarded a FP7 granting support from Regione Toscana (C. CELATA and B. CALDERONE, “The cognitive representation of the word. Psycho-computational convergences in the

study of word perception and production”, € 10000); however, due to bureaucratic complications, this grant has not yet been cashed. Current experimentation in this field is carried on in collaboration with CLLE-ERSS/Université de Toulouse Le Mirail.

Project 3: Modeling the rhythm of natural languages

This project started in 2007 and currently benefits from collaboration with a number of external students and scholars: L. FILIPPONIO, O. FLOQUET, R.

GIORDANO, L. GUIDUGLI, M. TARANTO. As a first step, a new algorithm (CCI = Control/Compensation Index) was devised, aiming at measuring the rhythmical behavior of natural languages as an effect of phonotactic constraints (BERTINI & BERTINETTO 2008; BERTINETTO & BERTINI 2008). A fully-fledged model, spelling out the epistemological and theoretical implications, was subsequently proposed in BERTINETTO & BERTINI (2010). Substantially innovating on previous models, the one at issue is phonologically-oriented, rather than purely inspired by the phonetic surface. A tool to support the analysis, also allowing direct comparison with a number of competing algorithms, has recently been developed and will soon be made available to whoever interested (BERTINI & TARANTO in preparation).



Application of the CCI (Control Compensating Index) algorithm to different samples of spontaneous speech. Red triangle = Pisa Italian (middle speed); blue circle = German (very fast rate); black square = Chinese (middle speed). The dotted lines divide the space into three rhythmic areas, according to the control-compensating model (top left = implausible, middle = controlling, bottom right = compensating). Speech rate has a strong impact on the results, to the effect that fast-rate German appears to be more controlling than normal-rate Pisa Italian.

The first application of the analysis was on a corpus of semi-spontaneous Italian. The model was subsequently applied on a corpus of semi-spontaneous German (BERTINETTO, BERTINI & GUIDUGLI in preparation). At present, the analysis is being extended to the following corpora: (a) read Italian; (b) spontaneous Brazilian Portuguese; (c) spontaneous Mandarin Chinese (as part of a PhD thesis); (d) dialectological data of the Pistoia-Bologna continuum. The last type of data opens up the diachronic dimension: according

to the analysis carried out by L. FILIPPONIO, the Pistoia-Bologna continuum can be viewed as the topological translation of a diachronic process of prosodic reduction, eventually yielding vowel deletion and syllable loss. We aim at finding the rhythmical correlates of this process of language change.

Dissemination initiatives

- LABLIN organized two workshops on phonology and phonological acquisition in 2007 “Phonology Workshop” (April 19-20, invited speaker: John GOLDSMITH) and 2008 (“From Phonetics/Phonology to Linguistic Modeling”, invited speakers: Timo HONKELA and Bernard LAKS). Some results of projects 1 and 3 were presented on these occasions.

Selected publication and presentations

- BERTINETTO Pier Marco 1999. Psycholinguistic evidence for syllable geometry: Italian and beyond. In RENNISON John & Klaus KÜHNHAMMER (eds.). *Phonologica 1996. Syllables!?*. The Hague: Holland Academic Graphics. 1-28.
- BERTINETTO Pier Marco, Sylwia SCHEUER, Katarzyna DZIUBALSKA-KOLACZYK, Maddalena AGONIGI 2007. Intersegmental cohesion and syllable division in Polish. *Proc. of the 16th International Congress of Phonetic Sciences*. Saarbrücken. 1953-1956

- BERTINETTO Pier Marco & Chiara BERTINI 2008. On modeling the rhythm of natural languages. In Plinio BARBOSA, Sandra MADUREIRA & Cesar REIS (eds.). *Proc. of Speech Prosody 2008*. Universidad de Campinas. 427-430.
- BERTINETTO Pier Marco & Chiara BERTINI 2010. Towards a unified predictive model of natural language rhythm. In Russo Michela (ed.). *Prosodic Universals. Comparative studies in rhythmic modeling and rhythm typology*. Napoli: Aracne. 43-77.
- BERTINETTO Pier Marco, Chiara BERTINI & Lorenzo GUIDUGLI. A Control/Compensation account of spontaneous German speech rhythm. Invited plenary lecture at the 2010 Italianistentag (Regensburg, 3/5th March).
- BERTINETTO Pier Marco & Chiara FINOCCHIARO 2003. On the weakness of syllabic effects in Italian. *Proceedings of the 15° International Congress of Phonetic Sciences*. Barcelona.
- BERTINI Chiara & Matias TARANTO *in preparation*. Rhythmic Index Elaborator (RIE) come strumento di indagine della struttura ritmica. Un'applicazione al pisano semi-spontaneo vs. letto.
- CALDERONE Basilio & Pier Marco BERTINETTO 2009. La sillaba come stabilizzatore di forze fonotattiche. Una modellizzazione. In FERRARI Giacomo, Ruben BENATTI & Monica Mosca (eds.). *Linguistica e modelli tecnologici di ricerca. Atti del XL Congresso Internazionale di Studi della Società di Linguistica Italiana (SLI)*. Roma: Bulzoni. 401-410.
- CALDERONE Basilio 2009. Learning Phonological Categories by Independent Component Analysis. *Journal of Quantitative Linguistics* 16(2). 132-156.
- CALDERONE Basilio & Chiara CELATA *in press*. Restrizioni fonotattiche, pattern lessicali e recupero delle regolarità morfologiche. Evidenze computazionali e comportamentali. In BERTINETTO Pier Marco, Valentina BAMBINI, Irene RICCI & Collaboratori (eds.). *Linguaggio e cervello / Semantica. Atti del XLII Convegno della Società di Linguistica Italiana*. Pisa. Scuola Normale Superiore. Settembre 25-27, 2008. Roma. Bulzoni.
- CALDERONE Basilio, Chiara CELATA & Fabio MONTERMINI *in press*. Phonological detail for accessing morphological structures. Human and artificial responses in comparison. In *Selected Proceedings of the 7th Décembrettes: Morphology in Toulouse*, Muenchen, Lincom Europa.
- CALDERONE Basilio, Ivan Herreros & Vito Pirrelli *under review*. Mapping Words: from Phonemes to Lexical Representations via Self-Organizing Map.

Verb features

Domains: semantics/pragmatics

Methods: theoretical analyses, behavioral analyses

Coordinator: Pier Marco BERTINETTO

Collaborators: Maddalena AGONIGI, Valentina BAMBINI, Olga BATIUKOVA (Madrid), Cristina BERTONCIN, Valentina CAMBI, Sara Eco CONTI, Margherita FARINA, Tatjana KENINA, Alexandra KRATSCHMER (Aarhus), Anna LENTOVSKAYA, Alessandro LENCI, Clémentine PACMOGDA, Paola PAONESSA (Pisa Univ.), Danica PUŠIĆ, Irene RICCI, Jacopo TORREGROSSA, Alessandra ZARCONI



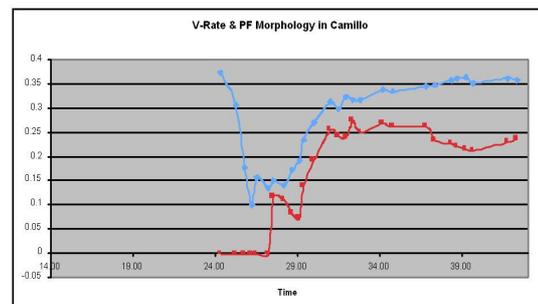
The study of verbal features, with special emphasis on actionality, temporal reference and aspect (and, more recently, modality) is a long-standing focus of interest of the principal investigator, as witnessed by the list of publications available at <http://linguistica.sns.it/PaginePersonali/Bertinetto.htm>. Needless to say, this is also a hot-topic in international research. However, despite the substantial (and steadily growing) literature, the disagreement on even basic concepts is still a hall-mark of this field. One of the aims of this research line is thus to contribute to gather solid evidence for theoretical clarification. In what follows, this specific domain will be indicated by means of the abbreviation ATAM (Actionality, Temporal reference, Aspect, Modality).

The main lines of investigation pursued by LABLIN scholars can be summed up as follows. In project 1, we wanted to collect behavioral evidence that the acquisition process, in the ATAM domain, is driven by the morphological structure of the individual language, rather than by universally valid principles. This is not to deny that the latter do play a role, but to conveniently delimit their impact. In project 2, we wanted to collect experimental evidence that the actional classes found in natural languages are based on underlying features, and that the role of such features can be detected in the on-line processing of speech materials. In project 3, we wanted to gather experimental evidence that one important component of the category of modality, namely epistemicity, yields empirically observable consequences in language processing.

Project 1: Tense and aspect acquisition

This project was carried out in collaboration with A. LENCI and S. NOCETTI (Pisa) and E.M. FREIBERGER (Vienna) and benefited from the financial support of the 2006-08 PRIN project “Dimensioni della variazione linguistica”. It has been assumed for over three decades that the acquisition of ATAM features is guided by language-independent, universal principles. Depending on the scholar, the triggering role was assigned to actionality or aspect, to the extent that a clear distinction between these two categories is assumed to exist. This sounds highly suspect, however, for languages differ dramatically in terms of ATAM structure. The various ATAM categories can, according to the individual language, be explicitly manifested in the morphology, or remain unexpressed. It is thus unlikely that aspect can be the triggering factor in languages where it is poorly manifested. An alternative hypothesis is however available: namely, that the morphologically expressed categories, whatever they are, act as triggers. This has been shown to be the case in the study of three Italian and one Austrian German child

(BERTINETTO in press; BERTINETTO et al. in preparation).



Blue line: expansion of one child's vocabulary (Camillo) according to the verb/noun cumulative ratio; red line: expansion of perfective morphology (cumulative number of perfective forms divided by the verbs' cumulative number). The figure shows a striking correlation between the two lines, suggesting that the acquisition of ATAM morphology goes hand-in-hand with the expansion of the verbs' lexicon.

This ground-breaking hypothesis is presently further under verification against two highly relevant test cases for the acquisition of the ATAM features: (a) Croatian, namely a language (as any other in the Slavic family) explicitly marking actionality, or rather actionality

intertwined with aspect (collaboration with G. HRZICA, Zagreb, PhD student); (b) Mòoré, the major language of Burkina Faso, characterized by the almost systematic marking of the basic aspectual distinction “perfective vs. imperfective” (an internal PhD program).



Burkina Faso Children as part of field-work on the acquisition of ATAM features in the Mòoré language (Gur family).

In addition, this line of investigation has been extended to the acquisition of the ATAM features by Italian-Russian early bilinguals, i.e. children growing in Italy with a Russian speaking mother. This will allow us to simultaneously observe the acquisitional dynamics in two typologically different languages.

Project 2: Actional categorization

The actional classification proposed by Vendler is generally used – possibly with integrations/modifications – by virtually all scholars in the field. Yet, the striking (and often strikingly neglected) fact is that the impact of the actionality category is assumed to be equally present in all languages, despite the far from explicit marking that this category exhibits in most languages of the world. This invites a focused investigation of this particular feature. In work carried out by ZARCONE & LENCI (2010), it was shown that some of the features underlying the actional specification of Italian verbs have a detectable effect in on-line processing, as evidenced by featurally similar vs. dissimilar priming. This technique was more recently extended to Russian (in collaboration with O. BATIUKOVA, Madrid), with focus on the morpho-lexical distinction ‘perfective/imperfective’, and even more crucially on the highly specific class of ‘delimitative’ verbs (Batiukova et al. in press).

The structure of the Russian verbal lexicon has been a hot topic for quite a long time, and indeed it has impregnated the very conception of aspectology. Unfortunately, this has not always led to constructive results, due to the tendency of Slavicists to face the problem in a typologically-blind way, as though the categories normally valid for the languages of the world would not apply to the Slavic languages. In relatively recent times, however, this topic has been reanalyzed in a typologically-oriented perspective, giving rise to interesting proposals. One section of project 2 is precisely devoted to the reanalysis of the Russian verbal lexicon with respect to its actional interpretation, using the widely accepted categories inspired by Vendler’s seminal proposal (LENTOVSKAYA 2007/8). Both of the above lines of investigation are currently in progress.

Project 3: Epistemic modality

Epistemic modality deals with the speaker’s evaluation of the chances that a certain state of affairs will occur, is occurring, or has occurred. Within the ATAM domain, epistemicity (as part of modality) has received very little attention in psycholinguistic research, probably due to its highly complex interaction with other grammatical features. In collaboration with A. KRATSCHMER (Aarhus), we undertook an experimental investigation to assess whether the rich array of epistemic expressions exhibited by natural languages (where verbs are a major tool) has a psychological *pendant*, i.e., whether the finely grained repertoire of epistemic expressions correlates with analogous distinctions relating to cognitive effort. As a first step, we considered the adjective scale that goes from *certain* to *impossible*, via *probable*, *possible* and *improbable*, so as to avoid any possible sources of complexity related to the use of verbal forms. We set up a series of behavioral tasks that allowed us to explore how the modulation along the certainty continuum, as conveyed by the above adjectives, affects responses and reaction times. The first results indicate that, although the participants can qualitatively distinguish among different degrees of certainty, the levels of cognitive effort for epistemic judgment are fundamentally two, namely: certain/uncertain, as already noted in child language research (BAMBINI et al. in press). In an ongoing project (with collaboration by P. Paonessa, visiting



student) we are exploring the role of the speaker's status in modulating evaluating efforts, in order to test the hypothesis that the processing of epistemic markers also pragmatically relies on the evaluation of the speaker's *auctoritas*. This project is supported by a SNS "Giovani Ricercatori" grant awarded to V. BAMBINI ("Between social cognition and semantic modality. A psycholinguistic investigation of epistemic terms", 2010).

Project 4: Tense and aspect in selected languages

In the attempt to broaden the typological coverage of the "verbal features" enterprise, a number of independent but methodologically correlated projects were launched, based on PhD dissertations. CAMBI (2007) studied the aspectual structure of Hittite, shedding new light on long-debated issues. M. FARINA examined the verbal system of Syriac. S. CONTI's aspectual account of the Imperative in Ancient Greek concludes this recent series of dissertations devoted to Ancient languages. As for the living languages, a study of the Croatian verb system is currently under development by D. PUŠIĆ, while C. BERTONCIN is investigating the problem of epistemicity and evidentiality in Basque. In both cases, the diachronic dimension will also be taken into account.

Dissemination initiatives

- In October 2006, LABLIN organized the *XXXI Convegno della Società Italiana di Glottologia*, devoted to "Categorie del verbo. Diacronia, teoria, tipologia"; see now BERTINETTO, P.M., BAMBINI, V., BERTONCIN, C., FARINA, M. (eds.), 2008, *Categorie del verbo. Diacronia, teoria, tipologia*. Atti del XXXI Convegno della Società Italiana di Glottologia (Pisa. 26-28 ottobre 2006), Roma, Il Calamo.
- The meeting "Language development in time and space" (October 13-14, 2008; invited speakers Catherine T. BEST, Melissa BOWERMAN, Roy C. MAJOR) was organized by LABLIN as a concluding event for the 2006-08 PRIN project "Dimensioni della variazione linguistica"; part of the papers presented by LABLIN members on that occasion were outputs of this research line.
- The international conference "The Identification and Representation of Verb Features", with large international attendance, was organized in November 2010 by LABLIN, in cooperation with Dipartimento di Linguistica dell'Università di Pisa.

Selected publications and presentations

- BAMBINI Valentina, Alexandra KRATSCHMER & Irene RICCI *in press*. *Correlati comportamentali delle gradazioni epistemiche*. In BERTINETTO Pier Marco, Valentina BAMBINI, Irene RICCI & Collaboratori (eds.). *Linguaggio e cervello / Semantica. Atti del XLII Convegno della Società di Linguistica Italiana*. Pisa. Scuola Normale Superiore. Settembre 25-27, 2008. Roma: Bulzoni.
- BATIUKOVA Olga, Pier Marco BERTINETTO, Alessandro LENCI & Alessandra ZARCONE *in press*. *Semantic Priming Study of Russian Aspect and Resultativity*. Paper presented at the Russian Verbs conference. S. Petersburg 2010.
- BERTINETTO Pier Marco *in press*. *Tense-Aspect acquisition meets typology*. Plenary talk at the Int. Conference on Tense, Aspect, Mood, and Modality. "Chronos". Austin, TX. 2008. [provisional version in: *Quaderni del Laboratorio di Linguistica della SNS* n.8/2009].
- BERTINETTO Pier Marco, Alessandro LENCI, Eva Maria FREIBERGER, Sabrina NOCCETTI, Maddalena AGONIGI *in preparation*. *Morphology as a trigger of tense-aspect acquisition*.
- CAMBI Valentina 2007. *Tempo e aspetto in ittito, con particolare riferimento al suffisso -ske/a*, L'Orso, Alessandria.
- LENTOVSKAYA Anna 2007/8. *Una nuova possibile classificazione azionale dei verbi russi*. *Quaderni del Laboratorio di Linguistica della SNS* 7.
- ZARCONE Alessandra & Alessandro LENCI 2010. "Priming Effects on Event Types Classification: Effects of Word and Picture Stimuli". Poster presented at *Cognitive Science 2010*. Portland.

Domains: semantics/pragmatics

Methods: equipment-supported analyses, behavioral analyses

Coordinator: Valentina BAMBINI

Collaborators: Pier Marco BERTINETTO, Chiara BERTINI, Marta GHIO, Donatella RESTA (Univ. Salento), Nicola SPOTORNO (Lyon)



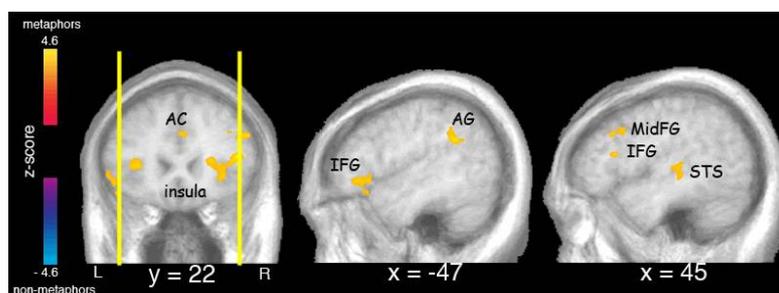
Since long, pragmatics has brought to the fore the existence of a gap between linguistic meaning and communicated meaning. In order to achieve successful communication, speakers constantly supplement linguistic decoding by context-driven inferences, operating upon elements from previous discourse, communicative situation, knowledge and beliefs about the world. This project investigates the cognitive mechanisms and the neural architecture underlying language-context integration, by focusing on the fine-tuning of lexical elements across different contexts of use and across a wide range of experimental techniques. As such, the project places itself in the emerging fields of experimental pragmatics and neuropragmatics. The project was launched in the academic year 2004-05 and is still on-going, becoming a strategic LABLIN's research area. Since its beginning, the phenomenon of metaphor was chosen as a test-bed to investigate context-dependent pragmatic processing. We carried out a series of experiments to investigate where, when and how metaphors are processed in the mind/brain, employing fMRI, ERP and eye-movement techniques (projects 1-3, respectively). To this purpose, LABLIN has established a wide range of external collaborations with centers specialized in cognitive neuroscience. Significantly, LABLIN has been chosen for the organization of a number of dissemination initiatives (see below). Over the last year, two new projects have been launched, expanding from metaphor to other forms of context-dependent meanings, such as approximation, metonymy and discourse-phenomena (projects 4-5).

This research area has been supported by three SNS "Giovani Ricercatori" grants awarded to V. BAMBINI ("Pragmatica e cervello", 2004; "Semantica e cervello", 2008; "Text and context: neurocognitive dynamics", 2009), and by two EURO-XPRAG travel grants awarded to V. BAMBINI and M. GHIO, in collaboration with European partners (see below).

In parallel to the experimental research, an in-depth state-of-the-art survey in the field of neuropragmatics was undertaken, in order to provide global insight onto this emerging field: this led both to review publications (BAMBINI & BARA 2010) and to an editorial enterprise hosted by the *Italian Journal of Linguistics* (BAMBINI 2010). In addition, in June 2010, LABLIN has inaugurated an applied research program in clinical pragmatics (see the Special Project 2, APACS), which benefits from evidence stemming from the present research area and in turn is expected to provide useful input to further investigations.

Project 1: The neural architecture of metaphor comprehension

We used fMRI to study the brain regions activated by metaphor comprehension. This study was carried out in collaboration with the Laboratory of Clinical Biochemistry and Molecular Biology of the University of Pisa (P. PIETRINI and collaborators). We were able

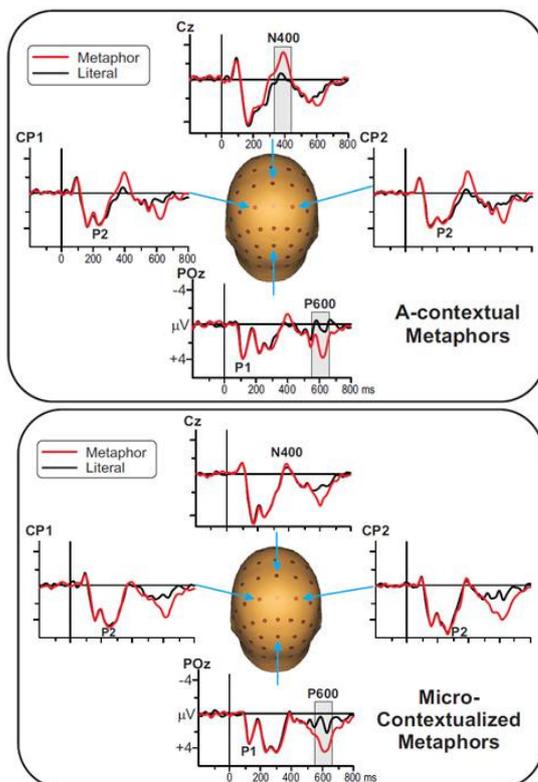


In warm colors, regions with higher activation for metaphors ("Do you know what that lawyer is? A shark") vs. non-metaphors ("Do you know what that fish is? A shark"). $P < 0.005$ (cluster size corrected for multiple comparison). AC: anterior cingulate; IFG: inferior frontal gyrus; MidFG: mid-frontal gyrus; STS: superior temporal sulcus; AG: angular gyrus.

to identify a diffuse network of activations distributed over the two hemispheres, which can be decomposed into circumscribed functional sub-systems mediating different aspects of metaphor resolution, among which conceptual integration, attentional mechanisms and mind-reading processes (GENTILI et al. 2006). In a further analysis we showed an important effect of metaphor's familiarity, modulating activity in the temporal regions of both hemispheres (GENTILI et al. 2008). A preliminary data set has been published (BAMBINI 2010), while the main study is currently submitted to an international journal (BAMBINI et al. submitted). Future research is planned to explore the role of embodiment mechanisms in processing metaphorically used verbs (in collaboration with M. TETTAMANTI, Milano).

Project 2: Electrophysiology of metaphor comprehension

We used high-resolution ERP recording (64 channels) to examine the time-course of metaphor comprehension and to estimate the influence of linguistic context. The experiment was run in collaboration with F. DI RUSSO



Grand-average ERP waveforms time-locked to the onset of the last words of metaphorical (red) and literal sentences (black) in the minimal context condition (upper panel) and in the supportive context condition (lower panel). Grey bars indicate significant effects.

(Rome). We detected a significantly higher N400 for metaphors than for literal controls, as well as a P600 effect (BAMBINI et al. 2006). Furthermore, we were able to show that, when presented in a more supportive linguistic context, metaphors did not elicit higher N400 amplitude, while maintaining a robust P600 effect (BAMBINI et al. 2008). These results point to the P600 as the key component of pragmatic meaning resolution. A final report is being prepared for submission to an international journal.

This research line is presently being further developed in collaboration with Centro di Ricerca Interdisciplinare sul Linguaggio, Univ. Salento, Lecce (M. GRIMALDI and D. RESTA), by taking into account literary metaphors. The aim is to assess whether the literary signature (with its distinctive meaning's open-endedness) affects the temporal dynamics of metaphor comprehension. This study may be viewed as an attempt to provide empirical evidence to cognitive poetics.



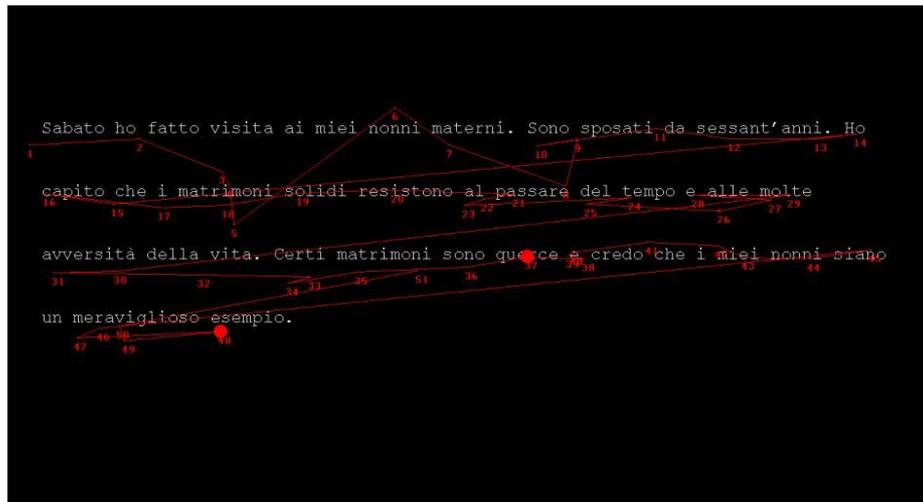
Setting up an ERP recording session at CRIL (Univ. Salento, Lecce) for the joint project on literary metaphor.

Project 3: Metaphorical readings

In this project, developed thanks to the technical facilities provided by Istituto di Neuroscienze, CNR Pisa (M.C. MORRONE), we recorded eye-movement during the reading of metaphorical vs. literal sentences. Our preliminary results suggest that readers do not spend more time on metaphors in first-pass reading, but rather re-read the critical nouns and adjacent material in later stages (second pass effects). Furthermore, when metaphors are placed in a supportive linguistic context, re-reading is significantly reduced in timing and number of fixations (BAMBINI & BERTINI 2009).

A follow-up study is now on-going in collaboration with N. SPOTORNO (Milano/Lyon). It explores the effect of context and aims at improving the ecological validity of the

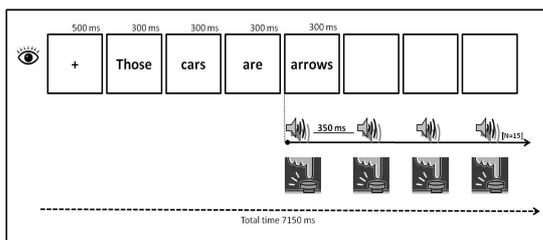
experimental protocol. We are testing the hypothesis that the availability of a wide discourse situation can suppress the additional re-reading efforts caused by metaphorical, as compared to literal, meaning. Preliminary data seem to offer a positive answer (SPOTORNO & BAMBINI 2010).



Fixation points' trajectories of a participant reading a text during an eye-tracking experiment.

Project 4: Steps of the mind over figurative meaning

This two-year project, launched in September 2009 in collaboration with P. B. SCHUMACHER (Mainz) and I. NOVECK (Lyon) thanks to a travel grant awarded by the EURO-XPRAG Research Network, focuses on the temporal dynamics and the cognitive efforts of figurative language processing (BAMBINI & SCHUMACHER 2010). The aim is twofold. On the one hand, we want to assess how pragmatic processing unfolds over time, by employing an experimental paradigm able to tap onto the early processing phases (masked-priming ERP, currently running in Mainz). On the other hand, we are trying to assess whether and how pragmatic processing varies across types of figurative meaning, by comparing metaphor, metonymy and approximation. To this purpose, LABLIN is pioneering a sophisticated behavioral methodology (Speed Accuracy Trade-off: SAT), apt to measure information accrual and employed for the first time in Italy for the sake of psycholinguistic investigation.



The SAT (Speed Accuracy Trade-off) experimental procedure. Each trial begins with a fixation asterisk presented at the center of the computer screen. Then the sentence is presented word by word. At the onset of the last word, a series of tones begins, cueing participants to respond.

Project 5: The representation of linguistic context

In previous experiments we observed that, when stimuli are presented with a supportive linguistic context rather than as isolated sentences, the efforts for computing pragmatic meanings are significantly reduced (see projects 2 and 3). There is also evidence that the linguistic context not only conveys linguistic information, but also prompts extra-linguistic knowledge, which takes part in the construction of communicated meaning. Little attention, however, has been devoted to the real-time representation of linguistic context. In April 2010 we inaugurated a project devoted to disentangling linguistic from extra-linguistic aspects of the context. This program is being developed in collaboration with N. SPOTORNO (Milano/Lyon) and C. BIANCHI (Milano) thanks to a travel grant awarded by EURO-XPRAG network. The aim is to find out whether the linguistic context activates a set of abstract structures for computing communicated meaning (frames or scripts) or it merely consists of non-structured linguistic inputs, as *ad hoc* employed to construe the meaning. We intend to apply behavioral and ERP techniques, with particular care in developing ecologically valid experimental paradigms to simulate discourse unfolding in real communication (GHIO & SPOTORNO 2010).

Dissemination activities

- LABLIN organized in Pisa (June 8-10 2006), in collaboration with the University of Pisa, "The Architecture of Language", a satellite event of the 12th Annual Conference of the Human Brain Mapping Organization. The conference



gathered more than 150 participants from all over the world.

- In September 2008, LABLIN organized the “XLII Convegno della Società di Linguistica Italiana”, divided into two sections: “Linguaggio e cervello” (organized by the host institution, i.e. LABLIN) and “Semantica” (organized by SLI), and including two workshops. It was the most attended SLI conference ever, with thirteen invited speakers. The conference proceedings are in preparation (they will be published by Bulzoni in Rome,
- with P.M. BERTINETTO, V. BAMBINI, I. RICCI and Collaborators as editors).
- LABLIN has been appointed as hosting institution for the 2nd Workshop of the ESF Research Network called “Experimental Pragmatics” (EURO-XPRAG), which will be held in September 2011 and will gather researchers from over 13 countries to discuss 16 new projects sponsored by the network. The Workshop will be almost entirely funded by ESF.

Selected publications and presentations

- BAMBINI Valentina 2010. Reti metaforiche: il contributo delle neuroimmagini alla modellizzazione della pragmatica. In FERRARI Giacomo, Monica Mosca & Ruben BENATTI (eds.). *Atti del XL Convegno della Società di Linguistica Italiana. Vercelli*. Settembre 21-23, 2006. *Linguistica e modelli tecnologici di ricerca*. Roma: Bulzoni. 33-45.
- BAMBINI Valentina (ed.). 2010. Neuropragmatics. *Special Issue of Italian Journal of Linguistics/Rivista di Linguistica* 22(1).
- BAMBINI Valentina & Bruno G. BARA 2010. What is neuropragmatics? A brief note. *Quaderni del Laboratorio di Linguistica della Scuola Normale Superiore* 9, 1.
- BAMBINI Valentina & Chiara BERTINI 2009. “Tracking metaphor through eye-movements: from words to meanings”. Poster presented at *European Science Foundation Exploratory Workshop: Words In Action: Interdisciplinary Approaches To Understanding Word Processing And Storage*. Pisa. October 12-13, 2009. Also available in *Quaderni del Laboratorio di Linguistica della Scuola Normale Superiore* 9,1 (2010).
- BAMBINI Valentina, Chiara BERTINI, Alessandra STELLA & Francesco Di Russo 2006. “Spatio-Temporal Characterization of Metaphor Comprehension”. Poster presented at *12th Annual Meeting of the Organization for Human Brain Mapping*. Florence. June 11-15, 2006.
- BAMBINI Valentina, Chiara BERTINI, Alessandra STELLA, Francesco Di Russo 2008. “Spatio-temporal patterns of metaphor comprehension: The effect of context”. Oral communication. *14th Annual Meeting of the Organization for Human Brain Mapping*. Melbourne. June 15-19 2008. Also available in *NeuroImage* 41. Supplement 1, cd-rom S1620.
- BAMBINI Valentina, Claudio GENTILI, Emiliano RICCIARDI, Pier Marco BERTINETTO, Pietro PIETRINI *submitted*. Cognitive decomposition of metaphor processing through fMRI.
- BAMBINI Valentina & Petra B. SCHUMACHER 2010. “Steps of the mind over figurative meanings: Behavioral and ERP investigations” Oral communication. *EURO-XPRAG Workshop*. University of Leuven. Belgium. June 10-12, 2010.
- GENTILI Claudio, Valentina BAMBINI, Emiliano RICCIARDI & Pietro PIETRINI 2006. “Neural Correlates of Metaphor Comprehension Assessed by fMRI”. Poster presented at *12th Annual Meeting of the Organization for Human Brain Mapping*. Florence. June 11-15, 2006.
- GENTILI Claudio, Valentina BAMBINI, Emiliano RICCIARDI & Pietro PIETRINI 2008. “The effect of familiarity in metaphor comprehension: An fMRI study”. Poster presented at *14th Annual Meeting of the Organization for Human Brain Mapping, Melbourne*. June 15-19, 2008. Also available in *NeuroImage* 41. Supplement 1, cd-rom, S1612.
- GHIO Marta & Nicola SPOTORNO 2010. “How linguistic is linguistic context?”. Oral communication. *EURO-XPRAG Workshop*. University of Leuven. Belgium, June 10-12, 2010.
- SPOTORNO Nicola & Valentina BAMBINI 2010. “La metafora fra concetti, contesto e sforzo cognitivo, comunicazione”. Oral communication. *XVII Congresso Nazionale della Società di Filosofia del Linguaggio*. Trieste. September 16-18, 2010.



Morpho-syntactic investigations

Domains: morpho-syntax

Methods: equipment-supported analyses, behavioral analyses, computational modeling & corpus-based analyses, theoretical analyses

Coordinator: Pier Marco BERTINETTO

Collaborators: Valentina BAMBINI, Basilio CALDERONE (Toulouse), Denis DELFITTO (Verona), Michelangelo FALCO, Chiara FINOCCHIARO (Trento), Chiara MELLONI (Verona), Luca PESINI, Emanuela SANFELICI



In this area, we address several issues in the morpho-syntax of Italian and other languages, pursuing a fruitful combination of theoretical inquiry and experimental investigation on multi-faceted research topics. One of the projects summarized below focuses on morpho-syntactic ‘mixed’ categories, i.e., morpho-syntactic objects overlapping two or more distinct prototypical categories, thus challenging – by virtue of their intrinsically hybrid nature – the received classification criteria. A PRIN project on ‘Mixed categories’ was recently submitted (see the Appendix, Pending evaluations), with the aim of identifying the defining structural properties of such entities, mostly to be found in morpho-syntax, but also in semantics and phonology. Some of the research projects described below concern the crucial topic of morpho-syntactic acquisition; some have strong experimental vocation. Traditional experimental protocols of psycholinguistic research are exploited, in conjunction with innovative paradigms of psycho-computational investigation.

Project 1. On the structural properties of mixed-categories

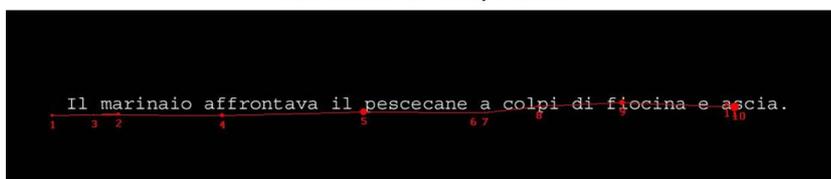
a. Noun-noun compounds through eye-movements

The theoretical side of this investigation benefits from collaboration with D. DELFITTO and C. MELLONI (Verona), whereas the experimental side is carried out in collaboration with C. SEMENZA and G. ARCARA (Padova). The internal structure of NN compounds (such as It. *capostazione*) is rather atypical, compared to what is found in phrasal syntax: the head Noun directly selects the other Noun (the non-head or modifier), contravening the Nouns’ selection properties. The hypothesis is that NN compounds are not the result of simply juxtaposing two words or lexical bases, on the grounds of specific

word formation rules; rather, this type of compounding is a special case of syntactic computation, resulting in a construction which is opaque to movement operations, internal modification, etc. In the experimental component of the project, the eye movements of subjects reading right-headed vs. left-headed compounds are compared, with the aim of enlightening the role of the head and its positional effects. Italian admits both right-headed and left-headed compounds and thus represents a privileged litmus-test for verifying whether compounds are associated, over and above the lexical representation, with a head-position influenced structural representation.

Preliminary eye movement data on reading left- vs. right-headed compounds. Compared to left-headed compounds, right-headed ones elicit a higher number of fixation points and a regressive, instead of linear, path.

Left headed compounds



Right headed compounds



b. The verbal noun in Ancient Irish

Nominalizations are to be considered a prototypical example of syntactically ‘mixed categories’, for they can be characterized in terms of both nominal and verbal features. Celtic languages (with a basic VSO word order) offer interesting – and typologically rare – examples of nominalizations, such as *Seán a léamh an leabhair* (lit. ‘John to reading of the book’), where the nominalized element is part of a three-member construction, with a noun in the nominative case preceding the nominalized component, and a noun in the genitive case following it.

This investigation is the focus of an internal PhD thesis addressing nominalizations in Celtic (and other I.E. languages) within the framework of Distributed Morphology and Nanosyntax.

c. Para-hypotaxis

Another categorical distinction commonly accepted in syntactic theory is the one referring to coordinate vs. subordinate constructions. However, mixed constructions are attested in



Dijaide (and his wife), one of the native informants in the Ayoreo field-work conducted by LABLIN scholars.

various languages, such as, e.g., co-subordination relations (as suggested by FOLEY and VAN VALIN). In one type of such constructions (usually called “clause chaining”) a sequence of coordinate clauses containing non-finite verb forms is closed by a clause containing a finite verb form.

In this sub-project (which is the topic of an internal PhD thesis), ancient Romance texts are analyzed, where a proleptic adverbial subordinate is often followed by the main clause introduced by a conjunction. This constitutes the so-called phenomenon of “para-hypotaxis”. The analysis will focus in particular on the origin of these constructions in the diachrony of the Italo-

Romance varieties and its possible functional explanations. In addition, the same phenomenon is currently being scrutinized in the Zamuco languages (see area 6) where, quite surprisingly, it has been detected. Since the same feature exists in typologically disparate languages, this offers a rare opportunity for a structural comparison.

Project 2. The emergence of predication

How do children develop the expression of predicative relations, when they still lack fully-fledged syntactic tools? We carried out a multi-layered analysis of early two-word combinations in the productions of five Italian children aged between 1;7 and 2;1 years of age, using data from the Calambrone CHILDES corpus (see area 7 as for our digitalization project). The results suggested that predication emerges as a cluster of basic lexical, thematic and semantic categories, best captured in terms of the Topic/Comment construction (BAMBINI & TORREGROSSA 2010). This project was supported by funding from the 2006-08 PRIN project “Dimensioni della variazione linguistica”.

Project 3. Connectionist modeling of Italian inflectional morphology

This project is being carried out in collaboration with B. CALDERONE (Toulouse) and V. PIRRELLI (Pisa). The acquisition of the inflectional system of a language requires the fundamental ability to identify, from the point of view of a child exposed to parental input, a specific repertoire of formal means to mark the morphological contrasts. In this project, an attempt is made at enlightening the comparative role of lexical storage and morpheme processing in morphology learning. The morphological acquisition is modeled by means of algorithms of dynamic adaptive systems’ organization (Self-Organizing Maps) and by unsupervised learning protocols simulating the emergence of linguistic structures from raw, unstructured input data. Self-Organizing Maps’ simulation has repeatedly shown that the paradigmatic and syntagmatic dimensions of morphological organization crucially co-determine each other (PIRRELLI et al. 2004, CALDERONE et al. 2007, CALDERONE & PIRRELLI in press, PIRRELLI et al. in press). While the computational algorithm has been developed by researchers at LABLIN, aspects of this project are investigated in collaboration with Istituto di Linguistica Computazionale of CNR, Pisa (V. PIRRELLI).

Project 4. On binding and pronominal reference

The term “crossover” was originally introduced in syntactic theory to describe constructions whereby a *wh*-phrase, in its right-to-left movement, crosses over a pronoun (compare *Who said Mary kissed him?*, with no crossover, with **Who did he say Mary kissed?*, with crossover).

In this project, crossover phenomena are analyzed at the syntax/semantics interface and with particular reference to the mechanisms responsible for pronominal binding (FALCO 2007). It is claimed that referential indexes are present only when syntactically justified and crossover is said to be a consequence of interface economy principles, operating on structurally rich Logical Form representations. This investigation was carried out as part of an internal PhD dissertation.

Project 5. The cognitive representation of number / gender features in Italian pronominal clitics

This project was carried out by C. FINOCCHIARO (Trento) when she was still part of LABLIN. The obvious reason for studying the Romance pronominal clitics stems from their notoriously uncertain status. Not only is there no consensus about the boundaries between clitics and ‘similar’

elements (affixes and definite articles), but it is also a matter of debate whether such boundaries exist at all. Several psycholinguistic investigations on pronominal clitics processing in Italian have been developed by LABLIN researchers in the period 2004/06, particularly dealing with the asymmetries between proclitics and enclitics (FINOCCHIARO 2005) and the role of frequency effects in lexical access and the mechanism of gender feature selection (FINOCCHIARO & CARAMAZZA 2006). Gender agreement on multiple referents and its implications for lexical access have also been addressed through on-line and off-line methodologies for analyzing the behavior of native speakers of Italian and other languages (FINOCCHIARO et al. 2008).

Dissemination

- The meeting “Language development in time and space” (October 13-14, 2008; invited speakers Catherine T. BEST, Melissa BOWERMAN, Roy C. MAJOR) was organized by LABLIN as a concluding event for the 2006-08 PRIN project “Dimensioni della variazione linguistica”; part of the papers presented by LABLIN members on that occasion were outputs of this research line.

Selected publications and presentations

- BAMBINI Valentina & Jacopo TORREGROSSA 2010. Cognitive categories behind early Topic/Comment structures. In CHINI Marina (ed.). *Topic, struttura dell'informazione e acquisizione linguistica*. Franco Angeli. Milano. 35-58.
- CALDERONE Basilio, Ivan HERREROS & Vito PIRRELLI 2007. Learning Inflection: The Importance of Starting Big. *Lingue & Linguaggio* 2. 175-200.
- CALDERONE Basilio & Vito PIRRELLI *in press*. Apprendimento morfologico, relazioni base-derivato e topologie paradigmatiche. Evidenze psico-computazionali a confronto. In BERTINETTO Pier Marco, Valentina BAMBINI, Irene RICCI & Collaboratori (eds.). *Linguaggio e cervello / Semantica. Atti del XLII Convegno della Società di Linguistica Italiana*. Pisa. SNS. Settembre 25-27, 2008. Roma. Bulzoni.
- FALCO Michelangelo 2007. Weak Crossover, Specificity and LF Chains. In EGUREN Luis & Olga Fernandez Soriano (eds.). *Coreference, Modality and Focus: Studies on the Syntax/Semantics Interface*. Amsterdam/Philadelphia. John Benjamins.
- FINOCCHIARO Chiara 2005. Psychological evidence on the status of Romance clitics. *Italian Journal of Linguistics* 17. 291-310.
- FINOCCHIARO Chiara, Alfonso CARAMAZZA 2006. The production of pronominal clitics: implications for theories of lexical access. *Language and Cognitive Processes*. 21. 141-180.
- FINOCCHIARO Chiara, B.Z. MAHON, A. CARAMAZZA 2008. Gender agreement and multiple referents. *Italian Journal of Linguistics* 20. 285-307.
- PIRRELLI Vito, Basilio CALDERONE, Ivan HERREROS & Michele VIRGLIO 2004. Non-locality all the way through: Emergent Global Constraints in the Italian Morphological Lexicon. In GOLDSMITH John & Richard WICENTOWSKI (eds.). *Proceedings of the Seventh Meeting of the ACL Special Interest Group in Computational Phonology*. Barcelona.
- PIRRELLI Vito, Marcello FERRO & Basilio CALDERONE *in press*. Learning paradigms in time and space. Computational evidence from Romance languages. In GOLDBACH M., M.O. HINZELIN, M. MAIDEN & J.C. SMITH (eds.). *Morphological Autonomy: Perspectives from Romance Inflectional Morphology*. Cambridge. Oxford University Press.



Endangered languages documentation

Domains: phonetics/phonology, morpho-syntax

Methods: theoretical analyses, field research

Coordinator: Pier Marco BERTINETTO

Collaborators: Luca CIUCCI, Irene RICCI, Emanuele SAIU



As is well-known, there is nowadays a dramatic loss of languages. The projections tell us that within this century a considerable share of the presently spoken languages will die out. This is the inevitable fate of all languages only spoken by the elder generations, with no children able to pass it on to the next generation. But even those minority languages which still present an apparently sound picture, due to the relatively large number of children still using them, might be severely endangered. The environment pressure can at any moment cause the shift to the colonizing language, at the expense of the heritage one.

One project of LABLIN is devoted to the topic of language documentation. It is inspired by the linguists' mission to try and reduce the effects of this gloomy perspective, by at least producing reliable descriptions of as many endangered languages as possible.

Of the many possibilities that suggest themselves, the attention was drawn – by a number of coincidences (also made possible by the collaboration with G.E. PIA) – to the Zamuco languages, spoken in the Gran Chaco territory between Bolivia and Paraguay. Of all the Zamuco languages that might have existed in the past (a small number, at any rate), two are still spoken: Ayoreo and Chamacoco. Research area 6 is mainly addressed to their documentation.

One should however be aware that the dramatic loss of languages presently occurring on this planet does not only concern distant and exotic languages. The same phenomenon is occurring on the Italian territory where, in quite a number of cases, the last speakers of various local vernaculars are due to pass away within the next few decades. It is thus urgent to document the linguistic competence of such speakers, in order to reduce the impact of this silent cultural catastrophe. With this in mind, the dialect of Colónora in Valleriana (in the province of Lucca) has been targeted.

Project 1: Grammatical description of Ayoreo (Zamuco)

Ayoreo is the language of the homonymous ethnic group traditionally (and, in a small portion, still presently) leading a nomadic life in the Gran Chaco area. They are now spread in small (mostly rural) communities between South-Eastern Bolivia and North-Eastern Paraguay. Two or three tiny bands still lead the traditional life, with virtually no contact with the



Members of the Ayoreo community (photo taken in Chochis, Bolivia)

Western society. There are little less than 5000 people, all using their language on a daily base. After a fortuitous contact with an Ayoreo community by the principle investigator in 2005,

during field-work targeted to the local variety of Guarani, this project was launched in 2007. The aim is to provide the first scientific grammar of this language. So far, three dedicated field-work campaigns have been carried out. In the course of the investigation, it turned out that Ayoreo is not entirely undescribed: there is a fairly reliable dictionary and a rudimentary grammar, both written by American missionaries (a second dictionary, produced by Italian and South American missionaries, is comparatively less reliable, but nevertheless useful). Despite the availability of such previous work, much remains to be done in order to produce a scientifically-grounded grammar.

A number of preliminary works have been produced so far, aiming at describing some of the most salient morpho-syntactic features of the language: CIUCCI (2007/8a; 2007/8b), BERTINETTO (2010), BERTINETTO et. al. (in press). BERTINETTO et al. (2010) is an acoustic analysis of the unvoiced nasal consonants, which constitute a salient feature of the phonetics/phonology of Ayoreo.

Project 2: Grammatical description of Chamacoco (Zamuco)

The Chamacoco speakers (less than 2000) live in North-East Paraguay, mostly concentrated in the traditional ethnic territory. Their language is strictly related to Ayoreo, although the shared lexicon does not exceed 25%. Despite this relatively marginal lexical overlap, many grammatical features ostensibly show that the two languages have a common ancestor. This is particularly evident in the verbal system (CIUCCI 2009; BERTINETTO in press) and in the inflection of possessable nouns (CIUCCI 2010). But virtually all morpho-syntactic aspects show this to be the case. One remarkable feature of the Zamuco languages, shared by other languages of the Chaco, is the parhypotactic strategy to be observed in clause combining (BERTINETTO & CIUCCI in press). This brings about an unexpected affinity between these South-American languages and the genetically

unrelated Ancient Romance languages, where this phenomenon was first described. The task of providing a fully-fledged grammatical description of Chamacoco is especially assigned to the PhD student L. CIUCCI, who has already done his first experience as field-researcher.

Project 3: The dialect of Cológnora in Valleriana

This project started in 2009 by initiative of the PhD student E. SAIU, who is collecting data on this Northern vernacular, imported in the Toscana territory by a small population migration in the late Middle Age. Contrary to a widespread assumption, claiming that this vernacular is now completely lost, the last speakers still exist and are eager to cooperate in the enterprise of documenting and describing their dying language.



A LABLIN PhD student during field-work with Chamacoco speakers near Asunción, Paraguay.



Field work in Cológnora by a LABLIN PhD student.

Dissemination initiatives

- In February 2008 an exhibition of ethnographical materials, mostly dealing with Ayoreo craftsmanship, was organized by LABLIN in cooperation with the field-worker Gabriella Enrica PIA.
- The workshop “Italo-Americana” was organized by LABLIN in June 2009; it was the first of a Workshop series aiming at bringing together all Italian scholars dealing with Amerindian languages.
- P.M. BERTINETTO and L. CIUCCI took care of the item “Zamuco languages” for the *Sorosoro* web-site, where detailed info concerning the world’s endangered languages and cultures is provided. See: <http://www.sorosoro.org/familles-des-familles.zamucoanes>
- Any publication relating to the Zamuco languages produced by LABLIN scholars is



The 2008 exhibition of ethnographical materials from the Ayoreo communities and other ethnic groups of the Gran Chaco area.

announced on the *Etnolinguística* web-page, specially devoted to the South-American native languages.

Selected publications and presentations

- BERTINETTO Pier Marco 2010. Ayoreo (Zamuco). A grammatical sketch. Provisional version in *Quaderni del Laboratorio di Linguistica della Scuola Normale Superiore* 9,1.
- BERTINETTO Pier Marco *in press*. How the Zamuco languages dealt with verb affixes. [to appear in *Word Structure*].
- BERTINETTO Pier Marco, Luca CIUCCI & Enrica Gabriella Pia *in press*. Inquadramento storico, etnografico e linguistico degli Ayoreo del Chaco. In AJELLO Roberto, Pierangiolo BERRETTONI, Franco FANCIULLO, Giovanna MAROTTA & Filippo MOTTA (eds.). *Quae omnia bella devoratis. In memoria di Edoardo Vineis*. Pisa. Edizioni ETS.
- BERTINETTO Pier Marco & Luca CIUCCI *in press*. Parataxis, hypotaxis and para-hypotaxis in the Zamuco languages. Paper presented at the 43rd Conference of the Societas Linguistica Europaea. Vilnius. 2010.
- BERTINETTO Pier Marco, Irene RICCI & Na ZHI *in press*. Le nasali sorde dell’ayoreo. Prime prospezioni. In *Proceedings of the 6° Convegno Annuale dell’ Associazione Italiana di Scienze della Voce* (Napoli, Università Federico II, February 2010).
- CIUCCI Luca 2007/08a. Indagini sulla morfologia verbale nella lingua ayoreo. In *Quaderni del Laboratorio di Linguistica della Scuola Normale Superiore* 7.
- CIUCCI Luca 2007/08b. Sulla morfologia nominale dell’ayoreo: genere e numero. In *Quaderni del Laboratorio di Linguistica della Scuola Normale Superiore* 7.
- CIUCCI Luca 2009. La flessione verbale del Chamacoco. In *Quaderni del Laboratorio di Linguistica della Scuola Normale Superiore* 8.
- CIUCCI Luca 2010. Morphological evidence for Zamucoan: the case of possessable nouns. Invited talk at the Typology Research Colloquium. Institut für Linguistik, Universität Leipzig. June 3, 2010.

Corpora building and maintenance

Domains: phonetics/phonology

Methods: archiving & documenting, behavioral analyses

Coordinator: Pier Marco BERTINETTO

Collaborators: Valentina BAMBINI, Chiara BERTINI, Chiara CELATA, Irene RICCI



The one described here should be considered a permanent LABLIN task, rather than a research area in the proper sense. LABLIN has taken part, in the course of time, to a number of enterprises leading up to durable archives. To the extent that such archives reside (exclusively or sharewise) on our web-site, we feel obliged to ensure their maintenance and periodical revision.

This is no more the case with the vocal archive *AVIP* (“Archivio delle Varietà di Italiano Parlato”), produced by a consortium led by LABLIN (with P.M. BERTINETTO as project leader), to which scholars from Università di Bari and Università Federico II di Napoli took part. The archive *AVIP* has subsequently migrated into a follow-up of that project, namely the project *API* (“Archivio del Parlato Italiano”), presently accessible and down-loadable from a server at Università Federico II di Napoli (<http://www.parlaritaliano.it/index.php/it/progetti/40-api-archivio-del-parlato-italiano>).

Below is a list of the currently available – or in the progress of building – data-bases hosted on the LABLIN’s web-site (<http://linguistica.sns.it/BancheDati.htm>).

1) *CoLFIS* (“Corpus e Lessico di Frequenza dell’Italiano Scritto”; Bertinetto et al. 2005) is the result of a collective enterprise, involving scholars from the former Istituto di Psicologia del CNR, Rome (now part of Istituto di Scienze e Tecnologie della Cognizione del CNR; Cristina BURANI, Alessandro LAUDANNA) and of the former Istituto per i Circuiti Elettronici del CNR, Genova (now part of Istituto di Linguistica Computazionale del CNR; Lucia MARCONI, Daniela RATTI, Gianna MORGAVI, Claudia ROLANDO), plus collaborators (Anna Maria THORNTON). The corpus, which contains almost 4 millions words, is based on a balanced set of texts, mirroring the competence of the average Italian reader, and has become the

major tool for assessing the frequency values of Italian words. LABLIN is presently engaged in the attempt to increase the potentialities of this powerful research tool, as detailed in Special Project 1 below.

Lemma	Categoria	Frequenza totale	Frequenza quotidiani	Frequenza periodici	Frequenza libri
ANNO	S	9203	4752	3682	769
GIORNO	S	4052	2037	1322	693
TEMPO	S	3598	1611	1341	646
VOLTA	S	3165	1390	1082	693
UOMO	S	3243	1241	1033	969
CASA	S	2954	1214	1127	613
VITA	S	2829	906	1285	638
PARTE	S	2608	1184	945	479
COSA	S	2418	816	767	835
DONNA	S	2307	825	975	507
MONDO	S	2193	860	884	449
LAVORO	S	2114	970	847	297
ORA	S	2021	1056	629	336
MODO	S	1953	720	715	518
MESE	S	1998	1125	702	171
PERSONA	S	1915	836	749	330
PROBLEMA	S	1930	1035	697	198
PUNTO	S	1874	953	627	294
CASO	S	1753	787	702	264
PAESE	S	1857	1063	574	220
MOMENTO	S	1659	680	589	390
STORIA	S	1662	770	657	235
CITTA'	S	1674	912	562	200
MANO	S	1595	581	440	574
PRESIDENTE	S	1884	1486	370	28
FIGLIO	S	1597	623	679	295
PAROLA	S	1452	624	441	387
FAMIGLIA	S	1430	613	603	214
STATO	S	1469	936	338	195

The most frequent nouns of written Italian language, extracted from CoLFIS. The columns indicate the total frequency, and the frequency across text types.

2) LABLIN has promoted the initiative of digitizing the Calambrone **CHILDES** archive – consisting of a fairly large stock of videocassettes recorded during the Eighties and kept at IRCCS Fondazione Stella Maris (Calambrone, Pisa) – in order to ensure the preservation for the future generations of this important source of data, documenting the acquisition of L1-Italian by a conspicuous number of learning children. Although LABLIN did not participate to this data collection (which was carried out under the world-wide CHILDES project), we made use of these recordings in works carried out in area 5. This gave us the motivation to start this activity, fully endorsed by the staff of Fondazione Stella Maris (Anna Maria CHILOSI).



Frame from the Calambrone CHILDES corpus, showing one of the L1-learning children video-recorded for longitudinal study.

3) In addition to these on-going activities, LABLIN takes care of the maintenance of the following corpora:

- (i) “Corpus di lapsus della SNS”, collected during the last Eighties, which still constitutes the only publicly available Italian speech error corpus.
- (ii) The audio recordings accompanying the paper by P.M. BERTINETTO & M. LOPORCARO (2005) [The sound pattern

- of Standard Italian, as compared with the varieties spoken in Florence, Milan and Rome. *Journal of the International Phonetics Association* 35: 131-151].
- (iii) Ayoreo speech samples recorded in Chochis (Bolivia, Departamento de Santa Cruz). It is planned to substantially expand the vocal archive by gradually including materials stemming from our field-work.

Special Projects



This area includes projects devoted to specific purposes, entirely funded by external sources. Although they have a target of their own, they are connected to some of the above research areas, as their description will show. It is thus foreseen that their results will provide further input to one or another of the relevant projects.

1. WIKIMEMO

Domains: phonetics/phonology, morpho-syntax
Methods: theoretical analysis, archiving & documenting

Coordinator: Pier Marco BERTINETTO
Collaborators: Chiara BERTINI, Piero COSI (and collaborators, Padova), Paola CUTUGNO (Genova), Luca DINI (and collaborators, Torino), Lucia MARCONI (Genova), Irene RICCI

This project, supported by a 4 years FIRB grant (2009-2013), is a collective enterprise, including LABLIN (with P.M. BERTINETTO as project leader), CELI, Torino (Luca DINI), Istituto di Linguistica Computazionale del CNR, sezione di Genova (Lucia MARCONI, Paola CUTUGNO), Istituto di Scienze e Tecnologie della Cognizione del CNR, sez. di Fonetica e Dialettologia di Padova (Piero COSI).

The above title summarizes the project's goals, namely to create a web-tool capable of:

- Providing dynamic access to some of the most significant resources relating to the Italian language and culture.
- Stimulating the potential users to create thematic written (and oral) productions, to be gathered into a lively and expandable database of native speakers' personal experience.

The aim is to implement an open portal of the Italian language and culture, supporting and spreading the use of our language abroad. The project will focus on: (i) language in use and the means to promote its knowledge; (ii) documenting the cultural traditions (including the major literature masterpieces); (iii) resources sharing.

The portal is intended for a diversified body of users, including specialists (Italian language, literature and culture scholars; educators; etc.) and "naive" users of any age or geographical



origin. Moreover, in order to meet the needs of writing impaired users (or of visually impaired ones), the possibility will be offered of storing audio texts in a special, thematically organized archive. The portal aims at becoming a site where – through suitable interfaces – it will be possible to: (a) access organized resources; (b) consult lexical archives; (c) read texts of various sorts; (d) use teaching tools; (e) extract data and images relating to particular themes and connected to specific activities or historical periods; (f) access encyclopedic information; etc.. Among the tools that will be put at the user's disposal, the following deserve mention (the list is not exhaustive): lexicons, text corpora, linguistic tools, teaching softwares, a genealogical search interface, etc. The dynamic component of *WIKIMEMO* will develop into a large and expandable corpus of written Italian, itself over time possibly becoming an object of study. Starting from the (free or thematically-oriented) texts produced by the users, it will be possible to create various sub-corpora and lexica, divided according to author's age, origin, topic, etc. The portal will include mechanisms of information

aggregation, such as: Google-like free text search; (semi-)automatic hyperlinking; thematic indexing (including the possibility to identify and stop undesired materials, such as pornographic ones). Moreover, in order to make the written information accessible to visually impaired users, a special acoustic interface will be provided, based on efficient speech synthesis. Other users, and in particular those with lower computer literacy, will be able to take advantage of “talking agents” (i.e., moving images of human faces) simulating text-reading.

While all the above goals will be carried out by the various local teams (as indicated at the outset), the LABLIN research unit will specially take care of enhancing the functionalities of an important tool for linguistic research, namely the Italian frequency corpus and lexicon *CoLFIS* (“Corpus e Lessico di Frequenza dell’Italiano Scritto”), already accessible through the LABLIN

web-site (<http://linguistica.sns.it/CoLFIS/Home.htm>). This was the output of a previously collective enterprise, to which LABLIN took part in the relatively recent past (see area 7). We aim at thoroughly re-designing the web interface, to allow easier use and above all to provide so-far absent data, such as detailed frequency information relative to derivational affixes. This will enable the user to achieve an unprecedented detail of analysis, bridging the gap that has so far characterized the status of Italian with respect to most of the main European languages (English, French, German, Dutch). If possible, analogous info will be provided with reference to the words’ prosodic structure. It is hardly necessary to point out the importance of this sort of tools, not only for scientific, but also for teaching purposes.

2. APACS

Domains: semantics/pragmatics
Methods: clinical diagnostics & intervention

Coordinator: Valentina BAMBINI
Collaborators: Giorgio ARCARA (Padova), Pier Marco BERTINETTO, Chiara BERTINI

The project *APACS* (*Assessment of Pragmatic Abilities and Cognitive Substrates*) was launched in June 2010, thanks to a biannual research grant awarded to V. BAMBINI by Regione Toscana. It aims at contributing to the development of an ecological approach to the assessment of language-related disorders. It thus goes beyond the investigation of the formal features of language, addressing linguistic use in natural communicative environment. The research focuses on the topic of communicative disruptions, with heavy repercussions on the life of patients suffering from a wide range of clinical deficits, from dementia to focal lesions and traumatic brain injury. The final goal is to develop both an innovative method and practical tools to assess the types of communicative disorder, along with their impact on the patient’s familiar environment.

Traditional neurofunctional models of language are based on formal aspects, such as production and comprehension of sounds and words. Such models have so far informed both diagnosis and treatment, inspiring queries such as: “Does the



patient understand passive sentences?”, or “Does the patient correctly articulate the labial consonants?”. In the patient’s life, however, language is mostly used for communication purposes, a task that goes far beyond the correct processing of sounds and words. A considerable number of patients, while able to (grammatically and phonetically) handle words and sentences, fail to communicate properly, being unable to understand the speaker’s message and to maintain coherent conversation. Such communicative disorders usually go unnoticed by standard neuropsychological tests. Here we aim at rethinking language diagnostics, by focusing on the assessment of pragmatic abilities and their cognitive substrates.

APACS exploits evidence and insights that we have been gathering in experimental and neuro-pragmatics on healthy subjects (see area 4, “Pragmatics in the mind/brain”). We know that successful communication is made possible by the so-called pragmatic abilities, which allow us to integrate language and context, based on the

delicate interplay of linguistic and extra-linguistic systems, such as memory, executive functions and mind reading. *APACS* will thus not simply aim at assessing the language abilities, but rather language abilities in context. In this light, it will provide an assessment method inspired by language use, rather than by formal aspects of linguistic structure, viewing linguistic behavior in ecological (communicative) situations. Moreover, *APACS* will be implemented with a practical assessment tool composed of two parts: (i) a short (easy and fast to use) battery, to ascertain the presence of pragmatic deficits; (ii) an extended battery, to identify the origin of the pragmatic deficit.

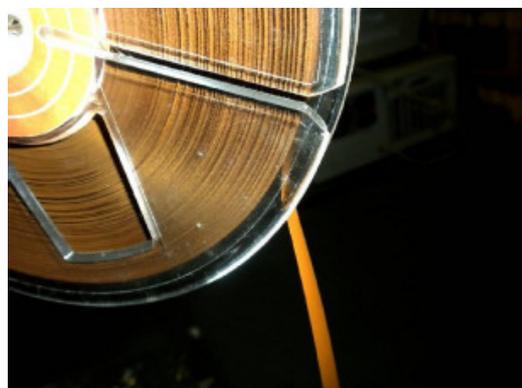
Special attention will be devoted to the psychometric aspects of the batteries. We envisage to collect normative data from a wide sample of normal subjects and clinical patients, taking into account a number of demographic variables that have been proved to influence communicative behavior. The ecological approach fostered by *APACS* will disclose new ways of intervention, by concentrating on the patient's communicative proficiency. Specific communication-oriented rehabilitation programs could be developed along the following two lines: (a) training the specifically impaired functions; (b) teaching compensatory strategies that rely on the residual abilities.

3. GRA.FO

Domains: phonetics/phonology
Methods: archiving & documenting

Coordinator: Pier Marco BERTINETTO
Collaborators: Chiara BERTINI, Silvia CALAMAI, Sergio CANAZZA (Padova), Irene RICCI (plus collaborators yet to be selected)

In Autumn 2010, LABLIN got financial support from the PAR FAS 2007-13, administered by Regione Toscana, for the project *GRA.FO* (*Grammo-foni. Le soffitte della voce*). This funding was granted to P.M. BERTINETTO (project leader) and Silvia CALAMAI (Facoltà di Lettere di Siena, sede di Arezzo). The aim is to spot, digitize and thus safeguard all sorts of vocal documents of linguistic interest, i.e., recordings documenting the territory's dialectological variegation. It is also foreseen to dress a general catalogue and, as much as possible, to transcribe part of these materials. The final output will be an *on-line* archive accessible to the interested scholars as well as the general public (to the extent, of course, that the legal owners will give their consent). In this project, vocal materials are conceived of as part of the general "cultural heritage", more specifically as part of the gradually disappearing language diversity (see area 6, "Endangered languages documentation"). They are thus in-and-by themselves worth of protection and – when needed – of restoration, just as any other cultural product of the past. The obvious motivation for this initiative is the pending danger of physical deterioration and even (in some cases) of dispersion of this



irreplaceable treasure of old testimonies. As is well-known, analogical tapes and even CDs (increasingly popular in more recent times) run the risk of losing their content, if no careful preservation strategy is envisaged. In some cases, this might be the last opportunity for action.

We have already established a first contact with a number of both public and private institutions, as well as individual collectors, where we know that such materials are preserved. Most have given a very encouraging answer, suggesting that the urgency of this problem is felt by many.

The centralized archive will consist in a user-friendly platform, namely an interactive map where the single locations (which the vocal data refer to) will be easily identifiable. From each location, the user will have access to the list of the available data and to a selection of the corresponding sound materials. To our knowledge, no such archive exists in Italy, although similar examples exist in other countries. It will thus be a pioneering initiative, hopefully conducive to analogous safeguarding enterprises.

The final output will consist of:

- Bringing to light voices doomed to remain silent or even be lost forever.
- Counteract the dispersion of this valuable material, often inaccessible or even unknown.
- Create a unified repository, with uniform catalogue and transcription procedures.
- Offer the competent scholar the opportunity to investigate the linguistic situation of the Toscana region, with an eye at its diachronic evolution (at least within the relatively short time-span which the recordings refer to).

The ownership of the sound documents will of course remain with the legal owners. The access to the web-site will be based on a password provided to the individual scholar and governed by copy-right rules, thus excluding any risk of inappropriate usage of these materials. The project is presently in its initial phase; actual action will start in Spring 2011, when the selection of the collaborators will have become operative. In the meantime, the relevant equipment for digitalization is being purchased.

Future programs



All the above described research lines will be pursued in the period to come, obviously relative to the specific projects still in progress. Indeed, as the preceding pages show, each area implies an internal development, with new horizons opening up or possibly, as it happens, “old” ones re-opening after a period of silence. As is typical of scientific research, it seldom (if ever) happens that a major line of investigation is fully exhausted.

It would be sheer boasting, on our side, to detail a program for the next 5 years. We consider it more serious to list here a number of projects which are certainly going to be pursued – within the areas identified above – in the next three years. Nevertheless, whatever we shall say below about the purchase of new equipments should be intended as a strategic acquisition to be exploited for a longer period of times.

Strategic research lines

It is appropriate to start with the **Special Projects**, since they refer to external grants and more specifically to activities that will keep us busy, respectively, during the next two (*GRA.FO*, *APACS*) and three years (*WIKIMEMO*). We obviously have an obligation to carry them out, to comply with the engagement we took on us when submitting such projects. It is however useful to repeat that although these three projects have an independent status of their own, they should be seen in conjunction with the major research areas. Indeed, the output of Special Project 1 (*WIKIMEMO*) will feed further research to be carried out within area 1 (“Speech production and perception”) and area 2 (“Prosody and rhythm”); the output of Special Project 3 (*GRA.FO*), besides feeding the two just mentioned areas 1 and 2, will also feed work in area 6 (“Endangered languages description”); finally, the output of Special Project 2 (*APACS*) will feed further research within area 4 (“Pragmatic meanings in the mind/brain”).

Similarly, we have an obvious obligation to pursue work in **area 7 (Corpora building and maintenance)**. As for our basic strategic lines, we now turn the attention to the major developments in areas 1 to 6.

Area 1 (Speech production and perception) incorporates – together with area 2 – the original L.A.B.L.I.N’s mission, which was never disowned.

Within this area, projects 1-3 will be carried out and in addition we are planning an extension of the research on the Mòoré vowels (project 4), with new speakers to be recorded. The domain of articulatory phonetics is an ever-green topic. New experiments are going to be carried out with respect to consonant clusters’ assimilation and glides’ articulation in Italian and other languages. Besides exploiting the EPG technique, we are planning to collect data on nasal airflow and vocal cord vibration. We are also hoping – provided adequate financial resources will be found – to expand our technical capacities by acquiring new instrumental equipments, with special regard to the ultrasound detector (see below). As for the domain of L2 phonological acquisition (project 2), the already exploited paradigm will be replicated within a research project on ‘Mixed categories’ (see also area 5) with respect to the perception and production of quasi-phonemes in Scottish English. This will be done in collaboration with the Edinburgh Speech Science Research Centre and the School of English and Scottish Language at Glasgow University. We also plan to initiate a cooperation with the University of Pennsylvania on automatic vowel analysis, making use of their home-developed forced alignment technique. The output of Special Project 3 (*GRA.FO*) will in due time enable us to extend this sort of analysis to samples of speech collected in the past, so as to gather diachronic evidence on the possible change in progress as occurring within the vowel system of Tuscany’s speakers.

Within **area 2 (Prosody and rhythm)**, project 3 will carry on with great intensity for (at least) the next two to three years, during which we aim at collecting robust cross-linguistic evidence supporting our home-developed “Control-Compensation” predictive model of natural language rhythm. We shall also try and model the languages’ rhythmical behavior with respect to the speech-rate factor. Further refinements of the CCI algorithm are planned and will be the topic of conference presentations in the next future (CCI normalization; CCI stabilization by means of computations inspired by neural network approaches). In addition, we intend to carry on the investigation on the computational modeling of the syllable (project 1). As for project 3, it is a hot and highly promising research line, with interesting theoretical fall-out: new experiments

are being planned. The output of Special Project 1 (*WIKIMEMO*) will allow us to further refine the predictive capacity of the model.

Area 3 (Verb features) is a long-lasting interest of LABLIN's scholars and co-workers. A great deal of the on-going research referring to various languages (Basque, Croatian, Mòoré, Russian) is carried out by doctoral students within their dissertation program. It is thus foreseeable that this component of the project will be completed within the next two to three years. Needless to say, further topics within this particular domain might be addressed, in case new students decide to engage in this sort of enterprise. As for the experimental component, follow-up experiments are currently being carried on within projects 2 and 3. As for project 1, concerning the acquisition of tense-aspect features, the data so far collected are now undergoing careful analysis and a final report is soon going to be submitted for publication to an international journal. This line of investigation will, however, remain active at least until the final results from work on Croatian and Mòoré will be available.

Area 4 (Pragmatic meanings in the mind/brain) is steadily growing since it was first launched in 2004-5, and has indeed turned LABLIN into an important center for research in experimental pragmatics and neuropragmatics. This is confirmed by a number of visiting students who chose our lab for stages, and by the recent appointment to host the II EURO-XPRAG Workshop in 2011 (almost entirely funded by the European Science Foundation). Not to be neglected are the important practical implications of this research area, especially for clinical purposes (see Special Project 2). Projects 1-3 identify the initial core of this research domain: final reports are currently being submitted to important journals. Two follow-up studies are presently running and are expected to be completed by the end of 2011. Two new projects (4 and 5) have been inaugurated in 2010, thanks to impulses from the ESF EURO-XPRAG network (who awarded us two travel grants), and will keep us busy until 2012. Furthermore, we intend to launch new projects in experimental and neuropragmatics, expanding in two directions. First, we are planning to assess how the construction of pragmatic meanings is influenced by the "concrete vs. abstract" distinction (this is part of an internal PhD work). Second, we intend to strengthen the ecological validity of the experimental protocols, by exploiting the LABLIN's long-lasting experience in speech studies. As for the technical point of view, we would like to become independent in conducting EEG/ERP recordings, conveniently enriching our own laboratory facilities.

Area 5 (Morpho-syntactic investigations) is perhaps the only one, among the major areas, that

might undergo drastic reduction. The pursuance of project 1 on mixed categories largely depends on the fate of a recently submitted PRIN proposal (see the Appendix, Pending evaluations). Should this program be adequately funded (allowing us to recruit one research position), it would definitely keep us busy for the next future. But even in the worst case, this research domain will remain active, with special regard to project 3. Besides, it is foreseeable that new doctoral theses will be launched in the future within this area.

To conclude, **area 6 (Endangered languages description)** should be viewed as a definitely strategic – albeit relatively recent – LABLIN's research line. It is conceivable that it will be pursued for quite a number of years to come, definitely so with respect to the Zamuco languages, in whose grammatical description some LABLIN's scholars are presently engaged. The historical reconstruction of Proto-Zamuco, based on data from the two extant Zamuco languages (Ayoreo and Chamacoco) and on what we know from the past (the data collected by the 18th century French-Flemish Jesuit Ignace Chomé) will be attempted in the next future.

LABLIN needs (for those who will listen...)

In order to achieve the above indicated goals, the following urgent needs have to be pointed out.

1) First and foremost, it is highly desirable that **one permanent research position** be created. The increasing volume of the research activities into which LABLIN is engaged makes it unlikely that this workload can be sustained in the long run with only temporary research positions. At present, LABLIN can only count on one full professor (with teaching load and general supervising responsibility on all LABLIN's activities) and two technicians. Besides their contribution, all activities are carried out by temporary researchers (presently two, with grants expiring within the next two years) and PhD students, as well as by external collaborators and visiting scholars. The presence of an additional permanent research unit would be a crucial (or, rather, necessary) stabilizing factor.

2) LABLIN suffers from severe space limitations. This is a long-lasting problem that anybody can easily check by even a cursory inspection. The problem was made even more dramatic, in the recent past, by the "temporary" transfer to the central administration of one of our rooms, during the restoration of so-called Collegio D'Ancona. We solicited the administration to return it to us, and we are waiting for consequent action. The availability of this room is absolutely necessary to carry out Special Project 3 (*GRA.FO*), which requires dedicated space for its completion. More generally, LABLIN has been awaiting for over a decade for a **new location** or



(even preferably) for the **enlargement (and restoration) of the present one.**

Expansion of the experimental facilities

As for experimental facilities, LABLIN needs to obtain financial resources to ensure, besides the appropriate maintenance and updating of the present facilities, the purchase of the following new equipments, highly needed for one or another of the above described lines of investigation:

- An **amplifier to record neurophysiological activity (EEG/ERP)** (approximately € 85000). This is highly needed, above all, for work in area 4. It should be pointed out that our previous investigations with this methodology had to be carried out in Rome and in Lecce. We are currently exploring the possibility to share this cost with medical research centers of the Pisa area.
- An **ultrasound detector**. LABLIN is currently promoting partnerships with other research centers and clinical structures to allow the researchers involved in area 1 projects to familiarize with the instrument, but purchase will inevitably be required in the next future (approximately € 30000).
- Various equipments needed for the digitalization of old-style tape recordings (an **analogical tape recorder**, approximately € 7000; a professional **analogical/digital converter**, approximately € 3400; a **storage data system**, approximately € 3000; a **natural convection incubator**, approximately € 3000). These equipments are needed to fulfill Special Project 3; their cost will be partly covered by the

obtained grant from the Toscana regional government.

- An appropriate number of EPG custom-made **artificial palates** for articulatory investigation. Electropalatographic research requires reliance on a number of pseudo-palates (approximately € 600 each) for suitable testing of the relevant articulatory variables in the selected languages/dialects under investigation. This is necessary to feed research within area 1.

Altogether, the cost of the above purchases amounts, approximately, to **€ 125000** (+ an estimated € 3000 per year for the EPG palates).

Financial requirements

Although we shall try and collect from external sources (at least in part) the above-indicated sum of money, we expect that in the coming future SNS will support LABLIN a bit more than it has been the case so far.

It is appropriate to underline once again that LABLIN has been exceedingly cautious in its demands for support, to the point of spontaneously adhering in the past (as the only SNS laboratory) to the administration's solicitation to reduce the budget's request, due to general financial restrictions.

With the same sense of responsibility that has characterized our action so far, we would like to limit our future request to an increase of the internal annual support from the present average of € 23000 per year to **€ 40000 per year, plus the occasional extraordinary support** to face the need to acquire new experimental equipments, should all our efforts to obtain dedicated external funds fail.

Appendix



Present facilities

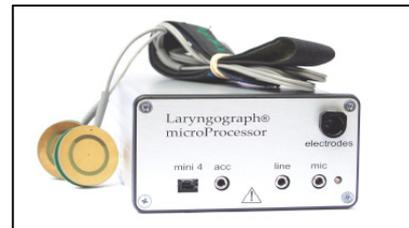
Anechoic Chamber (since 1990): this 2x2x2 m. sound-proof room, protected from exterior sources of noise and capable of stopping sound reflection and electromagnetic interference, allows acoustic data recording with up to 80dB noise reduction. In/out connections are also available for audio, video and PC. It is equipped with one monitor inside the room and an external **digital recording** (Edirol R04; since 2007).



Electropalatograph (since 2004): a computer-based Reading WinEPG 3 (Articulate Instruments®) to record tongue-palate contact patterns during running speech; the sampling rate is 100 Hz; it allows synchronous recording of the speech wave. Presently equipped with 10 artificial custom-made palates.



Laryngograph (since 2006): a Digital Laryngograph® system to measure the electrical impedance of the larynx, assessing the degree of vocal chords closure. Portable, non-invasive and easily combinable with other articulatory instruments.



Oral-nasal airflow measurement system (since 2007): a SCICON® R&D system to measure phonatory aerodynamics synchronously with audio recording. It is presently equipped with one oral mask, one nasal mask and a transducer interface.



Fund-raising (2005 onwards)

Year	Source and Title	Assignee	€	Positions*
2004-06	SNS: “Indagini sul vocalismo toscano”	P.M. Bertinetto	33000	1 P-D
2005-06	Promozione Ricerca CNR: “Analisi linguistica comparata e storia dei segni linguistici”	C. Finocchiaro	6000	
2006-08	PRIN 2005: “Dimensioni della variazione linguistica”	P.M. Bertinetto	39600	1 RC 1 OC
2006-08	SNS: “L’architettura del linguaggio: basi neurocognitive delle strutture linguistiche”	P.M. Bertinetto	39400	1 RC
2006	SNS Giovani Ricercatori: “Movimenti articolatori ed esiti acustici: indagine elettropalatografica di sequenze consonantiche e consonante-vocale”	C. Celata	4000	
2007	SNS Giovani Ricercatori: “Analisi elettropalatografica della coarticolazione nelle consonanti retroflesse: arrotondamento vocalico e nasalizzazione”	C. Celata	2000	
2007-08	Università Italo-Francese, Progetto Galileo 2007: “Modellizzazione connessionista della sillaba”; 2008 extension: “Variabilità fonetica e categorizzazione fonologica: modelli computazionali”	P.M. Bertinetto	7491	
2008	SNS Giovani Ricercatori: “Semantica e cervello”	V. Bambini	8290	
2009	SNS Giovani Ricercatori: “Text and context: neurocognitive dynamics”	V. Bambini	3900	
2009-13	FIRB 2007: “WIKIMEMO.IT: Il Portale della Lingua e della Cultura Italiana”	P.M. Bertinetto	41477	1 RC
2009-12	SNS: “Towards an ecological architecture of language: the neuropragmatic component”	P.M. Bertinetto	61700	
2010	SNS Giovani Ricercatori: “Between social cognition and semantic modality. A psycholinguistic investigation of epistemic terms.”	V. Bambini	3000	
2010	SNS Giovani Ricercatori “An articulatory account of nasal place assimilation in Italian: quantitative issues in the systematic treatment of coarticulatory Indices”	C. Celata	3000	
2010-12	Regione Toscana (Bando Salute 2009): “Assessment of Pragmatic Ability and Cognitive Substrates (APACS).”	V. Bambini	152500	1 RP 1 OC (to be activated)
2011-13	Regione Toscana (PAR FAS 2007-13): “Grammofoni. Le soffitte della voce (GRA.FO)”	P.M. Bertinetto	130400	2 RC (to be activated)
TOTAL			535758	

* P-D = post-doc; RC = research contract (“assegno di ricerca”); RP = research position (“ricercatore”); OC = occasional collaboration (“Collaborazione occasionale”)

In addition, LABLIN can count on € 8000 for travel expenses granted by the European Science Foundation Program within the EURO-XPRAG program (“Steps of the mind over figurative meaning. Behavioral and ERP investigations”, awarded to V. BAMBINI in collaboration with German and French partners, 2009-2011; “How linguistic is linguistic context?”, awarded to M. GHIO in collaboration with Italian and French partners, 2010-2012).

Pending evaluations

- PRIN 2009: “Categorie miste”, P.M. Bertinetto (National Coordinator), V. Bambini & C. Celata (staff of the SNS Research Unit) [In addition, V. Bambini is involved in 2 other PRIN projects (Milano Bicocca and Pisa Univ.) and C. Celata in one (Univ. per Stranieri, Perugia)]
- FIRB “Futuro in Ricerca” 2010: “L’evoluzione delle abilità pragmatico-linguistiche. Comprensione e uso della lingua secondo classi di età e livelli di scolarizzazione”, V. Bambini (National Coordinator)
- FIRB “Futuro in ricerca” 2010: “Per una analisi sociofonetica dell’assimilazione nei nessi con nasale”, C. Celata (Principal Investigator of the SNS Research Unit)
- Fondazione TELECOM 2010: “Voci nel tempo. Parole dalle comunità italiane”, P.M. Bertinetto (Coordinator)