MAX-PLANCK-INSTITUT FÜR PSYCHOLINGUISTIK

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# PREFACE

This is the third Annual Report of the Max-Planck-Institute for Psycholinguistics. Although the year 1982 did not produce any major changes in the Institute's direction, there was substantial development in the main areas of research. The Institute's central concern is to study the processes underlying the acquisition, production, and comprehension of natural language. This study demands careful analysis of the biological endowment making a natural language possible at all. The Institute's approach here is diverse, but necessarily indirect. One line of research involves the study of language universals and their possible explanation in terms of innate characteristics of the processing apparatus and of grammatical knowledge. Another approach requires the experimental and observational analysis of acquisition patterns in different languages, especially the comparison between children constructing their first language and adults acquiring a second language in an untutored setting. A third major source of information is the language use of aphasics; 1982 saw the start of a long-term research project on "Aphasia in Adults", funded by the Dutch Research Council ZWO, and jointly executed by the Institute and Nijmegen University.

It is also of great importance to analyse the ways in which contextual factors (perceptuomotor, motivational, social, linguistic, cultural and others) affect the course of acquisition, comprehension, and production of language. This analysis serves descriptive purposes, but more fundamentally, it is the only way to determine with precision how language functions. The question, for instance, whether or to what degree certain parsing operations, such as lexical access or anaphor resolution, function in autonomous or "modular"

fashion can only be answered by studying these operations under systematically varied contextual conditions. During 1982 the Institute continued its study of language-in-context in several ways, including the on-line measurement of auditory word-recognition in different types of discourse context, the analysis of monitoring and self-repair in spontaneous speech, and further inquiries into children's and adults' referring to space and time.

Progress in research is also reflected by further growth of the technical and research staff (see pp.9-12), as well as by the acquisition of new research facilities. Most noteworthy among the latter was the installation of a VAX 11/750 computer. Last but not least, progress was made in the planning of the Institute's new building on the University campus. The Institute will take up these new quarters in the course of 1985.


Willem J.M. Levelt

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# RESEARCH IN PROGRESS

# 1. LANGUAGE PRODUCTION

Language production involves a complex and purposeful interaction between various component processes, some of them of a rather more conceptual, others of a more linguistic or articulatory character. The ways in which a speaker exploits the different components for expressing his intentions in different contexts have been a subject of various research projects of the past year. Research focussed on three main problem areas: speech repairs (Levelt, Lang, Cutler), intonation (Klein, Cutler, Levelt, Pechmann) and deictic reference (Levelt, Richardson, Lahey, Ehrich, Jarvella, Levy).

## 1.1 Speech Repairs

Levelt completed his study of speech repairs in adults. The main addition to what was reported in the previous Annual Report was an analysis of the speaker's restarting from the listener's point of view. After the speaker has interrupted his speech, the listener has a continuation problem: he or she must find out how the repair is to be related to the original utterance. There are essentially three ways for a speaker to begin anew after interruption. The first one is "instant repair". An example is:

(1) Turn left at node, to node blue.

Here the preposition "at" needed replacement by "to", and after interruption this replacement is instantly made. The second type is called "retracing". An example is:

(2) Go then to the wrong, to the other side.

Here the word "wrong" has to be replaced by "other". This is performed by starting anew a few words before the critical item. The third type, finally, is called a "fresh start". An example is:

(3) Straight to, or the entrance is brown.

The listener's continuation problem consists in deciding which of these three ways is being used. The earliest possible moment when this is possible is at the very first word of the repair proper. This is theoretically feasible for the listener, if the speaker respects the following rules:

(i) Let the first word of the repair proper be of the same syntactic category as an earlier word in the interrupted utterance if and only if an instant repair of that word is intended.

(ii) Let the first word of the repair proper be identical to an earlier word in the interrupted utterance if and only if it is intended to make a retracing from that word on.

If neither (i) or (ii) hold, the speaker intends to make a fresh start (there is a possible confusion here with hesitations, which can be dealt with).

The analyses show that speakers follow these non-trivial rules in no less than about 95% of the cases. In other words, the listener can solve the continuation problem "on line", and no later than at the first word of the new utterance.

A further linguististic analysis of self-repairs was done by Lang (Akademie der Wissenschaften, Berlin). He made a distinction between self-repairs, which are triggered by unexpected trouble, and corrections, which are rather more planned and which do not lead to interruptions at linguistically odd places. The latter take the form of regular coordinations, with normal determination of focus, and explicit denial. But in proper self-repairs there is no focussed denial in the first (interrupted) conjunct; the contrast is wholly set up by the second conjunct, including its editing terms ("rather", "that is", etc) and its prosody. Lang proposed a reformulation of Levelt's well-formedness rule for self-repairs (cf. Levelt's forthcoming paper in Cognition, 1983) in order to deal with the syntax and semantics of focussed constituents.

## 1.2 Intonation

The group's work on intonation pursued two basic goals: to develop an integrated theory of context dependency and intonation and to gain further empirical insights into suprasegmental features of actual speech.
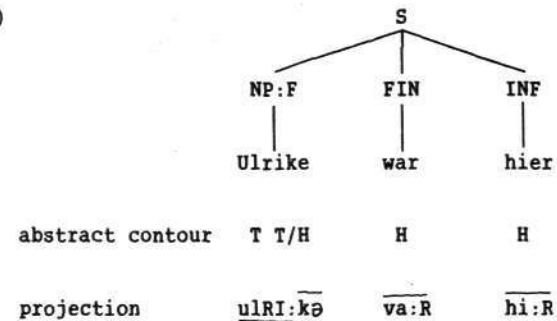
1.2.1 Klein - in cooperation with v.Stechow (Konstanz) - developed a new account of intonation and semantics of focus. The basic ideas are as follows. Within the syntactic structure of a sentence, any constituent (and sometimes several constituents) may be marked as "focus". This F-structure is reflected in intonation, on the one hand, and its semantic interpretation corresponds to specific conditions of use in discourse, on the other. Intonation of an F-structure is determined by two groups of phonological rules: contour rules and projection rules.

Contour rules associate an abstract sequence of tones with each F-structure. Two tones, H and T (high and low, respectively) are distinguished. Each F-constituent gets T H, followed by T, in

declaratives, and T T, followed by H, in interrogatives. Elements
before an F-constituent get T, elements after an F-constituent
continue the last tone of the F-contstituent. In case S itself is
the focus, another constituent may be the focus too ("double focus").
It is assumed that in normal questions or declaratives, S itself is
the focus, plus - possibly - an additional constituent, while in echo
questions or in corrections of preceding declaratives, only an
embedded constituent is the focus - namely that one which is
questioned or serves as a correction. Double focus results in two
merged focus-contours.

Projection rules map the abstract sequences of tones onto the
segmental structure of the given utterance. Each constituent has a
special "target point" within its segmental counterpart - the pivot.
In minimal constituents, the pivot is the syllable crest of the
(lexically) stressed syllable of the corresponding word; pivots of
larger constituents are between its immediate constituents. Details
aside, the projection rules may be summarized as follows: If K is
the segmental counterpart of an F-constituent, with an abstract tone
contour T H / T (or T T / H, respectively), then the first tone is
projected before the pivot of K, the second tone onto the pivot of K,
and the third tone after the pivot of K; if K is the segmental
counterpart of a non-F-constituent, then it simply takes over the
tones of the corresponding abstract contour. The following example
is an echo question with focus on Ulrike (with pivot on "i"):

(1)

```
                              S
                  ┌───────────┼───────────┐
               NP:F          FIN         INF
                │             │           │
              Ulrike         war         hier
```

abstract contour    T T/H        H           H

projection         ulRI:kə     va:R        hi:R

According to the specific phonetic properties of the segmental
structure (number and length of syllables), the actual contour may
look very different for a given abstract contour.

Semantic interpretation of F-structures is stated in terms of an
extended possible-worlds-semantics. An F-structure is assumed to
express a structured proposition, that is, a pair $\langle T,R \rangle$, where T and
R are properties of the same logical type. Roughly speaking, T
("thematic part") is obtained by replacing the F-constituent of the
given F-structure by an appropriate variable and by
lambda-abstraction; R, on the other hand, is the $\lambda$-abstract
corresponding to the F-constituent. Thus, (1) expresses the
structured proposition $\langle \lambda x$ war-hier'$x, \lambda x$ x = Ulrike'$\rangle$. With the aid
of this notion, pragmatic concepts such as "discussion score", "open
alternatives", "relevance" (of an utterance at a given discussion
score), "meaningful continuation of a discussion" and others are
given a precise definition.

1.2.2 Cutler and Levelt did an initial analysis of the prosodic
structure of lexical self-repairs, i.e. repairs where a word was to
be replaced by another word. Repairs were scored as "marked" if the
repair proper was prosodically different from the corresponding part
of the original utterance and as "unmarked" otherwise. The analyses
are still underway, but a major finding is that repairs for errors
(i.e. the original word was simply erroneous) are mostly marked,

whereas repairs for appropriateness (the original word was correct but not fully appropriate) are generally unmarked. Marking seems to express the degree of incompatibility between reparandum and replacement.

1.2.3 Pechmann studied the relation between the informativeness (of an utterance in a given context) and stress.Two experiments were carried out both with children and adults investigating whether acoustic stress is placed on the distinctive as opposed to the non-distinctive elements in referring phrases, that is, on that element which unambiguously discriminates a target referent from possible alternatives. The results show that both children and adults systematically stress information which is distinctive with respect to the previous discourse, but do not systematically stress information which is distinctive with respect to the non-linguistic, situational context of referential alternatives. This finding might be explained by assuming that the process of comparing an object with a previously mentioned one is relatively simple. Therefore, the speaker can determine the distinctive information early in time and, thus, plan its accentuation accordingly. Children followed a different strategy with respect to the non-linguistic information. They exhaustively scanned all the objects in the non-linguistic, situational context. It was only then that they started to produce their utterance. Thus, the temporal precedence of the speech production process over the determination of the corresponding non-linguistic information which had been observed in the case of adults, but not in the case of children might explain a somewhat puzzling finding which has repeatedly been reported in the literature, namely that adults' referring phrases are more often overspecified than those of children.

1.3 Reference and Deixis

1.3.1 A set of studies centered around the thematic organization of discourse on both a cognitive and a linguistic or paralinguistic level. Based on a critical review of linguistic and psycholinguistic research, Jarvella (in cooperation with Engelkamp, Saarbrücken) developed an integrated account of definiteness, word order and phonetic prominence. Jarvella also continued the data analysis for speech corpora collected where subjects were asked to slightly modify their speech output (cf. Annual Report 1980, 1981). This work involved collecting and scoring of ratings of explicitly segmented speech using oral and silent reading tasks, and obtaining some sample protocols in English for use in illustration.

Levy continued her work on discourse segmentation and linguistic as well as gestural pointing. Based on empirical investigations of videotaped film narrations and spontaneous conversations, she developed a model of surface linguistic and extralinguistic devices used to introduce referents, both as topics and non-topics, and to subsequently maintain anaphoric reference to them; for example, a given referent may be introduced as a topic with an explicit, even overdetermined referring expression in the predicate of its clause, with accompanying stress and gesture, and may then be maintained as a topic through the use of inexplicit referring expressions, in subject position, and without accompanying stress or gesture.

Results indicate furthermore that deictic gestures tend to occur in conversations when a new topic is being negotiated, and tend not to occur once a given referent has already been established as a conversational topic.

1.3.2 Levelt, Richardson, and Lahey completed the data collection phase of their study of the temporal relations holding between deictic gestures and speech. In the experiments, subjects were

typically watching one of a few lights to flash; they then had to point to the light and to say the Dutch equivalent of "this light" or "that light". Several experiments were done in which the number of the lights, the number of alternative responses, the distance and position of the lights, and the freedom of the pointing hand to move were varied. The course and timing of the pointing finger were registered by means of a Selspot system. Some of the major findings are these: (i) The moment of voicing adapts in part (in the contralateral field), or in full (in the ipsilateral field) to the apex of the gesture. (ii) If no gesture has to be made, voicing latency is substantially shorter. A major question is whether this voice-to-gesture adaptation takes place before or during the execution of the gesture. The experimental results make it very likely that the following holds: (iii) Adaptation of voice to gesture is programmed just before the release of the gesture, or during the initial phase of its execution. Voicing cannot be adapted anymore after about 400 ms before apex (there are individual differences here). It seems therefore that the programming of gesture sets the pace for the programming of speech, rather than the inverse.

1.3.3 Ehrich continued her work on secondary spatial deixis (expressions like left, right, in front, behind). She did a semantic analysis of these expressions. Several experiments were conducted on the basis of this analysis investigating speakers' use of the deictic as opposed to the intrinsic perspective. It turned out that speakers who describe a whole scenario rather than just one pair of objects stick to the deictic perspective even in those cases where an intrinsic description is possible. This finding can be explained by discourse organization constraints: only the deictic perspective allows for construction of a uniform description schema.

1.4 Computer Models for Language Production

1.4.1 Jameson continued work begun within the framework of the natural language artificial intelligence system HAM-ANS at the university of Hamburg on models of two aspects of language production: the generation of elliptical forms and the selection and verbalization of information in 'evaluation-oriented dialogs', i.e. dialogs in which one of the participants has the goal of forming a value judgment concerning a given object.

Jameson also implemented on the VAX computer a modified version of the linearization models previously proposed by Levelt of the production and comprehension of descriptions of spatial networks. These implementation efforts suggested hypotheses and possible experimental tests concerning theoretical questions which had remained open in the earlier research, particularly in connection with the description of networks containing 'loops'.

1.4.2 Kempen - in cooperation with Hoenkamp, Nijmegen University - designed a computer model for syntactic processing reflecting speakers' capability to produce sentences incrementally, that is their ability to start speaking with only a fragmentary idea of what they want to say and to refine and supplement these ideas 'on line' in subsequent parts of their utterance. This capability imposes a number of constraints on the design of a psychologically plausible syntactic processor. It turns out that in an incremental syntactic processor, it is more efficient to have the hierarchy of syntactic constituents computed independently of their left-to-right order. So it is desirable to have separate components for tree formation (or rather "mobile" formation) and for word order. Among the other constraints derivable from the incremental production requirement are the following: explicit computation of functional syntactic relationships such as subject and object; operations (e.g., transformations) on syntactic trees constrained by locality principles; lexical transformations should be permitted.

# 2. LANGUAGE COMPREHENSION

The central aim of the language comprehension group is to analyse the processes by which listeners or readers derive the intention of what is spoken or written. These processes are both fast and highly context-dependent, and substantial effort has been put in the development of techniques for assessing these processes and the effects of context "on-line", i.e. at particular moments during speech input, or at particular moments of eye fixation during reading.

A further aim is to relate these processes and their constraints to distributional universals of language; some patterns of word order, for instance, may be easier to process than others, and this may be reflected in the distribution of word order patterns over the languages of the world.

The group's work focused on four different problem areas: theoretical accounts of the form/meaning relation (Bach, Partee, Steedman, Flynn, Altmann), lexical processing (Marslen-Wilson, Tyler, Zwitserlood, Flores d'Arcais, Schriefers), text comprehension (Vonk, Glowalla, Metzing), and language universals (Hawkins, Dunlea).

## 2.1 Theoretical Accounts of the Form/Meaning Relation

Some theoretical work of the group was concentrated on formal semantics in a Montague type categorial grammar. Flynn (University of Massachusetts, Amherst) worked on the history and theoretical foundations of categorial grammar. Partee (Amherst) continued her research on formal semantics and its relation to syntax, focussing on controversial issues surrounding the principle of compositionality, the thesis that the interpretation of a complex expression is a function of the interpretations of its parts and of the way they are syntactically combined. The principle is highly theory-dependent and can be made precise only in conjunction with explicit theories of syntax and semantics; a study of the principle serves as a useful focal point for comparing theories with respect to how far they see natural language syntax as a natural (or even possibly optimal) vehicle for encoding semantic content. A case study of the syntax and semantics of English genitives was carried out with particular attention to the difference between genitives with relational nouns ("John's father") and those with simple means ("John's team"), and a similar study was begun of sentences with have ("John has two sisters", "John has a car"). Two analyses covering approximately the same data were developed and compared, showing the possibility of tradeoffs between the proliferation of syntactic (and semantic) categories and the burden placed on context-dependent interpretation of free relation variables. Bach (Amherst) developed a categorial account for the semantics, syntax, and morphology of a number of problems in English, Dutch, and Amharic.

Closely related to this is the work done by Steedman (University of Warwick, Coventry) on the syntax of tensed verbs and subjects in English, Dutch and German. Steedman also extended his categorial-grammar-type parsing model (developed in cooperation with Ades) to the exceptional case of nested constructions in Dutch, which do not occur in closely related languages like English or German. An

example is: ...omdat ik Celia de nijlpaarden zag voeren. The remarkable fact about these constructions is that they involve crossing dependencies, which imposes some difficulties on the construction of context-free surface grammars as well as on the actual comprehension process.

Altmann (München) continued his research on complex syntactic structures in German. This project gives special attention to the complex interaction of different syntactic means like category formation, ordering of elements, morphological marking, and intonation. Altmann, in particular, developed a sentence type classification which is based on features like intonation and sentence mood.

2.2 Lexical Processing

2.2.1 Marslen-Wilson and Tyler continued their work on spoken word recognition within the framework of a "cohort" model, which claims that the recognition of a word in isolation is mediated by the parallel activation, at the beginning of the word, of all the words in the language that begin with the same sound sequence, and that the word in question can be recognized as soon as it becomes uniquely distinguishable from all the other words with which it shares its initial segments.

A first set of experiments, carried out in collaboration with Church (Massachusetts Institute of Technology), used an auditory lexical decision task to investigate these claims of the cohort model for on-line decision processes as a word is heard. The first part of the experiment looked at the effects of cohort size on the recognition process: does the number of possible words compatible

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with the input prior to the separation point have an effect on the speed of the recognition decision? The mean size of the cohort was varied over three sets of stimuli from 1.0 to 18.5 to 78.5. No effects of this variation were found, once the interference due to common prefixes had been corrected for. The second part of the experiment looked at the effects of location within a syllable on response-time. If the speech input is not continuously analysed with respect to its possible lexical interpretations, but rather is input to the lexicon in syllable-sized chunks, the response-time to a given separation-point should vary depending on where the separation-point came within a syllable. The positions were varied from syllable-initial, syllable-medial, to syllable-final. The results showed no effect of syllable-structure, since response-time was constant, at around 450 msec, independent of where the separation-point came in the syllable.

A second set of experiments investigated two aspects of spoken word-recognition in context (Marslen-Wilson, Tyler, Brown, and Van Haandel). These were aspects of word-recognition which, in previous studies, had provided much of the motivation for the development of the cohort theory. The first part of the study, using a word-monitoring task, examined in more detail than had been done previously the effects of variations in degree of contextual anomaly on response-time for a given target-word. In particular, relative to a normal baseline (1), reaction-times were measured for the same words in contexts where (2) the words were pragmatically inappropriate, (3) where they violated semantic selection restrictions, and (4) where they violated syntactic sub-categorization restrictions. Examples of these types of contexts are as follows (where guitar was the target throughout):

1) John held the guitar...
2) John buried the guitar...
3) John drank the guitar...
4) John slept the guitar...

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The results confirmed and extended earlier research, showing response-times to be progressively and significantly slower (relative to the normal baseline) over the three types of violation, with an effect of 28 msec for the pragmatic violations increasing to an effect of over 80 msec for the syntactic violation.

The second part of the study combined for the first time the use of the gating paradigm with the use of reaction-time measures for the same words. That is, the words used in the monitoring-task described above were also presented to subjects in a gating task. In this task, the subjects hear successive 30 msec increments of a word, and at each increment they are asked to say what they think the word is. This gives a direct measure of how much of the sensory input corresponding to a given word needs to be heard by a subject before it can be identified. By using the same acoustic tokens in the monitoring task and in the gating task, we can test directly the crucial claim underlying the cohort theory: that words are recognised in context before sufficient information could have accumulated to allow them to be recognised on that basis alone. The monitoring experiment provides estimates of on-line recognition time, and the gating experiment, presenting subjects with the monitoring target-words excised from their original contexts, provides estimates of the amount of purely sensory information needed for recognition. The analysis of the gating data is now in progress and will shortly be completed.

The long-term cooperative research project involving Marslen-Wilson and Tyler as well as Garrett and Schweikert (both from MIT) which was described in the last year's report continues.

Zwitserlood, in a project on the effects of contextual information on spoken word recognition, also made use of the gating paradigm. However, in this case, the target word was either presented in isolation (like in Marslen-Wilson's and Tyler's experiments) or it was embedded in either sentence pairs or short

single sentences. Using a speech editing program, it was possible to present the target words in a piecemeal fashion. Subjects listened to fragments of accumulating length. With each additional fragment, 50 msec of the word were added. Subjects had to write down the word they thought was being presented. Also, they had to indicate on a 7 point scale how confident they were about their response. 36 subjects were tested, 12 in each condition. The results of this experiment are not yet fully available, but preliminary analyses show an effect of context on the amount of stimulus information that is needed to identify a word.

A second experiment, still in progress, uses the sentence pairs of the gating experiment. The aim of this study is to investigate the processing events that take place as a spoken word is recognized. Specifically, it deals with the on-line activation of different word candidates early in the word. In this experiment, sentence pairs are presented auditorily to the subjects. The task is a cross-modal lexical decision task on visually presented associates of both the target word and another possible word candidate. The results of the gating experiment allow to establish a context-dependent recognition point for each target, in the lexical decision experiment the associates will be presented before and after this context-dependent recognition point.

Jarvella, in cooperation with Nelson (University of Florida), investigated the impact of pragmatic information on listeners' idenfication of words. In an initial study using masked speech, it was found that more perceptual errors of word identification occurred on focused constituents which were otherwise pragmatically plausible, than presupposed elements which were not otherwise plausible. In a second experiment, done without masking, it was shown that highly plausible sentence content tends to override a tendency for listeners to select the focused noun in an utterance as the progress response to a question.

2.2.2 Several projects were concerned with mental accessing of closed class items like prepositions, conjunctions, etc.:

Flores d"Arcais and Colombo (University of Padova) continued their project on the lexical access and the conceptional structure of Dutch prepositions. Based on a classic sorting procedure task, Colombo reconstructed the subjective structure of the different meanings and uses of ten Dutch prepositions for native speakers. A second set of experiments investigated the question whether all meanings and uses of prepositions - function words which are typically "poor" in semantic content - would become available as a result of presentation. The different experiments involved lexical decisions with a preposition as a prime and a synonym to one of the meanings as a target, decisions on semantic similarity, etc. It turned out that it is the most frequent use of the preposition which is more directly and easily accessed in the mental lexicon.

Kean in cooperation with Matthei (University of California, Irvine) started a project on the on-line processing effect of open and closed class items in specific linguistic structures. Preliminary results obtained from experiments with normal subjects indicate that in auditory sentence processing the distinction between open and closed class items is a function of structure rather than simply vocabulary class. Similar studies with aphasics are currently planned.

A set of further studies had to do with the process of semantic activation in lexical access. Jarvella in cooperation with Meijers investigated the perception of inflected spoken words. Several experiments were carried out, where listeners were asked to decide whether an inflected Dutch verb form, heard in a list of words, had the same stem or the same grammatical form as a verb heard before the list. It was found that subjects' decisions were slowed in verbs having grammatical or lexical prefixes. In general, decisions were also made more slowly on grammatical form than on words' root

morphemes. The results of this research suggest that listeners identify inflected words via their stems, and are consistent with a view of word perception including a premorphological analysis and/or comparison process with a form generated by rule or indirectly addressed in memory.

Flores d'Arcais - in cooperation with Schreuder and Glazenburg - attempted to assess and isolate the contribution of two separate components to priming, namely semantic information which is based on perceptual properties, such as information about color, form and other perceptual features of the objects to which a concept refers to, and knowledge-based conceptual information, which is inferred and not based on the perceptual experience with the objects, such as functional properties, etc. Several experiments were carried out using tetrads of word pairs such as banana-apple (conceptually related); ball-apple (perceptually related); cherry-apple (perceptually and conceptually related) and chair-apple (unrelated). In a lexical decision task the conceptual similarity had a significant and strong effect on decision latency, while perceptual similarity only had a smaller marginally significant facilitation effect. In word naming only perceptual similarity between prime and target had a significant facility effect on word naming latency. The results suggest that conceptual and perceptual aspects of word meaning constitute mutually independent components of the mental access to the lexicon. A further study by Flores d'Arcais and van de Waal, investigated the meaning of adverbs with different scope in different sentence positions. An adverb such as probably can be inserted in four different positions in the following sentence:

John will arrive in Amsterdam tommorow night by train
  (1)           (2)            (3)              (4)

What is the scope of the adverb in each of these positions? If the adverb, for example, is inserted in (2) does the speaker want to put some doubt about the coming of John, about the place, or also about

the time and the transportation means? This question and several others related to this have been investigated with a variety of tasks, such as several recall experiments, judgments of paraphrases, etc. While many of the experiments have not produced any clear indication as to the "psychological" scope of the adverb, some of the rating experiments have yielded interesting results congruent with the notion of the adverb as modifying in the first place the first constituent to the right and making a kind of "gradient" effect to the constituents further on to the right.

Schriefers started a dissertation project on the production and comprehension of unmarked and marked relative adjectives, addressing the question whether an advantage of the unmarked form previously found for the production and comprehension of comparatives (longer vs. shorter) can also be verified for the positive forms (long vs. short).

2.3 Text Comprehension

Vonk - in collaboration with Noordman and Kempff (Interfacultary Research Group for Language and Speech, University of Nijmegen) - continued her work on inferences in text comprehension. Previous research done by Vonk suggested that readers do not make inferences to the premisses of causal statements such as "Connors used Kevlar sails because he expected not much wind", where - given that Connors won the race - one can infer that Kevlar sails are advantageous when there is not much wind. The technique used to study inferences was to have subjects read a because sentence, in one condition preceded by the general premise and in the other condition not. The reading time of the because sentence was not significantly decreased by the preceding mentioning of the premise that had to be inferred.

However, the times to verify statements after reading the text indicated that subjects made the inference when they were required to do so by the task. In short, the results suggest that readers do not process a text as deeply as possible, but that they are satisfied with a more parsimoneous understanding. Several experiments were carried out to explore this hypothesis. One way to manipulate the processing of a text is to insert inconsistencies in the text and to instruct the readers to decide with respect to each sentence whether it is compatible with the text read so far. This manipulation indeed gave evidence for an inference process during reading: the reading time for the because sentence was shorter when the information to be inferred was explicitly stated before the because sentence. Another way to manipulate the processing of the text is to present the reader with questions before having them read the text. Subjects were instructed to read the text in such a way that they could answer the previously given question and explain the answer. There were two kinds of questions: those that were related to the because sentence and those that were not. Only when the question referred to the because sentence was there evidence for the inference process during reading. In order to test the hypothesis that the inferences are not made during normal reading, texts were constructed in which the information that was presupposed by the because sentence was denied by a preceding sentence in the text, e.g., Kevlar sails are advantageous in heavy weather. Subjects were instructed to read the text and to judge whether the texts were comprehensible so that they could be used in reading experiments for subjects of certain age groups. They had to indicate at which points a text could be improved. Only one third of the readers discovered the constructed inconsistencies. These results support the earlier finding that readers do not make these inferences in normal reading.

Glowalla (Marburg), in close cooperation with Vonk, studied the question how incoming text information has to be processed to produce a memory representation of the information in question. In particular, it was asked whether the processing time to connect the

present clause to already encoded clauses depends on the distance
between the former and the latter in terms of the surface as well as
the deep structure of a text. This question was investigated in the
eye viewing laboratory of the Institute, with much support from the
technical group (Klaas and Wittenburg).

Perfetti carried out several experiments with more and less
skilled readers, investigating the relation between top down and
bottom up processes in reading.

2.4  Word Order Universals

Hawkins completed a book on word order universals and their
explanation.  The book draws on a 350-language sample and defines
cross-language word order patterns using two types of language
universals:  implicational statements ('if a language has word order
P, then it also has word order Q');  and distributional universals
(predicting relative frequencies of language types). Explanatory
principles are proposed for these universals, some of them more
narrowly grammatical (involving e.g. rule complexity, or the
syntactic status of different constituents), others historical
(involving general principles of language change, leading to the
currently observed word orders).  Another explanatory factor is
claimed to be relative processing difficulty.  There is a clear
universal tendency for 'heavy' syntactic constituents to occur to the
right of their heads (e.g. sentential complements to the right of
the verb, relative clauses to the right of the noun).  Heavy
constituents to the left are argued to cause more difficulties for
clause boundary recognition, and for the processing of
argument-predicate and head-modifier relations.  The precise
interaction of such psycholinguistic principles with more narrowly

grammatical and typological principles is defined.

Hawkins and Dunlea devised a project entitled 'Explanation in
Universal Grammar', which will start in 1983 and will involve the
invitation of numerous distinguished guests to both the
Max-Planck-Institute and the Netherland Institute for Advanced Study
(Wassenaar). The goals of the project are: to identify the various
explanatory forces which underlie the increasingly extensive body of
language universals collected within linguistics, by drawing on
insights and ongoing research from both linguistics and
psycholinguistics; to try and formulate some explanatory principles
with precision, and define their mutual interaction; and to identify
and explain some universals of child language, i.e. cross-language
similarities in and constraints on first-language acquisition.

# 3. LANGUAGE ACQUISITION

Both, in the domain of first language acquisition and in the domain of second language acquisition, essentially previous work was continued; in the former, however, some new projects were taken up. There is a number of parallelities in both research domains, particularly with respect to problems of context dependency; but actual work is still rather independent. So, we will present research within both areas separately.

## 3.1 First Language Acquisition

The group's work in First Language Acquisition centered around four problem areas: lexical development (Deutsch), grammatical development (Bowerman), the development of discourse skills (Hickmann, Weissenborn), and the acquisition of real-time comprehension skills (Tyler, Friederici). Several new projects were designed and got started, whose theoretical background assumptions will be outlined here in some more detail.

3.1.1 In language acquisition the child has to learn how to link his or her growing repertoire of linguistic forms to corresponding distinctions in meaning and function. One can view this development either as a series of stages during which certain deficits appear and disappear until the final target stage - that of a well functioning adult - has been reached or as a process of changing organizations and reorganizational procedures of linguistic functioning. Deutsch, in cooperation with Budwig (Berkeley), explored the contributions of the latter framework to the development of one aspect of language development, namely the acquisition of possessives. His investigation of how the child comes to express the relationship between a possessor and a possessum focusses not on the child's deficiencies at any given stage, but rather on the child's own efforts to work out the relationship between possessive forms and their use in ongoing communication. The analysis is based on the written transcriptions from Roger Brown's longitudinal project on language development (Brown, 1973) in which the language development of three children was systematically recorded under natural conditions. Presumably all instances of possessive constructions that appeared in the transcripts of two children, called Adam and Eve, were extracted. The data cover an observational period of roughly 12 months starting when Adam was 25 months and Eve 18 months of age. The observational period was divided into four phases of equal length. The analysis is based on three transcripts of equal length in time for each phase and each child so that a direct comparison between the two children becomes feasible. The analysis of the data was restricted to the development of possessive constructions of the sort that express a relation between self as possessor and some possessum. In acquiring English, children express this relationship with either a pronominal or a nominal form, as, for instance, in "My pencil" or "Adam's pencil". The use of both types of forms requires different cognitive demands. The pronominal form can be considered as more difficult to produce than the nominal one, since the speaker has to take into account the distribution of the communicative roles between himself and the other participants. This difficulty is usually called the "Shifting Reference Problem" and leads to the expectation that children first apply their proper name for self-reference and replace it later by the pronominal form. The transition between the use of the two forms could take place in different ways. For example, there could either be a sudden change in which the nominal form completely drops out when the pronominal

form begins to appear or there could be a gradual change with a progressive increase in the use of the pronominal and a corresponding decrease of the nominal form. The results of Deutsch's study make clear that neither of these hypotheses account for the actual developmental relation between pronominal and nominal forms. In referring to themselves as possessor both children use the pronominal form (My pencil) as well as the nominal form (Adam's pencil) in the first three phases. It is only after a fairly long period of time, namely ten months, that the nominal form drops out. This implies that during the first three phases both forms are used simultaneously by both children.

Could it be possible that Adam and Eve employ the two forms for self as possessor in different functions during phases I - III, before they start using the pronominal form in a plurifunctional way in phase IV? Deutsch's answer to this question is based on a distinction between two functions, the constative and the volitional function. A possessive construction is used constatively when the speaker wants to indicate that the possessor is a sort of attribute of the object referred to; it is used volitionally when the speaker wants to request an object that s/he does not possess but would like to, to claim or maintain possession of an object s/he believes is his/her own. The results show that during phase I - III both children expressed the constative function of possessive constructions by using their own name when they referred to self as possessor. In contrast, they employed the pronominal form when the volitional function of requesting or maintaining possession of some possessum (often a toy) was involved. Thus, both children constructed a form-function relationship that does not exist in the target language they are acquiring, and they continued to use their own rational construction over a fairly long period of time in a systematic and predictable way. During phase IV the nominal form drops out and at the same time the pronominal form is no longer used exclusively for the volitional function. In sum, the results of the study suggest that the child is playing a constructive role by

breaking apart the notion of possession and starts with forms that are unifunctional and works toward a plurifunctional notion of how a possessive form can be used.

3.1.2 Bowerman is also working within a theoretical framework that conceives of language development as a continuum of reorganizational processes. Since joining the Max-Planck Staff in September, she has continued with her ongoing research into the causes of children's speech errors in the acquisition of their first language, and on the implications of these errors for the formulation of an adequate theory of language development. In earlier work on children's errors - defined as deviations from the conventions observed by speakers in the child's environment - Bowerman has documented the existence of a variety of error types that do not set in until considerably after the child appears to have mastered the forms in question. Some of these 'late' errors are best interpreted as overgeneralizations of relatively abstract patterns of correspondences between semantic categories and syntactic or morphological structures, while others appear to be word substitutions involving pairs of sets of words that are closely related semantically. The late onset of the errors, relative to the child's ability to use the words of construction patterns in question flexibly, productively, and correctly, suggests that an important component of language acquisition is a covert process involving the child's implicit comparison and analysis of items of his or her existing repertoire. More specifically, children appear to acquire much initial linguistic knowledge in a piecemeal fashion. They subsequently perform deeper analyses, coming to an implicit, i.e. unconcious, appreciation of abstract regularities and relationships that serve to integrate forms or sets of rules that have been learned and previously used independently of one another.

Bowerman has argued that implicit reorganizational processes of the types she has described have at least two important implications for the construction of a theory of language development. One concerns the child's "motivation" to make linguistic advances. Some

current theorists hypothesize that progress can be attributed to the child's efforts to improve on his or her ability to communicate. But the deepening of linguistic knowledge described in Bowerman's research cannot readily be accounted for in this way, since the processes do not result in communicative advances beyond what the child can already do, albeit on the basis of more fragmented and superficial knowledge. Instead, progress of this type appears to reflect a spontaneous tendency on the child's part to systematize linguistic knowledge, even where such systematization is not strictly necessary for fully adequate communication. A second implication concerns the role of meaning in language acquisition. Many theorists currently argue that the meanings expressed by language are acquired independently of the linguistic forms that encode them; acquisition is thus seen as a process of mapping from one representational system (nonlinguistic cognitive concepts) to another (language). Bowerman's analyses suggest that this one-sided view is simplistic. Many of the reorganizational processes she describes appear to involve the child's gradual construction of relatively abstract categories of meaning that maximally "fit" linguistic forms or operations that have already been acquired. In sum, an explanation of the child's construction of the formal system of his or her language cannot be bought by granting to the child for free, courtesy of nonlinguistic development, the semantic categories that the formal system encodes. Rather, the construction of the semantic system is as much a part of linguistic development as is the construction of the formal devices of the language.

One problem area, investigated by Bowerman on the basis of her past research, concerns the way in which children learn to coordinate selection of verb with appropriate morphological and syntactic choices. Many of children's errors appear to involve simultaneous selection of linguistic options that cannot, in adult language, be combined in the same sentence: e.g. selection of an inherently reversative verb and a reversative derivational prefix, as in How do I untake this off? (=take this off), and selection of a

syntactic arrangement for the noun arguments of a predicate that is not compatible with the requirements of the predicate, as in I have an idea but it won't approve to you and daddy (=you and daddy won't approve of it) and I'm gonna pour it with water, my belly (=pour water on my belly). Errors of this latter type are hypothesized to involve a conflict between the goal of selecting the semantically most appropriate predicate and the pragmatic goal of manipulating syntactic structure so as to achieve the right foregrounding/backgrounding effect for the discourse context. Experimental tasks are currently being planned to "encourage" such conflicts in order to establish when children begin to be responsive to multiple, possibly competing communicative goals and to determine how they resolve potential conflicts. It is hypothesized that a gradual developmental shift will be found from a period in which syntactic structure follows as a relative automatic consequence of choice of predicate to a more mature stage in which the desired syntactic framework is first established and a predicate that harmonizes with this framework is then selected.

3.1.3 Several projects on discourse cohesion, referentiality and, deixis described in the previous year report were further pursued.

Karmiloff-Smith continued her work on the development of cognitive and linguistic skills underlying the production and comprehension of cohesive discourse. Her research concentrated mainly on an in-depth comparison between linguistic processes of cohesion and children's cognitive processes in explaining principles of physics. Carrying out a reanalysis of two earlier studies, one of children's cohesive devices in narrative production and the other of the way in which children solve problems involving the Torques Principle, many analogies were found between the subtle interplay of bottom-up and top-down processes across development. These findings suggest that it is only by comparing the underlying processes of development, rather than the structure and content of developmental progress, that valid comparisons between linguistic and nonlinguistic

cognition can be made.

Hickmann investigated the development of narrative skills, pursuing earlier research in which she showed differences among 4 to 10 year-old children's production of various linguistic devices in cohesive discourse. She designed a series of studies to investigate whether young children are sensitive to various types and degrees of "disruptions" in the cohesion of narratives presented to them. A first pilot study involved reading children stories in which a sequence of coreferential expressions across clauses could take a number of disrupted forms. For example, in the following sentences, embedded in a story: "... he saw a beachball ... it would be fun to sit on the beachball ... he rested on top of it ...", the sequence a beachball/the beachball/it could be disrupted to the beachball/it/a beachball. English-speaking children of 7 and 10 years were asked to perform three possible tasks: 1) to retell the stories to a "naive" listener, 2) to judge their well-formedness by interrupting the adult's reading as soon as they spotted a problem and explaining what was wrong, 3) to repeat the last utterance read when the experimenter gave a signal to do so at various points during the story. Preliminary results indicate that both 7 and 10 year-olds, "repair" such "local" disruptions very effectively when retelling stories, even though most of them can reproduce at least some of the disrupted elements accurately during the repeating task. However, only the 10 year-olds seem able to spot and explain them during the metalinguistic judgement task. These results seem to show that, at least in these situations, 7 year-olds are able to reconstruct the local referential coherence when comprehending a text, even when it is highly disrupted, although they are not aware of their own processes in doing so, and although they do not always spontaneously produce such local connections in their own speech. Further studies will determine: 1) whether 4 year-olds perform in the same way, 2) whether other aspects of the text such as the animacy and topical status of referential expressions have an effect on children's reconstruction and/or judgement processes (as they do

in production), and 3) whether, and under what conditions, there might be interactions between such local disruptions and more "global" ones, by systematically manipulating the local cohesion of stories and/or the structural properties of their content, as defined for example by "story-grammars".

Continuing his research on the ontogenesis of communicative competence and spatial reference Weissenborn's work focussed on the development of children's ability to establish verbally, in an interactive setting, a frame of reference for spatial information. The setting consisted in a communication game between pairs of children, 7 to 14 years old, and adults. The game consisted in the description of a path through a miniature town given by one participant to the other. The participants were separated by an opaque screen. The analysis of a certain number of parameters that are central for the realization of a coherent referential context as the prevailing perspective (deictic or intrinsic), homogeneity of the perspective, perspective awareness, etc. yielded the following results: on the cognitive level the development goes from contradictory, context-dependent local reference frames that are very unstable (field dependency) to systematic integration of different context-independent reference frames, which is monitored by perspective awareness (field independence). The change in the perception of the spatial array can be characterized as an exchange between figure and ground: whereas the youngest children focus on the elements occupying their perceptual space (figure) while the abstract pattern delimited by these elements (ground) is largely ignored, later on these concrete elements fade away and the abstract pattern of paths is perceived. On the interactive level there is a change from dysfunctional interaction to metacommunicative agreement. The spatial expressions develop from great restrictedness and non-observation of conversational implications (necessity to specify the perspective for items like 'left'/'right' - 'in front of'/'behind') to the negotiation of rules of use.

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3.1.4 The acquisition of skill in real-time comprehension of spoken language was studied by Tyler and by Friederici. One strand of Tyler's research is concerned with the issue whether there are developmental changes in the use of sensory information to recognize words, both in and out of context. This question was investigated by use of the 'gating' paradigm in which successive increments of a word are presented to a subject and he/she is asked to name the word. At present, only the data from the words-in-isolation-part of the study are available. These data show that there is a clear developmental progression in the amount of sensory input needed for correct word identification, with younger children needing to hear more of the sensory input than older children and adults. The later phases of this research will examine the interaction of sensory input and contextual constraints in word recognition processes.

Friederici investigated the development of lexical and structural information processing during sentence perception in children. A word monitoring task was designed, where subjects were requested to listen to targets from different word classes (open and closed) and different word categories (lexical and obligatory prepositions) under varying context conditions (semantically related and unrelated). The pattern of performance of German children between the age of 5 and 10 years differed with respect to word class and context, 5 year olds responded slower to closed class than to open class items; and they failed to react more often to closed than to open class items independent of the contextual constraints. Seven year olds demonstrated a reaction time pattern which is already similar to that of normal adults, that is, they reacted equally fast to members of the two classes. The error analysis, however, revealed that 7 year olds only successfully recognized the closed class items in a semantically related context, they failed to monitor these items more often when they were preceded by a semantically unrelated context. This pattern of performance can still be seen with the 9 year olds. And it is only by the age of 10 years that closed class items are treated equally in both context conditions. The results

suggest that younger children do not seem to use closed class items to construct a structural frame as they listen to a sentence, but rather focus on a sensible representation of meaning. By the age of 7 years they seem to be able to draw their attention to structural information as long as meaningfulness survives; when the meaning is less straightforward they focus even more on semantic cues. Structural information is not processed automatically, i.e. in all context conditions. And by the age of 10 years children are still on their way to the behavior of normal adults who rely on structural information even more heavily when semantic interpretation is less obvious. One implication of these findings is, that language development not only involves acquiring different knowledge sources but also accessing them efficiently. The automatic use of syntactic information in sentence perception seems to be one of the capacities which is acquired rather late in development.

Bamberg pursued his dissertation project on the use of temporal adverbs, tense and aspect in children's story production.

3.2 Second Language Acquisition

3.2.1 The cross-linguistic research project on second language acquisition by adult immigrants sets out to describe from or near its onset, the process of spontaneous second language acquisition of a group of forty adult immigrants spread over five European countries (England, Federal Republic of Germany, France, Netherlands, Sweden), and to isolate the various factors which determine the structural properties and tempo of this process. Four major domains are studied: understandings and misunderstandings in linguistic interactions; the thematic structure of the learners' utterances; their different ways of referring to persons, place and time;

semantic processes in their developing vocabulary. The study is cross-linguistic, with ten different source language(SL)/target language(TL) pairs, and longitudinal, involving regular monthly interviews with informants, and participants observations of their social environment. It will be completed by smaller, cross-sectional studies of a control group, groups of long resident immigrants and groups of native speakers. A longer description of the objectives and organization of this project appeared in the Annual Report 1981. Its Field Manual, edited by Perdue, and published by the European Science Foundation (ESF) appeared in July, 1982.

During 1982, the project's pilot year was completed, culminating in a 'training week' organized in Nijmegen for the research teams of the five participating countries. During this week, final agreement was reached on the criteria for informant selection, and the final specification of the data collection methods to be used, and of transcription conventions, was made in the light of the pilot studies conducted at the universities of Göteborg (SL Finnish, TL Swedish), Heidelberg (SL Turkish, TL German) and Paris VIII (SL Spanish, TL French). These decisions, together with a complete description of the major areas of research mentioned above, and a review of relevant previous research undertaken in the participating countries, are included in the project's Field Manual.

Informants for the project itself have been contacted and selected and, despite some initial difficulties, regular data collection is now under way in five countries.

3.2.2 Klein's studies on tense and von Stutterheim's studies on temporality have been worked out in cooperation and strong connection with the ESF project. In a longer study on untutored second language acquisition, Klein tried to pin down some of the principles which govern the formation and internal systematicity of early learner varieties. One aspect of this study concerns the role of "tensedness". In German, as in many other languages, sentence

structure is closely linked to the position of the tensed verb. Now, a tensed verb is comprised of two components: the "finite" component (FIN), which is moveable and carries tense, modality, etc., and the infinite component (INF), which carries the lexical content and whose position is rather stable. The two may be separated (... hat ... gesehen) or merged (sah); in the latter case, INF leaves the normal INF-position and goes with FIN. Utterances in early learner varieties are not tensed; if they contain a verb at all, it is in an infinitive-like neutral form. The acquisition of FIN marks an important step in the learner's possibilities to organize his utterances (including the possibility to make additional mistakes, e.g. by incorrect transfer). It appears that the development of some often studied structural features, such as negation, is a mere epiphenomenon of FIN-acquisition. Thus, most results of studies on negation acquisition in German, English and Swedish may be subsumed under two simple principles. In these languages, sentence negation is normally placed before the INF-position (which is also the position of predicates and which, in the case of F + INF-merging, is empty):

1. As long as the learner has only infinite constructions, he puts the negation into the correct position.
2. As soon as he acquires FIN, he may get into trouble, especially when FIN and INF merge: he does not know whether the stable INF-position as such counts or the new placement of INF, that is, the FIN-position. After a while, he realizes that the former alternative is correct.

In languages such as Spanish, the sentence negation is usually placed before FIN (rather than before INF). There is no reason to assume that this confuses the learner so long as he has not learned what FIN in the target language is. But it clearly may contribute to his trouble in stage 2 and prolongate this stage.

This straightforward picture is somewhat blurred by phenomena such as contextual ellipsis (e.g. after questions) or constituent negation (as opposed to sentence negation). But apart from that, it seems to cover all known facts on negation acquisition.

Pursuing her dissertation project on the expression of temporality and modality in the German of Turkish immigrant workers, von Stutterheim developed a theoretical framework for the analysis of her data which is based on the assumption that adult second language acquisition is essentially determined by cognitive concepts and processes. In this framework, a particular concept and its subcategories are taken as the starting point for analyzing and systematizing references to time and mode as they occur in the data. This approach makes it possible to analyze different types of linguistic devices in view of the meaning and communicative functions they have in common. Basically, two kinds of reference to a given concept can be distinguished, lexical and morphosyntactic devices on the one hand and pragmatic devices on the other.

Compiling the explicit linguistic devices for temporal reference of the 18 informants in a table, a rather homogeneous picture arose; it corroborates the hypothesis that the concepts determine to a large extent the learning process, which can be regarded as a selecting process, where the learner chooses particular items and forms from the huge amount of input according to criteria of communicative salience. All informants dispose of the same repertoire of temporal adverbs, which cover very general temporal categories: 'speech time reference' (jetzt), 'following in time' (dann), 'duration' (immer), 'repetition' (wieder). Besides the deictic temporal markers, the absolute calendar system plays a important role for establishing points of reference especially in very restricted varieties. The next step still remaining on the level of adverbial marking involves the expression of two more concepts: 'preceding in time' (vorher, erstmal), and the distinction between general sequencing (dann) and explicit temporal sequencing (nachher). In more advanced varieties,

the first tense forms (past participle) appear. They are introduced as rote forms in particular frozen contexts, not yet available for systematic tense marking. The following step seems to involve rule formation for past time reference (aux + past participle), whereby the form might still be idiosyncratic.

Analyzing larger pieces of discourse with respect to their temporal structure, von Stutterheim found the following pragmatic devices, which, depending on the degree of proficiency of the speaker, were of different importance for successful communication: 'implicit reference' on the basis of contextual knowledge shared by the participants of a conversation; 'order-of-mention principle': events are reported in the same order in which they actually occurred; 'framing': a reference point has to be maintained over a large number of reported events; 'contrasting' of two referential domains; 'reduction of temporal embedding'.

# 4. LANGUAGE DISORDERS

In January 1982 the ZWO-project on "aphasia in adults" started; the details of the project, its affiliations with institutes of Nijmegen University and the staff have been described in the Annual Report 1981. Besides the research activities within the framework of the project other research on aphasia has also been going on at the Institute. Although the following report will be organized according to whether the research is or is not directly related with the project, it should be stressed that all research on aphasia at the institute is thematically, as well as with respect to the co-workers involved, closely interconnected so that the separate presentation of the project and of the other language disorder research is somewhat arbitrary.

## 4.1 The ZWO-project

Two preliminary remarks should be made. Firstly, the size of the present project makes it impossible to review each of the major studies in the framework of the present report. The following, therefore, is a selection. Secondly, the general policy in testing (English, German, Dutch) patients is to ask for their repeated collaboration in different experiments. The aim is to build up a detailed profile of each patient, as well as obtaining group data.

4.1.1 One of the core themes of the project is whether the comprehension deficits in Broca's and Wernicke's aphasia can be attributed to the same underlying deficit or should rather be located at different processing levels in the language system. This question was addressed by Friederici in a real-time experiment (word monitoring) which varied context (semantically relevant and semantically neutral) and word class (open class and closed class) as well as different word categories within the closed class (lexical prepositions and obligatory prepositions). As reported before (see Annual Report 1981) experiments with agrammatics had suggested that these patients are not able to use closed class items as to construct a syntactic representation - unlike normals they responded slower to those items which carry syntactic information than those carrying lexical information. Their ability to process semantic information was not deviant from normal behavior. Wernicke's aphasics, however, - although their overall monitoring times were slower than for normals - showed a reaction time patterns similar to normal controls. It appears that Wernicke's aphasics are able to initially process syntactic as well as semantic information - as they perceive it - but are not able to integrate this information at a higher level of representation where interpretation takes place.

Two other ongoing experiments - designed by Tyler and done with both Dutch and English aphasic patients, in cooperation with Eling - are also of the real time type and devoted to a question very much related to that of Friederici's experiment. Both experiments use also the word monitoring task: patients are presented with two connected sentences and have to monitor for a given word in the second sentence. One experiment looks at the global effects of syntactic and semantic structure on word recognition, whereas the other looks at local effects. A very preliminary analysis of the data from the latter experiment indicates that there is a clear dissociation between agrammatic and non-agrammatic Broca aphasics in their use of syntactic sub-categorization constraints during real-time comprehension. Non-agrammatic Brocas appear to behave like

normals when faced with a violation of sub-categorization constraints - i.e. their processing of the speech input is slowed down. Agrammatic Brocas, on the other hand, are much less disturbed by such violations, indicating that they are not taking as much advantage of this sort of syntactic information when processing a spoken sentence.

Another experiment designed by Tyler uses an auditory lexical decision task to determine whether patients, like normals, make optimal use of the sensory input in recognizing spoken words. That is, Marslen-Wilson has shown that normal adults recognize a word at that point, going "from left to right", where the word in question diverges from all the other words in the language beginning with the same acoustic-phonetic input. The question is whether aphasic patients show the same optimal performance, or whether, for some patients at least, their language deficit can be explained as a breakdown at this level of analysis of speech input. This experiment is in progress.

A further study, also dealing with the agrammatics' supposed inability to process grammatical structure in comprehension, is of the off-line or time-unrestricted type. Friederici and Kolk (Nijmegen University) designed an experiment which investigated different prepositional forms in various functional roles. A cross-linguistic comparison between Dutch and German allowed them to compare lexical and non-lexical prepositional forms in the two languages (lexical versus obligatory preposition), to compare the same function assigned by different forms (case is marked by preposition in Dutch but by inflection in German), and to compare different word order in German and Dutch (topicalized versus non-topicalized). The variable of semantic constraints was introduced by using semantically reversible and irreversible sentences.

Eight German and eight Dutch agrammatics participated in this study. All patients mastered the semantically irreversible sentences very well; performance, however, dropped dramatically when reliance on semantic cues was not possible. German and Dutch patients showed a very similar pattern of performance for the non-topicalized (reversible) sentences, though the sensitivity for case marking is somewhat better for Dutch than for German patients. This is probably due to the higher saliency of case marking in Dutch (by preposition) than in German (by inflection) in the materials used. The results from the experiment show that agrammatics are not totally insensitive to syntactic and morphological cues, there ability to use these cues to build a structural representation, however, is severely impaired. This impairment is compensated by the use of various context-dependent strategies, which can be regarded as forms of adaptation to the impairment. It is, in fact, a recurring theme in the project to distinguish between direct effects of the impairment, and indirect effects which result from a patient's more or less idiosyncratic solutions to the problem of circumventing trouble in language use.

4.1.2 The second core theme of the project is whether pragmatic abilities are preserved in aphasics - a question which was addressed in the project-proposal sub verbo "information distribution": is the distribution of "given" and "new" or "topic" and "comment" still regular in aphasic speech despite the potentially severe formal deficiencies of their speech? Extensive pilot work done by Heeschen and Hagoort showed that tasks of a "question-answering" type were most sensitive to this type of variable. In a first experiment patients were presented pictures depicting an action involving an agent and a patient - either animate or inanimate. Then the experimenter asked a question varying along two dimensions: (1) either the agent or the patient is asked for, (2) the form of the question was so that - per evidence from normal controls - either an active or a passive sentence is required as an appropriate answer. The experiment was planned for Dutch and German subjects, and

completed for the Dutch patients. It should be noted that in both languages the passive can be used for topicalization, but that only German offers, besides the passive, the possibility to make a topicalized sentence with subject-object inversion in the answer (e.g. the picture shows a girl hitting a boy. The question "what happens with the girl?" can be answered in German with "Den tritt das Mädchen" [topicalized construction]. The question "what is done with the boy", however, must be answered with a passive "Der wird vom Mädchen getreten".)

With respect to aphasic patients the interesting question is: how do they solve the conflict between the conversational demand to begin the answer with the person/object asked for and the syntactic demands to give the answer in a form that very often exceeds their syntactic abilities. The preliminary results are highly interesting: the patients fulfill the conversational demand (they typically tell something about the boy and also begin their answer with an expression referring to the boy), but if they are unable to fulfill the syntactic requirements then they use all kinds of avoidance strategies. So, the patients do topicalize the pragmatically induced element, but this does not help to trigger the correct syntactic form.

Another expression of information structure can be found in the prosody of aphasic speech. Wittenburg and Eling asked Wernicke patients and a comparison group of normals to read, or to repeat sentences, and other utterances were collected in a picture description task. The materials are being analyzed with respect to the global and local course of F0. The first impression is that Wernicke's neutral (non-focussed) patterns for NPs and PPs are normal, but that problems arise with focussing, and with the shaping of larger size units.

4.1.3 A basic issue in aphasia research, and also in the present ZWO-project is the question as to whether specific deficits are due to the loss or impairment of specific functional systems or to the interaction of intact systems in the face of damage. Kean's research, which began in autumn, addressed the issue of factoring out those components of aphasic deficits which can be attributed to unimpaired functional systems to the end of more closely delimiting the domain of data which psycholinguistic theory must be responsible to. Particular attention is being focussed on the functional neuroanatomy of the medial temporal region, on the one hand, and on verbal learning and memory in aphasia, on the other.

4.2 Other Research On Aphasia

4.2.1 Heeschen compared the spontaneous speech of paragrammatic patients to their speech elicited in a very constrained picture description task. The pictures to be described by the patients were drawn in such a manner that the patients were more or less forced to use certain morphosyntactic devices, in particular inflected articles and inflected verb forms. A comparison of these experimentally elicited utterances with the utterances in spontaneous speech revealed that agrammatic patients omitted approximately 50% of the obligatory closed class elements in their spontaneous speech, in the experimental utterances, however, only 20%. The crucial point is that this gain of 30% consists exclusively of incorrect or incorrectly used elements, thus giving the impression that the patients "knew" in advance with which class of elements they would have trouble and, in consequence, avoided these elements in their spontaneous behaviour. Note that this hypothesis is related to the "adaptation" theory recently developed by Kolk (Nijmegen University): the patient does not avoid the use of certain elements in any direct

fashion, but rather by constructing simple "telegraphic" messages whose formulation is less likely to require the troublesome linguistic elements.

4.2.2 The work on aphasics' ability to describe spatial networks (by Heeschen and Blomert, cf. Annual Report 1981) developed into a study of the production and comprehension of descriptions related to very simple spatial patterns: rows of three colored dots. The three dots in the row could have different colors (X-Y-Z), or the first and the last dot could be of the same color (X-Y-X). In the production task subjects were asked to describe such patterns, whereas in the comprehension task they were to listen to a description and to "build" the corresponding pattern by laying a row of three colored chips. In the latter task the intended row was again either of the ("structured") X-Y-X type, or of the ("unstructured") X-Y-Z type. The additional variable was whether the description was syntactically complex (e.g. "place Y between two X's") or syntactically simple (e.g. "place an X, a Y, and an X), and mutatis mutandis for the X-Y-Z patterns. The results show that the paragrammatic and especially the agrammatic patients tested perform far better in the comprehension task when the syntax "matches" the pattern, i.e. complex syntax for "structured" patterns and simple syntax for "unstructured" patterns. These patients, apparently do appreciate the congruency between a description and a pattern, i.e. they have not lost their sensitivity for a "motivated" syntax, this in spite of the fact that they have great linguistic trouble in producing congruent descriptions in the production task.

4.2.3 Some work on "automatic" speech in aphasia was conducted by Dronkers (Berkeley) during her short stay at the institute. Her data show that patients treat certain residual utterances as unanalyzed linguistic units; they are not aware of the constituent parts of such phrases. In a cooperative project with Heeschen the work is now being extended to smaller size units, viz., the patients' awareness of bound morphemes.

4.2.4 Last but not least, a promising new development should be mentioned. In the course of the year cooperation was established with the Max-Planck-Institute for Neurological Research, Cologne (Prof. W.-D. Heiss). The institute specializes in the study of cerebral blood flow, and has the facilities to study post-stroke blood flow patterns by means of a variety of techniques, among them positron emission tomography. It will, on a small scale, be possible to study relations between metabolic disorders in the brain and concomitant psycholinguistic disorder in aphasic patients. For this purpose our aphasia group will regularly test potentially relevant cases in Cologne.

# 5. OTHER ACTIVITIES 1982

5.1 Activities of the Technical Group.

As in previous years, the institute's technical group concentrated mainly on topics such as automatic speech processing, processing of gesture, eye-movement signals, and special experimental software and electronics.

The speech editor has been extended and refined, i.e. the interface has been upgraded and additional functions like "expand" or "compress" speech, automatic taperecorder control, automatic pulse setting and other special purpose functions for gating experiments have been implemented. The work on the speech editor is now completed.

The eye-movement software has been extended by a flexible and powerful stimuli preparation, presentation and experiment control program package. A structurally compatible analysis package has almost been completed.

In the field of gesture analysis, different types of digital filters have been applied to noisy signals produced by the equipment. A comparison has been made between a smoother, based on optimal Fourier-Series approximation, and different FIR-filters, and these have been made available to the research groups. Both techniques can also be used as differentiating filters to calculate first and second derivatives of the trajectories.

For the analysis of natural language network descriptions (Levelt), the group developed a flexible and powerful syntax-driven software package which allows a wide range of special retrieval operations. The Technical Group also coordinates the computational aspects of the ESF second language project. The final version of the

Field Manual for data Processing Aspects has been completed.

A new group experiment design has been realized which allows up to 8 subjects working in parallel, full experimental control by the experimenter, and video-based stimulus presentation. Here the group found a satisfying solution to the problem of controlling the presentation timing with the high accuracy (< 1 msec) necessary for various experiments.

Furthermore, the group provided a set of low-cost stand-alone units for running experiments in the field and another, modified, -processor-based pulse setter which is even more comfortable for the user than the previous version. This work has been carried out in cooperation with the Hogere Technische School (HTS) in 's-Hertogenbosch.

In addition, much effort has gone into integrating the institute's new VAX 11/750 computer system into the general data processing concept. Several statistic packages have already been implemented on the VAX. Word processing tools are also available and supported. All other (experimental) computers will be connected to the VAX via appropriate and efficient links allowing at least file transfers. A high speed link to the PDP 11/55 has already been installed. This work will be finished in 1983. Two operating systems, VMS (DEC-standard) and UNIX (Bell-Labs) are available on the VAX.

FRANZ LISP, a dialect of LISP, the programming language most widely used in artificial intelligence research, was installed on the VAX computer with the help of A. Jameson and E. Hoenkamp of the University of Nijmegen. An interpreter for Augmented Trasition Networks, designed so as to be usable by persons with only minimal familiarity with computers, was made available within the LISP system, as were several miniature versions of programs developed by Schank's artificial intelligence group at Yale University.

These facilities were used in a 10-week introductory course on LISP and natural language artificial intelligence programming offered at the Institute by Jameson with the assistance of Hoenkamp. The course participants, who numbered about 15 on the average, came from

several different sectors of the institute.

5.2 Annual Conference

An interdisciplinary discussion meeting, on the topic "Constraints on modelling real-time language processes", was organised by members of the comprehension group (Tyler, Marslen-Wilson), with the collaboration of D. Swinney (Tufts University) and M. Silverstein (University of Chicago). The meeting took place in Port Camargue, France, from June 21st-26th, and involved 29 participants. These included, apart from the organizers, Hawkins, Karmiloff-Smith, Klein, and Levelt from the Institute, D'Arcais (Leiden and MPI), Block, J.A. Fodor, and Garrett (MIT), H. Clark (Stanford), J.D. Fodor (U. Connecticut, Storrs), Forster (Monash), Hobbs (SRI), Kean (UC Irvine), Matthew (Rutgers), Mehler (CNRS), Noordman (K.U.Nijmegen), Pylyshyn (London,Ont.), Ratcliffe and McKoon (Yale), Schiffer (USC), Silverstein and McNeill (Chicago), B, Smith (Xerox PARC), E. Smith (BBN), Steedman (Warwick), Swinney (Tufts), Thompson (Edinburgh), Wilks (Essex). The funding for the meeting was provided by the Max-Planck-Institute, the American National Science Foundation, and the Center for Psychosocial Studies in Chicago.

The purpose of the meeting was to provide a forum for a genuine interdisciplinary discussion of the problems involved in modelling the language processes that take place as humans produce and comprehend natural language, with a special emphasis on real-time language processing. The assumption underlying the interdisciplinary nature of the conference was the belief that while these problems are of most immediate concern to experimental psycholinguists, there are important theoretical and methodological considerations, deriving from developments in philosophy, linguistics, cognitive psychology, and artificial intelligence, which place strong constraints on the development of psychological models of language use.

Within this general framework, discussion was directed in particular at the following issues: What types of mental

representation develop during and as a result of language processing, and how are these representations to be characterised -- what forms of structural descriptions do they presuppose, and what distinct forms of mental knowledge do they include? Given some set of assumptions about mental representations in language processing, what types of computational procedures operate over these representations and what general picture can be developed of the organisation of the language system as a whole? Finally, and most central to the concerns of the meeting, what types of evidence and what types of research are relevant to the conceptualisation and investigation of these issues?

The day-by-day organisation of the meeting was structured to allow the maximum possibilities for free but informed discussion. To this end, five main papers were prepared, which approached the main themes of the meeting from the perspective of each of the five main disciplines represented among the participants. These papers were circulated in advance, and, in addition, a number of short formal discussion papers, based on these main papers, were also prepared in advance, and pre-circulated as far as was possible. Thus, of the 6 hours the meeting was in session each day, less than half was taken up by formal presentations, and the rest of the sessions were given over to generally very animated discussion.

For Day One, Hawkins presented a position paper from the linguistic perspective, while the principal discussants were J.D. Fodor, Ratcliffe, Silverstein, Hobbs, and Garrett. For Day Two, the main paper, from an experimental psycholinguistic perspective, was by Tyler and Marslen-Wilson, with Forster, J.A. Fodor, Steedman, and Noordman as the discussants. For Day Three, philosophy, the main paper was prepared by Matthews, and the discussants were H. Clark, Block, Schiffer, McNeill, and Klein. On Day Four, cognitive psychology, the main paper was prepared by Swinney and E. Smith, and the discussants were D'Arcais, Mehler, Pylyshyn, McKoon, and Thompson. Finally, on Day Five, B. Smith presented a paper from an artificial intelligence perspective, commented on by Levelt, Karmiloff-Smith, and Wilks.

## 5.3 ZWO/Max-Planck Project on Descriptive Language

The year 1982 saw the completion of two of the four subprojects in the special ZWO/Max-Planck project on "Descriptive Language", which is jointly carried out by the Institute for Perception Research in Eindhoven, the Interfaculty Research Unit for Language and Speech of Nijmegen University, and the Institute. Among them was the subproject on Child Language by Deutsch and Pechmann in the Institute.

## 5.4 Working Groups

A working group on problems of Dutch linguistics has been set up by Bach, with local participants from the Institute as well as from the University of Nijmegen and the University of Tilburg.

A four-session seminar on the role of artificial intelligence in the study of natural languages was organized at the institute by Jameson and Wittenburg. The following scientists from other institutions participated in the first session, a panel discussion: H. Bunt, Institute of Perception Research; P. Hellwig, University of Heidelberg; and G. Kempen, University of Nijmegen. In the other three sessions, which included talks by Kempen and by Jameson, artificial intelligence models of several specific aspects of natural language processing were presented and discussed.

## 5.5 The Institute on Television

A TV-film on Psycholinguistics was produced at the Institute. It illustrates different areas of interest (among them deictic reference, word monitoring, mother-child communication, untutored second language acquisition, and aphasic speech) as well as different research paradigms (such as eye view monitoring, speech shadowing, computer simulated speech processing). The film was broadcasted (early 1983) as part of the Scientific Program of the Bayrische Rundfunk and will also be transmitted by other German companies.

## 5.6 Teaching

The institute's staff taught courses of varying duration at the following universities: Free University of Berlin (Bamberg, Stutterheim, Weissenborn); Technical University of Berlin (Weissenborn); University of California Irvine (Kean); University of Fankfurt and University of Heidelberg (Klein); University of Mannheim (Deutsch); University of Münster (Friederici); University of Nijmegen (Eling, Vonk); University of Sussex (Hickmann, Karmiloff-Smith, Klein).

## 5.7 Lectures and Colloquia

The institute organized colloquia and lectures which were given by the following scholars:
H. Altmann, P. Bertelson, D. Brazil, P. Carpenter, G. Dell, R. Denny, A. Dunlea, W. Edmondson, S. Fischer, P. Fletcher, M. Flynn, U. Glowalla, M. Gross, J. Hawkins, M. Just, E. Keller, S.-Y. Kuroda, E. Lang, J. Mehler, A. Merin, D. Metzing, E. Ochs, C. Perfetti, M. Pienemann, S. Romaine, T. Sanford, J. Schachter I. Schlesinger, P. Schönle, M. Schatz, M. Steedman, R. Wales.

## 5.7 Papers Presented.

The following papers were read elsewhere by the Institute's staff and fellows:
- E. Bach, "Generalized categorial grammars", Annual Conference on Formal Semantics, Amsterdam, September.
- "Generalized categorial grammars", University of Tilburg, October.
- "Generalized categorial grammars", University of Groningen, November.
- "Semi-compositionaliteit", University of Amsterdam, December.
- M. Bamberg, "Metaphoric processes in the language acquisition process", University of Oslo, April.
- "Metaphors as 'framing devices': Relating linguistic and

cognitive processes in 3-year-olds", 17th Linguistic Colloquium, Brussels, September.

W. Deutsch, "Die Entwicklung referentieller Fähigkeiten", Sprachwissenschaftliches Kolloquium, University of Düsseldorf, June.

- "Language control processes in development", tutorial paper, 10th International Symposium on Attention and Performance, Venlo, July.

- "Theorien des Spracherwerbs", 33. Kongreß der Deutschen Gesellschaft für Psychologie, Mainz, September.

- "Language acquisition", Nederlands Instituut van Psychologen, Utrecht, October.

W. Deutsch and K.F. Braun, "Can children be more innovative than adults?", 4th International Conference on Psychological Development, Learning and Personality, Prague, July.

W. Deutsch and J. Koster, "Children's interpretation of sentence-internal anaphora", 13th Annual Child Language Research Forum, Stanford University, March.

V. Ehrich, "The linguistic encoding of causal events", 8th Annual Meeting of the Berkeley Linguistic Society, Berkeley, February.

- "Discourse organization and sentence form in child language", 13th Annual Child Language Research Forum, Stanford University, March.

P. Eling, "Problemen met het meten van lateraliteit", Symposium of the Working Groups of 'Funktiestoornissen' and 'Prestatieleer' of the Dutch Psychonomic Society on Laterality, Nijmegen, January.

- "Measures of laterality in adults", 4th European Conference of the International Neuropsychology Society, Deauville, June.

- "Temporal order perception and lateralization in dyslexic children", Nato Institute 'Dyslexia: a global issue', Maretea, October.

S. Fischer, "The expression of causation in American Sign Language", University of Amsterdam, March.

- "Psycholinguistics and Neurolinguistics of sign Language", Free University of Brussels, March.

G.B. Flores d'Arcais, "The acquisition of semantic knowledge: The connectives", 13th International Congress of Linguistics, Tokyo,

August-September.

- "Components of priming effects in word and object recognition", 1st Congress of the Experimental Division of the Italian Psychological Association, Pavia, September-October.

- "The organization and financing of psychonomic research in the Netherlands", 1st Congress of the Experimental Division of the Italian Psychological Association, Pavia, September-October.

- "Lexical knowledge and word recognition: Children's reading of function words", International Symposium on Reading, Padova, December.

G.B. Flores d'Arcais and L. Colombo, "Lexical access of Dutch prepositions", 1st Congress of the Experimental Division of the Italian Psychological Association, Pavia, September-October.

G.B. Flores d'Arcais, R. Schreuder and G. Glazenborg, "Perzeptuelle und Konzeptuelle Faktoren beim Erkennen von Worten und Objekten", 15. Treffen der Gruppe Gedächtnispsychologie, Konstanz, October.

M. Flynn, "Montague syntax", University of Tilburg, October.

A.D. Friederici, "Effects of word class and context upon the on-line comprehension of agrammatic and normal speakers", 2nd Meeting of Aphasiologists and Psycholinguists, CNR, Rome, January.

- "Semantische und phonologisch-syntaktische Aspekte lexikalischer Repräsentation", 4th Annual Meeting of the Deutsche Gesellschaft für Sprachwissenschaft, Köln, March.

- "On-line comprehension in agrammatic patients", 4th European Conference of the International Neurpsychology Society, Deauville, June.

- "Classe de mots spécifiques et accès au lexique: mise en évidence par l'usage du langage chez les sujets aphasiques et normaux", Journée d'Etude "Accès au lexique", Paris, September.

- "Aphasics' recognition of words in sentences: real time differences in Broca's and Wernicke's patients", 20th Meeting of the Academy of Aphasia, Lake Mohonk, New Paltz, N.Y., October.

- "The contribution of Arnold Pick to psycholinguistics and aphasia", University of Nijmegen, November.

A. Fuchs and H. Schriefers, "Wo wird 'schnell' schneller verarbeitet

als 'langsam'? Zur Lokalisierung des Effektes semantischer Markiertheit im Verarbeitungsprozeß", 24. Tagung experimentell arbeitender Psychologen, University of Trier, April.

U. Glowalla, "Das Verstehen und Behalten von Texten", 33. Kongreß der Deutschen Gesellschaft für Psychologie, University of Mainz, September.

J. Hawkins, "On explaining some universals of word order", University of Amsterdam, May.

- "Constraints of modelling real-time language processes: Assessing the contributions of linguistics", Conference on Constraints on Modelling Real-time Language Processes, Port Camargue, June.

- "Language and culture: explaining some general contrasts between English and German", public lecture, Goethe-Institut, York, November.

- "Explaining some general contrasts between English and German", University of York, November.

- "Explaining some general contrasts between English and German", University of Leeds, November.

C. Heeschen, "On the prehistory of cerebral localization", University of Nijmegen, January.

- "Erkennung semantischer Kategorien durch Aphatiker", Technische Hochshule Aachen, February. - "Language abilities of the right hemisphere", Sloan-Workshop, Nans-les Pins, June.

C. Heeschen and L. Blomert, "Interaktion zwischen syntaktischer Komplexität und der Natürlichkeit des Ausdrucks beim Sprachverständnis von Aphatikern", Gesellschaft für Aphasieforschung und -therapie, Bonn, November.

C. Heeschen, E. Drews and F.M. Reischies, "Die Verarbeitung grammatischer Strukturen in einer zeitungsregistrierten metasprachlichen Situation durch Aphatiker", Gesellschaft für Aphasieforschung und -therapie, Bonn, November.

M. Hickmann, "Contexte et fonction dans le développement du langage", Conference on Communication, développement du langage et compétence psychologique chez l'enfant d'âge pré-scolaire", University de Haute Bretagne, Rennes, June.

A. Jameson, "A model of evaluation-oriented dialog", 6th German Workshop on Artificial Intelligence, Bad Honnef, October.

R.J. Jarvella, "Morphology and spoken word perception", University of Göteborg, April.

- "Short-term memory in speech production and perception", University of Göteborg, April.

- "Information integration in sentence processing", University of Umeå, April.

- "Morphology and spoken word perception", University of Padova, May.

- "Information integration in sentence processing", University of Padova, May.

- "Asymmetries between speaking and listening", University of Linköping, May.

- "Asymmetries between speaking and listening", University of Padova, May.

- "Short-term memory in speech production and perception", University of Padova, June.

- "Pragmatics of aphasia", University of Padova, June.

- "Pragmatics of aphasia", University of Linköping, May.

A. Karmiloff-Smith, "Cognitive and language development from a process-oriented point of view", University of California at San Diego, January.

- "Why do human languages have pronominalization procedures: a cognitive development perspective", Cognitive Science Programme, Massachusetts Institute of Technology, Cambridge, January.

- "A functional analysis of children's narratives", University of Pennsylvania, Philadelphia, January.

- "Conference Overview: a developmental psychology perspective on phylogeny, ontogeny and human knowledge", British Psychology Society Joint Developmental Biology/Developmental Psychology Symposium on Evolution, Development and the Nature of Knowledge, Brighton, March.

- "Process versus structure in language acquisition", "Metaprocedural processes in cognitive development", "Basic

research and educational research in cognitive development", "The role of developmental psychology in cognitive science", University of Pittsburgh, April.

- "A.I. or artful infiltration of the computer metaphor into cognitive psychology theorizing: commentary on Artificial Intelligence position paper", Conference on Constraints on Modelling Real-time Language Processes, Port Camargue, June.

M.-L. Kean, "Localization in aphasiology", Technische Hochschule Aachen, November.

W. Klein, "Second language acquisition of adult workers", 37. Nederlands Filologencongres, Utrecht, April.

- "Ellipsis and intonation", European Psycholinguistic Association Workshop on Prosody, Maison des Sciences de l'Homme, Paris, April.

- "Discussion of R. Matthews' linguistic knowledge in a theory of language processing", Conference on Constraints on Modelling Real-time Language Processes, Port Camargue, June.

- "Probleme der Fragesatzintonation", University of Heidelberg, July.

W. Klein and A. Becker, "The internal systematicity of learner varieties", Workshop on Language of Migrant Workers and their Children", University of Konstanz, October.

J. Koster and W. Deutsch, "Het verstaan van kinderen van anaforische uitdrukkingen", 37. Nederlands Filologencongres, Utrecht, April.

S.-Y. Kuroda, "Some applications of indexed predicate calculus", Formal Semantics Seminar, University of Nijmegen, February.

- "Analyticity, apriority, necessity in the perspective of the theory of cognitive capacity", University of Tilburg, February.

- "Japanese causatives and lexicalist hypothesis", University of Venice, May.

- "Axioms of binding theory and Japanese", Scuola Normale Superiore, Pisa, May.

- "Necessity , apriority and the theory of cognitive capacity", University of Paris VII, June.

- "Japanese and some recent issues in generative syntax", University of Paris VII, June.

- "Semantics of Japanese demonstrative", Ecole des Hautes Etudes en Sciences Sociales, Paris, June.

- "Indexed predicate calculus", University of Bielefeld, June.

- "Japanese VP", Summer School of Linguistics, University of Salzburg, August.

W.J.M. Levelt, "Recent advances in language production research", Tagung der Gruppe Gedächtnispsychologie, Nijmegen, February.

- "Het lineariseringsprobleem van de spreker", University of Leuven, March.

- "Zelfcorrecties bij het spreken", University of Leuven, March.

- Discussion of E. Zurif and Y. Grodzinsky, "Syntax", Sloan Workshop on Perspectives on Human Linguistic Capacity, Nans-les-Pins, June.

- "Zelfcorrecties in het spreekproces", Koninklijke Nederlandse Akademie van Wetenschappen, Amsterdam, June.

- Discussion of B. Smith, "Linguistic and computational semantics", Conference on Constraints on Modelling Real-time Language Processes, Port Camargue, June.

- "The speaker's organization of discourse", Invited paper for the Plenary Session on Psycholinguistics, 13th International Congress of Linguists, Tokyo, September.

- "Self-repairs, a window on speech production mechanisms", Paper for Fachbeirat Meeting MPI, Nijmegen, October.

E. Levy, "Towards an objective definition of 'discourse topic'", Chicago Linguistic Society, Chicago, April.

W.D. Marslen-Wilson, "Comments on lexical processing", Sloan Workshop on Perspectives on Human Linguistic Capacity, Nans-les-Pins, June.

- "Function and process in spoken word-recognition", tutorial paper, 10th International Symposium on Attention and Performance, Venlo, July.

- "Activation processes during spoken word-recognition", University of Cambridge, UK, November.

- "Research in speech understanding: A review", University of Cambridge, UK, December.

- "Integrative processes during utterances resolution", University of Essex, December.

- "Speech understanding as a psychological process", AISB Meetings, University of Essex, December.
- W.D. Marslen-Wilson and L.K. Tyler, "Explanatory models in psycholinguistics", Conference on Constraints on Models of Real-time Language Processes, Port Camargue, June.
- F. Maurer, "SPED, a speech editor", 1982 European DECUS Symposium, Coventry, September.
- D. Metzing, "Prozedurale Dialogmodelle", Colloquium on Procedural Linguistics, University of Hamburg, May.
- B.H. Partee, "Compositionality", 4th Amsterdam Colloquium Frontiers of Intensional Semantics, University of Amsterdam, September.
- Commentator on paper by David Lightfoot "Philosophy in Linguistics: grammar and logical form", Conference on the Psychological Content of Logic, University of Tilburg, October.
- "Genitives, have, and compositionality", University of Essex, December.
- "How far does grammar constrain interpretation?", University of Sussex, December.
- T. Pechmann, "Die Bedeutung sprachlicher und nicht-sprachlicher Faktoren für die Betonung in Referenzausdrücken", 24. Tagung experimentell arbeitender Psychologen, Trier, April.
- "Accentuation and redundancy in children's and adults' referential communication", 10th International Symposium on Attention and Performance, Venlo, July.
- C. Perdue, "Second Language acquisition by adult immigrants: presentation of the European Science Foundation project", 1st European Science Foundation Summer School in Sociolinguistics, University of Sussex, July.
- "Recueil de données: les enseignements d'une année pilote", 4th International Colloquium on Foreign Language Acquisition, University of Neuchâtel, September.
- C. Perfetti, "Reading and linguistic ability" University of Groningen, September.
- "Speech processing in reading", University of Leiden, October.
- "Speech processing in reading", University of Nijmegen, October.

- "Consultant on text processing", University of Tübingen, October.
- F.M. Reischies, O.J. Grüsser and C. Heeschen, "Reaction time of aphasic patients to tachistoscopically projected verbal and nonverbal items: visual half-field effects", 4th European Conference of the International Neuropschology Society, Deauville, June.
- C. von Stutterheim, "Temporality in learner varieties", Conference on Cross-Linguistic Research, Jyväskylää, June.
- "The conceptual approach", North American European Workshop on Second Language Acquisition Research, Göhrde, August.
- L. Tyler, "Integrative processes in discourse comprehension", Conference on Language, Reasoning and Inference, University of Edinburgh, April.
- "Integrative processes in language comprehension", Applied Psychology Unit, Cambridge, UK, November.
- "Real-time processes in spoken language understanding", Conference on Psycholinguistics and Language Pathology, University of Newcastle on Tyne, November.
- W. Vonk, "Interferentieprocessen", University of Nijmegen, February.
- W. Vonk and L.G.M. Noordman, "Making inferences during text understanding", Conference on Language, Reasoning and Inference, Edinburgh, March.
- W. Vonk, L.G.M. Noordman and H.J. Kempf, "Inferentieprocessen bij begrijpend lezen van tekst", Psychologencongres, Amsterdam, October.
- J. Weissenborn, "Evolution génétique de la négociation verbale d'un cade de référence et d'action dans le domaine spatiale", Université René Descartes, Paris, April.
- "Développement de la compétence discurisive et ontogenèse de la référence spatiale", Université de Provence, Centre d'Aix, April.
- "Learning how to become an interlocutor: The verbal negotiation of common frames of reference and actions in dyads of 4 to 14 year old children", 10th World Congress of Sociology, Mexico City, August.

- "Kognitive und verbale Aspekte in der Entwicklung räumlicher Referenzrahmen", University of Konstanz, December.
- P. Wittenburg, "Methoden der automatischen Spracherkennung", Tagung der Gruppe Gedächtnispsychologie, Nijmegen, February.
- "Eye view monitoring and data processing", Annual KIP-Meeting, Nijmegen, February.

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