

Processing of grammatical features in Czech: The role of externality, internality, and (in)dispensability in speech production

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In several picture – word distractor experiments we explored the processing of grammatical gender, declensional class (DC) and conjugational class in Czech. In this presentation we focus especially on the comparison between the gender and DC encoding.

In two experiments we addressed the production of NPs in nom.sg. consisting of an ordinal and a noun. The ordinals were either from a hard or soft adjectival declension (ADC). The two ADCs differ in that in the nom.sg. only the forms from the hard ADC have a gender-marked inflection (*druh-ý*, M, *druh-á*, F, *druh-é*, N). Soft ADC has in the nom.sg. (but not in any other case) one invariant ending for all three genders (*prvn-í*, M, F, N). The distractors were either gender congruent or incongruent with the picture name. Thus, in the incongruent condition of hard ADC, the ordinal endings of the picture and the distractor were different; in the soft ADC they were formally identical in both the congruent and incongruent condition. We observed the gender congruency effect (longer naming latencies in the incongruent condition) only when pictures were named with gender-marked ordinals from the hard declension; i.e. depending on the (in)variance of phonological realisation of the gender feature.

In an analogically designed experiment with a declensional class of nouns, subjects named pictures either in gen.sg. (picture name and distractor have different inflections in the DC-incongruent condition) or in inst.sg. (identical/homonymous inflections also in the DC-incongruent condition). Distractors were presented in nom.sg. The congruency effect was observed in both cases, i.e. irrespective of the (in)variance of the picture's and distractor's ending, suggesting that the abstract DC features and not their phonological realisations compete for selection.

We propose a differentiation between externally and internally specified features of lemmas, especially with respect to the time course of their activation. Internal features which become available only when the lemma is activated (e.g. gender and DC of nouns) can be bypassed or not, depending on the grammatical specification of the earlier available external features (like case or number). If the information about the values of the external parameters is sufficient for the selection of a unique ending, the setting of internal parameters can be bypassed. Following this argument, supposedly inconsistent findings regarding grammatical gender (morphologically dispensable feature for nouns) and declensional class (morphologically indispensable feature) can be explained straightforwardly.

Bidirectional and unidirectional comitative verbs in Hungarian

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The paper deals with the instrumental-comitative syncretism in Hungarian. The two types of constructions under investigation are termed as bidirectional and unidirectional constructions because they differ in terms of the relationship of the agents involved: (i) *Anna Péterrel sakkozik* ('Anne is playing chess with Peter') (bidirectional, comitative), (ii) *Anna Péterrel együttérezett* ('Anne sympathized with Peter') (unidirectional, instrumental/asymmetric).

The topic is at the interface of morphology and semantics, because the two constructions are marked with the same suffix *-VAL* ('with'), yet encoding different relationships. The study is also relevant from a cognitive linguistic point of view, because the relationship between the comitative and instrumental conceptual categories is highly debated. Lakoff and Johnson (1980) suggest that the Companion metaphor is responsible for the syncretism, however, recent comparative studies have pointed out that the syncretism is not universal among the languages of the World (Stolz et al, 2005).

The paper reports on two exploratory psycholinguistic studies conducted in Hungarian that investigate the two categories of verbs regarding their semantics. We used the self-paced reading paradigm to determine if bidirectional (i) and unidirectional (ii) verbal constructions are read differently. This hypothesis is motivated by the assumption that the two constructions evoke two different mental representations of the scenes encoded in the sentences.

Two experimental conditions were designed: in the first condition participants read two sentences in a self-paced manner (word-by-word central presentation). Each trial consisted of two sentences: the first sentence always started with two human agents (e.g. the girl the boy-with) and the critical verb in the last position (Hungarian has relatively free word order).

After the end of the second sentence participants had to answer a control question that related to the two sentences they have just read. Reading times were measured for the critical verbs: an analysis of mean reading times of the verbs revealed that bidirectional comitative verbs were read significantly faster than unidirectional verbs [$t(61) = -2.625, p < .01$]. The critical verbs in both conditions were matched for length and lemma frequency. Lemma frequency for the unidirectional verbs (mean: 4633,6) tended to be larger than for the bidirectional verbs (mean: 1880,9), however, this difference goes in the opposite direction to the significant effect observed. The difference in reading times on the region of the critical verbs suggests that the two NP's before the verb are interpreted as a conjoined NP (subject), which is compatible with the comitative interpretation but not with the instrumental-like, unidirectional one.

We next manipulated word order (NP+V+NP), which allows the investigation of the verb priming its possible argument structures. There was no difference in reading times of the critical verbs this time, however, the arguments of bidirectional verbs were read significantly slower than that of unidirectional ones [$t(29) = 2.538, p < .02$]. Since most of the experimental comitative verbs can function as intransitive verbs, this effect is due to the fact that the NP's after these intransitive comitative verbs are adjuncts (which are read slower than arguments).

The purpose of this study was to provide an online measurement of the processing of bidirectional and unidirectional verbs and their arguments. The findings of the first experiment suggest that mental representations activated by bidirectional and unidirectional verbs are also activated automatically during online language comprehension. The psycholinguistic difference between arguments and adjuncts and the effect of word order were also replicated (Mitchell, 1987; van Gompel & Pickering, 2001). An area for future research would be a more refined investigation of the reading times of comitative and instrumental-like sentences that require two arguments (e.g. *The girl met up with the boy* vs. *The girl sympathized with the boy*).

Hungarian noun paradigm priming underpinning morphological families

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If words are indeed organized into morphological families (Hay & Baayen, 2005) then similarly inflected nouns should prime each other, even in the lack of semantic and phonological overlap. Two experiments were designed in Hungarian to examine the plausibility of morphological families. In the experiments we exploited the fact that irregular forms of Hungarian nouns are only triggered by certain inflections (which are generally the most frequent ones, such as the plural or the accusative) while these same nouns with other inflectional suffixes keep their regular allomorphs.

In the first experiment we have shown that the same inflected allomorphs of the same noun prime each other more significantly than different inflected allomorphs of the same noun. However this can not be conclusive as all priming results were in fact significant, except for priming between less frequent regular forms (which we put down to a frequency effect).

In the second experiment we used paradigms of nouns (e.g. *sarat* ['mud' ACC, shortening type of noun]) to prime other members of the same paradigm which had a different inflection (*kezet* 'hand' [ACC, shortening type of noun]). As both semantics and morphology were different, we explained significant priming by stating that it arose relying on morphological family ties.

Both experiments suggest that morphological families seem to be the best explanation for Hungarian, ruling out dual route models and leaving multiple rule-based models with a certain credibility.

Hay, B.J., Baayen, H., (2005). Shifting paradigms: gradient structures in morphology. *Trends in cognitive science*, Vol 9. No.7

Constituent activation of compounds in Modern Greek and English: Do category, position and complexity matter?

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Compounds have attracted the attention of theoretical linguists for a number of years. During the last decade, there has been an increased interest among psycholinguists in issues pertaining to the representation and processing of compound words across a variety of languages (Libben & Jarema, 2005 and references thereof).

This is a comparative study investigating constituent activation during the lexical access of transparent compounds in Modern Greek (MG) and English (E). It addresses the following issues: first and second constituent activation, the role of headedness, the effect of lexical category, the effect of complexity, and the role of internal compound structure and its interaction with the processing of argument structure.

Methodology: We report on an on-line visual lexical-decision experiment with constituent priming.

Participants were 25 native speakers of MG and 14 speakers of E.

Stimuli included: deverbal compounds N-N(V+er) with Θ -role saturation; Adv-Adj(V+af) with no Θ -role saturation (G only), Adv-V (G only); N-V with Θ -role saturation; V-N (E only); 5) N-N compounds without derivation; 6) fillers and non-words.

Results revealed a dissociation in performance across the two languages: while strong second constituent priming and a headedness effect were found for derived compounds in MG, in E, there was equal priming between the first and second constituent. A marked second constituent/headedness effect was found in the N-V compounds in E, thus denoting the importance of the verb head; however, for MG, this effect was visible only in those cases involving Θ -role saturation. With regard to all other types of compounds, there was equal constituent priming for MG while strong first constituent priming was found in E. We thus observe an effect of language reflected in the headedness effects, in the relationship between lexical category and constituent activation and in the role of compound internal operations during constituent priming.

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When and how do Danish children begin to use noun plurals?

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We shall present aspects on our Danish work on noun plural, including work on longitudinal data from The Odense Twin Corpus and results from The Danish CDI-studies (The MacArthur-Bates Communicative Developmental Inventory), seen in relation to each other.

An essential part of the work is made in an international collaboration between groups headed by Wolfgang U. Dressler, Vienna, Dorit Ravid, Tel Aviv, Steven Gillis, Antwerp, Hans Basbøll, Odense (see Ravid et al. forthcoming). Katja Rehfeldt has also participated in the work with the acquisition of Danish noun plurals.

The Odense Twin Corpus is a longitudinal corpus of spontaneous Child Speech and Child Directed Speech. The sample that we use in this study, consists of 44 recordings of five Danish twin pairs aged 1;1-1;5 (Simon and Cecilie), 1;2-1;3 (Chris and Lucas), 1;2-2;5 (Ida and Sofie), 1;1-2;4 (Cindy and Alexander) and 0;9-1;2 (Anna and Gustav). The children were recorded in their homes in interaction with their parents or caretaker. Recording intervals is approximately one month. The data were transcribed in CHILDES (MacWhinney 2000/2007 a, b) and coded in the OLAM system (Madsen et al. 2002). These data will be supplemented by parts of 56 recordings from Kim Plunkett's Danish corpus (Plunkett 1985, 1986) with a boy (Jens) in the age of 1;0-6;1.

The Danish CDI-studies consist of a longitudinal study of 182 children followed from the age of 0;8 to the age of 3;0 (with a total of more than 4.000 CDI-reports), a cross-sectional study of 6.112 children aged 0;8 to 3;0, and CDI-reports from the five twin pairs from the Odense Twin Corpus in the ages of 0;8-3;0 (see Bleses et al. 2007; Bleses et al. forthcoming a, b; Wehberg et al. forthcoming a, b).

Building upon the Danish CDI-studies as well as on The Odense Twin Corpus, we shall consider the following questions: when do Danish children produce their first word; produce their first noun; start combining words; start using genitive forms; start using plural forms. Theoretical and methodological implications of comparing such different forms of data will be discussed.

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Potential vs. impossible German noun plurals in online tests and language acquisition

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The acquisition and processing of German noun plurals has been a hotly debated issue during the last fifteen years. Supporters of dual route models claim that there are two separate systems: grammar which is responsible for generating regular forms according to rules, and the lexicon where irregular forms are stored. Only –s plurals (or in more recent version –s and a subtype of –n plurals) are considered to be rule-based, whereas all others are to be stored. One main problem with this view is that also masculine and neuter –e plurals (with or without umlaut) and zero plurals without umlaut are productive.

In contrast, connectionists and schema theorists have proposed single-route models of processing and acquiring all types of plural formation (like all inflectional morphology). One main problem with this approach is that it is difficult to reconcile with the difference between potential (but non-existing) and impossible plurals, as postulated by several models of theoretical morphology.

In our longitudinal acquisition studies we have found that children during the phase of protomorphology produce impossible plurals which combine –n plurals with umlaut, such as *Mäus-en* (instead of *Mäus-e* from *Maus* mouse'). But during the second half of their third year of age they stop producing such impossible plurals, whereas they continue to produce potential non-existing plurals such as *Hünd-e* (dogs) *Gespentst-e* (ghosts) *Marienkäfer-s* (ladybugs). However, in classical offline experiments (production experiments) impossible plurals occur even much later, albeit rarely and much rarer than incorrect potential plurals. This difference could be explained with the higher level of awareness in lab experiments, including the possibility of test artefacts.

In order to test the psychological reality of the theoretical linguistic distinction between potential and impossible non-existing plurals, we designed and performed an online experiment with both adults and primary-school children which contrasted potential non-existing, correct existing and impossible non-existing plurals. We tested 117 monolingual Austrian German-speaking school children (aged 6 – 10) at their school in Vienna and 41 adult students. This experiment is a lexical decision test introduced as a task of correcting wrong plurals.

The results were analysed according to response accuracy and response latency. With adults, response accuracy generally does not differ between acceptance of correct plurals and rejection of impossible plurals, both approach ceiling. As predicted, potential variants, such as *Büss-e* of *Buss-e* 'buss-es' are less often rejected than the impossible variants *Büss-en*, whereas the equally potential *Ball-e* (correct: *Bäll-e* with umlaut) is rejected at ceiling, i.e. excessive umlaut is more acceptable as a plural marker than lacking umlaut. Children do not reach ceiling for the acceptance of correct plurals of whatever type of plural. Rejection of impossible plurals is at about the same level. What is typical for children is their much lower rate of rejection for potential plurals than for impossible plurals. As to response latencies, both adults and children showed, in the majority of cases, longer response time for the rejection of potential than of impossible plurals. The results indicate that the difference between potential and impossible German plurals is relevant in online processing both for adults and, at least, for older children.

Imperfectivisation strategies of Bulgarian preschool children

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The paper presents results from an experimental study with 3 to 5 year old Bulgarian children which explores the strategies applied by the children when the sentential context forces them to use an imperfective verb form.

Synthetic negative imperatives with perfective verbs are ungrammatical in Bulgarian. Negative requests present a context of aspectual coercion (Moens & Steedman 1988) which in Bulgarian must be reflected overtly. When negation operates directly on the aspectual value of a perfective verb (as it is the case of the tenseless synthetic imperatives), it induces an imperfective interpretation. The changed aspectual value translates directly into an imperfectivisation requirement at the level of formal morphological expression. As a result, perfective verbs are banned from the negative imperative construction, the use of their imperfective counterparts remaining the only well-formed alternative.

This peculiarity of Bulgarian morpho-syntax promotes two main questions: Firstly, is there evidence from speech production that young children are sensitive to the imperfective interpretation of negative imperative sentences and to the necessity of overt morphological imperfectivity markers imposed by the functional organisation of the TAM system in Bulgarian? Secondly, does the type of perfective derivation influence the imperfectivisation processes represented in the production patterns of preschool children?

Assessing these questions we conducted a production experiment with 4 groups of children (age brackets: 3;6 – 4;0 – 4,6 – 5;0). In an elicitation task, the children were prompted to produce negative requests with imperfective verbs after hearing positive requests containing perfective verbs. As prompts we selected primary perfective verbs, and secondary prefixed and suffixed perfectives. Their secondary imperfective forms represent both the productive (suffix *-va*) and the minor imperfectivisation pattern (suffix *-a/-ja*).

We found an age effect on the general compliance with the task (ability to produce the required synthetic negative imperatives) and on the preferred imperfectivisation strategy. The obtained production patterns reveal significant effects of morphological complexity and transparency of the perfective verbs on the imperfectivisation process. While the youngest group achieved best correctness scores with the highly transparent suffixed perfectives, no difference between the performance with primary and suffixed perfectives was found in the older groups. The correctness score of prefixed perfectives increased only gradually and the obtained morphologically erroneous imperfective forms reveal a strong interaction between the dominant imperfectivisation pattern and the transparency of the perfective stem. From a processing point of view, the data suggests that the whole form storage of non-transparent secondary imperfectives is achieved later (around the age of 5;0).

Bulgarian preschool children stick with the imperfective suffix *-va* applying it as a general strategy independently from its (in)appropriate use with the verbal stems in the given negative imperative contexts. The findings allow inferences about the gradual constitution of grammatical meanings carried by imperfectivising suffixes and for the representation of aspectual affixes in the mental lexicon of children acquiring Bulgarian as a first language.

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Learning with defaults

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When it comes to associations between form and meaning, homonymy presents a notorious problem both for the learner and the processor. Homonymy is particularly common in inflection, where it is also less likely to be disambiguated by contextual factors. In many morphological models, instances of inflectional identity (covering homonymy and syncretism) are sometimes accounted for with help of underspecification and some version of the Paninian “elsewhere” Principle. The use of such “default” mechanisms is usually motivated on the grounds of economy (which are weak in general - we know that people don’t always prefer most minimal analysis - and especially in inflectional paradigms which are finite and quite small).

In this paper, I provide a much stronger motivation for the notion of defaults. Namely, lexical representations involving defaults are argued to arise as a result of a natural learning strategy that is able to predict strong statistical tendencies with respect to patterns of homonymy in inflection, and that also predicts overgeneralizations to arise at the intermediate learning stages (a typical trait of human learning).

The particular generalization method I assume is based on cross-situational intersections (Siskind 1996). In presence of homonymy, this method leads to overgeneralizations. When such overgeneralizations arise, the learner corrects them by positing blocking relationships, and, if all else fails, by introducing homonymous lexical entries. I show how such a learner can be constructed and prove that it successfully learns attested patterns of form-meaning mappings even in the presence of irrelevant features. My learner has the easiest time learning one-to-one mappings, followed by the elsewhere cases, with “overlapping” mappings (i.e. those that cannot be described with defaults) being the most difficult to learn. Interestingly, the empirical data shows that the kinds of mappings that my learner finds easy predominate in inflection (based on my analysis of verbal subject agreement paradigms from a sample of genetically diverse languages). Overall, overlapping patterns turn out to be quite rare ($\approx 5\%$ of paradigms); elsewhere-type patterns are more common ($\approx 20\%$ of paradigms), with non-ambiguous mappings dominating in inflectional paradigms.

The kinds of grammars that the learner posits (i.e., grammars with defaults) also make some processing predictions which I’m currently investigating. In particular, they predict that distinct instances of the same “elsewhere” morph should exhibit priming effects, while distinct instances of other homophones should not.

Conflicting cues in the acquisition of plural adjective agreement in Hebrew

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Marking plural agreement on attributive adjectives in Hebrew is a challenging task requiring morpho-phonological knowledge as well as grammatical insight. Hebrew adjectives follow the head noun and agree with it in number and gender. When the inherent grammatical gender of the noun matches its plural suffix, marking plural agreement on the adjective is straightforward. Thus, for masculine *pil* 'elephant' and adjective *lavan* 'white', the plural NP 'white elephants' would be *pilim levanim* 'elephants white,PI'; for feminine *pila*, the plural phrase would be *pilot levanot* 'elephants,Fm white,PI,Fm'. But in case of clash between the plural noun suffix and its grammatical gender, adjective agreement follows noun grammar rather than its surface suffix. For example, masculine *kir* 'wall' takes an irregular feminine plural suffix *-ot* to yield *kirot*, but the adjective would take its plural agreement from the inherent gender of the noun. The plural phrase 'white walls' would then be *kirot levanim* 'walls,Fm white,PI,Masc', with conflicting suffixes on the noun and on the adjective. Children often mark such adjectives erroneously, following the surface noun suffix (Berman, 1985).

The current study uses a structured elicitation task to investigate how Hebrew-speaking children learn to mark Hebrew adjectives in conflicting and non-conflicting plural contexts. The study population consisted of 420 children from two SES backgrounds (low vs. middle-high) in 7 consecutive age groups (5-6 to 11-12). Each child was tested orally and individually. Participants were given a set of 24 singular noun phrases (e.g., *kir lavan* 'white wall') and asked to convert them to plural forms (in this case, conflicting *kirot levanim* 'white walls'). Half of the head nouns were masculine and half were feminine; half had regular, non-conflicting plural suffixes, and half had irregular suffixes. In addition, half of the nouns had changing bases (e.g., *tof* 'drum' / *tupim* 'drums'), which we hypothesized would also prove challenging in the complex task of plural adjective agreement (Ravid & Schiff, in press).

Accuracy (production of correct plural noun and plural adjective) and reaction times were measured. Accuracy gradually improved with age and schooling, while reaction time decreased significantly between 3rd and 4th grade. High-SES children had more correct plural nouns and adjectives and took less time to formulate them than low-SES children, though age and schooling diminished these effects. Phrases with conflicting suffixes had lower scores and took more time to formulate than those with non-conflicting suffixes, especially in the low-SES population, though these differences gradually diminished with age and schooling. In the same way, phrases containing nouns with changing bases were more challenging than phrases with non-changing bases across development and SES. These findings demonstrate the complex interface of morphological, syntactic and phonological knowledge in learning to inflect Hebrew adjectives in different plural contexts.

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How spelling errors inform us on the acquisition of inflectional patterns

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Most studies on the acquisition of morphology pertain to the acquisition of morphemic patterns in the spoken language of young children. Comparatively little is known about the acquisition of morphology in written language. This is unfortunate, as a lot of orthographies represent morphemes, and the study of how spellers render or fail to render these units in written language can shed light on matters of language processing and representation. I will argue that the study of spelling errors in the population of *experienced* language users sheds light on principles of language acquisition. More particularly, I will discuss experimental evidence suggesting that spelling errors on regularly inflected verb forms (in Dutch) suggest the storage of whole-form storage of inflected forms. The results of two sets of experiments will be reported. (i) Errors in the *production* of verb forms follow a simple trend: “when encountering an inflectional homophone, spell the most frequent homophone if you run out of computational resources” (extending earlier work by my colleagues and myself; e.g. Sandra, Frisson & Daerms, 1999). This principle can be derived from experimental data and from corpus data from Google, both at the level of whole word forms and at the sublexical level. (ii) Errors in the spelling of regular verb forms also cause *reading* problems, even though these problems are not entirely isomorphic with spelling problems. On the basis of these experimental data I will argue that the presence of a clear, deterministic rule-based spelling rule does not prevent language users from using a probabilistic spelling and reading strategy based on the most frequently encountered spelling pattern for a given pronunciation. This emphasizes the importance of distinguishing between a (meta-)linguistic, often rule-based, approach to language and a usage-based approach. The latter is more in line with the processing principles adopted by language users.

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Is a ‘default mechanism’ necessary? Not for regular and irregular German participles

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Based on the linguistically motivated assumption of a universal default (Chomsky & Halle, 1968), some psycholinguistic models (e.g., Clahsen, 1999; Pinker, 1998, 1999; Prasada & Pinker, 1993; Ullman, 2001) assume that an inborn default mechanism is necessary to acquire the rules of inflectional processing.

With regard to German participle formation, the default mechanism is assumed to combine the infinitive stem with the regular *-t* suffix. In contrast, combinations with the irregular suffix *-en* must be stored as whole words in a lexical storage system. If an irregular participle like *geworfen* (thrown) cannot be retrieved from memory, the default will construct ‘regularized’ forms like **gewerft* by applying the default rule to the infinitive stem. Hence, the infinitive stem *werf* should be accessible, but not the participle stem *worf*.

The present study contrasted responses for incorrect default combinations like **gewerft* with incorrect non-default combinations like **gewirft*, **gewirfen*, **gewarft*, **gewarfen*, **geworft*, **gewurft*. Lexical (word-nonword) decisions indicated that both default and non-default combinations were ‘word-like’ and elicited incorrect ‘word’ responses relative to matched pseudo-stem combinations like **geworst*. Moreover, non-default combinations like **geworft* and **gewurft* facilitated the recognition of the base verb like *werfen* as effectively as did the correct participle *geworfen*.

These data indicate that all existing stems (*werf*, *wirf*, *warf*, *worf*, *wurf*) are accessed regardless of whether they occur in a default combination or not, which fails to support a contrast between a rule-based ‘default’ mechanism and a lexical storage system.

Rather, the data of this study suggest that the frequency of specific stem-affix combinations encountered during language acquisition and language use determines which combinations are applied. The emergence of a ‘default’ is the epiphenomenon of distributional factors: the frequency of the stem, the frequency of the suffix, and the frequency of particular stem-suffix combinations. A single-mechanism model will be presented that can account for default data without assuming a default mechanism.

The development of the perfective past tense in Greek child language

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Past-tense formation in Greek interacts with aspectual distinctions yielding perfective (simple past) or imperfective (past continuous) forms. Within the perfective past tense, the so-called *sigmatic* forms involve *-s* suffixation (paired with predictable stem changes) and *non-sigmatic* forms which contain unsystematic and even suppletive stem changes and no segmentable past-tense affix.

We tested 35 adult native speakers of Greek and 164 children in six age groups (age range: 3;5 to 8;5) using an elicited production and an acceptability judgment task supported by pictures. The experimental material included 20 existing verbs, 20 novel verbs which rhyme with existing ones, and 10 novel non-rhyming verbs.

The results indicated a striking contrast between sigmatic and non-sigmatic perfective past tense forms. Sigmatic forms were widely generalized to different kinds of novel verbs in both children and adults and were overgeneralized to existing non-sigmatic verbs in children's productions. By contrast, non-sigmatic forms were only extended to novel verbs that were similar to existing non-sigmatic verbs, and overapplications of non-sigmatic forms to existing sigmatic verbs were extremely rare. Furthermore, the data provided a detailed picture of the development of perfective past tense formation. In particular, the use of non-sigmatic forms was developmentally delayed relative to sigmatic ones, since adult-like levels of generalizations were achieved later for non-sigmatic than for sigmatic forms. We argue that these findings are consistent with dual-mechanism accounts of morphology and hypothesize that in both children and adults, sigmatic forms involve combinatorial processing and nonsigmatic forms retrieval of stored forms from lexical memory.

Contextual influences in the production of past-tense forms in English

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Most research on the processing of regular and irregular inflected forms focuses on permanent effects (relating to the structure of the system or to factors such as lexical frequency). Phonological factors (including well-formedness of consonant clusters and output vowel frequencies) have been shown to have an effect on both regular and irregular past-tense forms in English, in adult processing, from early in acquisition for typically developing children, and in special populations such as children with specific language impairment. Stemberger (2004) demonstrated for adult processing that a vowel or rime in the subject noun primes the vowel or rime of irregular past-tense forms and can result in increased rates of overregularization errors. This paper extends this work to the production of conjoined noun phrases. Subjects transposed sentences such as *the clown was spinning and grinning* into past tense. While the two target nouns in this stimulus item have rhyming bases (*spin* vs. *grin*), the outputs do not (*spun* vs. *grinned*), and it is expected that interference between the regular and irregular patterns will raise error rates. The rate of over-regularization errors (*spinned*) is massively raised by a rhyming regular (from 5% to 18%), especially when the irregular form is second (25%, showing an especially strong perseveratory effect). The rate of over-irregularization errors (*grun*) is also increased by a rhyming irregular, but only modestly (from 2.8% to 4.2%). Results reinforce theoretical claims that phonological effects play a decisive role in the processing of both regular and irregular forms: phonology and morphology are intertwined and interactive. However, results are compatible with variants of both single-route and dual-route models. Acquisition will be discussed.

Early Compound Constituent Processing by the Two Hemispheres: Behavioral and MEG Evidence

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Studies on lexical processing have been inconclusive on whether or not morphological decomposition occurs during the early phases of visual word recognition (e.g., Sandra, 1990; de Almeida & Libben, 2002; Libben, 2006). This paper reports behavioral (masked lexical decision) and MEG (magnetoencephalography) experiments on the role of morphological process in word recognition relying on hemifield presentation of compound constituents. Our strategy was to investigate visual compound recognition by presenting them briefly (74 ms) and centered on the screen, but with the point of visual convergence (fixation) falling either at the constituent boundary (e.g., BATH+ROOM) or one character off the boundary (e.g., BATHR+OOM). Our strategy was motivated by the effects of hemifield presentation of stimuli, with left visual field (LVF) stimuli receiving initial processing in the right hemisphere (RH) and right visual field (RVF) stimuli, in the LH. In addition, we took advantage of the well-documented anatomical asymmetry of linguistic functions in the brain, with LH advantage for grammatical processes. An advantage of this technique is that it allows for the early processing separation of modifier and head constituents of bimorphemic compounds. In **Experiment 1**, two variables were manipulated: (a) morphological legality of split as a function of point of convergence, and (b) rate of presentation, with left and right constituent presented either simultaneously (thus, with the intact word presented in full) or 28 ms apart (modifier-first or head-first conditions). We also contrasted compounds (N=144) with monomorphemic pseudo-compound words (e.g., CARPET). Participants (N=32) performed a lexical decision task. Convergence was obtained by a 1000 ms fixation point (“+”) preceding the intact 74 ms stimulus presentation (“BATHROOM”), which was followed by a 500 ms mask (a row of Xs). We obtained a main effect of word type (compounds faster than monomorphemics) and a main effect of morphological legality, with convergence at morphological boundary yielding faster RTs than at off-boundary. In **Experiment 2**, we combined our Experiment 1 technique with MEG recording. In a recent MEG study, Zweig and Pylkkänen (submitted) found that morphologically complex forms (*teacher, refill*) evoke increased activation from sources in the left and right fusiform gyrus (Visual Word Form Area; Cohen et al., 2000) peaking approximately 170 ms after stimulus onset (M170; Tarkiainen et al., 1999), as compared to matched monomorphemics (*winter, resume*). Preliminary results (N=18) show that participants exhibit a significant M170/VWFA response, which initial analyses confirm is sensitive to the morphological complexity or simplicity of the stimuli. Interestingly, many participants also show a second evoked occipital response 50-80ms after the M170. Further analysis will be required to determine the relationship of this second response component to the stimulus manipulations. We discuss these effects in the context of a model of morphological processing that relies on an early constituent detection.

Morphology in the Bilingual Lexicon: Psycholinguistic evidence from Greek-French bilinguals

Madeleine Voga - Redlinger

In the study of bilingualism, the lexical level of language is of major importance to the acquisition of the vocabulary mastered by bilinguals. From a theoretical point of view, the characteristics and the organisation of the mental lexicon are of crucial importance for any model of language processing. The question of whether the two languages in the bilingual lexicon share representations, and whether these linked representations participate in the organisation of the lexicon, summarizes the interrogations of a large body of psycholinguistic research over the last years. According to Bybee (1985), morphology is the factor that clusters the (monolingual) lexicon and this organisation transcends languages. Such an organisation would have deep implications for second language acquisition and should be reflected in bilingual online processing.

We present two experiments using masked priming, a paradigm largely used to shed light on automatic non strategic processes in lexical access (latest version: Forster & Forster, 2003). The first experiment addresses the question of whether the well-documented asymmetry observed in cross-linguistic priming effects and found in a multitude of languages and paradigms (masked as well as long term priming, e.g. Gollan, Forster & Frost, 1997, for masked priming with Hebrew-English materials) is linked to morphological factors. The strong cognate priming effect obtained in the L1→L2 (from first to second language) disappears when the opposite direction is tested (L2→L1). This asymmetry is at odds with a view of the bilingual lexicon in which cognates belong to the same lexical paradigm (Bybee, 1985) and where consequently priming effects should occur regardless of the priming direction. The first experiment shows that Greek (L1) – French (L2) bilinguals show facilitatory priming when operating lexical decisions under masked conditions on etymologically Greek (e.g. *idée*) or etymologically French (e.g. *rôle*) cognate targets in the L1 to L2 direction. The facilitatory priming induced by cognate and morphological priming conditions is of larger amplitude for etymologically Greek primes (*ιδέα* for cognate and *ιδεατό*, ADJ. for the morphological condition) than for etymologically French primes (*ρόλος* for cognate and *ρολάκι* DIM. for the morphological condition), relatively to unrelated conditions. Nevertheless, significant priming is obtained for both types of materials, etymologically Greek or French. This is not the case when the opposite direction is tested (L2→L1), in which etymologically L1 cognates and morphological relatives prime, whereas etymologically L2 cognates and morphological relatives do not.

In the second experiment we control the etymological origin of the materials along with their morphological family size, that has been found to affect response latencies in tasks such as visual lexical decision (Schreuder & Baayen, 1997) in a variety of languages. The very large variety of Greek-French cognates provides the possibility to construct materials that include four conditions: etymologically L1 (Greek) cognates with high or low morphological family size and etymologically L2 (French) cognates with high or low morphological family size. The different impact of these conditions on the asymmetry between the two priming directions suggests an explanation for the asymmetrical effects reported on the literature.

The overall pattern of results we present seems to be difficult to insert in a morpheme based account of morphological effects. We show how a lexeme based approach can provide the framework for a model of cross-script bilingual processing in which morphological factors play an important role. We present a model of bilingual processing in which morphology is represented in a supra-lexical (post-orthographic) level and is contacted by the orthographic representation of words. This model is fully compatible and inspired by the monolingual model of Girardo & Grainger (2001), an interactive activation model for morphological effects, based on intra-level inhibition and inter-level activation (plus feed-back), and following the modelling principles of McClelland & Rumelhart (1981). In the bilingual model, the two languages are unified at the orthographic level (so that the data relative to the orthographic cue can be taken in account) and clustered along morphological principles, as argued by Bybee (1985). Such an architecture is compatible with competition effects in the whole-word orthographic level, as well as with the occurrence of morphological family size effects in the post-orthographic (supra-lexical) morphological level, thus enabling us to reconcile a large collection of data within a lexeme-based account of morphological processing.