

What Is Easy and What Is Hard to Acquire in a Second Language?

Roumyana Slabakova

University of Iowa

1. Introduction

In recent years, there has been increased interest in examining and explaining the differential difficulty of acquisition of language modules, interfaces, operations, and constructions (Lardiere 2005, 2008; Slabakova 2006, 2008; White, 2003). For example, a recent GASLA plenary, Lardiere 2005, argued that morphological competence should be accorded a special status and highlighted its difference from syntactic competence. This line of thought led Lardiere to propose the Feature Assembly Hypothesis. In a nutshell, the hypothesis postulates that learning a second language (L2) involves figuring out how to reconfigure the formal features of the native language and those available from UG into new or different configurations in the L2. It is precisely this assembly and re-assembly of formal features (which is almost never straightforward mapping) that is at the core of language acquisition. White (2003), chapter 4, asks the question of whether knowledge of inflectional morphology drives learning the syntax, or the other way around, knowledge of syntax comes before knowledge of inflectional morphology. She dubs the two views “morphology-before-syntax” and “syntax-before-morphology” (see more on this below). Slabakova (2006), building on White’s and Lardiere’s insights and viewing the issue from the point of modular critical periods in SLA, argues that there is no critical period for the acquisition of semantics; that is, meaning comes for free if the functional morpho-syntactic competence is already in place.

It is critical that we use principled distinctions, well understood in linguistic theory, and solid bodies of data in defining this relative demarcation of linguistic processes and modules. The ultimate goal of this endeavor is, of course, to explain the cognitive process of language acquisition. However, this demarcation can also inform language teaching by applying the insights achieved by generative second language acquisition (SLA) research and theory in the last thirty years. It makes practical sense that if teachers know what is hard to acquire and practice it more in the classroom, learners will achieve better fluency and higher accuracy in the second language.

In this paper, I will argue for the Bottleneck Hypothesis as a partial answer to the question of the title: what is easy and what is hard in second language acquisition. I will show that it is the functional morphology which is the bottleneck of L2 acquisition; acquisition of syntax and semantics (and maybe even pragmatics) flows smoothly (Slabakova, 2006, 2008). The hypothesis is based on a comparison of findings on the acquisition of inflectional morphology, syntax, the syntax-semantics interface, the syntax-discourse interface, and the semantics-pragmatics interface. I will summarize findings from representative studies in these areas to make the main point: inflectional morphology is the bottleneck of acquisition.

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2. Language architecture and the place of inflectional morphology in it

The answer to the question “What is the architecture of the language faculty?” is important because it directly bears on what has to be learned or not, and what comes for free in acquiring a second language. I will assume a widely accepted model of the grammar following Reinhart (2006), which is illustrated in Figure 1.

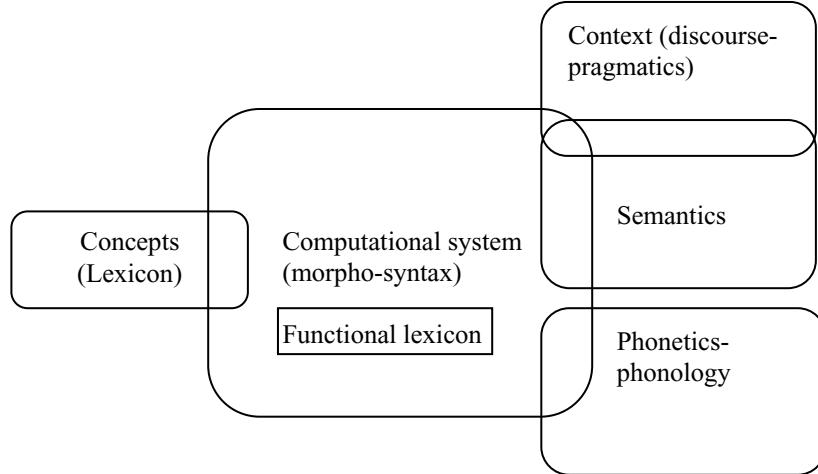


Figure 1: Modular design of the language faculty, following Reinhart (2006)

What is to be learned and what comes for free, keeping in mind the language architecture in Figure 1 above? Lexical items are drawn from the lexicon into the computational system (narrow syntax). The latter can be imagined as a working space where operations like Select, Merge, and Agree combine lexical items into phrases, and then into bigger phrases. Syntactic operations continue until all of the lexical items in the numeration are exhausted and all uninterpretable features are checked and deleted. Both visible and invisible movements take place here. Principles and language-specific parameters reside in the computational system. The complete syntactic object (a tree) is then passed on by means of Spell-Out to the phonetic-phonological system for linearization and pronunciation and to the semantic system for interpretation. Context, for example the discourse-pragmatics of the message or the dialog, also impacts semantic processes and interacts with the computational system.

Two types of formal features are relevant to the grammar-meaning interface: interpretable and uninterpretable ones. Interpretable (semantic) features are legible in the semantic component and contribute to the interpretation, so they cannot be eliminated. Uninterpretable features, on the other hand, should be eliminated before Spell-Out, since they do not contribute to meaning.

(1) My daughter often take-s the bus.

For example, in the sentence in (1), the interpretable feature [singular] on the subject phrase nominal head survives into the semantic module. The uninterpretable feature on the verb, which ensures agreement, on the other hand, is eliminated by Spell-Out, though it may survive until the acoustic system to be pronounced as /-s/. Which feature is interpretable and which is not is subject to language variation, so this attribution is predicted to pose a problem for second language learners. (See Adger 2003, chapter 2, for more examples of features across languages).

The set of functional categories constitutes a sub-module of the computational system, namely, the Functional Lexicon. Each functional category is associated with a lexical item, or items, specified for the relevant formal features. Parameterization is a blueprint made up of a finite set of features, feature values, and properties (e.g., whether a certain feature will induce phrasal movement or will move on its own, what we call “strength of features”). Acquisition of L2 functional categories involves the functional properties of a set of lexical entries, but is manifested in syntactic reflexes superficially

unrelated to these lexical entries, like displacement. For example, presence of overt agreement morphology on the verb in (1) signals agreement with the subject, but the formal features present in this category also capture Tense (present), the necessity of an overt subject in English as opposed to some null-subject languages, the case of the subject (Nominative), and the fact that the verb stays in the VP in English, thus appearing after the adverb *often*.

While the content of meaning (the concepts and relations between them) is the same for all languages, different linguistic forms map different natural groupings of meanings. Let me illustrate such a mismatch with Spanish and English aspectual tenses. While the English past progressive tense signifies an ongoing event in the past, Spanish Imperfect can have both an ongoing and a habitual interpretation. The English simple past tense, on the other hand, has a one-time finished event interpretation and a habitual interpretation while the Spanish Preterit has only the former.

- (2) a. Guillermo **robaba** en la calle. (habitual event)
 Guillermo rob-IMP in the street
 'Guillermo habitually robbed (people) in the street.'
- b. Guillermo **robó** en la calle. (one-time finished event)
 Guillermo rob-PRET in the street
 'Guillermo robbed (someone) in the street.'
- c. Guillermo **robaba** a alguien en la calle cuando llegó la policía (ongoing event)
 Guillermo rob-IMP someone in the street when arrived the police
 'Guillermo was robbing someone in the street when the police arrived.'

- (3) a. Felix **robbed** (people) in the street. (habitual event)
 b. Felix **robbed** a person in the street. (one-time finished event)
 c. Felix **was robbing** a person in the street (when the police arrived) (ongoing event)

Thus, the same semantic primitives (ongoing, habitual, and one-time finished event), arguably part of universal conceptual structure, are distributed over different pieces of functional morphology. When learning a second language, a speaker may be confronted with different mappings between units of meaning on the conceptual level and units of syntactic structure.

To recapitulate this section, we will assume the Minimalist premise that the functional lexicon is where language variation is encoded, while meanings (the content of thought) are universal. It follows logically from this language architecture that learning a second language entails learning the new configurations in which the various interpretable and uninterpretable features are mapped onto the target language inflectional morphology. In what follows, each section will correspond to a building block of the Bottleneck Hypothesis.

3. Syntax is easier than inflectional morphology

White (2003, ch. 6) describes two views of the morphology-syntax connection, which she labels Morphology-before-syntax and Syntax-before-morphology (p. 182-4). On the *morphology-before-syntax* view (Clahsen, Penke and Parodi, 1993/94; Radford, 1990), lexical acquisition of functional morphology actually drives the acquisition of functional categories, as we mentioned above. The *syntax-before-morphology* view, on the other hand, argues that L2 learners who do not have perfect performance on the inflectional morphology can still have engaged the functional categories related to that morphology and have the abstract syntactic features represented in their interlanguage grammar. Evidence comes from several studies of child and adult L2 production (Haznedar and Schwartz, 1997; Haznedar, 2001; Ionin and Wexler 2002; Lardiere, 1998a,b). White (2003: 189) summarizes the data of the three studies as follows, see Table 1.

What is especially striking in the data presented in Table 1 is the clear dissociation between the incidence of verbal inflection (ranging between 46.5% and 4.5%) and the various syntactic phenomena related to it, like overt subjects, nominative case on the subject, and verb staying in VP (above 98% accuracy). But knowledge of all the properties reflected in Table 1 is purportedly knowledge related to

the same underlying functional category, IP, and its features. In view of such data, it is hard to maintain that morphology drives the syntactic acquisition.

Table 1: L2 English supplience of functional morphology in obligatory contexts (in %). Reprinted with permission from White (2003: 189, her table 6.2)

| | 3 sg agreement on lexical verbs | Past tense | Suppletive forms of be (aux/copula) | Overt subjects | Nom. case | V in VP |
|---------------------|------------------------------------|------------|--|----------------|-----------|---------|
| Haznedar (2001) | 46.5 | 25.5 | 89 | 99 | 99.9 | -- |
| Ionin&Wexler (2002) | 22 | 42 | 80.5 | 98 | -- | 100 |
| Lardiere (1998a,b) | 4.5 | 34.5 | 90 | 98 | 100 | 100 |

Another recent study, Slabakova and Gajdos (2008), investigated the L2 acquisition of the different forms of the German copula *sein* in the present tense. Twenty-four beginner and 18 intermediate learners of German participated in the experimental study. They were for the most part undergraduate students. Participants answered a background questionnaire and took a written test. The learners' proficiency levels were established based on the number of class hours of exposure to German instruction at a US university. At the time of study, the beginners were exposed to roughly 40 hours of German classroom instruction; the intermediate learners—to 140 hours.

The test contained simple sentences with missing subjects. Participants had to choose which subject (out of four options) went well with the provided sentence. They could choose more than one option and they were provided with an example which showed more than one correct choice. The test contained six items for each form of *sein* and 10 fillers with other verbal forms, for a total of 40 items. (4) provides an example test item. It was considered that the test participant made an error if she chose an unsuitable subject for the pronoun, for example 'Moritz' in example (4), but also if she neglected to choose a correct subject, that is, if she did not choose 'du'.

(4) ____ bist ein guter Freund.
are a good friend

- Moritz
- du 'you' ← the only correct choice
- die Schüler 'the students'
- er 'he'

Table 2: Percentage errors in all forms of *sein* depending on type of subject, Slabakova & Gajdos 2008

| Type of error | Beginners | Intermediate learners |
|---|-----------|-----------------------|
| Errors in choosing correct pronoun subjects | 7.5 | 4.5 |
| Errors in choosing correct DP subjects | 20.2 | 29.8 |

As the reader can determine from Table 2, errors in choosing correct pronouns persist even in the second year of classroom instruction. Error rates in choosing DP subjects are stunning, if one considers how easy the test is and the fact that the copula forms are the first thing the learner hears in the language classroom. Slabakova (2009) looks at various linguistic accounts of morphological knowledge development and argues that two feature-based accounts, the Morphological Underspecification Hypothesis (McCarthy 2008) and the Combinatorial Variability Hypothesis (Adger 2006) were largely supported by the experimental findings. Slabakova (2009) argues that only accounts looking at mental representation of features adequately explain L2 morphological variability.

However, using inflectional morphology to comprehend grammatical meanings appears to be hard for some native speakers, too. Dąbrowska and Street (2006) test comprehension of pragmatically plausible and implausible passives by English natives and L2learners. The researchers tested four subject groups (n=10 each): highly-educated native speakers with more than 15 yrs of education, typically attaining MA/PhD degrees, low-educated natives with no more than high-school education, highly-educated non-native speakers with MA or PhD degrees, and low-educated non-native speakers who had not studied beyond high-school. The latter were native speakers of Arabic and had come to the host country as asylum seekers or refugees. Participants were asked to listen to the experimental sentences and then to answer the question of who is the do-er of the action (the agent). They heard sentences in four conditions: plausible and implausible actives and passives as in (5). Accuracy of comprehension and standard deviations are given in Table 3.

(5) a. The dog bit the man. (plausible active)
 b. The man bit the dog. (implausible active)
 c. The man was bitten by the dog. (plausible passive)
 d. The dog was bitten by the man. (implausible passive)

Table 3: Accuracy and SD (%) on active and passive sentences from Dąbrowska and Street (2006)

| | Plausible actives | Implausible actives | Plausible passives | Implausible passives |
|-------------------|-------------------|---------------------|--------------------|----------------------|
| Hi Ed natives | 100 (0) | 100 (0) | 100 (0) | 96 (13) |
| Hi Ed non-natives | 98 (6) | 100 (0) | 100 (0) | 98 (6) |
| Lo Ed natives | 98 (6) | 64 (30) | 98 (6) | 36 (26) |
| Lo Ed non-natives | 94 (13) | 90 (11) | 98 (6) | 94 (10) |

It is clear from Table 3 that all experimental groups were quite good at comprehending plausible sentences, that is, when knowledge of the world could be used to help them identify the agent of the action. However, low-educated native speakers had trouble comprehending implausible actives, while their understanding of implausible passives went down to 36% (see percentages in bold). These results suggest that the speakers were not using the passive inflectional morphology to process these sentences but instead were trying to make sense of the sentences using knowledge of the world. Dąbrowska and Street concluded that native speakers sometimes process sentences non-syntactically, relying on simple processing heuristics such as an Agent-Verb-Patient template. This suggestion is not new, it has been proposed by a number of psycholinguists: Clahsen and Felser's (2006) shallow processing, Ferreira, Bailey and Ferraro's (2002) 'good-enough' representations. The results of Dąbrowska and Street's study, however, also suggest that some non-native speakers process syntactic cues such as functional morphology much more reliably than less educated native speakers. In this respect, they surmise, the second language may even give an advantage to these speakers. Bilingualism may actually enhance attention to formal cues in language processing. Furthermore, input or exposure to a particular construction is not a completely decisive factor in comprehension, since the low educated non-native speakers did better than the low-educated non-native speakers on processing plausible and especially implausible passives.

Summarizing my main points about the inflectional morphology, I have argued that it is by definition the sticking point of acquisition because it encodes all the formal features of the grammar; it is hard not only in production but also in comprehension, and it is hard for native speakers who do not pay attention to syntactic cues. Keeping in mind the difficulty of functional morphology, the next question arises: is acquiring morphology harder than acquiring syntactic properties?

4. Relative difficulty of syntax for native and non-native speakers

In this section, I would like to speculate on the relative difficulty of syntax. It is well known that, apart from limited language-specific parsing strategies, processing syntax involves universal, therefore

transferable, operations. Once the features encoded in functional morphology and the lexical items of the second language are acquired, learners should have no trouble understanding complex syntax. This prediction actually follows from the language architecture discussed above and from the assumption that differences between languages are captured by formal features reflected in the inflectional morphology. This prediction is largely supported and has been amply documented in the pioneering work of Dekydtspotter, Sprouse and colleagues (e.g., Dekydtspotter, Sprouse and Thyre 1999/2000 among many other works, see Slabakova 2006, 2008 for review). However, it is a less well-known fact that processing complex syntax such as multiple embeddings or long-distance *wh*-movement may be affected by lack of experience with specific constructions as well as working memory or processing limitations. In this respect, second language learners are comparable. One could logically ask: Is what is difficult for non-native speakers easy for all native speakers? Next, we shall look at one study that points to a negative answer.

Dąbrowska (1997) tested 5 groups of native speakers differing in levels of education (n=10 each): cleaners, janitors, undergraduates, graduate students, and lecturers at the same UK university. She tested them on the comprehension of two types of parasitic gaps, complex NP, and *tough*-movement constructions. I will illustrate here with just one example as in (6). Sentences were presented visually and aurally.

(6) Paul noticed that the fact that the room was tidy surprised Shona.

Then participants were asked the following comprehension questions:

(7) What did Paul notice?
What surprised Shona?

Table 4: Accuracy percentage on complex NP comprehension from Dąbrowska (1997)

| Cleaners | Janitors | Undergrads | Graduates | Lecturers |
|----------|----------|------------|-----------|-----------|
| 29 | 14 | 38 | 66 | 90 |

What these results point to is the fact that complex syntactic structures, as exemplified here by the complex NPs, are not inevitably processed problem-free by native speakers. Furthermore, a speaker's accuracy on comprehension was highly correlated with the amount of schooling the individual had received. This finding highlights the importance of linguistic exposure and input for the performance of native speakers. One more study should be mentioned in this connection. Chipere (2003) tested complex NP comprehension again, following Dąbrowska (1997), with the same experimental design. This time, subjects were graduate student native speakers, high-school-only native speakers, and highly-educated non-native speakers. Chipere found that the highly-educated native and non-native speakers had the exact same behavior, while the low-educated native speakers had an error rate higher than 90%. This situation is of course reminiscent of the results of the Dąbrowska and Street (2006) study discussed in the previous section.

We can tentatively conclude, indeed, that what is difficult for non-native speakers is also difficult for low-educated native speakers who have had little exposure to complex syntactic constructions. After they learn the formal features, non-native speakers roughly pattern with their native speaker education peers in processing complex language. In processing syntax, as well as in the processing of morphology, learning an L2 may afford some advantages in terms of attending to syntactic cues in processing.

5. The syntax-semantics interfaces

Discussing L2 acquisition of linguistic properties at the syntax –semantics interface, Slabakova (2008) divides learning situations into two qualitative types. The first type is dubbed *Simple Syntax*—

Complex Semantics. These L1-L2 learning tasks involve meanings that are denoted by seemingly similar morphemes such as the English past simple and past progressive aspectual tenses compared to the Spanish Preterit and Imperfect tenses. Examples of this syntax-semantics mismatch are given in (2) and (3) above. In this case, the learner is initially tempted to map L1 morphemes onto L2 morphemes: simple past onto Preterit, past progressive onto Imperfect, based on the similarity of some meanings. However, this initial assumption is only partially correct, since not all meanings encoded by the simple past are rendered by the Preterit. The habitual meaning (2a and 3a) is denoted by the English simple past and the Spanish Imperfect. This is a classic morphosyntax-semantics mismatch, which understandably takes time to notice and learn.

I will illustrate the same situation with another contrast and then discuss its L2 acquisition. The linguistic properties whose acquisition Slabakova (2003) investigates have to do with grammatical aspect. English differs from German, Romance, and Slavic with respect to the semantics of the present tense. It is well known that the English bare infinitive denotes not only the processual part of an event but includes the completion of that event.

(8) a. I saw Mary cross the street. (completion entailed)
 b. I saw Mary crossing the street. (no completion entailed)

In trying to explain the facts illustrated in (8), many researchers have noticed that English verbal morphology is impoverished (Bennett and Partee, 1972). The experimental study adopts Giorgi and Pianesi's (1997) proposal. English verbs, they argue, are "naked" forms that can express several verbal values, such as the bare infinitive, the first and second person singular, and the first, second and third person plural. Giorgi and Pianesi (1997) propose that verbs are categorially disambiguated in English by being marked in the lexicon with the aspectual feature [+perf], standing for 'perfective.' Thus, children acquiring English can distinguish verbal forms from nominals, whose feature specification bundle will exclude the feature [+perf]. In Romance, Slavic, and other Germanic languages, on the other hand, all verbal forms have to be inflected for person, number, and tense. Thus, nouns and verbs cannot have the same forms, unlike English, in which zero-derivation abounds. The Bulgarian verb, for example, is associated with typical verbal features as [+V, person, number] and it is recognizable and learnable as a verb because of these features. Bulgarian verbs are therefore not associated with a [+perf] feature. Consequently, Bulgarian equivalents to bare infinitives do not entail completion of the event, as (9) illustrates.

(9) Ivan vidja Maria da presiča ulicata. (no completion entailed)
 Ivan saw Maria to cross street-DET
 'John saw Mary crossing the street.'

Thus, Bulgarian and English exhibit a contrast in the present viewpoint aspect. It follows that the Bulgarian functional category AspP does not have to check the feature [+perf] because the verbal root does not carry this feature from the lexicon. In the acquisition of English by Bulgarian native speakers, then, the learning task is to notice the trigger of this property: the fact that English inflectional morphology is highly impoverished, lacking many person-number-tense verb endings. The property itself, if Giorgi and Pianesi are correct, is the [+perf] feature that is attached to English eventive verbs in the lexicon. Knowledge of this property will entail knowledge of four different interpretive facts: 1) bare verb forms denote a completed event; 2) present tense has only habitual interpretation; 3) the progressive affix is needed for ongoing interpretation of eventive verbs; 4) states in the progressive denote temporary states. This is a syntax-semantics mismatch that relates a minimal difference between languages—the presence or absence of a feature in the lexicon—to various and superficially not connected interpretive properties. All of the properties are not attested in the native language of the learners. Even more importantly, of the four semantic properties enumerated above, the second, third, and fourth are introduced, discussed, and drilled in language classrooms. The first one, however, is not explicitly taught.

A hundred and twelve Bulgarian learners of English took part in the experiment, as well as 24

native speaker controls. The learners were divided into low, high intermediate and advanced. The learners were typical classroom instructed learners. All participants took a production task to ascertain knowledge of inflectional morphology and a Truth Value Judgment Task with a story in their native language and a test sentence in English. Example (10) below illustrates a test item. Each story was followed by a single sentence (I collapse a quadruple here for lack of space).

(10) A quadruple testing completed interpretation of English bare forms (a.k.a. perceptual reports)

Matt had an enormous appetite. He was one of those people who could eat a whole cake at one sitting. But these days he is much more careful what he eats. For example, yesterday he bought a chocolate and vanilla ice cream cake, but ate only half of it after dinner. I know, because I was there with him.

I observed Matt eat a cake. True False

I observed Matt eating a cake. True False

Alicia is a thin person, but she has an astounding capacity for eating big quantities of food. Once when I was at her house, she took a whole ice cream cake out of the freezer and ate it all. I almost got sick, just watching her.

I watched Alicia eat a cake. True False

Results on the acquisition of all four semantic properties pattern the same way. On the three instructed properties (habitual interpretation of the present, progressive needed for ongoing interpretation, states in the progressive denote temporary states), the advanced learners are highly accurate. Intermediate learners are more accurate on the habitual presents than on ongoing progressives. Thus initial L1 transfer and subsequent morphological acquisition are clearly attested in the data.

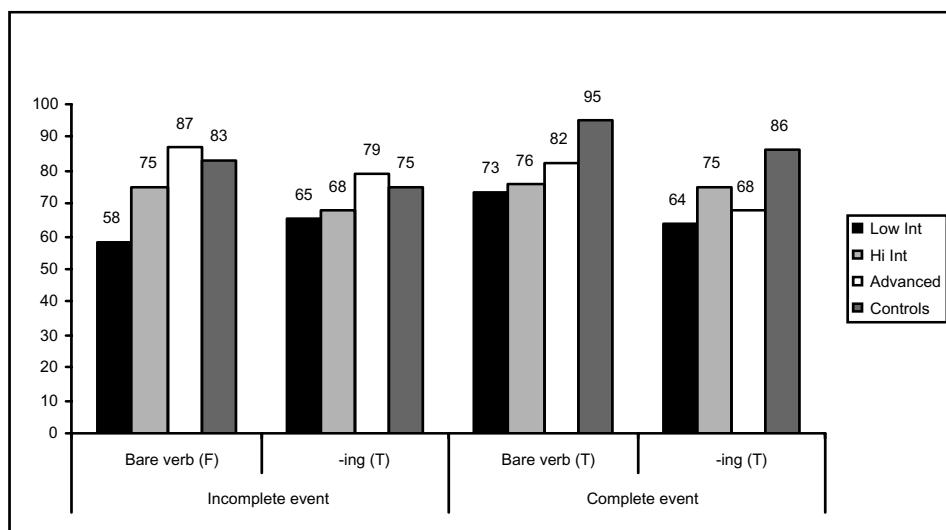


Figure 1. Mean accuracy on bare verb versus *-ing* form on perceptual reports (in per cent) from Slabakova (2003)

As Figure 1 shows, advanced learners are even more accurate than native speakers in their

knowledge that an English bare verb denotes a complete event, and consequently is incompatible with an incomplete event story (see first group of columns). Even more importantly, all learner groups are quite accurate in attributing a complete interpretation to the bare verb, a property that cannot transfer from the L1, as example (9) indicates. Note also that both native speakers and advanced learners prefer to combine complete event stories with a bare verb form, although the *-ing* form is not ungrammatical. In other words, both groups focus on completion in the context of a telic event. Individual accuracy shows that more than half of individual learners (ranging from 53% to 100%) have acquired successfully every aspect of the taught properties. Importantly, 44% to 72% of individuals were successful on the different mappings of the untaught property.

After establishing that it is *possible* to acquire semantic properties in the second language that are not manifested in the native language, let us now turn to the impact of the instruction variable. Slabakova (2003) reports that extensive scrutiny of the instruction materials and discussions with the instructors ascertained that the present simple and progressive tense meanings are explicitly taught and drilled from the beginning of classroom instruction. On the other hand, the closed denotation of bare verb forms is not taught, and the Bulgarian teachers are not consciously aware of it. Is it the case that instruction is a significant variable and learners were more accurate on the taught than on untaught properties? The short answer is “no.” ANOVA on the data for each group, with condition as the sole factor indicated that all groups perform equally well on all conditions. The theoretical implication of this finding is that all semantic effects of learning the trigger (English verbs are morphologically impoverished) and the related property ([+perf] feature attached to verbs in the lexicon) appear to be engaged at the same time. Even untaught syntax-semantics mismatches are learnable to a native-like level.

In the other learning situation identified by Slabakova (2008) and dubbed *Complex Syntax—Simple Semantics*, the properties to be acquired involve intricate and less frequent constructions such as double genitives, discontinuous constituents, quantifiers at a distance, scrambling, etc. As mentioned above, acquisition of this type of property was pioneered and developed in the work of Dekydtspotter, Sprouse and colleagues. Very often the native speakers in these experiments show far lower than the acceptance rates we are used to seeing in the L2 literature. In a lot of cases, alternative ways of articulating the same message exist, making the tested constructions dispreferred. (That may explain the fact that learners sometimes have higher rates of acceptance than native speakers.) In most cases, the properties under scrutiny present Poverty of the Stimulus learning situations to the learner. However, at the syntax-semantics interface, these same properties do not present much difficulty, as there are no mismatches. If learners have acquired the relevant Functional Lexicon item and have constructed the right sentence representation, the presence or absence of semantic interpretation follows straightforwardly without any more stipulations. In most cases (see Slabakova 2008, ch. 7) learners demonstrate that a contrast exists in their grammar between the allowed and the disallowed interpretations. Scrutinizing the combined findings of the already vast literature on acquisition of the syntax-semantics interface, we can safely say that it does not present difficulties to second language learners.

6. The syntax-discourse interface

The syntax-discourse interface may be qualitatively different from the syntax-semantics interface. There is a growing body of research suggesting that *external* interface properties (those that are at the interface of linguistic modules and other cognitive systems such as syntax-discourse) are especially difficult to acquire and subject to developmental delays, as compared to *internal* interface properties (those that are at the interface of different linguistic modules) (Tsimpli and Sorace 2006, White 2009). The most well researched property at the syntax-discourse interface is the Null Subject Parameter, since it involves both syntactic and pragmatic constraints (Belletti, Bennati, and Sorace 2007, Rothman 2009, among many others) I will compare here two studies that investigate another property: clitic doubling. Clitic-doubling in Bulgarian (a syntactic property) is sensitive to which argument is Topic (old information, based on the current discourse), Topics are clitic-doubled whether they are fronted as in (11A) or in situ as in (11B). In (11C), # stands for ‘infelicitous’.

(11) Q: Has anybody seen Ivan?
 A: Ivan **go** vidja Maria. O-Cl_{obj}-V-S
 Ivan him-cl saw Maria
 B: Maria **go** vidja Ivan S-Cl_{obj}-V-O
 Maria him-cl saw Ivan
 C: #Ivan vidja Maria #O-V-S
 'Maria saw Ivan'

In Spanish, a very similar construction is known as clitic-left dislocation (CLLD): a fronted topic is doubled by a clitic, but only when it is specific:

(12) El libro, lo lei
 the book, it-cl read-1sg
 'The book, I read.
 (13) *Un libro, lo lei
 a book, it-cl read-1sg
 'A book, I read.

Valenzuela (2006) studied knowledge of this semantic-pragmatic constraint in the interlanguage grammar of near-native speakers of Spanish with English as their native language. She employed an oral GJ task, an oral sentence selection task, and a written sentence completion task, all targeting knowledge of the same property. Oral presentation of the experimental stimuli is crucial in such studies, as the intonation should include a pause between the fronted object and the rest of the sentence, but not a very long pause (Valenzuela 2006: 291). Results of all three tasks indicate that near-native speakers are not distinguishing between specific and non-specific topic constructions to the same degree as the monolingual controls. However, the differences are really a matter of degree, as all the choices of the near-natives are in the right direction. Note also that examining individual results may point to a somewhat different conclusion.

Ivanov (2009) also studied knowledge of clitic-doubling as a marker of topicality, but he compared it to knowledge of the fact that the clitic is ungrammatical when it doubles focused constituents. He employed a GJ task and a context-sentence evaluation task: a situation described in English and a short dialogue in Bulgarian where the participants had to evaluate four options on a scale from 1 (totally unacceptable) to 5 (perfectly acceptable). Test items were presented both written and aurally. Fourteen intermediate and 10 advanced learners of Bulgarian as well as 15 native Bulgarian controls participated in the experiment over WebSurveyor (that is, they took the test over the internet at their own pace). Here is an example of a test item from the context-sentence evaluation task:

(14) Mr. Jordanov, the manager of Doublestream Ltd., runs into the office looking for one of the company employees, Ivan. Ivan is nowhere to be seen but there are several other employees working in their cubicles. Mr. Jordanov asks them:

Q: Njakoj viždal li e Ivan dnes?
 anybody seen Q is Ivan todaY
 'Has anybody seen Ivan today?
 A: Ivan **go** vidjah tazi sutrin. ✓ Felicitous
 Ivan him-cl saw-1sg this morning
 'I saw Ivan in the morning.'
 B: Tazi sutrin **go** vidjah Ivan. ✓ Felicitous
 C: Ivan vidjah tazi sutrin. # Non-felicitous
 D: Tazi sutrin vidjah Ivan. # Non-felicitous

Table 5 gives the mean acceptance rate in the accusative condition (Ivanov included accusative

and dative clitics in his study.)

Table 5. Mean acceptance rate (out of 5) in the accusative condition

| Participant group | O-Cl-V-Adv | Adv-Cl-V-O | O-V-Adv | Adv-V-O |
|--------------------------|------------|------------|----------------|----------------|
| | Felicitous | Felicitous | Non-felicitous | Non-felicitous |
| Bulgarian controls | 4.82 | 4.52 | 1.72 | 2.7 |
| Advanced Bg learners | 4.73 | 4.32 | 2.62 | 3.2 |
| Intermediate Bg learners | 3.7 | 3.33 | 3.79 | 4.41 |

Note that knowledge of clitic-doubling in these learners' interlanguage cannot come from English since English lacks clitics. The discourse requirements are not taught in Bulgarian classrooms but they are extremely frequent in every-day informal Bulgarian. Intermediate learners as a group are not sensitive to the discourse properties of clitic-doubling, although on the whole they are aware of their syntactic properties. All 10 advanced learners exhibit knowledge of syntactic as well as the discourse requirements of clitic-doubling, and 7 of them are statistically indistinguishable from native speakers in recognizing the pragmatic constraints.

While the jury is still out on L2 acquisition at the syntax-discourse interface, some studies indicate that there is extended optionality and variability in the acquisition of different types of interface properties while other studies point to complete and successful acquisition. It is essential in the future to expand the range of properties and languages that we investigate at this interface.

7. The semantics-pragmatics interface

Finally, I will review some recent work on the acquisition of properties on the interface between semantics and pragmatics. Work on L2 acquisition of such properties is in its very early stages, but there is already a considerable body of findings on the child knowledge of such properties. An ideal property to study at the semantics-pragmatics interface is scalar implicature. It involves additional calculation of meaning over and beyond what compositional semantics brings. For example:

(15) Some professors are smart. → **IMPLICATION** (16) Not all professors are smart.
BUT NOT (17) All professors are smart.

Logically speaking, *some* means *some and possibly all*. For pragmatic felicity, however, *some* means *some but not all*. Thus the sentence in (15) actually implies the meaning in (16) but not (17). The logic goes like this: If the speaker wanted to say that *some and possibly all* professors are smart, she would have uttered (17), being maximally informative. Since she did not, she must really mean (16), *not all* professors are smart. Understatements of this sort in human speech are regulated by Gricean maxims, and more specifically, the Maxim of Quantity: Make your contribution as informative as is required; Do not make your contribution more informative than is required (Grice, 1989). Lexical items that induce such calculations are arranged on a scale: *<some, most, all>*, *<start, finish>*, etc, where uttering the lower-placed item implies that the higher placed item is not true. Since the scalar implicature computation mechanism is universal, the learning task in L2 acquisition involves transferring this purportedly universal mechanism from the L1. Therefore, we expect L2 learners to be accurate in scalar implicature derivation once they know the scalar lexical items, but that processing resources may have an impact on accuracy and speed.

Slabakova (2007) tested knowledge of scalar implicatures by 23 English native speakers, 30 Korean native speakers, and 30 advanced and 20 intermediate Korean learners of English. The two native speaker groups were intended to ascertain that the scalar implicature calculation mechanism is indeed universal. In Experiment 1, subjects read 8 universally true sentences (*All elephants have trunks*), 8 sentences infelicitous with *some* (*Some elephants have trunks*), 8 sentences felicitous with *some* (*Some books have color pictures*), 8 sentences false with *all* (*All books have color pictures*), and

8 absurd fillers (*All/some garages sing*). Percentages of logical responses across participant groups are given in Table 6.

Table 6. Percentage of Logical Responses across participants groups in Experiment 1

| Groups | True all | False all | Felicitous some | Infelicitous some |
|------------------|----------|-----------|-----------------|-------------------|
| English controls | 75.5 | 98.9 | 96.7 | 55.4 |
| Korean controls | 88 | 98.5 | 99 | 61.2 |
| L2advanced | 82 | 98 | 98 | 39.2 |
| L2Intermediate | 78 | 97 | 90 | 41.8 |

The results in Table 6 confirm that English and Korean adult native speakers give roughly 60% logical answers and 40% pragmatic answers. In addition, individual results reveal that these participants fall roughly into two groups: people who consistently give logical answers and people who consistently choose pragmatically felicitous answers. Importantly, Korean learners of English attribute more pragmatic interpretations to scalar implicatures without context than they do in their native Korean, and significantly more than English native speakers. When asked to judge sentences with some in context, they offer pragmatic judgments around 90% of the times (Experiment 2). These findings suggest that L2 learners observe Gricean maxims even at an intermediate level of attainment, and probably right after they learn the scalar lexical terms. Much more research on properties at the semantics-pragmatics interface is necessary before we come to any solid conclusions. However, it is safe to say at this point that the first findings point to no real difficulty at this interface.

8. Implications for teaching

It is fairly common to assert that the generative approach to L2 acquisition does not really have any predictions to make about teaching a language. As a cognitive discipline within a theoretical perspective inherently not interested in the process of learning (as opposed to the process of acquisition), this approach has frequently turned its attention to the L2 acquisition of subtle phenomena that are never discussed in language classrooms and language teachers have no explicit knowledge of these properties. Subjacency, the linguistic constraint that regulates how far a *wh*-phrase can move away from its original position and how many other phrases it may jump over, is one such example among many. Generative studies of L2 acquisition rarely incorporate classroom instruction as part of their design.¹ Thus, it is generally believed that the generative framework has nothing valuable to offer to language teachers. In a break with tradition, however, I argue that the Bottleneck Hypothesis has some pedagogical implications.

In language classrooms, teaching techniques that emphasize communicative competence (Canale and Swain, 1980; Savignon, 1983) are very popular these days. Such techniques encourage learners to use context, world knowledge, argument structure templates, and other pragmatic strategies to comprehend the message, capitalizing on the fact that learners almost certainly use their expectations of what is said to choose between alternative parses of a sentence. In fact, Clahsen and Felser's (2006) Shallow Structure Hypothesis proposes that context, pragmatic knowledge, and argument structure are the only processing strategies available to adult learners. However, many second language researchers question the direct connection between comprehending the L2 message and figuring out how the L2 syntax works (Gass and Selinker, 2001:317; Cook, 1996: 76). It is believed that some attention to, or focus on, *grammatical form* is beneficial and necessary for successful learning. In this respect, communicative competence approaches—with their exclusion of focus on form—may not be the best way to accomplish the ultimate goal of second language learning: building a mental grammar of the target language.

The Bottleneck Hypothesis supports such a conclusion and endorses increased emphasis on

¹ The White and colleagues studies investigating the verb movement parameter are the notable exception. Their general conclusion on the effect of targeted instruction was quite pessimistic.

practicing grammar in the classroom. The functional morphology in a language has some visible and some hidden characteristics. It may have phonetic form, and if it does, its distribution is in evidence and learnable. Secondly, it carries syntactic features that are responsible for the behavior of other, possibly displaced elements and phrases in the sentence. Thirdly, it carries one or more universal units of meaning. While the first trait of functional morphology is observable from the linguistic input, the second and third characteristics may not be so easy to detect. It is suggested here that practicing the inflectional morphology in language classrooms should happen in meaningful, plausible sentences where the syntactic effects and the semantic import of the morphology is absolutely transparent and non-ambiguous. In a sense, drilling of the inflectional morphology is inevitable if the form has to move from the declarative to the procedural memory of the learner and then get sufficiently automatic for easy lexical access. Practicing inflectional morphology in context should be very much like lexical learning (because it *is* lexical learning), and, as everybody who has tried to learn a second language as an adult (or even a teenager) knows, no pain—no gain. Although rooted in a different theoretical foundation, the Bottleneck Hypothesis is akin in its pedagogical implications to the Focus on Form approach (Doughty, 2001; papers in Doughty & Williams, 1998), the Input Processing theory of VanPatten (1996, 2002a,b, 2007) and the Skill Acquisition theory of DeKeyser (1997, 2001, 2007).

9. Taking stock

I will conclude by reiterating the main points of this paper. I have argued that narrow syntactic knowledge comes before accurate knowledge of morphology in production and comprehension (White 2003, Slabakova and Gajdos, 2008). Functional morphology is harder for low-educated native speakers than for non-native speakers (Dąbrowska and Street 2006). In processing complex syntax, low-educated native speakers who have had little exposure to complex constructions may be at a disadvantage compared to non-native speakers (Gabrowska 1997, Chipere 2003). I have also argued that once the inflectional morphology is learned, learners are aware of all its semantic consequences, taught and untaught (Slabakova 2003). Even at the syntax-discourse interface, acquisition of properties unavailable from the L1 is possible (Ivanov 2009). At the semantics-pragmatics interface, L2 learners transfer universal properties like Gricean maxims (Slabakova 2007).

The rationale of the Bottleneck Hypothesis is as follows:

- 1) Inflectional morphology reflects syntactic and semantic differences between languages;
- 2) Narrow syntactic operations and meaning calculation are universal;
- 3) In order to acquire syntax and meaning in a second language, the learner has to go through the inflectional morphology;
- 4) Hence, morphology is the bottleneck of acquisition!

Thus the bottom-line of the paper is: Practice your functional morphology! In ample and clear, unambiguous context! As in learning other lexical items, it may be painful, but – no pain, no gain!

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