

# Reflexes of a Syntactico-Semantic Organization in English-French Implicatures\*

Laurent Dekydtspotter and Jon C. Hathorn  
Indiana University

## 1. Introduction

Exploring the implications of Fodor's (1983) modularity thesis for L2 acquisition, Schwartz (1986, 1987) points out that if language necessitates a domain-specific (i.e. Universal Grammar (UG) governed), informationally encapsulated sentence processing module, then L1 and adult L2 grammars must be constrained by UG. Schwartz argues that computational inevitability and inter-modular impenetrability in language processing determine UG-constrained L2 acquisition (see Schwartz (1998) for an argument that L2 acquisitional sequences are in fact the product of a language instinct). Inter-modular impenetrability also means that only primary linguistic data may lead to acquisition, whereas information about (analyses of) the TL's structure may not. Following Segal (1996), Schwartz (1999) explores the relationship between Chomsky's UG module and Fodor's language perception module: Chomsky's UG module is a body of inherent knowledge. Fodor's module is a computational algorithm mapping language input to semantic representations readable by central processors. Hence, as Schwartz (1999) notes, the two modules are complementary: Informational encapsulation added to a Chomskian module achieves a Fodorian module. Schwartz's conjecture would be most strongly supported by evidence that L2 knowledge not only require UG but crucially require key properties of the Fodorian language processing module such as mandatory (and informationally encapsulated) computations. At the interface with systems of language use, modular computations would satisfy general principles of cooperation in domain-specific ways and would exhibit impermeability to contextual information.

We document aspects of interlanguage interpretive knowledge across developmental groups that not only present a poverty of the stimulus problem that *prima facie* requires UG, but also requires Logical Form (LF) induced pragmatic computations satisfying general principles of cooperation in domain-specific ways. This might *a priori* seem odd. Schwartz (1986: 145) notes that "sociolinguistic and pragmatic competence must be the result of inferentially *promiscuous* processes [read, not informationally encapsulated], unlike grammatical competence." However, we show that certain aspects of L2 interpretive knowledge at the interface between domain-specific and domain-general knowledge present strong evidence that an innate, unchanging processing module constrains L2 acquisition. Indeed, not all aspects of pragmatics are of the same cognitive cloth: Gricean conversational implicatures are highly context-dependent. But, crucial to the investigation of

---

\* We wish to thank Indiana University for support through a Graduate Research Funds grant (administered though the Department of French and Italian) award to Laurent Dekydtspotter and Jon Hathorn. We express our thanks to Rex Sprouse for his input on the methodology, and comments. We also thank the individuals who volunteered as participants and the course administrators for their generosity. Finally, we also thank Kathleen O'Connor for collecting data from the group of native French speakers at the Université de Lille, France.

modularity in L2 acquisition, some presuppositions and scalar implicatures are grammatically calculated and triggered. In particular, scalar implicatures with numerals and quantifiers satisfy Grice's (1975) principles of conversational cooperation, but they do so along fixed, grammatical dimensions (Horn, 1992; Kadmon, 2000; Landman, 1998). Grammatically triggered scalar implicatures thus exemplify Fodorian computational modularity at the interface between domain-specific and domain-general knowledge by satisfying domain-general cooperation principles in idiosyncratic ways. Searching for reflexes of such a module in L2 acquisition, we focus on English-French knowledge of interpretation beyond the literal semantics of sentence types not licensed in English. We show that aspects of L2 interpretive knowledge require an innate and domain-specific morphosyntactic constraint on LF representations as well as LF-induced computations satisfying domain-general requirements on language use in domain-specific ways.

## 2. A learning problem

In French, unlike in English, the existential quantifier *quelque chose* ‘something’ may take an adjectival restriction introduced by the particle *de*. This adjectival restriction may appear together with the quantifier as in (1) or may be separated from it as in (2) (Azoulay-Vicente 1985, Birdsong 1985, Huot 1981, Hulk and Verheugd, 1994).

- (1)     Quelque chose de remarquable a été observé par chacun des chercheurs.  
            something       of remarkable    was observed    by each of-the researchers  
‘Something remarkable was observed by each of the researchers.’
- (2)     Quelque chose a été observé de remarquable par chacun des chercheurs.  
            something       was observed of remarkable    by each of-the researchers  
‘Something remarkable was observed by each of the researchers.’

The permutation of the continuous structure (1) into the discontinuous structure (2) is accompanied by very subtle interpretive effects. Both (1) and (2) may describe a situation where each researcher observed a different remarkable object. However, if you know that each researcher observed the same remarkable object, you utter (1), but not (2). When uttering (2), the native French speaker implies that the same remarkable object was not observed by all researchers.

Can a (second) language acquirer come to know that the discontinuous sentence (2) excludes situations where the same object was observed by all researchers? There are serious obstacles in the path of the learner. If the learner extends the familiar continuous pattern in (1) to the unfamiliar discontinuous pattern in (2), no evidence will ever inform the learner that discontinuous (2) is not a synonymous variant of continuous (1). This is because in every situation where discontinuous (2) is used, continuous (1) may be used as well. The learner thus never encounters a situation where only (2) can be used.

Even if the learner does not make this analogy, severe problems remain. Situations of use do not unambiguously reflect the form-meaning relations above. The assumption that the same remarkable object was not observed by all researchers can be cancelled by additionally uttering (3).

- (3)     En fait, la même chose a été observée par tous les chercheurs.  
            in fact the same thing    was observed by all the researchers  
‘In fact, the same thing was observed by all the researchers.’

Such corrective statements confuse form-meaning relations in usage, because the learner will not reliably encounter (2) only in situations where (at least) two different remarkable objects come into play. This is because the use of (2) can be felicitous when combined with sentence (3) in such a context. Additionally, the corrective statement in (3) is also compatible with the continuous sentence

(1) as seen in (4). Hence, corrective statements do not uniquely flag the interpretation of (2), because they can be found across the continuous/discontinuous dimension.

- (4) Quelque chose de remarquable a été observé par chacun des chercheurs.  
 something of remarkable was observed by each of the researchers  
 'Something remarkable was observed by each of the researchers.'

En fait, la même chose a été observée par tous les chercheurs.  
 in fact the same thing was observed by all the researchers  
 'In fact, the same thing was observed by all the researchers.'

It is thus evident that in actual usage the correspondences between sentence structure and real-world situations are highly unstable.

In addition to problems in the character of the environment, learning problems also arise as a function of the learner. If the learning algorithm proceeds inductively by making (non-demonstrative) inferences that can be (dis)confirmed by further evidence, (erroneous) beliefs about the facts under discussion could cause unlearning at any point of acquisition, depending on the perspective taken. Such disconfirmations cannot occur if grammatical knowledge follows deductively as a necessary consequence of a specific mental organization. Thus, since induction cannot *guarantee* that the relevant grammatical properties will arise in the general case, if such properties arise predictably (i.e., measurably) in the course of development, then these properties are more feasibly viewed as an expression of a specific mental organization inherent in the learner.

Finally, we note that the construction is subject to stylistic constraints that make it unlikely to be part of the daily exposure of classroom learners. This adds to the complexities facing inductive acquisition in actual situations of use. In the case of second language acquisition, it is also important to note that the construction and its interpretation are not the topic of instruction, and that most French language instructors are not consciously aware of the grammatical properties under discussion.

### 3. Mandatory computations beyond LF-imposed semantics

In this section we show that the interpretation of discontinuous Q... de A sentences is not uniquely imputable to a certain mapping between syntax and semantic representations, and specify the type of computations required for the interpretation. Both (1) and (2) introduce an existential quantifier *quelque chose* (analyzed with existential  $\exists$ ) and a universal quantifier *chacun des chercheurs* (analyzed with universal  $\forall$ ). These quantifiers bind variables in the thematic positions of the verb and interact with one another. The existential quantifier *quelque chose* either takes scope under the universal quantifier *chacun des chercheurs* as in (5) or over it as in (6). These representations in (5) and (6) (abstracting from tense) correspond to the range of interpretations potentially available to (1) and (2).

- (5)  $\forall y [ \text{researcher}(y) \rightarrow [\exists x [ \text{thing}(x) \wedge \text{remarkable}(x) \wedge \text{observe}(x)(y)]]]$   
 'For every researcher there is a remarkable thing she observed.'  
 (6)  $\exists x [ \text{thing}(x) \wedge \text{remarkable}(x) \wedge \forall y [ \text{researcher}(y) \rightarrow [ \text{observe}(x)(y)]]]$   
 'There is a remarkable thing that every researcher observed.'

We first consider the truth conditions of (5) and (6) and semantic relations between (5) and (6). (5) is true in situations where each researcher is such that some remarkable thing was observed by her (possibly the same object). (6) is true in situations where some remarkable thing is such that every researcher observed it. Thus both (5) and (6) are true in situations that make (6) true. (6) asymmetrically entails (5): Whenever (6) is true, (5) is true; but not the other way around. This is because the set of situations that make (6) true and the set of situations that make (5) true stand in the inclusion relations in (7): The set of situations that verify the semantic representation (6) with the

quantifiers in the  $\exists\forall$  scope relation (i.e., the set of situations where the same remarkable object is observed by each researcher) is a subset of the set of situations that verify the semantic representation (5) with the quantifiers in the  $\forall\exists$  scope relation (i.e., the set of situations where each researcher observed some remarkable object, possibly the same one).

- (7)  $\{s \mid s \text{ is characterized by (6)}\} \subseteq \{s \mid s \text{ is characterized by (5)}\}$

Given that (5, 6) constitutes the space of possible semantic representations for (1, 2), the asymmetry found in French between (1) and (2) is semantically unexpected. This is because on any mapping of the forms in (1) and (2) to the semantic representations in (5) and (6), both (1) and (2) will be true in situations where the same remarkable object was observed by all the researchers. Therefore, given the possible semantics, the interpretive intuitions arising in French require subsequent computations beyond mappings to semantic representations.

Since Grice (1975), language use is assumed to be governed by domain-general principles of cooperation. In particular, the maxim of quantity (8) requires that the strongest statement consistent with what is known be made.

- (8) Maxim of Quantity: Make your contribution as informative as required, and no more informative than is required (Grice, 1975)

Horn (1985, 1989, 1992) shows that informational strength relations (on specific interpretive domains) play a significant role in determining how Grice's principles apply. On the domain determined by scope relations among the quantifiers in the semantic representations, the asymmetric entailment relation between the  $\exists\forall$  representation (6) and the  $\forall\exists$  representation (5), where (6) entails (5) (but not vice versa), creates an informational scale in which the entailing ("subset") representation (6) is informationally stronger than the entailed ("superset")  $\forall\exists$  representation (5). This is because the  $\exists\forall$  representation (6) uniquely characterizes the speech context, whereas the  $\forall\exists$  representation (5) allows for other possibilities. Given that (6) is informationally stronger than (5), the conversational cooperation Maxim of Quantity (8) requires that in a context where the  $\exists\forall$  representation (6) is true, (6) should be represented at Logical Form (LF) as the more informative statement. Because the  $\forall\exists$  representation (5) allows for other situations, it is less informative. Conversely, on the assumption that Quantity is satisfied, the  $\forall\exists$  representation (5) at the LF-interface triggers the implicature that the stronger statement (6) is not verified. In other words, if you could have made a stronger statement, you would have. Since you didn't make the stronger statement, you must believe that it is not true.

We now turn to the manner in which the word order asymmetries arise in French. First, an idiosyncratic syntax-semantics (LF-interface) mapping is required. The fact that discontinuous (2) *a priori* describes a situation where each researcher observed a different object requires the  $\forall\exists$  representation (5), because (5) is the only representation that allows for such situations. Following de Swart's work (1992) on constructions with discontinuous constituents, we adopt the interface constraint in (9).

- (9) In a construction:  $Q_2, \dots, Q_1, \dots, [e_j \text{ [restriction of } Q_1]] \dots Q_2$  cannot take scope over  $Q_1$   
 Semantic formulation: A quantifier  $Q_1$  can only separate a quantifier  $Q_2$  from its restrictive clause if  $Q_1$  has wide scope (or is scopally independent from  $Q_2$ ).

The constraint in (9) fixes the scope of a discontinuous quantifier ( $Q_2$ ) in terms of the placement of its restriction with respect to some other scope-bearing element. The syntactic constraint in (9) is necessary but not sufficient to account for the interpretive difference between (1) and (2). This is because the  $\forall\exists$  LF representation of (2) in (5), forced by the constraint in (9), is true not only of situations where each researcher observed a potentially different object, but also of situations where it turns out that the same object was observed. The mapping of (2) to (5) required by (9) is, therefore,

necessarily accompanied by a pragmatic inference. Hence, (9) must be supplemented by Gricean interpretive computations that lead to the exclusion of the set of situations described by (6).

In sum, the interpretive differences between (1) and (2) follow if

- i.) the sentence (1) maps to the semantic representation in (5) or in (6) at the LF-interface, whereas sentence (2) maps uniquely to the  $\forall\exists$  representation (5) at the LF interface, and;
- ii.) a scalar implicature in the sense of Horn (1989) “(6) does not hold” supervenes on the  $\forall\exists$  representation (5) at LF by Gricean Quantity with specific reference to scalar relations on a scope-dependent semantic domain.

#### 4. An experiment

Our experiment investigated continuous and discontinuous Q(...) de A sentences as descriptions of contexts where there was one object for each human participant and of contexts where there was the same object for all human participants. (We thus abstracted away from computationally more complex “intermediate” cases.) In the Target Language, continuous sentences are potentially associated with either scenario, but, crucially, discontinuous sentences do not allow there to be the same object for each human participant. Each item in the experimental instrument included a story told in English by a character (Mrs. Briggs) which provided either a scenario where there was a different object for each human participant or the same object for all human participants. This was followed by a request for information (*Qu'est-ce qui s'est donc passé?* ‘So, what happened?’) from a French-speaking character (Madame Goyette) about the story, and a Q(...) de A answer in French about the story in response to the information request. Respondents were told to indicate whether the Q(...) de A answer was an adequate response to the query by Madame Goyette. The respondents were told that an adequate response need not be complete and it need not have all the details of the relevant aspects of the story. It merely should not mislead the hearer about the facts.

Experimental items consisted of eight quadruples. Within each quadruple, continuous vs. discontinuous Q(...) de A answers were crossed with stories depicting a different object for each human participant or the same object for all human participants. The request for information was a constant. The lexical material within a given quadruple was identical and was limited to vocabulary familiar to respondents even at the most elementary level investigated. For each quadruple, we composed two brief prose narratives in English: one unambiguously involving the same object for all human participants and another involving a different object for each human participant in the event. Each narrative then appeared twice: once paired with a sentence exemplifying a continuous Q(...) de A answer and once paired with a sentence exemplifying a discontinuous Q(...) de A answer.

Sample Test Items 1-4 present a quadruple with an actual example from the task. Mrs. Briggs tells a story in English to a French pupil (*élève*). Mme Goyette then asks the pupil what happened (in French) in order to check the pupil’s comprehension of the story. The French pupil then answers Mme Goyette. The role of the respondent is to determine whether the pupil provided an adequate response. The questions in Sample Test Items 1-4 ask: ‘So, what happened?’ Sample Test Item 1 presents a scenario with a different object for each human participant and a continuous Q de A answer. Sample Test Item 2 presents the identical scenario but with a discontinuous Q... de A answer.

**Sample Test Item 1:**

Mrs. Briggs: Having landed on the planet Omega, the three scientists of the interstellar expedition separated to begin their exploration of the planet. The first scientist observed a new life form. The second scientist observed the fast growth of interesting crystals. The third scientist looked up from his notebook just in time to observe a meteor crash into the surface of the planet.

Mme Goyette: Qu'est-ce qui s'est donc passé?

Élève: Quelque chose--de remarquable--a été observé par chacun des scientifiques.

IS THIS AN ADEQUATE RESPONSE?    YES    NO    CANNOT DECIDE

**Sample Test Item 2:**

Mrs. Briggs: Having landed on the planet Omega, the three scientists of the interstellar expedition separated to begin their exploration of the planet. The first scientist observed a new life form. The second scientist observed the fast growth of interesting crystals. The third scientist looked up from his notebook just in time to observe a meteor crash into the surface of the planet.

Mme Goyette: Qu'est-ce qui s'est donc passé?

Élève: Quelque chose a été observé--de remarquable--par chacun des scientifiques.

IS THIS AN ADEQUATE RESPONSE?    YES    NO    CANNOT DECIDE

Sample Test Item 3 presents a scenario with the same object for all human participants and a continuous Q de A answer. Sample Test Item 4 presents the identical scenario, but with a discontinuous Q...de A answer.

**Sample Test Item 3:**

Mrs. Briggs: Having landed on the planet Omega, the three scientists of the interstellar expedition separated to begin their exploration of the planet. At exactly 1:45 in the afternoon, there was a flash of light. From their respective vantage points, each of the scientists observed a single enormous explosion on the closest moon.

Mme Goyette: Qu'est-ce qui s'est donc passé?

Élève: Quelque chose--de remarquable--a été observé par chacun des scientifiques.

IS THIS AN ADEQUATE RESPONSE?    YES    NO    CANNOT DECIDE

## Sample Test Item 4:

Mrs. Briggs: Having landed on the planet Omega, the three scientists of the interstellar expedition separated to begin their exploration of the planet. At exactly 1:45 in the afternoon, there was a flash of light. From their respective vantage points, each of the scientists observed a single enormous explosion on the closest moon.

Mme Goyette: Qu'est-ce qui s'est donc passé?

Élève: Quelque chose a été observé--de remarquable--par chacun des scientifiques.

IS THIS AN ADEQUATE RESPONSE?    YES    NO    CANNOT DECIDE

18 fillers designed to blend in with the rest of the task and offset the expected imbalance between the positive and negative responses were included for a total of 50 items. The 50 items were presented in 3 distinct random orders.

The narratives were presented in English to ensure that all respondents unambiguously understood the context in which the sentence was uttered. This allowed us to study learners at low levels of proficiency who might not be able to deal with an entire context in the Target Language. It might be argued that using English could detract from learner performance, since it requires a switch from one mode of understanding to another. However, in the study of knowledge of interpretive effects where understanding of the situation is crucial, the native language nearly guarantees that the respondent is in the relevant information state.

Our respondents included a group of 40 classroom learners of French from students enrolled in the third semester of the basic language program at Indiana University. It also included a group of 20 learners from fifth- and sixth- semester French language proficiency courses at Indiana University. Magnan (1986) found that most English-speaking students having completed one year of university study are concentrated at the intermediate low/mid levels in French language proficiency on the ACTFL scale. Those having completed two and a half years are concentrated on the intermediate high level on the ACTFL scale. Thus we refer to the 40 classroom learners of French in third-semester French as the low/mid intermediate group, and we refer to the 20 fifth- and sixth-semester classroom learners of French as the high intermediate group. The volunteers provided background information on their native language, their exposure to French, and any other languages they had studied or acquired. We excluded from consideration volunteers whose L1 was not English. Our native comparison group included 16 native French students majoring in English, enrolled in a third-year English language proficiency course at Université de Lille in France.

For the French natives, the patterns of differences in levels of acceptance are in conformity with the derivation of an implicature with  $\forall\exists$  representations at LF and with the fact that such representations are obligatorily induced at LF by discontinuous sentences. Thus a crucial asymmetry is found: There is no significant difference between continuous answers (82.81%) and discontinuous answers (71.09%) in different object contexts ( $t(15) = 1.15$ ,  $p = .267$ ), but there is a crucial significant difference between continuous answers at 82.03% and discontinuous answers at 61.72% in same object contexts ( $t(15) = 2.50$ ,  $p = .025$ ).

We turn to the differences of means within the two constructions. For discontinuous answers, the French natives' acceptance rate with the same object scenarios was 61.72%; whereas it was 71.09% with the different objects scenarios. This difference is significant ( $t(15) = 2.16$ ,  $p = .048$ ). In contrast, for continuous answers, the French natives' acceptance rates are virtually flat: 82.03% for the same object for all participants versus 82.81% for different objects for each participant ( $t(15) = .09$ ,  $p = .930$ ). (see Table 1.)

**Table 1:** French Natives (n = 16): percentage “yes” on continuous vs. discontinuous answers

		Continuous answers	Discontinuous answers
Different objects	<i>M</i> <i>SD</i>	82.81% 26.17	71.09% 33.76
The same object	<i>M</i> <i>SD</i>	82.03% 25.40	61.72% 32.43

Note. M = mean, SD = standard deviation

The generally high level of acceptance of discontinuous answers is also in conformity with the notion that aspects of the interpretation are pragmatically induced and can be cancelled. As examined in section 3, it is crucial to keep in mind that this type of response pattern simply cannot logically be accounted for unless implicatures are calculated.

We now consider the English-French learners. T-tests were performed for both subgroups. We therefore adopt a Bonferroni protection level of  $\alpha = .05/2 = .025$ . The low/mid intermediate learners (n = 40) accepted continuous and discontinuous answers with scenarios involving a different object for each participant at very similar rates: 76.25% and 74.06% respectively ( $t(39) = .70$ ,  $p = .489$ ). They also accepted continuous and discontinuous answers in the same object condition at the similar rates of 59.06% and 59.69% respectively ( $t(39) = .15$ ,  $p = .881$ ). Low/mid intermediate learners are therefore strongly biased against accepting answers with scenarios involving the same object for all human participants: continuous answers ( $t(39) = 3.97$ ,  $p < .0005$ ) and discontinuous answers ( $t(39) = 3.11$ ,  $p = .003$ ). This is shown in Table 2.

**Table 2:** Low/mid intermediate learners (n = 40): percentage “yes” on continuous vs. discontinuous answers

		Continuous answers	Discontinuous answers
Different objects	<i>M</i> <i>SD</i>	76.25% 21.52	74.06% 19.28
The same object	<i>M</i> <i>SD</i>	59.06% 22.64	59.69% 22.91

Note. M = mean, SD = standard deviation

In short, low/mid intermediate respondents interpreted continuous answers and discontinuous answers alike. No effect of word order was found for this population. The low/mid intermediate respondents dispreferred answers given in same object contexts. Again, this contrast is not expected purely in terms of the semantics of the possible representations involved. This is because the semantics predict that the value “true” is returned in same object situations. Similar acceptance rates are expected in all four cells. This strongly suggests that  $\forall\exists$  representations are accessed at the LF interface and that the situations corresponding to the  $\exists\forall$  scope configuration are pragmatically excluded. The existence of this asymmetry suggests mandatory computations of scalar implicatures in interlanguage.

In contradistinction to the low/mid intermediate respondents, high intermediate respondents (n = 20) exhibit sensitivity to word order in interpretation. With continuous answers, acceptance rates are statistically flat: 84.38% for different objects for each human participant versus 80.63% for the same object for all human participants ( $t(19) = .47$ ,  $p = .645$ ). With discontinuous answers, however, the acceptance rate in different objects for each human participant contexts (84.38%) marginally contrasts with the acceptance rate in same objects for all human participants contexts (66.88%), ( $t(19) = 2.32$ ,  $p = .032$ ). An asymmetry is also found when one considers the acceptance of continuous versus

discontinuous answers for each context type. The acceptance rates for continuous (84.38%) and discontinuous (84.38%) answers in contexts involving a different object for each human participant are completely flat ( $t(19) = .00, p = 1.00$ ). But, crucially, the acceptance rates for continuous (80.63%) and discontinuous (66.88%) answers in contexts involving the same object for all human participants contrast significantly ( $t(19) = 2.60, p = .017$ ). This is shown in Table 3.

Thus, continuous and discontinuous answers contrast in situations involving the same object for all human participants, but crucially not in situations involving a different object for each human participant. In contrast to low/mid intermediate respondents, high intermediate respondents show a lower acceptance of discontinuous answers in same object contexts with respect to continuous answers (in same object contexts). Differences between the two groups reveal a clear acquisition sequence, associated with the interpretation of continuous and discontinuous answers. An independent samples t-test -- comparing the relative acceptance of continuous answers as descriptions of same object scenarios, versus discontinuous answers as descriptions of same object scenarios -- confirms that the two groups are indeed statistically distinct ( $t(58) = 2.09, p = .041$ ). The behavior of high intermediate learners (contra low/mid intermediate respondents) is not unlike the pattern found in the French native speaker group.

**Table 3:** High intermediate learners (n = 20): percentage “yes” on continuous vs. discontinuous answers

		Continuous answers	Discontinuous answers
Different objects	<i>M</i> <i>SD</i>	84.38% 28.64	84.38% 21.41
The same object	<i>M</i> <i>SD</i>	80.63% 17.43	66.88% 25.74

Note. M = mean, SD = standard deviation

## 5. Mandatory calculations in English-French

In the response pattern of high intermediate and native groups, differences between continuous and discontinuous Q ... de A answers are found with scenarios involving the same object for all human participants, but not (to the same degree) with scenarios involving a different object for each human participant. Given that the range of possible semantic representations cannot account for such an asymmetry, we concluded that high intermediate learners assigned  $\forall\exists$  representations of the type in (5) to discontinuous sentences, mandatorily computing implicatures of the type “and not (6)”. The conclusion of a constraint (9) forcing  $\forall\exists$  LF representations of the discontinuous Q...de A sentences and of the mandatory calculation of an implicature beyond LF representations is required by logic to account for the very existence of interpretive asymmetries. The asymmetries in English-French interpretation require the kind of organization discussed in section 3.

However, this is not merely the case for the high intermediate and native groups. As we have seen, the low/mid intermediates’ behavior is also characterizable precisely along these lines. The low/mid intermediates’ (pattern of) asymmetry between same object contexts and different object contexts -- irrespective of sentence structure, as seen in Table 2 -- is explained if low/mid intermediate learners ‘seize’ on  $\forall\exists$  representations of type (5) at LF and if the relevant scalar implicatures are computed mandatorily. Again, the relevant scalar implicatures have to exist because the range of available semantic interpretations simply cannot account for the pattern of asymmetries between same object and different object contexts. Furthermore, the judgment patterns offered by the low/mid intermediate respondents and by the high intermediate respondents seem to suggest learners’ ability to retreat from

$\forall\exists$  representations and the implicatures they induce. High intermediate respondents seem to show a greater ability to access the  $\exists\forall$  interpretation with continuous structures. We now show how these aspects of this acquisition sequence can also be captured in the strictures imposed by the constraint in (9) on mapping to LF and LF-induced implicatures.

In the range of possible semantic representations (and supervening LF-induced implicatures), the behavior of low/mid intermediate learners differs from that of high intermediate learners in very specific ways: the low/mid intermediate learners seem unable to assign (grammatically licit)  $\exists\forall$  representations such as (6) to the continuous sentences such as (1) at LF in contradistinction to the high intermediate respondents. This follows if the two scope-dependent representations as in (5) and (6) are serially accessible at LF in sentence processing. That is to say, the  $\forall\exists$  representation (5) is accessed first at LF in processing the continuous sentence in (1). (5) at LF induces the implicature “and not (6)”. When this implicature is not contextually verified, (5) is contextually rejected as the LF of (1), and the alternative  $\exists\forall$  representation (6) is adopted as the LF of (1). Thus, the low/mid intermediate learners’ response pattern can be explained if  $\forall\exists$  representations are derived at LF on first pass: the low acceptance rates in same object contexts result from the computation of an implicature. Following Dekydtspotter (2001), the failure of low/mid intermediate learners to retreat from initial  $\forall\exists$  LF representations may follow from (relatively) slow processing in the limits of fixed resources. In contrast, the high intermediate respondents (like the natives) seem to retreat from initial  $\forall\exists$  representations. This is presumably the result of enhanced processing in the limits of resources. Crucially, we note that this recovery from the initial  $\forall\exists$  representation occurs only with continuous structures. This is exactly as expected if learners follow constraint (9) in processing. Thus, serial access to LF representations, grammatically calculated implicatures, and domain-specific mappings to LF provide a characterization of significant aspects of the English-French interpretive development that we have uncovered.

Thus, semantic representations alone cannot account for the developmental asymmetries arising in English-French interpretation. Both a domain-specific constraint of the type in (9) and the mandatory computations of implicatures are logically necessary ingredients of an account of these asymmetries in English-French interpretation. Aspects of interpretive development follow from enhanced processing in the constraints imposed by this mental organization.

## 6. Conclusion

Grammatically-triggered implicatures were documented in English-French interpretive knowledge: that is to say, the patterns of asymmetries in natives and in high intermediate learners cannot be accounted for simply in terms of the range of possible Logical Form representations and idiosyncratic syntax-semantics mapping, but also crucially require knowledge of scalar implicatures beyond the LF-determined semantic representations. Furthermore, the low/mid intermediate respondents’ lower acceptance of answers in same object contexts versus different object contexts follows if these learners tended to seize on the  $\forall\exists$  representation at the LF interface and compute the implicature “and the  $\exists\forall$  representation is not verified”. Low/mid intermediate learners differed from high intermediate learners in failing to access the  $\exists\forall$  representation at LF (when available) in the fixed limits of mental resources. In stark contrast, high intermediate respondents and French natives accessed the  $\exists\forall$  representation at the LF interface, but only where permitted by UG (i.e., only with continuous sentences). These patterns of asymmetries in English-French interpretation crucially require idiosyncratic constraints on mapping to LF and mandatory LF-induced scalar computations satisfying domain-general principles of cooperation. Thus evidence of domain specificity (i.e., the constraint on mapping to LF) and of Fodorian modularity (i.e. mandatory computations of scalar implicatures) were found to constrain L2 interpretation. This offers support for Schwartz’s modularity thesis for L2 acquisition.

## References

- Azoulay-Vicente, Avigail. 1985: *Les tours comportant l'expression de + adjetif*. Geneva: Librairie Droz.
- Birdsong, David. 1985: Constraints on the structure de + modifier in French. In King, L. and Maley, C.A., editors, *Selected papers from the XIIIfth linguistics symposium on Romance languages*. Philadelphia: John Benjamins.
- Dekydtspotter, Laurent. 2001: The Universal Parser and interlanguage: domain-specific mental organization in the comprehension of *combien* interrogatives in English-French interlanguage. *Second language Research* 17, 91-143.
- de Swart, Henriete. 1992: Intervention effects, monotonicity and scope. In C. Barker and D. Dowty, eds., *Proceedings of the Second Conference on Semantics and Linguistic Theory*. The Ohio State University, Department of Linguistics.
- Fodor, Jerry.A. 1983: *The modularity of mind*. MIT Press, Cambridge, Massachusetts.
- Grice H. Paul 1975: Logic and conversation. In Cole, P. and Morgan, J., editors, *Speech acts (Syntax and semantics, 3)*. New York: Academic Press.
- Horn, Lawrence R. 1985: Metalinguistic negation and pragmatic ambiguity. *Language* 61, 121-174.
- 1989: *A natural history of negation*. Chicago: The University of Chicago Press.
- 1992: The said and the unsaid. In Barker, C. and Dowty, D., editors, *Proceedings of the second conference on semantics and linguistic theory*. The Ohio State University, Department of Linguistics.
- Hulk, Aafke and Verheugd, Els. 1994: Accord et opérateurs nuls dans les projections adjectivales. *Revue québécoise de linguistique* 23, 17-45.
- Huot, Hélène. 1981: *Construction infinitives du français: le subordonnant de*. Geneva: Librairie Droz.
- Kadmon, Nirit. 2000: *Formal pragmatics: Semantics, pragmatics, presupposition, and focus*. Malden, MA: Blackwell.
- Landman, Fred. 1998: Plurals and maximalization. In Rothstein, S., editor, *Events and Grammar*. Dordrecht: Kluwer Academic Publishers.
- Magnan, Sally 1986: Accessing speaking proficiency in the undergraduate curriculum: data from French. *Foreign Language Annals* 5, 429-438
- Schwartz, Bonnie. D. 1986: The epistemological status of second language acquisition. *Second Language Research* 2, 120-159.
- 1987: The modular basis of second language acquisition. Doctoral dissertation, University of Southern California.
- 1998: The second language instinct. *Lingua* 106, 133-160. [Also in Sorace, A., Heycock, C. and Shillcock, R., editors, (1999), *Language acquisition: Knowledge representation and processing*. Amsterdam: Elsevier.]
- 1999: Let's make up your mind: "special nativist" perspectives on language, modularity of mind, and nonnative language acquisition. *Studies in Second Language Acquisition* 22, 635-655.
- Segal, Gabriel. 1996: The modularity of theory of mind. In Carruthers, P. and Smith, P. K., editors, *Theories of theories of mind*. Cambridge, England: Cambridge University Press.

# **Proceedings of the 6th Generative Approaches to Second Language Acquisition Conference (GASLA 2002): L2 Links**

**edited by Juana M. Liceras,  
Helmut Zobl, and Helen Goodluck**

**Cascadilla Proceedings Project   Somerville, MA   2003**

## **Copyright information**

Proceedings of the 6th Generative Approaches to Second Language Acquisition Conference (GASLA 2002): L2 Links  
© 2003 Cascadilla Proceedings Project, Somerville, MA. All rights reserved

ISBN 1-57473-401-6 library binding

A copyright notice for each paper is located at the bottom of the first page of the paper.  
Reprints for course packs can be authorized by Cascadilla Proceedings Project.

## **Ordering information**

Orders for the library binding edition are handled by Cascadilla Press.  
To place an order, go to [www.lingref.com](http://www.lingref.com) or contact:

Cascadilla Press, P.O. Box 440355, Somerville, MA 02144, USA  
phone: 1-617-776-2370, fax: 1-617-776-2271, e-mail: [sales@cascadilla.com](mailto:sales@cascadilla.com)

## **Web access and citation information**

This entire proceedings can also be viewed on the web at [www.lingref.com](http://www.lingref.com). Each paper has a unique document # which can be added to citations to facilitate access. The document # should not replace the full citation.

This paper can be cited as:

Dekydtspotter, Laurent and Jon C. Hathorn. 2003. Reflexes of a Syntactico-Semantic Organization in English-French Implicatures. In *Proceedings of the 6th Generative Approaches to Second Language Acquisition Conference (GASLA 2002)*, ed. Juana M. Liceras et al., 34-44. Somerville, MA: Cascadilla Proceedings Project.

or:

Dekydtspotter, Laurent and Jon C. Hathorn. 2003. Reflexes of a Syntactico-Semantic Organization in English-French Implicatures. In *Proceedings of the 6th Generative Approaches to Second Language Acquisition Conference (GASLA 2002)*, ed. Juana M. Liceras et al., 34-44. Somerville, MA: Cascadilla Proceedings Project. [www.lingref.com](http://www.lingref.com), document #1026.