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A Theory of Syntactic Interference in the Bilingual

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1 Introduction

Research on bilingualism is concerned with the processes that take place in the bilingual mind when comprehending, producing and acquiring two languages. Differences in the semantic systems of the languages are explored in relation to such data as lexical learning, code-switching and syntactic errors. A theoretical model of the interface between syntax and semantics is necessary in order to interpret these data. Current minimalist syntactic theory (Chomsky, 1995) proposes a new way of conceiving of that interface. This model represents a new approach to the mapping between conceptual structures and syntactic constructions, and to how parameters specify different mappings in languages. The new approach has implications for psycholinguistic research both in general and for bilingualism.

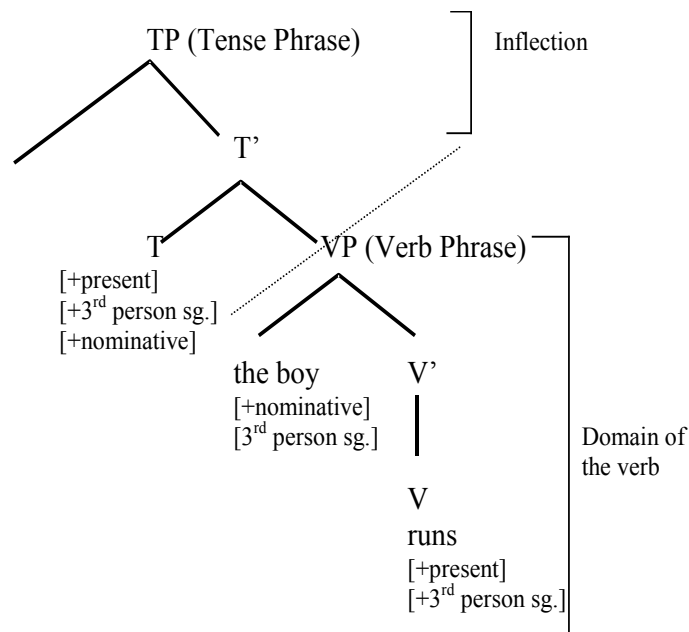
The theory states the following: a linguistic derivation consists of lexical items and functional categories that glue them together. Functional categories can be reflected in morphemes like *the* as a determiner, *-ed* for past tense, *BE-ing* for progressive, etc. The meaning of a sentence is a result of the way the functional elements combine the verb and content words. For example, the verbal phrase contains all the content words that are arguments of the verb. The inflectional component of a sentence carries information specific to that particular sentence which averages those words in relation to each other (whether the sentence is third person, past, etc.).

Functional categories have their own projections in the phrase hierarchy of a sentence, similar to nouns and verbs. These projections have some features that must be pronounced (*-ed*, *-s*) and some purely structural features such as Case. Languages differ in which features have syntactic effects and which do not: features which are “semantically uninterpreted” must have syntactic effects, while “semantically interpreted” features are not required to have syntactic effects. Semantically uninterpreted formal features of functional projections cause syntactic operations like movement of lexical categories. An uninterpreted feature of a functional projection is one that must be “satisfied” by being in construct or with a content word that carries that feature. For

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instance, in a derivation like *the boy runs*, there is a functional projection, Tense Phrase, that contains the features [+present], [+3rd person], among others. For the sentence to be grammatical, there must be a verb in the 3rd person present form (i.e. with a present morpheme) among the lexical items and in the appropriate hierarchical location. That verb must move to the appropriate location in the functional projection (Tense Phrase in this case) that needs to be satisfied with an appropriately inflected word. This is called “checking of features”. Uninterpreted features are, therefore, those that must be pronounced in the form of explicit morphemes or that cause visible syntactic operations, like movement of lexical items from one location to another. The structure in (1) exemplifies the checking of Tense with the features “present”, “3rd person singular” and “nominative” in the sentence *the boy runs*. The verb moves to check the features “3rd person singular” and “present”, while the noun moves to check “nominative.” After their movement, both noun and verb are contained in the same functional projection (Tense Phrase): if there were no content words available to check one of the uninterpreted functional features, the sentence derivation would be ungrammatical. Furthermore, even if the functional features were checked, but the content words were not compatible in all uninterpreted features (e.g. if the noun were, say, plural), the derivation would be ungrammatical, because content words containing conflicting features cannot be in the same projection.

(1)



The connection with semantics is established because all functional projections in the structure have some semantic import, as do all features (even formal features like 3rd

person or present are also semantic). In order to understand syntactic operations, one must determine what functional projections there are in the inflectional component and what formal features (including semantic features) are embedded in them. When a feature of a functional projection is uninterpreted, it requires that a lexical category in the sentence with the same feature move to the functional projection to check it. An interpreted feature does not involve such requirement. Thus, parameters that differentiate languages syntactically are based on the differences in semantic interpretability of features.

It is important to understand the difference between *conceptual* and *semantic* features. Conceptual features are the concepts in common to all human beings. For instance, the difference between a young individual and an old one is a universal that applies to all cultures and languages: *youth* is a concept that humans share. Likewise, normal adults have the concept of time as being past, present or future. Semantic features (or interpretable features, in Chomsky's (1995) terminology), on the other hand, are *linguistic* features: they represent the concepts that must be encoded in the grammar of languages for sentences to be grammatical. For example, the concept of time is ordinarily encoded into the grammar of languages in features of *tense*. Time is a concept. Tense features are semantic features. If we found a language in which the sentence *the boy runs* were grammatical but the sentence *the man runs* were not, we might have to posit that the concept of youth becomes grammaticalized as a semantic feature in the syntax of languages. In the absence of any such evidence, we assume that youth is a concept with no grammatical relevance: it is not a semantic feature. Figure 7.1 outlines relations between different kinds of features.

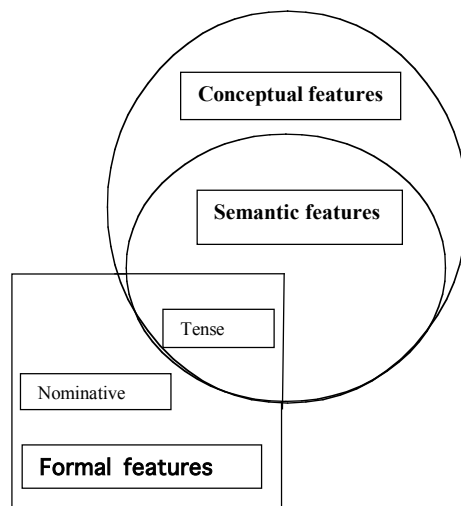


Figure 7.1. Types of features in the Minimalist Program

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Semantic features are a subset of conceptual features. *Some* of these semantic features are formal features of syntax, causing syntactic operations. This is the case with Tense, which is semantic but is ordinarily pronounced through particular morphemes.

Establishing parameters that differentiate languages is of major importance in unveiling the universal inventory of functional categories and their features. In this situation, comparative studies on processing different languages and studies of bilinguals take on a new relevance in standard psycholinguistic research on the syntax/semantics interface. Psycholinguistic research in this kind of model involves comparing different languages which differ as to whether a feature is grammatically uninterpreted, and hence relevant for syntax. Producing or decoding a sentence in a certain language involves determining what features are uninterpreted in that language and the processes that it motivates. Learning to speak a second language requires the same ability. If the interpretability of a feature varies in the two languages of the bilingual, certain syntactic judgments and syntactic processing facts in one of the languages might be affected by the other. Experimental evidence of this will support the claim that it is the interpretability of features that indeed causes syntactic operations, and that setting parameters in this way is the right path to follow in syntactic theory. This theory of the mapping of semantic onto syntactic structures poses the following questions:

- (2) a. Which conceptual features are encoded as semantic features in the grammar of languages?
- b. When semantic features are uninterpreted, are they reflected in the same way in the syntax of all languages?

In this paper we provide partial answers to these questions. (1) We sketch a minimalist analysis of event structure in interpretations (Davidson, 1967; Dowty, 1979, 1991; Tenny, 1987, 1994; Kratzer, 1994; Higginbotham, 1996, among others). (2) We develop this as an example of a concept that can be encoded in the syntax of languages through semantic features: the difference between *states* and *events* and the various action types that sentences can express. (3) Our hypothesis is that the features that distinguish events from states and other related features are embedded in a functional projection called Event Phrase. (4) We find that these semantic features vary in interpretability in English and Spanish. (5) These features are uninterpreted in Spanish but interpretable in English. (6) This difference explains certain syntactic phenomena involving unaccusative verbs and passive constructions in English and Spanish. (7) Data on parsing unaccusatives and passives with Spanish and English monolinguals confirm the distinction in syntactic representations. With this as a point of departure, we outline a research program for bilinguals designed to test the validity of the model and to provide some insight into syntax processing. We predict that there might be some interference from L1 into L2 because the speaker may have classified the features in a certain place in the grammar of his native language. For late learners, it may be impossible to change the semantic interpretability of features.

The paper is divided into two parts. In the first part, we provide a syntactic analysis of event types according to the minimalist model of the syntax/semantics interface, based on the semantic literature on events and our own syntactic work (Sanz, 1996; Bever & Sanz, in progress). We analyze the syntactic consequences of the different types of actions for the syntax of English and Spanish. The feature distinguishing telic and non-telic

events ([+telicity]) causes syntactic differences between unaccusative verbs in the two languages. The feature that distinguishes two types of non-events ([+permanent state]) has implications for the syntax of passive sentences in both languages. Finally, we claim that a feature related to objects ([+measure]) is uninterpreted in English but interpreted in Spanish. The syntactic consequences of this are seen in middle constructions. In the second part of the paper, we summarize predictions about experimental phenomena and grammaticality judgements of the bilingual in L2 with regard to these constructions.

2 A Syntactic Analysis of Events and Non-Events

Events and Non-Events

Since the 1960s, there has been an increasing interest in the differences between the predicates according to their status as “events” (Vendler, 1967; Dowty, 1979, 1991; Tenny, 1987, 1994; Davidson, 1967; Carlson, 1977; Parsons, 1990; Kratzer, 1994; Higginbotham, 1996, among others) (see Table 7.1).

Table 7.1. Classification of sentences according to their action type

EVENTS [+eventive]	[+telic]	[+measure]	write a letter/ drink a beer	accomplishment
		[−measure]	cross the finish line/ recognize John	achievement
	[−telic]	run/drink beer		activity
NON- EVENTS [−eventive]	[+permanent state]	know math/be tall		individual-level property
	[−permanent state]	be tired/be here		stage-level prop- erty

The sentences in the upper part of Table 7.1 contrast with those in the lower part in that they are events.¹ It is a property of events that they can be telic (i.e. they can have an end in time) or atelic. Conversely, telicity has no bearing on non-events, since they are not actions in time. The progressive aspect distinguishes events from non-events: while *He is writing a letter* or *He is running* are grammatical, **He is knowing math* is

¹ The table summarizes different trends in the semantics literature, glossing over differences among authors. There is controversy in the classification between events and states. Some authors consider events as only accomplishments and achievements. Others, like Higginbotham, consider the four action types events with different properties. Although we will adopt Higginbotham’s approach, for clarity of exposition we refer here to the three first sentences in Table 7.1 as events, in the nontechnical sense of *things that happen* as opposed to *mental or physical states of affairs*. In the table, we also include the features that we think distinguish the different action types and that we will explain later in the chapter.

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ungrammatical. Thus, the progressive morpheme in English (-*ing*), a grammatical operation, is controlled by the semantic distinction between events and non-events.

The distinction between telic and atelic events is reflected in the possible modifiers allowed in the verb phrase. The sentence *He ran a race in two hours* is grammatical, in contrast with the ill-formed **He ran in two hours*. The former is an accomplishment, a telic event, because the *race* is completed at the end. Observe what happens when the adverbial phrase is changed to *for two hours*. In this case, *He ran for two hours* and *He ran a race for two hours* pattern together in their grammaticality. But the sentence *He ran a race for two hours* has a different meaning from *He ran a race in two hours*: it does not express an accomplishment. It simply indicates that the subject engaged in the activity of race-running for a period of time, without specifying whether he finished the race or not. Applying this kind of durative adverbial phrase to an “achievement”, the other telic type of event, creates ungrammaticality: **He crossed the finish line for two hours*. Crossing the finish line is an instantaneously and categorically achieved event and thus cannot last any amount of time.

Four conclusions can be drawn from the previous facts: (1) events have different properties from non-events, and telic events are different from non-telic events; (2) accomplishments have two components (an activity and an end in which a new state of affairs is reached), whereas achievements do not have any internal structure of this sort; (3) the telicity of accomplishments is different from the telicity of achievements. In particular, an object is crucial in determining whether the activity is an accomplishment. If *a race* is completed, we have an accomplishment and the adverbial *in two hours* is allowed to appear in the VP. If *a race* is not completed, the sentence expresses an atelic activity. In such atelic cases, modification with a specific time line (*in two hours*) is out, but duration phrases of the sort *for two hours* are grammatical; (4) Tenny (1987, 1994) refers to this as “measuring out of the event by an object”. In contrast, achievements do not transpire over time and the object does not measure out the event. The sentence *I crossed the finish line in two hours* means that it took two hours to arrive at the moment of crossing the finish line, not that the actual crossing lasted that long. But the object is obligatory in this sentence. We will call this delimitation (without measure) by an object. In the next section the concepts of measuring out and delimitation by objects are developed further.

Measuring Out and Delimitation by Objects

Measuring out (Tenny, 1987, 1994, 1995) works as follows: a verb that is underspecified for telicity takes an object that, by its nature, measures out the event and makes it telic. The event “travels through” the object until it finishes. As we pointed out above, activity verbs alone are atelic. However, observe the following contrast.

- (3) a. **I ran in two hours*
b. *I ran the race in two hours*

The object *the race* provides what the verb *run* lacks: a beginning and an end to the action. In sentence (3b), *run* has been measured out and hence delimited by its object. Researchers agree that the telicity of accomplishments is a property of the entire VP, and not of the verb. The verb in this particular construction is no longer underspecified for

telicity: it has acquired the semantic feature [+telic] by being measured out by the object in syntactic construction with it.

Not all objects are capable of measuring out an event. For instance, the verb *drink* (unspecified for telicity) is measured out in (4a) but not in (4b) in the following pair of examples.

- (4) a. John drank a beer (accomplishment)
 b. John drank beer (activity)

The subevents of *drinking a beer* cannot be described with sentence (4a), whereas the subevents of *drinking beer* (a mass noun) are all describable with the sentence *drink beer* (Dowty, 1991). Mass nouns are not measurers.

The object in transitive achievements does not measure out the event in the same way. However, observe the obligatoriness of the object in (5).

- (5) John crossed *(the finish line)

The object in this case delimits the event by providing an entity on which the event can take place, but the event does not progress through the object and there is no change in the object at the end. The event of crossing simply cannot take place unless the agent crosses something. But, since there are no intermediate steps to this event and the object is obligatory to fill in the semantics of the verb, it is not a measure of the verb.

Syntactic Consequences of the Distinction between Action Types

The difference between accomplishments and achievements exemplified through the use of adverbs above has syntactic consequences for the grammar of English (Sanz, 1996). The next pairs of sentences illustrate them:

- (6) a. The blacksmith pounded the metal flat (accomplishment)
 a'. *The blacksmith crossed the finish line dirty
 (meaning that he made the finish line dirty by crossing it) (achievement)
 b. This bread cuts easily (accomplishment)
 b'. *This wall hits easily (achievement)
 c. John ran (*in two hours) (activity)
 c'. John ran to the store in two hours (accomplishment)

The sentences in (6a) contain a resultative (an adjectival phrase that expresses the new state of the object after the action has been completed). The adjectival is ungrammatical unless we consider the object of the sentence a measurer of the action. Resultatives disambiguate an expression that could be atelic or telic, making it definitely telic: when the resultative is present, we must interpret the object as a measurer.

The pair in (6b) exemplifies grammatical and ungrammatical middle in constructions. If the construction contains a measurer, the middle is grammatical. Middles formed from an achievement or an activity predicate are ill-formed. Middles express generalizations over classes of objects (Fagan, 1992). In other words, the sentence in (6b) means that a certain type of bread, and not a specific member of the class, cuts easily. Why should this be? The explanation hinges on the notion of telicity. A telic verb used in

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an imperfective sentence must refer to an iteration of telic events. The sentence (7a) can only mean that there were various wall-hitting events during the period of time. In contrast, (7b) cannot mean that there were several events of running.

- (7) a. He was hitting the wall for two hours
b. He was running for two hours

The use of a telic verb in an imperfective tense like the present (as in middles) yields an interpretation in which the event is iterated. This is the reason why middles are understood as generalizations over classes of objects (like *the bread*), and not as particular events occurring to particular items. The verb, which has become telic after having been measured out by its internal argument, is used in the present (an imperfective tense) and thus refers to an iteration of telic events of cutting bread. By assuming this operation of measuring out we can explain the grammaticality of middles with accomplishments, the ungrammaticality of middles with achievements and the interpretation of middles as generalizations.

(6c) is an example of measuring out of activity verbs like *run* in English. These verbs accept a goal phrase (a Prepositional Phrase) that indicates the end of the activity. The addition of the goal phrase turns the sentence into an accomplishment: the event must be interpreted as transpiring over time, having subevents and reaching a new state of affairs in which the subject is in a new location. In other words, the event must be interpreted as an accomplishment.

The generalization to be drawn from the data above is that these three constructions (resultatives, middles and delimitation by prepositional phrases) apply only to accomplishments.² Thus, the distinction between accomplishments and achievements has overt syntactic consequences in English. As opposed to this, consider Spanish.

- (8) a. *El herrero golpeó el metal plano
the blacksmith pounded the metal flat
b. Este pan se corta fácilmente
this bread REFL cuts easily (this bread cuts easily) (accomplishment)
b'. Esta pared se golpea fácilmente

² A caveat is in order here: a middle with an accomplishment in which the object is a specific measurer is ungrammatical.

[i] a. *this letter writes well

b. ??This house builds well

This is because middles express generalizations or properties of types of objects (Fagan, 1992). When one says “this bread cuts easily” one means that this type of bread cuts easily. On the contrary, accomplishments with a specific measurer are specific events.

On the other hand, Fagan claims that middles in English are formed from accomplishments or activities. Her examples of activities are

a. the car drives well

b. the piano plays easily

Note, however, that the interpretation of these middles is not that of a generalization over classes of things. The speaker means a particular car or a particular piano, not a class of cars or of pianos. Our account of the data in terms of the feature [+measure] in English captures this difference naturally (for a thorough discussion on this topic, see Sanz, in press): the car and the piano are not possible measurers, and thus the verb does not acquire the feature [+telic].

- this wall REFL hits easily (this wall hits easily) (achievement)
 c. Juan corrió
 John ran

- c'. Juan corrió (*a la tienda)³
 John ran (*to the store)

The examples in (8b) illustrate that middles in Spanish are possible with both accomplishments and achievements (and in fact, they are also possible with states and activities). In contrast with English, these sentences suggest that the distinction between accomplishments and achievements is not reflected in the grammar of Spanish. (8a) and (8c) show that resultatives and delimitation of movement verbs through a goal phrase are impossible in Spanish. Whatever feature distinguishes accomplishments from the other types of events, it is not grammaticalized in Spanish in the way it is in English.

However, the distinction between telic and atelic events is indeed relevant for the syntax of Spanish (Sanz, 1996). The use of the reflexive in the sentence in (9b) proves this. Observe the following sentences.

- (9) a. Mi hermano leyó un libro (accomplishment or activity)
 my brother read a book
 b. Mi hermano se leyó un libro (accomplishment)
 my brother REFL read a book

Whereas (9a) is ambiguous between an activity and an accomplishment interpretation (both *in an hour* and *for an hour* would be possible), (9b) is definitely an accomplishment:

- (10) *Mi hermano se leyó un libro durante una hora
 my brother REFL read a book for an hour

The reflexive signals that the sentence must be interpreted as telic (Sanz, 1996). Even though the object could be a good measurer in sentence (9a), it is not enough to make the sentence unambiguously an accomplishment. What happens when there is no object present but the sentence must be interpreted as an accomplishment? In those cases, the presence of the reflexive is mandatory.

- (11) a. El barco se hundió
 the boat REFL sank (the boat sank)
 b. *El barco hundió
 the boat sank

³ This sentence would mean that he ran towards the store, not that he arrived in the store. The usual way of modifying movement verbs in Spanish is by a periphrasis: *fue corriendo a la tienda* ('he went by running to the store'). This sentence still would not mean that the subject arrived in the store. The PP does not delimit.

Se signals that the sentence is an accomplishment, that is, a telic event. But why is it mandatory in middle constructions that are not accomplishments but achievements, as (8b')? As we said above, a middle construction is nothing but a telic verb in the present. This yields a sentence that must be interpreted as a repetition of telic events. If so, the obligatory presence of the reflexive in middles in Spanish is due to the fact that Spanish needs to mark the verb *overtly* as telic. Therefore, we speculate that the difference between telic and atelic events is semantically uninterpreted in Spanish, and thus is reflected in the obligatory presence of a reflexive in certain constructions (Sanz, 1996).

Our proposal, in brief, is follows: the feature distinguishing accomplishments and achievements ([+measure] of the verb by the object) has syntactic consequences for the grammar of English. As opposed to this, it does not show overtly in the syntax of Spanish. On the other hand, the feature distinguishing telic vs. atelic events ([+telicity]) is overtly realized in the syntax of Spanish. This feature must be checked by a verb that has been measured out overtly by an object. When the verb does not have an overt object, the checking is performed by the telic morpheme *se*.

The next step is to explore whether this feature ([+telicity]) also affects English syntax. We now compare an analysis of the consequences of this feature for the grammars of English and Spanish.

Consequences of Telicity for Spanish and a Comparison with English

We noted in the previous section that the grammar of Spanish is sensitive to the distinction between telic and atelic events, but not to the difference between accomplishments and achievements that hinges on the feature [+measure]. We tested our hypothesis using verbs that are potentially transitive but have been detransitivized (middles and detransitive accomplishments like *el barco se hundió*). These verbs are not inherently telic: they become telic through an object. The subject of these constructions is clearly an internal argument. To further test our hypothesis, we examine the verbs that express inherent telic actions but are monadic (i.e. mono-argument) and thus have no possible measurer. These are achievement verbs like *die* or *arrive*. The question is: do they have any particular syntactic characteristics that prove that telicity is marked in the syntax of Spanish?

Monadic achievement verbs belong to the category known as “unaccusative” verbs (Perlmutter, 1978, 1989). A peculiarity of these verbs across languages is that they are assumed to have an internal argument that surfaces as a subject, making their pattern like a plain intransitive verb with an external subject (also called “unergative”, like *run*, etc.). Several tests are applied to the only argument of intransitive verbs to determine if it behaves like an object, indicating unaccusativity of certain verbs. In Spanish, the argument of these verbs behaves like an object in certain constructions (Bever & Sanz, 1997). But there are some phenomena involving this type of verb for which there was no clear account using a theory based on Principles and Parameters: i.e. the existence of so-called unaccusative “mismatches” and alternations. An unaccusative mismatch is the fact that a verb is unaccusative in one language and unergative in another. An unaccusative alternation means that the same verb, within a language, may show unaccusative or unergative behavior, depending on other elements in the sentence. The following well-known example from Italian exemplifies an unaccusative alternation.

- (12) a. Giovanni ha corso (John has run) Auxiliary used: *avere*
 b. Giovanni è corso a casa (John has run home) Auxiliary used: *essere*

c. Giovanni è morto (John has died)

Auxiliary used: *essere*

Unaccusative verbs use the auxiliary *essere*, whereas unergative verbs take *avere*. The change in auxiliary in (12b) indicates that when the verb *run* is delimited and given an end, it behaves like a regular unaccusative verb, illustrated in (12c) (the argument must be internal). Examples like these show that telicity is intimately linked to unaccusativity. But how? According to what we have said so far, telicity can be linked to internal arguments naturally. Accomplishment verbs need the object for measuring purposes. Transitive achievement verbs require the object for delimitation (without measuring). In Spanish, furthermore, achievement monadic verbs behave syntactically as having an internal argument, unlike atelic monadic predicates (Bever & Sanz, 1997). Therefore, the structure of telic monadic predicates containing an internal argument is a first confirmation that telicity plays a role in the syntax of Spanish. Telic monadic verbs require an internal argument for delimitation.

In contrast with this, in Levin and Rappaport Hovav's (1995) study on unaccusativity in English, most of the tests to distinguish unaccusatives from unergatives in English proved to be inconsistent and very weak.⁴ In fact, the behavior of these two types of verbs is syntactically identical. (For example, in (13) the argument is agent in both cases.)

- (13) a. The running boy
b. The arriving train

We speculate that the difference between telic and atelic events does not play a role in the overt syntax of English (i.e. [+telicity] is a weak feature). This means that in English, the argument of a telic monadic predicate is not in the internal position at any step of the derivation, because checking telicity is not needed, and therefore delimitation is not either. We will come back to this issue later in the paper, when we present experimental data on priming.

To summarize, telicity is a feature that distinguishes some types of events from others. This feature is uninterpreted in Spanish and thus requires overt checking. In accomplishments, either measuring out of the verb must occur overtly so that the verb (which is unspecified for telicity by itself) acquires the feature to check it in the functional projection in which it is embedded, or the clitic *se* must head the projection to satisfy the strong feature. The projection is called Event Phrase. In this projection, all features related to action type are encoded: in particular, the features [±eventive], [±telic] and [±permanent state] (see next section for details). Delimitation occurs in Spanish every time there is a telic Event Phrase. That is to say, every telic event in Spanish must have an object. The sentence may be transitive with an event object or unaccusative with an initial internal object.

⁴ Levin and Rappaport Hovav claim that the only valid syntactic test to distinguish the two types of monadic verbs is the resultative construction. However, the resultative construction applies to transitive or detransitivized verbs, not to real monadic verbs, as in [i]. In this section we are considering only monadic predicates, and hence we cannot accept this test, which does not distinguish between *arrive* and *run*, for instance.

[i] the river froze solid

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Features Related to Non-Events in Spanish and English

We have demonstrated that telicity plays a role in the syntax of Spanish. Other data show that [\pm permanent state], encoded in the same position as [\pm telic], also plays an important syntactic role in Spanish.

- | | |
|--|---------------------------|
| (14) a. Mi hermano es alto
my brother is tall [+permanent state] | Copula used: <i>ser</i> |
| b. Mi hermano está aquí/está cansado
my brother is here/is tired [–permanent state] | Copula used: <i>estar</i> |

The sentences in (14) exemplify the use of two different copulas in Spanish. Luján (1981) points out that the adjectives with *ser* are a subclass of the adjectives with *estar*. All adjectives are stative. But there are perfective states and imperfective states. Adjectives with *ser* express [–perfective] states and adjectives with *estar* express [+perfective] states. According to Luján, “a perfective state says that x is in the class of individuals bearing the property A at a delimited period of time whose beginning and end are both known or assumed or at least one of them. An imperfective state says that an individual x is in the class of individuals bearing the property A in a period of time whose beginning or end are not assumed and which stretches over a number of delimited time periods.” To translate this into less technical terms, think of the difference between being tired and knowing math. You can say that someone is in the state of being tired, but you cannot say that someone is in the state of knowing math. Luján calls the former [+perfective] states: assuming the beginning and/or the end of a state implies that the state can change. In other words, a true state of affairs is that which is temporary. The copula used for these is *estar*. In contrast with this, the copula *ser* stretches over *delimited* periods of time, and therefore refers to “several instances of being at a state” (resulting in the interpretation as a “permanent state”, one that does not change and one that is not paraphrased as “being in the state of”). (We label the features with the more intuitive terms [+permanent state] and [–permanent state], although we assume Luján’s aspectual analysis in its entirety.)

It is obvious that the grammar of Spanish marks overtly (through the choice of copula) the distinction between the two types of non-events established in Table 7.1. Does this distinction also appear with events? Imagine a situation in which we had an event (a verb, not an adjective) that needed a copula. Which of the two copulas would it take? Since we have claimed that the eventive features of [\pm telic] play an important role in the syntax of Spanish, it seems sensible that the appropriate copula would be the one that is further from states. Recall that the copula *estar* is associated with true states of affairs, the ones paraphrased by “in the state of.” *Ser*, on the other hand, is less specified for stativity. Thus, we predict that the copula appearing with verbs denoting events would be *ser*. Passives are the kind of construction that exemplifies this. Consider the following sentences.

- | | |
|---|----------------------|
| (15) a. La ciudad fue arruinada por el enemigo
the city was ruined by the enemy | Copula: <i>ser</i> |
| b. La ciudad estaba arruinada (*por el enemigo)
the city was ruined (*by the enemy) (the city was in a state of ruins) | Copula: <i>estar</i> |

(15a) illustrates a passive in Spanish. The passive expresses an event. The copula must be *ser*. (15b) is a non-event: the *by*-phrase is banned from appearing, and the copula *estar* must be used. (15b) cannot be called a passive, although it resembles the passive in the use of a past participle that agrees in gender and number with the subject of the sentence. In a transitive event like (15a), there are two arguments: *the enemy* and *the city*, and thus *the city* must be the patient at some point during the linguistic derivation. As opposed to this, non-eventive sentences are statements about one and only one argument (in this case, *the city*). We do not need to suppose the existence of an internal argument in the derivation.

English lacks this copula distinction. As a result, passive constructions are ambiguous between an eventive and a non-eventive reading.

- (16) a. The city was ruined (ambiguous)
 b. The city was ruined for ten years by the flood (non-eventive, but accepts *by*-phrase)

One can interpret (16a) as an event in which an unknown agent acted upon *the city*. Thus, *the city* has been an internal argument in the derivation, although it surfaces as an external one. In the reading in which the speaker is just talking about the state *the city* is in, *the city* is not an internal argument. Note that one cannot say **the city looks attacked*, whereas it is possible to state that *the city looks ruined*. Similarly, **the city is attacked* is ungrammatical, as opposed to *the city is ruined*. But these grammatical sentences with *ruin* are only possible under the reading in which the sentence is non-eventive. Interpreting it as an event licenses the ungrammatical **the city looks ruined (by the enemy)*.

Table 7.2. Summary of constructions in English and Spanish that depend on features related to action types

14 SYNTACTIC INTERFERENCE IN THE BILINGUAL

	SPANISH	ENGLISH
Unaccusatives	The argument raises from internal position during the derivation	The argument does not raise from internal position (the argument is never internal)
Passives	Eventive passives marked through a special copula (<i>ser</i>). Subject raises from internal position Non-eventive passives impossible	Ambiguous between eventive and stative interpretations In eventive interpretations, subject raises from internal position
Resultatives	Non-existent	Existing and productive
Middles	Not restricted to accomplishments with [+measure]	Restricted to accomplishments with [+measure]
Delimitation of activity verbs with PPs	Impossible in Spanish	Possible in English

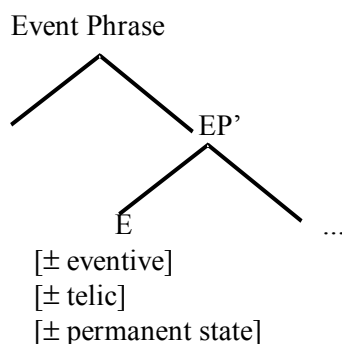
The ambiguity of the passives in English shows once more that the position of the features related to events is unimportant for the overt syntax of English. The distinction between the copulas in Spanish indicates that the features of this position are crucial for the overt syntax of Spanish. In other words, [\pm eventive], [\pm telic] and [\pm permanent state] cause syntactic (overt) consequences in Spanish, but not in English. As opposed to this, the feature related to objects ([\pm measure]) causes syntactic operations in English but not in Spanish. This creates a paradigm affecting several constructions, which is summarized in Table 7.2.

In the previous sections we have claimed that the features that relate to action type must be semantic, that is, must be grammaticalized in the syntax of languages. In the next section, we develop the syntactic analysis of these phenomena.

A Minimalist Analysis

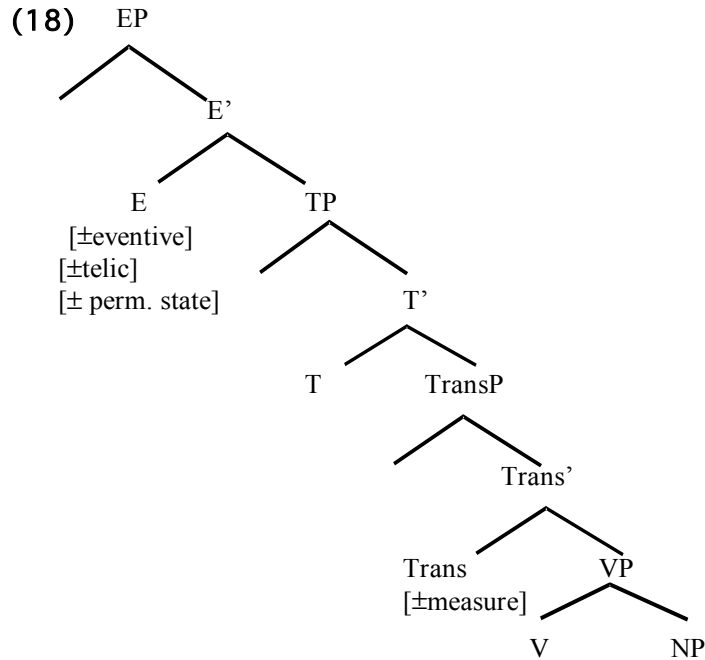
Our proposal is that there is a functional category in the structure of sentences in which the features [\pm eventive], [\pm telic], [\pm permanent state] are located. This position is sometimes filled by a morpheme (the clitic *se*) that must be pronounced in Spanish. We suggest that there is a functional category, “Event Phrase”, that projects and has features, in

(17)



the same manner as Tense. This is a formalization of what semanticists have been arguing since the 1960s: that there is an event argument in sentences.

The following is a tree that represents a transitive sentence, incorporating our proposal that events are part of the functional component.

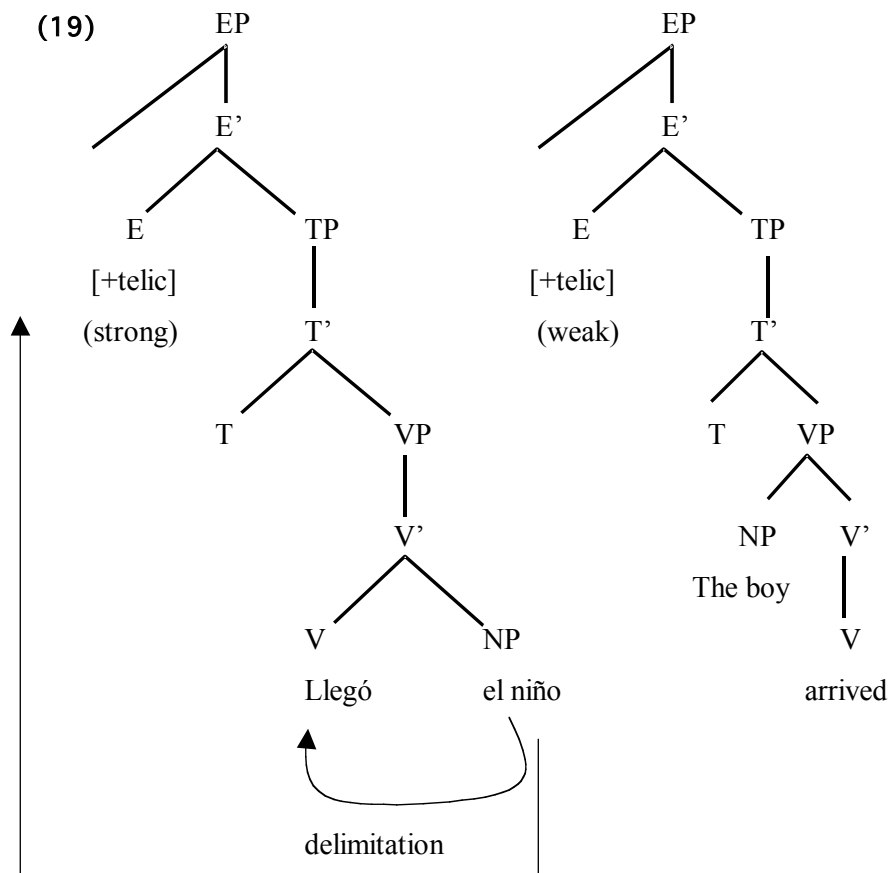


As we said in the previous sections, the feature [+measure] is related to objects (some objects are good measurers and others are not). We therefore encode this feature in the Transitive Phrase, where objects get accusative Case.⁵ We also claimed that this feature is important in the grammar of English in that it licenses grammaticality of certain constructions and causes ungrammaticality of others. This is to say that the feature [+measure] is semantically uninterpreted in English. Therefore, it must be checked in the course of the syntactic derivation. It is checked by objects, and once this is done, the verb is [+telic] for the rest of the overt derivation: this causes the interpretation of middles as repetitions of events when the verb checks present tense. As opposed to this, in Spanish,

⁵ This projection used to be called AgrO. Under minimalist assumptions, AgrO does not have a reason to exist. However, Transitive Phrase has been argued for by Jelinek (1995) and Murasugi (1992), among others.

the feature, being interpreted, is not checked overtly.⁶ When the verb checks Tense, it is not marked with the feature [+telic]. So, the interpretation of the Spanish middle is not that of a repetition of events. Since the verb is not endowed with the feature [+telic], in order to check a [+telic] Event Phrase, the derivation accesses the telic clitic *se*. This shows that in Spanish the feature [+telic] is strong.

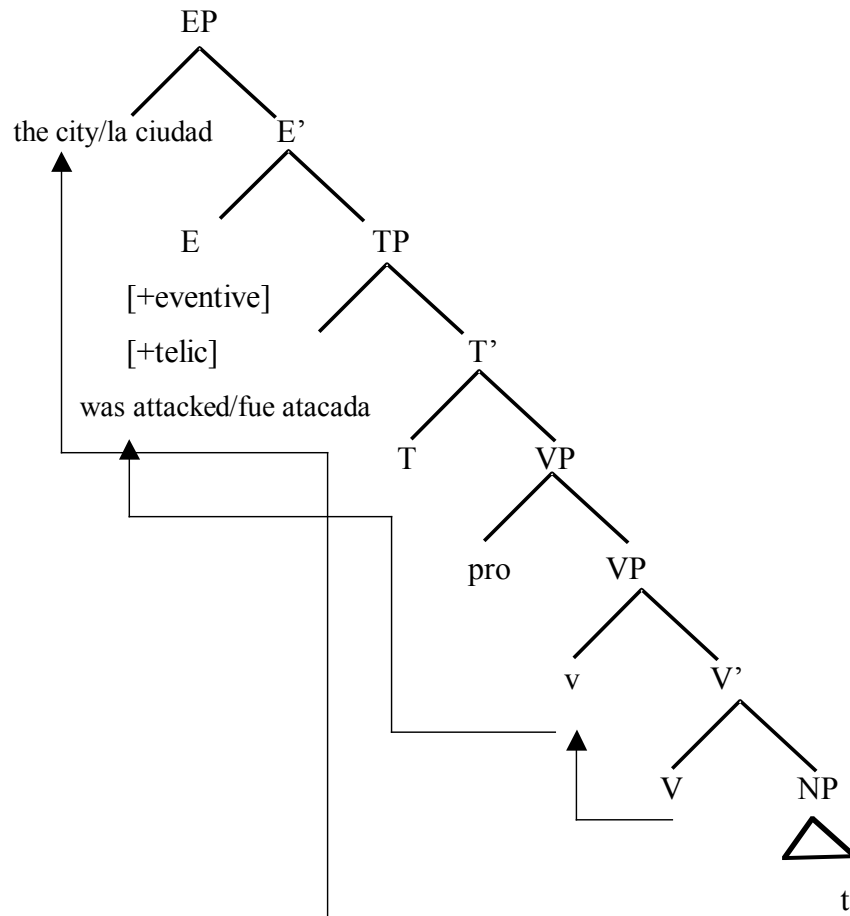
As for telic monadic predicates, the derivation of Spanish involves delimitation of the verb by means of an internal argument, whereas in English the argument is external throughout the derivation, since the verb does not need to be delimited overtly. This is exemplified in (19) below. This amounts to saying that, in order to learn which verbs behave as unaccusatives in one's language, one must learn that telicity is semantically uninterpreted in that language.



⁶ It is possible that the feature gets checked *for free* when the object gets accusative Case, but the verb does not acquire the feature [+telic] that would allow it to check the feature in the Event Phrase.

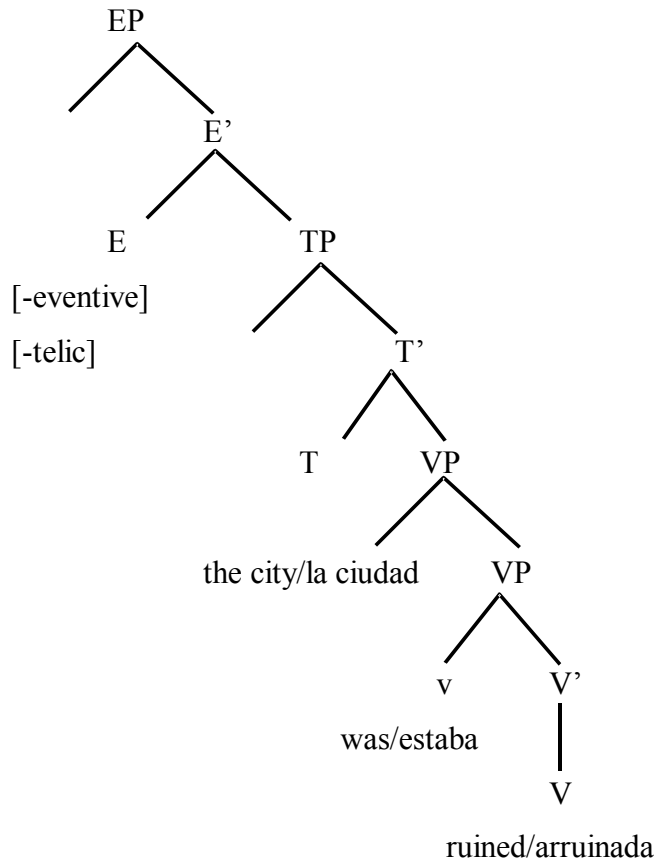
Summarizing so far: telic monadic predicates in Spanish have a different derivation from atelic ones. The same is not true in English. Because the argument of a telic verb in Spanish is needed for overt delimitation of the verb, it starts the derivation in object position. Movement to subject position ensues. The consequence is that there is a trace left behind. The other features of Event Phrase are also strong in this language. Passives in Spanish, unlike English, are unambiguous. They can only be interpreted as eventive, because of the choice of copula (the copula used for states of affairs, *estar*, is impossible in the passive). In English, the derivation of an eventive passive is no different from that of Spanish. They both involve two arguments (a *pro* and an object) and the object raises to the subject position.

(20)



The derivation of a stative passive differs from that of an eventive passive in that the sentence is a non-event, and thus there is no agent acting upon an object. The subject argument of the passive is a true subject, and there is no transitive structure. The sentence is a statement about the state the subject (in this case, the city) is in, which does not necessarily derive from a previous action.

(21)



Conclusion

In the first part of the paper, we presented the semantic distinction between events, non-events and the different types of action; we then developed a syntactic theory of the mechanisms by which these distinctions affect the syntax of languages. We propose a place in the structure where the properties of the event in question are encoded by way of features: the functional projection Event Phrase. The features of Event Phrase are [\pm eventive], [\pm telic] and [\pm permanent state]. In Spanish, the features of this category are semantically uninterpreted. This means that the syntax of this language shows the distinc-

tion between events and non-events, telic events and atelic events and permanent vs. non-permanent states, overtly. English syntax does not exhibit these features through overt syntactic operations. But there is one feature related to events that is crucial in distinguishing accomplishments from achievements: [+measure] by objects. This feature is semantically uninterpreted in English, and therefore accomplishments show certain syntactic peculiarities in this language.

In sum, we have provided partial answers to the questions that a theory of the syntax/semantics interface must address, which we repeat here.

- (22) a. Which conceptual features need to be encoded as semantic features in the grammar of languages?
 b. When a semantic feature is uninterpreted, is it reflected in the same way in the syntax of all languages?

The conceptual distinctions between action types must be grammaticalized as semantic features. The Minimalist Program offers a mechanism to encode semantic features in syntactic functional projections (the projections that link content words with each other). In some languages, these semantic features become formal features. In others, they do not. If this is the right way of conceptualizing the mapping of semantics onto syntax, learning a language means learning the level of syntactic activity of features in that language.

3 Implications of the Model for Parsing

Priming

In the previous sections of this paper we have reviewed the minimalist model, and applied it to the semantic problem of the event structure of sentences. In this model, the functional component determines the syntactic operations of the sentence. The functional component is manipulated by the speaker for each particular derivation (that is, the speaker must decide whether a feature is plus or minus for a particular sentence). But the level of syntactic activity of features with a plus sign is fixed within a language. What does this all mean for processing in the monolingual and the bilingual?

The first implication of the above model of the syntax/semantics interface is that learning the syntax of a language actually resolves into learning what features are strong in that language. For instance, instead of learning a list of intransitive verbs that have an internal argument in their argument structure (*unaccusatives*), the speaker must learn that telicity is semantically uninterpreted and therefore syntactically active. Once that is learned, the speaker will know that a telic monadic verb requires syntactic delimitation of the verb in order for the verb to check the feature [+telic] of Event Phrase overtly.

Some of the structures that we have been considering contain a trace due to movement of a phrase. Spanish telic monadic sentences, as opposed to atelic ones, do contain a trace because the argument is needed initially in the object position for delimitation, but must move to subject position to get Case. Contrary to this, English telic and atelic monadic predicates have the same structure, one that does not require movement or a trace. The eventive passive in both languages also has a trace. This is because there is a transitive event with two participants, and one of them (the one that surfaces as a subject) is the

object of that event. However, stative passives in English, as well as stative sentences in Spanish, do not contain a trace.

The trace acts as a prime for the probe word in a visual recognition experimental task (Bever & Sanz, 1997; for a general review, see Townsend & Bever, in press). The probe in cases with a trace is recognized faster than in cases without a trace. The visual recognition technique works as follows: the subject sees a sentence on the screen of a computer, presented in natural multi-word fragments. At the end, a probe word appears and the task for the subject is to respond as fast as possible whether the probe was or was not in the just-read sentence. The probe word in the critical cases is always an adjective that modifies the pre-verbal surface subject phrase. That noun phrase, of course, is represented by the trace in the cases in which there is movement. The minimal pairs for active constructions are sentences containing a telic monadic verb vs. sentences containing an atelic monadic verb. For the passives, the comparison is between a clearly eventive and a clearly stative passive.

- (23) a. The city was attacked by the enemy
b. The city was ruined by the enemy
- (24) a. La ciudad fue atacada por el enemigo (the city was attacked by the enemy)
b. La ciudad fue arruinada por el enemigo (the city was ruined by the enemy)
c. La ciudad está arruinada (*por el enemigo) (the city is ruined)

The results of these experiments with monolinguals are sketched in Figures 7.2 and 7.3 (Bever & Sanz, 1997; Sanz, 1996; Bever et al., 1989; Elías-Cintrón, 1994).

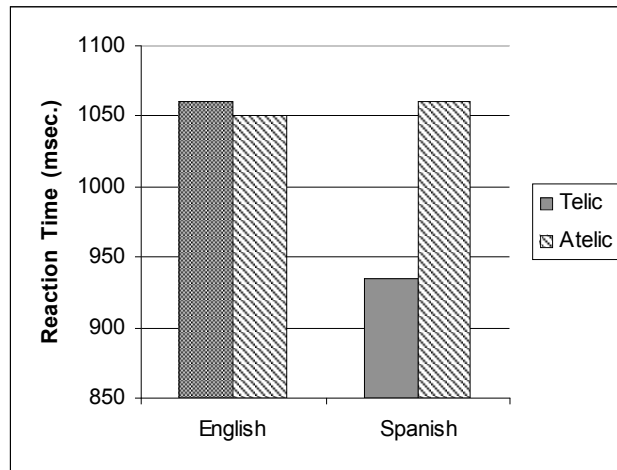


Figure 7.2. Monadic predicates in English and Spanish (reaction time in msec.)

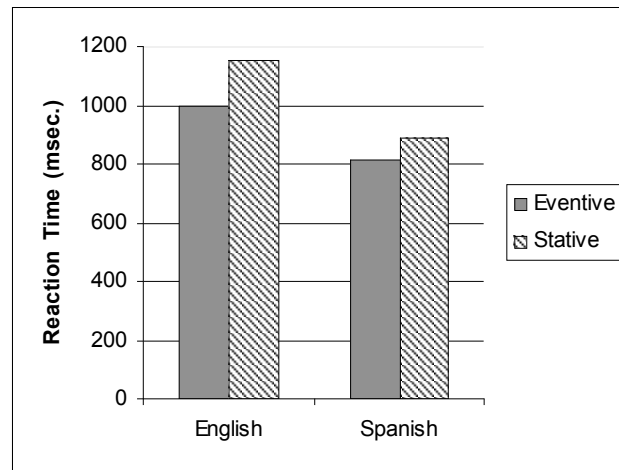


Figure 7.3. Passives in English and Spanish (Spanish data from Elías-Cintrón, 1994)

The priming of telic verbs vs. atelic verbs in Spanish was highly significant. As opposed to this, there were no significant differences in English. Significant priming was also observed in eventive passives compared with stative passives, in both languages. This pattern of results demonstrates the critical value of NP trace in priming recognition: it further confirms the distinct predictions made for the separate languages.

Bilinguals

What could we say about the bilingual mind in light of these results? Kroll (this volume) claims that, in lexical acquisition, L1 interferes with L2 in that the speaker conceptualizes L2 through L1 until he achieves a high level of proficiency. The problem then becomes “turning off” L1 for the purpose of conceptualization. Myers-Scotton (this volume) presents evidence that “structurally assigned” morphemes (which correspond roughly to functional categories in our model) are acquired last in L2. The bilingual holds on to the structurally assigned morphemes in L1 the longest. Our hypothesis is consistent with these two findings. Learning L2 involves changing the syntactic activity of features of functional categories for the cases in which they differ from L1. The fact that “structurally assigned” morphemes are acquired last is expected. Changing the syntactic activity of features, once it has been set for one’s first language, is a difficult task.

Our goal in the following research program is to explore the L1–L2 relation at the level of syntax, in terms of the distinction between semantically uninterpreted and interpreted features as in the Minimalist Program. For late learners of a language, it may be impossible to change the interpretive status of features. Several possibilities arise in this regard. It may be that changing an interpreted to an uninterpreted feature is impossible. A second possibility is that changing a feature in the reverse direction is impossible. Of course, a third possibility is that both changes are possible, but with different kinds of cognitive mechanisms.

Three kinds of evidence can be brought to bear on the processes involved in changing strength of features as a way of learning L2 syntax. The first is the manifest difficulty of becoming fluent in L2. For instance, an English speaker might take a relatively long time to learn the patterns of unaccusatives in Spanish. Yet, it is important to realize that it might be the case that a late learner seems fluent in L2, but assigns the incorrect syntactic analysis to certain constructions that hinge on a feature whose strength is different in L1. This might show up when eliciting critical judgements about grammaticality. It is also testable through priming experiments of the type described above. We now analyze the predictions that ensue from every possibility in turn.

Monadic Verbs and Passives

Interpreted \Rightarrow Uninterpreted: impossible

Uninterpreted \Rightarrow Interpreted: possible

For an English speaker, the problem of learning Spanish unaccusative and passive patterns involves changing a feature which is semantically interpreted in his language to being uninterpreted, and hence, syntactically active. In this situation, English speakers learning Spanish would learn unaccusative patterns very slowly, since Spanish unaccusatives have an internal argument because the feature [telicity] is uninterpreted. If it is impossible to change a feature from interpreted to uninterpreted, English speakers who have appeared to master Spanish would still not show priming with unaccusatives as monolinguals do, because they in fact do not assign the correct syntactic representation. They would also rank low in grammaticality judgements of constructions that distinguish unaccusatives from unergatives. Opposite to this, if “turning off” the syntactic effect of an uninterpretable feature is possible, Spanish speakers would not show difficulties learning unaccusatives in English. After mastering English, they would behave like English monolinguals in not showing priming with telic monadic verbs in English.

With regard to passives, the prediction is that English speakers will have a difficult time learning which verbs should be constructed with *ser* and which ones with *estar* in Spanish, since this difference hinges once again upon the Spanish uninterpreted feature of Event Phrase ([\pm eventive]). English speakers who have mastered Spanish will show priming with eventive passives in Spanish, because the structure of eventive passives is the same in both languages. Spanish speakers will learn the passives in English easily and once they have mastered English they will show priming with just eventive passives, as monolinguals do.

Uninterpreted \Rightarrow Interpreted: impossible

Interpreted \Rightarrow Uninterpreted: possible

This is the opposite situation as before. Syntactic phenomena reveal that the features of Event Phrase are semantically uninterpreted in Spanish. The differences in these constructions between English and Spanish are explained with regards to the fact that the same features in English are interpreted. Spanish speakers learning English would have to repress the level of interpreted features in order to behave like English monolinguals in grammaticality judgements and priming tasks.

In this situation, English speakers would not show difficulties in learning unaccusative patterns in Spanish. After mastering Spanish, they would show priming, like monolinguals, only with telic monadic verbs (i.e. unaccusatives). Spanish speakers, after mastering English, would still show priming with unaccusatives in this language, following the patterns that apply to Spanish.

For passives, this situation would mean that English speakers would not show problems learning the passive in Spanish (i.e. learning which verbs can passivize through the copula *ser*). Speakers who have mastered the language would show priming with eventive passives, that is, all the passives with *ser*, which are events involving an object. Spanish speakers learning English would learn English passives relatively easily because, due to the fact that eventive features are semantically interpreted, it is possible to passivize all verbs with the same copula. But Spanish speakers who have mastered English might show priming with all passives, even with stative ones, because in Spanish all (real) passives (not the sentences that, although they involve a past participle, are constructed with *estar*) are eventive and involve raising of the object. Upon encountering a passive structure, they might posit movement. It would then be the case that they are not aware of the differences in the structure between English eventive and stative passives. In grammaticality or semantic judgements, Spanish speakers would not be aware of the ambiguity of a certain passive and assume it is always eventive.

Middles, Resultatives and Delimitation by Goals

Recall that in the first part of this paper we analyzed certain constructions that hinge on the uninterpreted feature of Transitive Phrases ([+measure]). This feature is uninterpreted in English but interpreted in Spanish. The result is that English displays some constructions that are impossible in Spanish (resultatives and delimitation by goals), and that English middles are more constrained than Spanish middles. In other words, the situation with middles mirrors that of passives. Spanish passives are more constrained, but middles are pervasive. The opposite is true in English. The techniques to test whether changing the level of interpretability of features is possible for late learners cannot be the same with these constructions as with monadic predicates and passives. The reasons are obvious: some of these constructions do not exist in Spanish, and the derivation of middles (whether measured or not) is the same in both languages, so a trace should appear in both. However, we can resort to grammaticality judgements as a way of testing the real vs. apparent proficiency of second-language learners.

In a grammaticality judgement task, subjects might be presented with a set of sentences and indicate whether they think all of them are equally grammatical. If they do not think so, they could be asked to rank every sentence in the group on a scale from 1 to 5 (1 being poor and 5 being perfect). This might reveal systematic subtle judgements hard to grasp for a non-native speaker. For instance, take the following two sentences.

- (25) a. This bread cuts easily
b. *This wall hits easily

Whereas the difference in grammaticality should be transparent for a native English speaker, a Spanish speaker may not be able to distinguish these two sentences according to their grammaticality. The predictions are as follows.

Interpreted \Rightarrow Uninterpreted: impossible

Uninterpreted \Rightarrow Interpreted : possible

Spanish speakers learning English will not be able to change their weak [+measure] to a strong one. They will probably find that pairs of middles like the ones above are possible in English. A similar phenomenon will be observed with border-line resultatives or bad delimitation by goals. English speakers, on the other hand, will not show difficulties learning to construct middles in Spanish and will judge them all grammatical, since middles in Spanish do not involve the strong feature [+measure], unlike in English.

Uninterpreted \Rightarrow Interpreted: impossible

Weak \Rightarrow Uninterpreted: possible

This is the opposite situation. English speakers learning Spanish will have difficulty learning that middles can be constructed out of achievements, states, etc., since that involves repressing the feature [+measure], which is uninterpreted in their native language. When faced with certain grammatical middles in Spanish that do not involve [+measure] (i.e. middles of achievements), they will incorrectly judge them ungrammatical. Spanish speakers will make correct judgements with regards to resultatives, middles and delimitation by goals in English.

4 Conclusions

We have presented a theory of how syntactic operations depend on the semantics, via structures that are represented in the functional component of sentences. The Minimalist Program allows us to conceive of the mapping between semantics and syntax by encoding some of the conceptual features as semantic features of functional categories (i.e. as strong features). If the speaker chooses to make an eventive passive, for instance, he must then perform a certain syntactic derivation that follows from the features of the functional component. One knows the syntactic operations one needs to perform in a language by knowing what features are semantically uninterpreted in that language. Learning L2 involves learning the uninterpreted features of L2, or changing the interpretive level of the features that might vary between L1 and L2. We predict that there might be some interference from L1 into L2 because the speaker has already classified the features according to level of interpretation in their native language. For late learners, it might be impossible to change this level. This would have the consequence that even fluent late learners of L2 may assign incorrect derivations to their correctly used sentences. Extensive probing of linguistic intuitions and psycholinguistic experimentation on processing can uncover such a distinction.

The approach to the study of the syntax/semantics interface proposed here opens new possibilities to understand previous data on bilingual learning and performance. It also gives us new tools for exploring the notion of a critical period for learning language and hence, learning L2. It may turn out that the ability to master L2 fluently does not have an obvious critical age, but rather a gradual decrease as the learner is older. But qualitative analyses may reveal that there is a critical age for learning to assign the cor-

rect mapping between semantic and syntactic features, and the correct sentence derivations.

Finally, most people assume that bilinguals have the same underlying conceptual features, regardless of which language they happen to be speaking. Thus, they offer a unique population, in which conceptual and semantic bases of sentences are constant, but the mapping onto syntactic derivations can differ. This allows careful study of the behavioral effects of particular syntactic structures and operations, holding meaning constant. This in turn gives us a tool for studying the relation between semantic and syntactic features in general. Since that relation is at the heart of the minimalist method of parameterizing language, the study of bilinguals takes on new importance as a method to verify and refine linguistic theory.

Acknowledgements

We wish to acknowledge help with early phases of our work from Merrill Garrett, Eloise Jelinek, Adrienne Lehrer and especially, David Townsend. Special thanks to Andrew Barss for a careful and insightful review, which improved the final paper greatly. All mistakes and infelicities, of course, are our own.

