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Title:

***Sociobiological Bases
of Information Structure***

CANDIDATE:

Viviana Masia

SUPERVISOR:

Prof. Edoardo Lombardi Vallauri

COORDINATOR OF THE PHD PROGRAMME:

Prof.ssa Lunella Mereu

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List of abbreviations

Poss – possessive	PLUPRF - pluperfect
COM – comitative	DEF - definite
DAT – dative	DIR – direct evidential
QUOT – quotative	RPT - reportative
NOM – nominative	SG - singular
TEMP – temporal	NAR - narrative
NEG – negative	CNJ - conjectural
STAT – stative	MOD - modal
NML – non masculine	Y/N – yes/no
VOC – vocative	IMP - imperative
FIRSTH – first hand	OPT - optative
NON.FIRSTH – non first hand	EVID - evidential
REP – reportive	PROGR - progressive
PRES – present	
LOC – locative	
DIR – directional	
EV – Evidential	
REFL – reflexive	
IMPF – imperfective	
PL – plural	
NARR – narrative	
PART – participle	
EVEN – eventive	
INFR – inferential	
EMPH – emphatic	
GEN – genitive	
CAU – causative	
ACC – accusative	
INF – infinitive	
ART – article	
REM – remote	

P – past

CL – classifier

F/FOC – focus

A – agent

S – (intransitive) subject function

T/Top - topic

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Abstract

This work faces the sociobiological bases of Information Structure. The term “sociobiological” is here taken to encompass socio-interactional and processing implications of distributing sentence contents according to presupposition/assertion, topic/focus and given/new oppositions.

The socio-interactional domain explores the interplay of Information Structure units and the linguistic encoding of evidentiality, whereas the processing perspective looks into the neurocognitive underpinnings that support the decoding of informational articulations in discourse. These two approaches are put together to set forth hypotheses on the emergence of Information Structure categories in human communication.

The organization of the dissertation is summarized as follows. Chapter 1 provides an overview of the main theoretical literature on Information Structure from the earliest philosophical and Praguian traditions to the more up-to-date accounts. In this chapter, the correlation between information units and precise memory stores (expressly, Short-Term Memory and Long-Term Memory) is also laid out, together with the effects of *information packaging* on the storage and manipulation of information in the receiver’s mental model of discourse.

Chapter 2 outlines the interaction between the discourse realization of information units and the encoding of evidential meanings. On this purpose, a broad notion of *evidentiality* is taken into account (i.e. a notion embracing both the speaker’s attitude towards a proposition and the grammatical marking of its source); precisely, a taxonomy of epistemic stances elaborated by Mushin (2001) is drawn upon. Two stances are contended to be crucial for the distribution of sentence contents into more or less relevant informational units; these are referred to as *personal experience* and *factual* stance. I suggest that the former correlates with the assertion and/or focalization of some information, whereas the latter more strongly relies on its presupposition and/or topicalisation.

Chapter 3 presents experimental perspectives on the processing of Information Structure units, both from psycholinguistic and neurolinguistic perspectives. An introductory part gathers some the most far-reaching achievements reported in earlier and recent works on the subject. I put forth that these findings point towards two different trends in Information Structure processing. Using a terminology widely diffused within the purview of cognitive psychology and related disciplines, I called one

trend *bottom-up*, because it follows from processing operations that capitalize on the structural cues of sentence information; the other trend has been referred to as *top-down* because it reveals the influence of discourse-driven expectations on the processing of upcoming utterance contents. I attributed these two processing criteria to the experimental designs adopted in the reported studies, and, particularly, to the fact that in the bottom-up modality sentences were often processed in isolation, whereas in the top-down trend they were usually embedded in a wider context of discourse.

In Chapter 4, two experiments are described that confirm the role of expectation-based parsing criteria when presupposed, asserted, topicalised and focalized information is processed. It is shown that, when information structures are compliant with the receiver's expectations on both activation state and information packaging of contents, sentence processing is easier as opposed to when they deflect from his pre-conceived mental representation of the discourse model.

Chapter 5 represents the final part of the dissertation where the considerations developed in the foregoing chapters are built on to advance some possible evolutionary hypotheses of Information Structure in human communication. Here, the aforementioned socio-interactional (evidential) and processing-based arguments are recast as *exogenous* and *endogenous* forces or, in biological terms, as *nurtural* and *natural* biases, on the gradual shaping of Information Structure units. From the nurtural perspective, it is discussed that the presupposition/assertion and topic/focus dichotomies either *emerged* or have been *exapted* to modulate epistemic stances on communicated information. In this sense, in virtue of their discursive properties, topic and presupposition may have been selected (or exapted) to mark a pragmatic meaning of factual evidentiality, therefore reducing the speaker's commitment to the truth of a proposition. By contrast, focus and assertion may have been selected (or exapted) to mark a meaning of personal experience evidentiality, which increases the speaker's degree of commitment to truth.

From a natural standpoint, the development of Information Structure is addressed against the background of processing constraints which I assume to be complied with by the above mentioned bottom-up and top-down processing modalities. In other words, there are conditions of sentence processing in which discourse-driven expectations cannot be relied on (as in the case of all-new sentences). In these cases, information structural cues may have appeared to serve the function of allocating processing

resources according to degrees of relevance of contents to the communicative tasks at hand. On this account, focus and assertion receive more attention because they are typically more purposeful in the current exchange; conversely, topic and presupposition require a lesser amount of attention, because they are less relevant to the communicative goal. In the top-down account, the units of Information Structure may have originated in order to facilitate the recognition of activation degrees of contents. More precisely, topic and presupposition allow relating some information to recently activated and previously shared contents respectively, whereas focus and assertion allow recognizing some content as new or unshared. Easing processes of mental recall of contents turned out to be particularly adaptive in a context of mainly oral communication (but the same can be said for written communication), which is generally more transient and ephemeral. So, the human attentional system exploits the cues provided by packaging in two ways: when previous expectations on the discourse model are not available, the processor allocates resources on the basis of information packaging instructions; on the contrary, if expectations on the activation state and packaging of contents can be properly computed, these guide processing. As for this latter condition, when expectations are not met, sentence processing is more demanding than it would be when information structure is consistent with the receiver's pre-conceived representation of the discourse model.

Preface

Perhaps the great bulk of the derivational machinery in the syntax of natural languages can be functionally explained by reference to the specialized conversational job that many sentence structures seemed to be designed to perform.

[Knud Lambrecht – 1994, p. 2]

“Let me just ask a question which everyone who has been faithfully attending these sessions is surely burning to ask. If some rules you have described constitute universal constraints on all languages, yet they are not learned, nor are they somehow logically necessary *a priori*, how did language get that way?”¹

Stevan Harnad raised the above question to Chomsky during a conference in 1976. With a clear attempt to minimize the relevance of the question to a general understanding of the language faculty, Chomsky replied in the following way:

“Well, it seems to me that would be like asking the question how does the heart get that way? I mean we don’t learn to have a heart, we don’t learn to have arms rather than wings. What is interesting to me is that the question should be asked. It seems to be a natural question, everyone asks it. And we should ask, why people ask it.”

Although apparently naïve in its clothing, Harnad’s question concealed a somewhat sarcastic and provocative intent to challenge Chomsky’s *saltationist* approach to language evolution. Saltationist views conceive of the origin of the language faculty as the result of a unique, big developmental step, much in the fashion of an “all-or-nothing” process. To this view, advocates of a Darwinian line of reasoning champion the assumption that language is a *biological product* which, exactly for this reason, has

¹The more extensive discussion is reported in Harnad S. (1976), *Induction, evolution and accountability*, «Annals of the New York Academy of Sciences» 280, 58-60.

undergone the same transformations that were (and are) typical of all living beings as “reactors” to environmental pressures of some kind. Some of the most cogent pieces of evidence of how language responded and gradually adapted to cognitive, semiotic or pragmatic biases of different sorts can be found in what have been popularized as the *design features* of language, that is, the set of properties and requirements that a symbolic system must have in order to be called a “language” (Pinker & Bloom 1990; Simone & Lombardi Vallauri 2010: 206). Today’s research frontiers on language evolution engaged in the daunting task of exhaustively describing these features, on the one hand, and correlating them with domain-general or domain-specific abilities subserving language use and comprehension, on the other.

This work faces the same challenge from the point of view of Information Structure. More particularly, the discussion proposed aims at tracing the sociobiological underpinnings of the relevant categories of Information Structure building on theoretical and experimental approaches to their manifestation and processing in communication. The expression *Sociobiological Bases of Information Structure* is here intended as a more general designation in which Information Structure phenomena are accounted for placing an emphasis on their socio-interactional and processing properties in communication. The ultimate goal of the debate is the discussion of some of the reasons that might have grounded for the emergence of informational hierarchies in linguistic messages.

In light of the foregoing, the dissertation comprises five main chapters whose structure and contents are elucidated as follows. Chapter 1 (*Theoretical Overviews*) gathers earlier and recent outlines of the most widely studied units of Information Structure with particular regard to the presupposition/assertion, topic/focus and given/new dichotomies. The presupposition/assertion distinction will be addressed from the seminal accounts of the philosophical tradition up to later sociolinguistic and epistemological perspectives on their use in communication. Notably, these latter views emphasize the epistemic entailments of asserting and presupposing contents with corresponding implications for their challengeability degree in conversation (Sections 1.2.1 and 1.2.4). The categories of assertion and presupposition have lent themselves to diversified interpretations developed within formal modelings aimed at capturing their defining properties from different angles. More than assertion, most of these models have been concerned with presupposition projection in simpler clauses, as well as in

complex sentences (Sections 1.2.2.1 and 1.2.2.2). Indeed, contrary to assertion, presupposition often shows itself as underencoded meaning, not always fully available on surface structure. For this reason, before being elaborated by the processor, presupposition must be first of all computed and extracted from other verbally encoded content. The two models described in Chapter 1 (*Dynamic Semantics* and *Discourse Representation Theory*) have been particularly influencing in the literature on presupposition, and both have massively contributed to an in-depth understanding of its functioning in communication. It will be argued, though, that only a discourse-based approach (*Discourse Representation Theory*) proves suitable to explain presupposition interpretation as it actually takes place in ordinary conversations, since it conceives of presuppositions as entrenched in more complex discourse representations licensing their projection and decoding in the sentence. Furthermore, this approach more naturally accounts for contexts in which the receiver is required to compute unshared presuppositions, a mechanism commonly known as *accommodation* (Lewis 1979).

Some reflections will also be devoted to unveiling crucial differences between presuppositional and implicatural meanings in discourse. The reason for addressing this issue is that in a number of contributions on the subject these two classes of presumptive meanings have been regarded as bringing about analogous discourse operations, whereas in fact some relevant differences must be taken into account. Lately, the need of a separate treatment of presupposition and implicature has been further strengthened on experimental grounds (cf. Chapter 3).

Although presupposition and assertion are now largely regarded as instantiating a further level of informational articulation, the very early studies on Information Structure started with the theme-rheme, topic-comment or topic-focus distinctions, developed within the Second Prague School linguistic tradition (Section 1.3.1). Chapter 1 retraces the seminal outlines of these notions together with their impact on subsequent formulations caught on in other recent theoretical frameworks (Section 1.3.3).

In the same fashion of packaging-oriented approaches to Information Structure, throughout the dissertation I will deal with the given/new distinction (Section 1.3.4) as inhering in a level other than the topic-focus structure. Following Chafe (1976, 1987, 1994), I assume that the attribution of givenness and newness states to some information hinges on its degree of activation in discourse and in the conscious attention of the receiver; its topical or focal nature in the sentence, instead, reflects the speaker's criteria

in distributing given and new contents according to his intended goals in the conversation. The inter-independence of the presupposition-assertion, topic-focus and given-new pairs is more extensively debated in terms of their interaction with different memory stores in the human cognitive system (Section 1.3.5).

In Chapter 2 (*Sociobiological Perspectives: For an integrated account of Evidentiality and Information Structure*), a socio-interactional facet of Information Structure is explored. Here, the topic/focus and presupposition/assertion categories are laid out as markers of evidential meanings in discourse. More particularly, adopting a broader notion of evidentiality (entailing both the indication of the source of information and the speaker's epistemic attitude to it), I describe presupposition and topic as outward expressions of a *factual stance* taken by the speaker, and that allows him to communicate information that he assumes to be previously shared by the receiver (Section 2.5.1.2). On the contrary, assertion and focus tie the speaker to an evidence-based representation of a state of affairs, in which case he takes a *personal experience stance* on it (Section 2.5.1.1). For the purpose of our discussion, an integrated account of evidentiality and micropragmatic facts does not only find Information Structure a place in epistemological conceptions of meanings (as Nuyts rightfully remarked in his 2001 volume *Epistemic Modality, Language, and Conceptualization*), but also allows us to elaborate on the implications of transacting new information in contexts or social dimensions in which its communication appears particularly costly for the speaker. A case in point I will discuss is exemplified by what Givón (2002) called *societies of intimates* (Section 2.3), which he claims to epitomize “our bio-cultural descent”. A remarkable feature displayed by these social communities – typically made of a restricted number of people – is the treatment reserved to the communication of new information, whose (possible) repercussions on the entire speech community call for compelling socio-interactional evaluations on the part of speakers. This explains why interactions in these social realities are massively regulated by strict provisos dictating which contents can or cannot be communicated, and in what way they are expected to be communicated. In this chapter, it will be speculated that the way the categories of Information Structure are used in present-day ordinary conversations may in part reflect one of the reasons why they emerged in utterances to meet the aforementioned conversational constraints: modulate speakers' stances on sentence meanings, so that questionable information or information about others is diffused

limiting its (potentially) negative consequences in the rest of the community. From another perspective, this function of Information Structure units can be regarded as the upshot of an *exaptive extension from other primary functions* (e.g. supporting sentence processing mechanisms, among other things).

Chapter 3 (*Experimental perspectives on Information Structure processing: a literature review*) reports on earlier and recent experimental findings on the processing of different informational articulations. The phenomenon of presupposition has been the first to receive extensive investigation on empirical bases, and its cognitive underpinnings have been assessed using diverse experimental paradigms (Section 3.2.1). Most of these studies revealed that presupposition is likely to induce an almost subconscious and less attended processing of some information; namely, it seems to attract a lesser amount of cognitive resources in order to be computed. By contrast, assertion showed to demand additional processing, because its use is more typically associated to the speaker's informative goal in the communicative task at hand.

Quite similar trends have been noticed for topic and focus. The well-known MOSES ILLUSION paradigm (Erickson & Mattson 1988) is usually pointed towards as the opening gambit in the tradition of studies on topic/focus processing. After Erickson & Mattson's seminal paper, subsequent appraisals and replications of this study highlighted more effortful processing associated with focused information, as opposed to topicalised information. A quite noticeable feature of this first tradition of studies is that testing materials mainly consisted in isolated sentences with no prior discourse context licensing the interpretation of presented contents as given or new. This meant that processing effects were essentially measured on sentences which were all new for the subjects. However, the fact that some remarkable differences in the processing of presupposition vs. assertion and topic vs. focus units were detected indicates that subjects' processing strategies were more strongly influenced by information packaging cues, rather than activation states of contents. I accounted for these responses as the reflection of *bottom-up* effects, induced by the structure or "external presentation" of incoming information. Bottom-up processing directs the way some information is represented in one's mental model, which appears on the whole consonant with the effects observed in false information recognition paradigms, in which false information encoded as topic or presupposition was less easily noticed and more subtly complied with by the subjects, as compared to when it was focused or asserted in the utterance.

So, a bottom-up modality entails a cue-to-representation direction of sentence processing.

More recent neurolinguistic strands of research have probed the neural bases of Information Structure units assessing the role of context-driven representations in sentence processing. A handful of studies evidenced that, when sentences are embedded in a more extended context, their information structure is processed against the background of already established representations that make the distribution of given and new contents, together with their packaging, more or less expected. Traditionally, when processing is guided by expectations or pre-conceived representations, *top-down* mechanisms are involved. Differently from earlier studies, experimentations using context-driven parsing models found out that information structures that contravene the receiver's expectations – based on his mental model of discourse – require additional processing. Expressly, the processing of presupposition and topic, or focus and assertion, is costly to the extent that their degree of (un-)familiarity is more or less consistent with the receiver's predictions on the communicative dynamism of upcoming sentences. In this sense, if the previous discourse activates some contents, these are expected to be topicalised or presupposed in the subsequent utterance. Similarly, if some information is not known or has not been introduced yet in the preceding context, it is expected to be realized as focus or assertion. Accordingly, any reversal of such a configuration makes sentence processing more effortful.

In Chapter 4 (*Experimental perspectives on Information Structure processing: two case studies*) the results of two electroencephalographic (EEG) experiments are presented that seem to lend support to the role of the top-down effects discussed above. One experiment (Section 4.1) aimed at gauging the processing cost of presupposed vs. asserted (new) information on the basis of Event-Related Brain Potential recordings. In this study, it appeared that presupposition imposed a major allocation of working memory resources reflected in higher deflections in the N400 signature. In another experiment (Section 4.2), the processing effort of topical and focal sentences in texts has been measured registering brain rhythmic changes in different frequency bands. The sentences carried more or less active information which made the distribution of topic and focus units more or less aligned with the receiver's expectations. Interestingly, less expected information structures (with topic patterning with new information, and focus with given information) turned out to induce more effortful processing. So, contrary to

the findings reported in previous psycholinguistic studies, what we found on neurological grounds is that the presence vs. absence of a discourse context impinges on the cost required to mentally construct a *new* presupposition or a *new* topic in discourse.

Chapter 5 (*A Bio-linguistic perspective on Information Structure*) addresses some bio-linguistic accounts of Information Structure units and elaborates on the possible rationales behind their emergence in human communication. This part of the discussion capitalizes on the arguments set out in chapters 2, 3 and 4 to debate some of the evolutionary reasons that may have led speakers to assign sentence contents different packaging formats. For greater convenience, I decided to articulate this part into two main blocks. The first block contains an overview of the state-of-the-art literature on the development of Information Structure in human communication (cf. Krifka's laterality model) and in child speech. The second block zeroes in on a more evolutionary contention in which socio-interactional (evidential) and cognitive issues are debated. Precisely, Section 5.4.1 tackles the socio-interactional implications that may have contributed – together with pressures of a different nature – to the shaping of sentences into presupposition/assertion and topic/focus units. It will be argued that these implications bear upon the need to regulate one's epistemic attitude towards information in a context in which its safe transaction was probably an adaptive solution for the achievement of social cooperation. In this outline, I assume that the interactional dynamics Givón (2002) discussed for present-day traditional societies of intimates most probably characterized early human communities as well. I called the pressures from this socio-interactional ecology “constraints posed by *nurture*”.

Section 5.4.2 probes the interplay between the emergence of informational articulations and the processing limitations of the human brain; I called these biases “constraints posed by *nature*”. Based on the limits affecting our working memory system, I propose to speculate on the ways in which informational hierarchies supported either bottom-up or top-down mechanisms in different conditions of sentence processing. More in detail, when the discourse context does not allow anticipating the activation state or packaging of subsequent sentence contents, no pre-existing expectations can guide the planning of processing strategies. And so, in order to avoid wasting the small amount of cognitive resources available, resources are allocated on sentence contents according to degrees of salience and importance. Such degrees must be signaled by the formal properties of information units. It can then be thought that, in

such a case, information structure is exploited to sustain the intervention of bottom-up processing mechanisms.

On the contrary, when discourse grounds for the formulation of expectations, these inevitably guide processing. Precisely, the fact that the processing of Information Structure units is less costly when their correlation with activation statuses is more expected lets infer that the emergence of presupposition/assertion and topic/focus dichotomies served the purpose to identify proper givenness/newness statuses of contents; namely, topic and presupposition facilitated the recognition of given and shared contents, respectively, and focus and assertion that of new and unshared contents. In other words, the units of Information Structure gave contents a dedicated linguistic “vest” that allowed the receiver to access the activation status of information more rapidly in discourse, thus making sentence processing more efficient. This explanation finds support in the ephemeral nature of oral discourse necessitating more rapid and efficient devices for mental recall. In this view, the emergence of Information Structure categories provided for indications on continuity or discontinuity degrees of some information with respect to general discourse-based expectations. In so doing, they eased the anticipation of decoding strategies, thus supporting a top-down direction of sentence processing.

As can be imagined, this work brings together models and argumentations from different traditions of studies. This made it difficult, at times, to harmonize views and paradigms that are for the most part tangential to the phenomenon observed, but also help inquiring into it from a more exhaustive perspective. Because of the multi-faceted imprint of the discussion, this work does not intend to be conclusive in its scope. Much of the experimental part needs to be further refined, and the proposed connection between the linguistic encoding of evidentiality and the manifestation of information structure units in discourse should be better investigated in the light of some more elaborate reflection, possibly on the basis of in-depth corpus-based analyses. Nonetheless, I regard this attempt as a little step towards an appraisal and further improvement of these preliminary stages, to which I hope my future research interests might be more extensively devoted.

V. M.

Acknowledgments

This work is the ultimate result of a long, sometimes arduous, path undertaken three years ago when I finally made up my mind about exploring new frontiers in the field of Information Structure theory, embracing what are now currently addressed as its *neurobiological correlates*.

This choice has involved courage, determination, fear, and a good dose of stickability against all adversities and frustrations that experimental work might expectedly or unexpectedly entail. For this reason, my first thought goes to my family, which has persistently supported me so far and to which I am indebted for what I have become and whatever I will be in the future.

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To my family

CHAPTER ONE

Theoretical Overviews

*“If you can’t explain it simply,
you don’t understand it well enough”*

[A. Einstein]

1.1. Preamble

Information Structure (IS) has now become a prolific field of research, dynamized by ever-changing approaches and terminologies which refined the linguist’s descriptive tools in many ways, but also made it difficult for him to adopt the most suitable framework for his object of inquiry.

This chapter gathers the major terminological traditions diffused in IS studies since the very “dawn” of the discipline. The categories that will be examined saw the light within the scope of two main realms of language sciences: philosophy of language and linguistics. Both disciplines are concerned with language structure, but from different points of view. While the central issues of philosophy of language stand on explaining language foundations leading abstract speculations on its functioning, linguistics is more deeply interested in language use, as well as in the major differences between languages’ grammars. Together with other components of human language, IS shows itself as an interesting point of contact between these two frontiers of knowledge, since many of the formulations elaborated in the philosophical domain have been later absorbed by linguistics studies where they have been fine-tuned and/or recast in terms of their manifold functions in communication.

This chapter works a way through this interaction tracing both seminal outlines and more recent designations of three main informational dichotomies: *presupposition/assertion*, *topic/focus* and *given/new*. The discussion is organized as follows. Section 1.2.1 portrays the phenomenon of presupposition from its philosophical bases to more contemporary outlines relating to aspects of challengeability, speakers’ socio-interactional roles and effects of presuppositivity on implicit communication. Section 1.2.2 describes the two current approaches to presupposition projection,

Dynamic Semantics and Discourse Representation Theory, and argues why the latter better grasps the phenomenon of presupposition in its complex and actual happening in natural discourse. In Section 1.2.3, a discussion on the pragmatic profile of presuppositions and implicatures is addressed with a view to marking out their differential status and contribution in communication, contrary to recent integrated accounts. Section 1.2.4 deals with some theoretical views on assertion, from logical to pragmatically-based definitions.

Section 1.3 is dedicated to the topic-focus opposition. A historical overview of the notions of theme and rheme within the Prague School tradition is laid out in Sections 1.3.1 and 1.3.2. Section 1.3.3 presents post-Praguian perspectives on IS theory. In Section 1.3.4 the notions of given and new are debated, and a particular emphasis is placed on their autonomy from the topic-focus level, which makes provision for some further considerations on the concept of *information packaging* and its effects in sentence processing. In Section 1.3.5, the inter-independence of the presupposition/assertion, topic/focus and given/new levels is tackled in terms of the cognitive operations each informational dichotomy grounds for. Then, a concluding section summarizes the main points of the discussion setting forth further prospective lines of investigation.

1.2. Presupposition and assertion

1.2.1. Theoretical perspectives on presupposition

Presupposition has been one of the central planks of much theoretical and experimental debate, blossoming within the philosophical tradition of studies, then moving through the fields of linguistics, rhetoric, cognitive sciences and psycholinguistics. This far-reaching speculation has been, and still is, suggestive of the growing interest in the phenomenon as well as of its relevance to different, though interrelated, branches of knowledge.

As is known, earlier attempts at investigating the place of presupposition in the study of sentence meaning harken back to Frege's observations on definite descriptions. In his

componential semantics, Frege (1892) stated that the truth value of a sentence depended on the truth value of its constituent parts. For a sentence like (1)

(1) The one who discovered the elliptical shape of the planetary orbits died in misery

he noticed that its truth value is not only conveyed by what is explicitly asserted, but also by the inference that

(2) It existed someone that discovered the elliptical shape of the planetary orbits

related to the definite description *The one who discovered the elliptical shape of the planetary orbits*. Frege assumes (1) to be true iff the presupposition (2) is true. So, the truth value of the presupposition of existence grounds for the truth value of the entire proposition subsuming it². He also observed that, in denying (1) the definite description would not be affected, because, if it were, what is predicated about it would be consequently false.

The problem of true or false definite descriptions was later taken up by Bertrand Russell (1905) who proposed to separate the level of true/false judgments from the level of semantic values. Indeed, he believed that sentences containing non-referring expressions could be deemed true or false, but not necessarily meaningless. In his famous example

(3) The present King of France is bald

the definite description *The present King of France* evidently refers to no “King of France”, yet in its totality, the sentence is perfectly intelligible. In Russell’s line of thought, non-referring definite descriptions are regarded as “incomplete symbols” entailing quantifications in the sentence in which they occur.

²In analytical philosophy, this particular kind of presupposition has been traditionally referred to as *semantic*, because it determines the actual truth-conditional value of a proposition (cf. the formulation recently given in Domaneschi 2015: 1, “a sentence *p* semantically presupposes a sentence *q* in order to treat *p* as endowed with sense, that is, as either true or false”).

Peter Frederick Strawson (1950) brings Russell's observations to further empirical analysis setting out a more pragmatic-centered account of definite descriptions. According to Russell, for a sentence like

(4) The floor is strewn with petals

to be true, there must be only one floor designated by the definite description *the floor*. Strawson, however, detects uses of *the*-definite descriptions like that in (4) referring to wider categories of objects, often in a somewhat vague manner. Consider (5)

(5) The dolphin is one of the most intelligent animals on earth

The definite description *the dolphin* does not indicate a single specimen of dolphin but rather all specimens that, by virtue of their intensional features, can be included within this category. He points out that the meaning of definite descriptions like those in (4) and (5) is incomplete, if exclusively analyzed at the semantic level. What delineates the reference expressed by *the floor* in (4) is the speaker's intention to refer to a particular floor, possibly identifiable by both speaker and hearer. (The title he chooses, *On referring*, in contrast to Russell's *On denoting*, is suggestive of this more speaker-oriented interpretation of definite descriptions. Indeed, as Donnellan will state, "*Expressions denote, people refer*", cf. also Cohen 2008: 2.) So, behind the use of a definite description, there is also the speaker's instruction to treat some referent as spatio-temporally identifiable for the hearer.

Contention on referring properties of definite descriptions - and therefore of existence presuppositions - became even hazier with Keith Donnellan's (1966) bipartite distinction between ATTRIBUTIVE and REFERENTIAL definite NPs. In Donnellan's account, speakers can use definite descriptions either to presuppose the existence of a referent or with no particular referent in mind. In his popular example

(6) Smith's murderer is insane

the definite description *Smith's murderer* can be uttered attributively, i.e. with reference to any individual who committed the crime, whatever his/her identity, or referentially,

indicating an individuated person – say, John Miller – who killed Smith because of his [John’s] mental insanity³. In the same way as Strawson, Donnellan’s ideas run counter to Russell’s outline of definite descriptions: while Russell holds that referentiality degrees somehow affect the truth value of a definite NP, Donnellan maintains that a definite NP can be used to say something true even if nothing can satisfy it. Additionally, along the same lines of Strawson, he recognizes that difference in referentiality degrees is not a semantic property of definite descriptions, but a pragmatic implication stemming from the speaker’s referring intentions.

It does not seem possible to say categorically of a definite description in a particular sentence that it is a referring expression (of course, one could say this if he meant that it might be used to refer). In general, whether or not a definite description is used referentially or attributively *is a function of the speaker’s intentions in a particular case...Nor does it seem at all attractive to suppose an ambiguity in the meaning of the words; it does not appear to be semantically ambiguous. (Perhaps we could say that the sentence is pragmatically ambiguous...)*” (Donnellan 1966: 272). [italics mine]

A rather common trend in philosophical studies on presupposition is to associate it with the notion of CONDITION OF USE. One of the first scholars to espouse this correlation is the English philosopher R. G. Collingwood (1940), who used the notion of presupposition in a much broader perspective. He stated that, since each act (whatever its nature) is aimed at a specific goal, by executing it we implicitly admit that it is fit to attain this goal, and that there is no *a priori* impossibility for its success. In Collingwood’s paradigm, presupposition is conceived as the condition required in order for an utterance to pursue the aim for which it is produced. One criterion he utilizes to detect the presupposition of an utterance is by conceiving it as the answer to a question whose “felicity” hinges on a number of conditions of possibility, also obtaining for the corresponding answer.

For the sake of illustration, he provides the following pair of examples:

(7) He stopped beating his wife

³Cf. Donnellan (1966: 267): “A speaker who uses a definite description attributively in an assertion states something about whoever or whatever is the so-and-so”. [...] A speaker who uses a definite description referentially in an assertion uses the description to enable his audience to pick out whom or what he is talking about and states something about that person or thing”.

(8) This rope is used to hang out the washing

He believes that (7) and (8) must be regarded as virtual answers to the questions:

(7)a. Did he stop beating his wife?

(8)a. Is this rope used to hang out the washing?

The preliminary conditions by which both the affirmative utterances and the correlative questions would be validated are: (a) *He was used to beating his wife*, and (b) *This rope has a particular function*. These conditions thus represent the presuppositions on which the truth of both the affirmative and interrogative utterances is placed.

The notion of condition of use or condition of success of an utterance has been subsequently taken up by Fillmore (1971) who depicted presuppositions as requirements for an utterance, having a particular surface structure, to be produced in a given communicative context. So, for the utterance

(9) Please, close the door

he pins down the following conditions of success:

- (i) the relationship between the sender and the receiver is one that allows the former to address a request to the latter;
- (ii) the receiver is in a condition such that he can close the door;
- (iii) the sender refers to a particular door and assumes the receiver can recognize it;
- (iv) the door mentioned is open at the moment of utterance;
- (v) the sender wants to have it closed

Fillmore maintains that actual presuppositions of (10) are (i)-(iv), whereas (v) is included among those he called *conditions of sincerity* (based on the fact that the speaker genuinely wants the hearer to perform the requested act, cf. Austin 1962).

Going back to Strawson, it must be observed that, although his contribution has been somewhat less influential than Frege and Russell's thought on subsequent philosophical and linguistic reflection on presupposition, it certainly paved the way for what Robert

Stalnaker later put forth as a PRAGMATIC notion of presupposition, which he set out in the following terms:

It is persons, rather than sentences, propositions or speech acts that have or make presuppositions (Stalnaker 1974: 52)

The basic presupposition relation is not between propositions and sentences, *but between a person and a proposition*. (Stalnaker 1973: 447) (italics mine)

One crucial aspect of his counterpoint to earlier semantic accounts is that presupposition use entails expectations that the content presupposed holds in the *common ground* of both speaker and hearer. He describes common ground as a network of beliefs and assumptions previously shared by interlocutors or accumulated up to a certain point in the conversation. As highlighted by Stalnaker, knowing what (and how much) can be taken for granted is an essential requirement that guides the direction of the conversation and, precisely, the adequacy of presuppositional and assertive strategies in an utterance. Yet, he remarks that conformity to what interlocutors already know is not a *sine qua non* condition for some information to be presupposed. Often, presupposing shows up as a mere act of *pretense*:

A speaker may act as if certain propositions are part of the common background when he knows that they are not. He may want to communicate a proposition indirectly, and do this by presupposing it in such a way that the auditor will be able to infer that it is presupposed. In such a case, a speaker tells his auditor something in part by pretending that his auditor already knows it. The pretense need not be an attempt at deception. It might be tacitly recognized by everyone concerned that this is what is going on, and recognized that everyone else recognizes it. In some cases, it is just that it would be indiscreet, or insulting, or tedious, or unnecessarily blunt, or rhetorically less effective to assert openly a proposition that one wants to communicate (Stalnaker 1974: 474)⁴.

So, the reason for resorting to presuppositions does not exclusively involve common background knowledge between participants in the conversation. It may as well concern

⁴A similar point was made in a previous work in which he stated that: "If, in a normal context, a speaker uses a sentence which requires a presupposition [...] then by that very act, he does make the required presupposition. Whatever his actual beliefs and assumptions, he does act as if he takes the truth of the proposition for granted, and as if he assumes that his audience recognizes that he is doing so" (Stalnaker 1973: 451).

the intention to avoid communicating a proposition directly, or appearing redundant or insulting, among other reasons we will broach in detail later on.

The inter-independence of presupposition use and interlocutors' knowledge states is also rendered possible by a mechanism which in the literature came to be known as ACCOMMODATION. Lewis first introduced this term in his 1979 paper to describe the process by which common ground is adjusted to the conditions imposed by a new presupposition being conveyed. That is how he originally formulated this notion⁵:

Rule of accommodation for presuppositions (Lewis 1979: 340):

“If at a time *t* something is said that requires presupposition *P* to be acceptable, and if *P* is not presupposed just before *t*, then – *ceteris paribus* and within certain limits – presupposition *P* comes into existence at *t*”.

Epistemically, what happens when accommodation of new presuppositions takes place is that they are accepted with no previous truth-value assessment. In such a case, the presupposition is simply taken as true, and calls for no subsequent verification on the part of the receiver⁶. At least, this is what usually happens in ordinary cooperative conversations (Kerbrat-Orecchioni 1986)⁷.

This universal property of presuppositions grounds for what Givón (1982) calls an *unchallengeability* effect on the content communicated. In his REVISIONIST EPISTEMOLOGY, Givón (1982: 24) groups presuppositions in the category of

propositions which are to be taken for granted, via the force of diverse conventions, as *unchallengeable by the hearer and thus requiring no evidentiary justifications by the speaker*.

⁵Although the introduction of the label *accommodation* must be put down to Lewis, earlier observations on the phenomenon are also found in Karttunen (1974: 191): “Ordinary conversation does not always proceed in the ideal orderly fashion described earlier. People do make leaps and shortcuts by using sentences whose presuppositions are not satisfied in the conversational context. This is the rule rather than the exception [...] I think we can maintain that a sentence is always taken to be an increment to a context that satisfies its presuppositions. If the current conversational context does not suffice, the listener is entitled and expected to extend it as required”.

⁶Cf. also Stalnaker's conception of the effect of accommodation of information in discourse (Stalnaker 2008: 6: “Accommodated information is communicated indirectly so that there is no provision for *straightforwardly rejecting it*. That is why accommodated information survives rejection and it is why it is inappropriate to communicate information that is either controversial or noteworthy by presupposing it”. [italics mine])

⁷Along similar lines, Lambrecht (1994: 52) uses the term “pragmatic presuppositions” to refer to the set of propositions lexicogrammatically evoked in a sentence which the speaker assumes the hearer already knows or is ready to take for granted at the time the sentence is uttered”.

In this view, by presupposing information the speaker is not compelled to commit to or vouch for what he is communicating, because he is presenting it as if its truth has been already “weighed up” by the receiver. In other words, accommodation often takes the form of a *tacit acceptance* of some content, in the sense that, when some new content is presupposed, its liability to be addressed or challenged by the receiver is markedly reduced⁸. In Sperber et al.’s words (2010), exerting EPISTEMIC VIGILANCE on some information would imply costly operations, potentially eventuating in uncooperative communicative strategies. In this light, presupposition can be regarded as a non-committal conversational attitude towards knowledge; precisely, a behavioral disposition to avoid any responsibility for the truth of the information negotiated (on this account, cf. also Henry 1977: 58, “les presupposés sont formulés de telle manière que la responsabilité de les avoir exprimés ne puisse pas être imputable au locuteur”).

Another fundamental property of presupposition in communication is related to pursuing LANGUAGE ECONOMY, and particularly to its capability of speeding up message transaction. Indeed, thanks to accommodation processes, more new ideas can be compacted within a single utterance, thus simplifying the structure of conversations. Consider the following contrasts ((10) is the original version, whereas (11) is the manipulated one)⁹:

(10) [My English teacher]_{PPP/NEW} [announced that we'd be reading 4 books that year].
[When I was a freshman in high school]_{PPP/NEW}, [I wrote a short story about a busboy working at a party house]. [My career]_{PPP/NEW}, you might say, [had begun].

(11) I had classmates and an English teacher. [My English teacher]_{PPP/GIVEN} announced that [we'd]_{PPP/GIVEN} be reading 4 books that year. I was a freshman in high school. [When I was a freshman in high school]_{PPP/GIVEN}, I wrote a short story about a busboy working at a party house. I knew I would start a new career. So, [my career]_{PPP/GIVEN}, you might say, had begun.

⁸A reason Kerbrat-Orecchioni (1986: 32) crucially associates to this property is that “les posés [i.e. assertions] sont simplement proposés comme vrais au destinataire” while “les présupposés lui sont plus brutalement imposés”.

⁹The excerpt is extracted from an interview to an American author. The extended version is available here: <http://lianametal.tripod.com/id38.html>

As can be seen, (11) shows up as a much longer turn than (10), because each of the presuppositions uttered is anchored to an assertive antecedent in context, thereby increasing redundancy effects, as well as structural complexity of the turn. In (10), new presuppositions are straightaway introduced in discourse without being assertively activated in the co-text. In this sense, (10), relative to (11), imposes several accommodation processes associated with the definite descriptions *my English teacher*, *we*, *my career* and the subordinate clause *when I was a freshman in high school*. If, on the one hand, these processes appear to be cognitively costlier to bring about (because new mental slots for these referents must be created by the receiver), on the other hand, they are utterly common in everyday speech.

Literature is nowadays abundant on the range of triggers activating presuppositions in discourse. It is widely concurred with that, besides the above mentioned definite descriptions and subordinate clauses, other common triggers are change-of-state predicates, factive predicates, defining relative clauses¹⁰, focus-sensitive particles (e.g. *also*) and iterative adverbials (Kiparsky & Kiparsky 1971, Lombardi Vallauri 2009). A few examples are given in (12):

- | | |
|--|--------------------------------------|
| (12)a. <i>My dog</i> broke the vase | (psp = “I have got a dog”) |
| b. <i>My dog stopped</i> breaking vases | (psp = “My dog used to break vases”) |
| c. It’s strange <i>my dog has broken</i> the vase | (psp = “My dog has broken the vase”) |
| d. <i>When my dog broke</i> the vase, I shouted at him | (psp = “My dog broke the vase”) |
| e. The vase <i>my dog broke</i> is my mother’s | (psp = “My dog broke the vase”) |
| f. <i>Also</i> my dog breaks vases | (psp = “Other dogs break vases”) |

According to more recent accounts (Sbisà 2007), presuppositions also rise from the use of superlatives, participial phrases and quantifiers, among others.

For example, the superlative in (13)

- (13) She is one of *the best* students in my class

¹⁰Cf. Lambrecht (1994: 51-52): “The [defining] relative clause helps the hearer determine the referent of the [definite] phrase [...], by relating this referent to some already given piece of knowledge, which I assume the hearer happens not to be thinking of at the time I utter the sentence.”

presupposes that (a) there are “best students”, by virtue of its definiteness, and that (b) in the class there are intermediate gradations from worse to better students.

The participial clause in (14):

(14) *Having spoken to her mother*, she finally felt relieved

bears the presupposition that “she had spoken to her mother”. This property is inherent in the basically hypotactic structure of participial constructions, equating them with other adverbial dependent clauses projecting truth presuppositions.

Similarly to other definite descriptions, universal quantifiers like *all* presuppose the existence of the referent designated by the NP they precede in the sentence. In (15)

(15) *All desert spiders* are poisonous

it is presupposed that there exist desert spiders.

Another widespread function associated with presupposition use is found in what was previously hinted at as reduction of responsibility. This property led some scholars to encompass presupposition among the phenomena commonly treated as IMPLICIT COMMUNICATION. To a certain extent, and for reasons that will become clearer later on, concealing responsibility in a message is tantamount to shrinking chances for some content to be recognized as potentially challengeable. This strategy has been extensively investigated within the domain of public communication, particularly that targeted at persuasive aims (Sbisà 2007, Lombardi Vallauri 1993, 1995, 1996, 2000, 2001, 2002, 2009, Lombardi Vallauri & Masia 2014).

It has been observed, in fact, that the language of advertising massively draws upon slogans like:

(16) Orkney white crab. *Our best starter* is already dressed for Christmas dinner

(17) What’s on *your wish list*?

(18) Pleased to increase team GB’s hand luggage allowance¹¹ (from British Airways)

¹¹Cf. Masia (unpublished).

In (16) *our best starter* presupposes that the advertised restaurant has a “best starter”; in (17), *your wish list* induces the presupposition that the addressee has a wish list, and the dependent clause in (18) conveys the presupposition that the British national airline would increase hand luggage allowance. In all these cases, the persuasive content of the slogan is presented as information to be accepted as true and not calling for further verification. The impact this function has on knowledge representation is remarkable, since it allows to forge beliefs and viewpoints in the receiver’s mind with little or no awareness on his part¹².

A volte la presupposizione informativa diventa anche persuasiva, poiché spinge il pubblico a vedere il mondo nel modo voluto dall’autore del testo, perché introduce di soppiatto e impedendone la discussione entità dubbie, interpretazioni tendenziose, criteri di valore. In caso di disaccordo, la presupposizione si sottrae alla discussione almeno in prima battuta: per essere discussa, deve essere prima esplicitata. Un contenuto qualsiasi, se introdotto mediante presupposizione, non chiede adesione esplicita e consapevole (rischiando un rifiuto), ma viene assorbito come naturale, rimanendo incorporato al successivo svolgersi del discorso o della conversazione¹³. (Sbisà 2007: 90)

Now, given the variety of approaches to the phenomenon, it will be better to elaborate on a general working definition of presupposition we will refer to in the rest of the dissertation. Thus, considering the formulations as yet provided, we intend **presupposition** as

¹²In the most typical cases, this mechanics stands on what – quoting Walton (1993) - Saussure & Oswald (2009) have recently dubbed “Straw man fallacy” effect, entailing the tacit undue attribution of commitments and responsibilities to message receivers thereby implicitly tying them to the truth of the speaker’s propositions (cf. Ibid. pag. 241: “Le sophisme de l’homme de paille fonctionne parce que le destinataire ne voit pas que le point de vue attribué à la cible attaquée lui est attribué de façon indue. En d’autres termes, c’est bien parce que le destinataire ne voit pas que l’engagement est attribué à tort que le sophisme est efficace”).

¹³“Sometimes, an informative presupposition also becomes persuasive, as it leads the audience to see the world the way the author of the text sees it. This is because presupposition stealthily introduces dubious notions, tendentious interpretations and value judgments keeping them from critical discussion. In case of disagreement, presupposition “dodges” discussion, at least in the first instance: in order to be challenged, it must first be made explicit. Any content, when introduced by means of presupposition, does not require conscious and explicit adherence to (running the risk of being rejected), but it gets assimilated as natural, thus being incorporated in subsequent development of the discourse or conversation”.

*any content the speaker presents as to be taken for granted by the receiver, either because it is already shared at the moment of utterance or because it is not relevant to the communicative goal to be attained in the conversation*¹⁴.

On balance, in this section I delineated the phenomenon of presupposition laying out philosophical and linguistic inquiries on its nature and implications in verbal communication. The manifold facets associated with its encoding and determination have laid the bases for the development of different explanatory models of its projection in discourse. Two of these – the most influential in the literature – are dealt with in the following sections.

1.2.2. Approaches to presupposition interpretation: Dynamic Semantics vs. Discourse Representation Theory

A hotly debated issue in the study of presupposition is the so-called PROJECTION PROBLEM, giving rise to different approaches to the calculus of presupposed information in communication. Generally speaking, the term “projection” refers to the way larger constituents inherit the presuppositions of the triggers they contain, or, put another way, the strategies carried out by speakers to represent presuppositional meanings in their mental model. Two approaches have been prevailing in earlier and recent literature on the subject, and these go under the labels of *Dynamic Semantics* (DS) and *Discourse Representation Theory* (DRT). In this section, I will lay out the general arguments of both paradigms, together with the way each proposes to solve the problem of presupposition projection.

1.2.2.1. Dynamic Semantics

DS is a model of interpretation of natural language semantics started by Irene Heim in about 1980 (Heim 1982, 1983). As the term “dynamic” hints at, the essential underpinning of this model is to observe information growth in time. This model finds

¹⁴As also remarked by de Saussure (2013), presuppositions are not the topic in focus.

its roots in the philosophy of language, flowing into cognitive and psychological models of meaning, and conceives of sentences as "information states transformers". More particularly, a sentence denotes a function that captures what it is to update any common ground with the sentence uttered (Rothschild 2011: 6). Thus, the leading tenet of DS is:

meaning is context change potential

Within this perspective, meanings are not merely static objects or Platonic entities, but instantiate preconditions to the felicity of specific discourse actions (intended as updating mechanisms).

Contrary to discourse-based paradigms (cf. DRT below), DS strives to provide a componential account of meaning, placing its interpretation exclusively within sentential boundaries. Indeed, DS claims no necessity to appeal to contextual coordinates in order to compute sentence meaning: contents are transposed on the discourse level after being preliminarily interpreted on the sentence level.

Most advocates of this paradigm argue that DS approaches to meaning may account for mechanisms like anaphora resolution and presupposition projection, among others. For example, (19):

(19)#[It]_i started barking and [a dog]_i entered the garden

is no doubt less acceptable than (20):

(20)[A dog]_i entered the garden and [it/Ø]_i started barking

because in (19), the receiver is compelled to form a representation of the referent resumed by the pronoun when such a referent does not already belong to his mental model of discourse.

By the same token, the definite description *John's children* could not precede a clause in which "John's having children" is presented as hypothetical. If, instead, the definite NP were placed after this clause, no interpretive problem would arise.

(21) #*John's children* are bald, if John has children

(22) If John has children, then *John's children* are bald

The presupposition in (22) would be satisfied because the preceding hypothetical clause prepares the conceptual ground to represent the referent encoded by the subsequent definite NP. What makes (22) acceptable is the fact that *John's children* must not be intended as denoting an exact referent outside the representation framed by the sentence meaning¹⁵, rather it is entrenched in the context set by what precedes that phrase. So, the existence presupposition triggered by *John's children* will be deemed true to the extent that what is predicated in the hypothetical clause is true, and vice versa.

In a conditional sentence of the form *If A, then B*, if the antecedent A satisfies the presuppositions of B, then the conditional as a whole does not carry the presuppositions of B. We can make sense of this by imagining that we first update the global discourse context with A, and that it is in *this temporary, hypothetical context that the presuppositions of B have to be satisfied* (Coppock 2014 [Karttunen 1974]) [italics mine].

This bears upon the assumption that sentential meaning is accorded the function to narrow down the context set, namely the number of possible worlds to which the presupposition can apply. Other virtual contexts not delimited by the sentence would not count as possible grounds for the presupposition.

So, in this perspective, the projection problem of presupposition would be tackled as follows:

In order to interpret a presupposition you must look on the context set by the sentence in which the presupposition is contained and assess how this context affects its meaning change potential.

It must be pointed out that, although innovative with respect to more static semantic models, DS privileges too artificial conditions of meaning interpretation, for it emphasizes the role of sentences, downgrading that of discourse context, which is not how language processing normally (and most naturally) occurs. Contents are not only related to immediately previous information in the sentence, but update our background

¹⁵In such a case, John's having children should be judged as true.

knowledge also on the basis of a wider discourse model representation. This aspect, which DS falls short of exhaustively explaining, is instead the pivotal principle of Discourse Representation Theory, which the subsequent section will bring home to.

1.2.2.2. Discourse Representation Theory

DRT branched off the DS paradigm adopting a more discourse-oriented perspective on meaning analysis. Hans Kamp (1981, 1993, 2011) originally introduced this theory to explain, in both semantics and pragmatics, issues related to anaphora, tense and presupposition.

In a different vein than DS, this model extends the analysis of meanings beyond individual sentences, drawing upon more complex discursive associations. In so doing, DRT licenses a theory of interpretation hanging on the formation of specific discourse representational structures, namely mental representations built up by the receiver as the conversation unfolds.

Within this framework, the most straightforward way to approach presupposition is to parallel it with other anaphorical elements gaining their referential strength from preceding textual anchors.

Presuppositions are just anaphors. They can be treated by basically the same mechanism that handles the resolution of pronominal and other anaphoric expressions. (Van der Sandt 1992: 341)

This line of reasoning has been formalized in terms of what Van der Sandt (1992) and Geurts (1999) have called BINDING THEORY, stressing the fact that presuppositions need to have discourse antecedents to bind to; and when none is already available to satisfy the presupposition, a new one must be construed by the receiver. Correspondingly,

to say that a presupposition is projected (in a given discourse) simply means that the lexical information contained in the “presuppositional anaphor” has been accommodated at some level of discourse structure, thus providing an accessible referent after all (Van der Sandt 1992: 345).

In equating presupposition with anaphor, Van der Sandt pinpoints two main differences between the two classes of categories. First, differently from anaphors, presuppositions

are richer in descriptive content, allowing them to be more flexibly accommodated in discourse. Secondly, presuppositions seem “to have an internal structure of their own” (ibid: 341).

In general, DRT can be viewed as an integration to the DS approach, in that it admits that a presupposition can be justified “locally”, namely on the basis of sentence-internal information, if an antecedent in the local context is found. On the contrary, when the presuppositions cannot be accounted for on the basis of sentence-internal information alone, their presence turns into a constraint on the global discursive context, which allows providing an antecedent to the presupposed item (Kamp et al. 2011: 131). Rather than impact on context change potential, DRT accounts for presupposition projection highlighting its cohesion-creating effect, in that “it links a sentence or sentence constituent to those parts of the context where the required information is found” (Kamp et al. 2011: 132). As Kamp et al. (2011: 132) pointed out, such an effect also yields a sensible explanation to accommodation processes, since the adaptation to an initially insufficient context makes it possible to conceive of presupposition as justified after all by the adjusted context. In this sense, whereas DS requires the presupposition to be supported by the preceding sentential context in order to be projected, DRT embraces a wider conception of context encompassing both linguistic and extra-linguistic coordinates which presupposition interpretation clings to.

At first blush, in accounting for presupposition projection phenomena, it is not straightforward to align either with a DS or with a DRT model. Given its sentence-based scope, DS can be called upon when it comes to triggers which do not (or barely) admit antecedents to be located outside sentential boundaries, let alone triggers activating new presuppositions. Nonetheless, a very common trend in communication is precisely the use of either presuppositions whose antecedents are far beyond the sentence scope, or context-independent (i.e. new) presuppositions. Indeed, in both oral and written language use, presuppositional triggers like definite phrases, adverbial subordinate clauses, among others, are frequently used to presuppose new contents. This makes a DRT approach generally more suitable to handle presupposition phenomena in their “authentic and natural habitat”, which is why I will adopt this model in the experimental studies described in Chapter 4. However, I assume contributions from other paradigms to be of great import in dealing with projection mechanisms in their manifold manifestations.

1.2.3. A snapshot on categories: presuppositions as not implicatures

Language is an impressive repository of what Levinson (2000) called *presumptive meanings*. With this term he indicated the exploitation of implicatural strategies in discourse, but also presuppositions, metaphors and other forms of implicit communication can be ascribed to this branch. Albeit similar in their attitude to leave informational contents unexpressed, or not directly asserted, these categories differ in the kind of under-encoding instantiated, as well as in the mechanisms required to reconstruct the content they implicitly convey. To date, ideological stances on the boundaries between the above mentioned pragmatic phenomena are not all the way convergent. This is especially true for presuppositions and implicatures, which have sometimes been addressed as bringing about analogous operations in discourse. In this section, I will succinctly discuss some of the reasons why I believe that implicatures and presuppositions should not be treated alike, but as triggering different kinds of semantic and pragmatic effects in communication. Further experimental backing to buttress this position will be presented in Chapter 3.

Since Grice (1975), it is well known that implicatures arise from speakers' intentional meanings, typically deflecting from what is literally encoded in the sentence. These meanings manifest themselves in inferences with varying degrees of explicit encoding. We recall conventional implicatures, deriving from the semantic value of expressions like *also* (*Also John adores fantasy novels* —> “Somebody else adores fantasy novels”); scalar implicatures, hinting at weaker or stronger values on a given scale (*Some people are playing tennis* —> “Not all people are playing tennis”); and conversational implicatures, following from discordances between the sentence literal meaning and the communicative situation in which a sentence is uttered.

It is generally agreed upon that all genres of implicatural meaning can be put down to the speaker's defeating attitude towards one or more conversational maxims, in that the speaker deliberately chooses not to comply with expected interactional behaviors, thus compelling the interlocutor to nail down his communicative purposes beyond the literal level of the message¹⁶. The interlocutor, on his part, manages to detect the rationale

¹⁶It is contended that conversational implicatures may arise via standard and non-standard interpretation processes. With standard conversational implicatures, maxims are not deliberately violated by the speaker and the inference is, so to say, carried out by means of default rules. Non-standard implicatures result from violation of one or more maxims which leads to non-default inferential calculus (cf. Andorno 2005)

behind the speaker's interactional moves because he assumes such moves to be cooperative after all, which allows for the speaker's communicative intention to be successfully gotten across. In fact, if implicatures use were infelicitous they would eventuate in a mere hindrance to the exchange.

We won't go back on the notion of presupposition, which I have extensively debated in Section 1.2.1, limiting myself to pointing out some crucial differences between the mechanisms underlying the presupposition of contents and those bearing upon their implication.

A *prima facie* aspect worth looking on has to do with *illocution* (or illocutionary force), i.e. what we intend to do with the contents encoded on the locutionary level (Austin 1962). Generally speaking, implicatures – especially the conversational type – are regarded as the actual intention with which an utterance is produced. For instance, if my friend and I know that our favorite movie will be on TV at 8 p.m., and we're both looking at a big clock on the wall striking 8 p.m., my saying to him *It's 8 o'clock!* would be apparently useless and irrelevant to the current communicative task. But if he succeeds in understanding my intention to say that our favorite movie is about to start, my utterance fits the context perfectly. So, with implicatures, the illocution is the very contextual meaning they depend on and that is implicitly conveyed through the verbalization of other states of affairs. These states of affairs are therefore a mere vehicle to access such a “covered illocution”¹⁷.

On the contrary, presuppositions are not presented as the intentional meaning of speakers. In saying

(23) The man in the back seat is chatting on the phone

I do not intend to assert that a man is sitting in the back seat, but rather the fact that he's chatting on the phone; and this second proposition bears the sentence illocution proper.

and Bianchi 2009). Since this distinction is not on the whole germane to our main concern in this section, we will use the term conversational implicature in its non-standard sense.

¹⁷Another strong point of this view is that implicatures (and not the overt assertions from which they derive) are understood as the content to which the speaker commits the most (cf. Saussure & Oswald 2009: 231, “l'implicature constitue l'objectif de la communication, et qu'elle est considérée par le destinataire comme prévisible par le locuteur, alors il est plus important pour le destinataire de considérer l'engagement du locuteur sur l'implicature, l'explicature n'étant que secondaire en tant que simple instrument de déclenchement du travail inférentiel”).

In my view, the computational processes carried out to determine implicatural and presupposed meanings impose different effort on the receiver. As Récanati (1987) rightfully observed, implicatures should be viewed as indirect assertions and, therefore, needing to be tracked down by the receiver, because they bear the speaker's main contribution to the interaction¹⁸. Conversely, presuppositions do not need to be reconstructed but simply "agreed upon" as part of the truth value of the proposition on which they depend. What is expected to be thoroughly attended to in a sentence is not what you already take for granted, but what genders knowledge updating. In micropragmatic terms, implicatures can be considered on a par with broad focus sentences, typically conveying all-new, purposeful information. On the contrary, the discursive operation carried out by presupposition is slightly more akin to that of topic, as it resumes information which is either already known or expected to be treated as such¹⁹.

Notwithstanding, controversies on the differential nature of presupposition and implicature have been the bulk of much recent discussion. Simons (2001) and Chemla (2009) are two of the most fervent upholders of an integrated account of presupposition and implicature phenomena. In what follows, we will sketch and comment on both stands on the matter.

Simons (2001) contends that presuppositions and implicatures rise on the basis of analogous conversational mechanisms. As illustration of this, she considers the case in (24) (ivi: 434):

(24)A: Do you want to go out for a drink?

B: I have to finish to write my SALT paper

¹⁸ Récanati (1987: 125): "an indirect speech act is a special kind of conversational implicature, where the speaker not only implicates some proposition P, but also that she intends to convey that P".

¹⁹ A similar interpretation is also found in Van der Sandt (1992: 336): "Presupposition and implicatures equally contribute to our understanding of natural language sentences. But the latter are computed in a different way. They are not part of the truth conditional content, but computed on the basis of the propositional content of the sentence uttered, contextual information and pragmatic principles of a Gricean nature. They are thus computed and represented separately and merged only afterwards into a more substantial proposition".

In the context, B's utterance conveys the implicature that "he/she cannot or does not want to go out for a drink". Simons observes that in the same context, utterances with more or less similar meanings like

- (25) a. I need to finish my SALT paper
- b. My SALT paper needs to get finished tonight
- c. I have to work on my SALT paper

would produce the same implicature associated with B's sentence in (24). In a similar vein, she argues that the presupposition arising from change-of-state predicates like *stop* in (Simons 2001: 435)

- (26) Jane didn't *stop* laughing

holds even if the trigger were substituted with synonymic expressions like

- (27) a. Jane didn't *quit* laughing
- b. Jane didn't *cease* laughing
- c. Jane didn't *discontinue* her laughter

The affinity she detects between the implicature in (24B) and the presupposition in (27) is that they are both non-detachable. In other words, in both cases the implicit meaning would be generated by whatever sentence, having a similar meaning, uttered in the same context. So, the implied content in (24B) (i.e. "I can't go out for a drink") would be attached to any of the utterances in (25), were these produced in the same context. The same goes for the presupposed content in (27) with respect to (26). Simons then draws the conclusion that

if at least some presuppositions are derived by the kind of mechanism which gives rise to other conversational inferences (i.e. conversational implicatures), then it is more appropriate to view them as propositions which the addressee can infer the speaker to believe on the basis of what the speaker has said, plus the assumption that the speaker is behaving cooperatively [...] presuppositions are not attached to atomic clauses, *but are inferences derivable from the utterance as a whole, given the conversational situation* [italics mine] (Simons 2001: 445).

If limited to the examples in (26)-(27) – namely, change-of-state predicates – presuppositions can indeed be viewed as paralleling other implicatural strategies, particularly those belonging to the conventional type, because the implicit content stems from the semantic value of the activating expression. However, this is one (if not the only) case in which convergences of this kind can be noticed. In fact, the same condition does not seem to obtain for other classes of triggers like definite descriptions, factive predicates or adverbial subordinate clauses, among others. A definite NP like *the dog* presupposes the existence of “the dog”, but, as far as I can guess, there is no context in which this content can be recast as implicatural. The same goes for the presuppositions projected by sentences like *It’s strange that she did not come* (ppp = she did not come) or *when she went away, I felt lost* (ppp = she is gone). In both cases, the presupposed contents must not be calculated by the addressee on the basis of contextual information or shared background knowledge. Rather, they are altogether available on the surface text, although they are presented to the addressee as ancillary and less relevant to the ongoing interaction.

Since affinities between presuppositions and implicatures seem to be restricted to the categories of change-of-state predicates, and that comparisons involving other classes of presuppositional triggers have not been thoroughly looked into, I do not believe any overlapping between presupposition and implicature phenomena is in order, at least not in the account I sustain.

Along the same lines of Simons, Chemla (2009) compares presuppositions with scalar implicatures. As anticipated in the outset of this section, this kind of implicature is derived from occurrences of the types in (28) and (29).

(28) Some children are red-haired

Scalar meaning → “Not all children are red-haired”

(29) John has three children

Scalar meaning → “John has no more than three children”

In both cases, the assumption of cooperativeness entitles the receiver to infer that what the speaker really intends to communicate is that “only some (and not all) children are

red-haired” and that “John has three children (and not more)”, respectively; but the implications that different values may be intended by the speaker are anyway part of the meanings of (28) and (29).

Chemla depicts presuppositions as weaker alternatives to the explicit trigger on a scale in which the trigger is the strongest element. For example, the weaker alternative of

(30) John won the race

is “John participated in the race”. Now, the inverse relation between (30) and its entailment would yield analogous effects as those in (28) and (29). So, by saying

(31) John participated in the race

the speaker may also imply that John won the race, in the same way as in (29) I may imply that John has four or five children. In Chemla’s account, what this comes down to is that the relation between an expression and the content it presupposes is basically a scalar one, whatever the direction of this scalarity.

As sketched out above, conjectural imprecision in these outlines lies in assuming meaning derivability for presuppositions. If implied contents must be conversationally derived because they carry the speaker’s communicative intention and main contribution to the interaction, presuppositions need not be computed as they are part of the base meaning of the uttered proposition and ground for its acceptability in a given communicative situation. In saying *I need to finish my SALT paper* as an answer to the question *Do you want to go out for a drink?* what I intend to inform my interlocutor about is that I’m not in the condition to go out for the moment. In a different way, with *Jane stopped smoking*, I do not want to call my interlocutor’s attention to the fact that Jane used to smoke, but on the fact that she has presently interrupted this activity. This distinction is properly a pragmatic, rather than a semantic, one. Precisely, it is a difference concerning the speaker’s attitude to the type of content involved, which, in the case of implicatures, is selected to achieve the illocutionary purpose of the utterance, although by means of another literal meaning. Contrarily, in the case of presupposition, such content is presented as secondary with respect to the communicative task at hand.

Another factor to consider is the SCOPE OF NEGATION. It is now well known that presupposition survives the effects of negation²⁰, as we show once again in (32)

(32) My son has left for Finland (psp = my son exists)

My son has *not* left for Finland (psp = my son exists)

It's strange she has come so late (psp = she has come late)

It's *not* strange she has come so late (psp = she has come late)

As far as can be conjectured from my present state of knowledge, the same does not hold for implicatures, since the inferences derived by means of implicatures change depending on the effect negation has on the surface meaning. Consider the following cases:

(33) A: Are you coming with us tonight?

B: I'm through with my chores (= So, I can come)

(34) A: Are you coming with us tonight?

B: I'm not through with my chores yet (= So, I cannot come)

It can be noticed that, in denying the literal proposition, what is inferred from it changes accordingly. This variation is a consequence of the fact that an implicature represents the point of the speaker's message, that is, its illocutionary force. Consequently, changes in illocution do not affect the content of a presupposition, but that of an

²⁰It is worth highlighting that, contrary to what other scholars suggested, presupposition survives the effects of negation but not necessarily those triggered by other illocutionary operators (see discussion in Kempson 1975). Indeed, if sentences like *Did Jane regret rebuking her son?* or *Did the King of France visit the Exhibition?* respectively presuppose that Jane rebuked her son and that there exists a King of France, in questions like *Did you go to Australia when you met your wife?* or *Do you have your own phone number?*, the presuppositions fall within the scope of the interrogation. Particularly, in the former case, the speaker is not asking whether the addressee went to Australia, but whether he did that when he met his wife (to be questioned, here, is not the truth value of the presupposition per se, but its being assumed to be the occasion on which the addressee went to Australia). In the latter case, the question is precisely about the existence of the addressee's phone number, designated by the definite description *your own phone number*. This behavior hints at a much stronger sensitivity of interrogative illocution (and other operators) to the topic-focus distinction, rather than the presuppositional or assertive status of some information (see details in Section 1.3).

assertion (cf. Section 1.2.3, for the effects of illocution change tests in identifying topic and focus units in utterances).

Another less debated aspect that has been thought to blur the boundary between presuppositions and implicatures is the condition known as *homogeneity*. In some recent philosophical and pragmatic-oriented accounts of definite descriptions and of other categories of presuppositional triggers (Horn 1981, Križ 2014) this term has been used to designate any “homogenizing” inference whereby plural definite descriptions are by default associated to the totality of entities they designate, although also partial interpretations would be allowed. For example, in the following sentence

(35) *The girls* have gone to a nearby pub

the definite description *the girls* is appropriate either in a context in which its meaning refers to the totality of girls identifiable by both speaker and receiver, or in cases in which only a part of such totality is being meant by the speaker. In this latter condition, *the girls* would point to a lower value along a scale. However, this would hardly be the default interpretation in the majority of cases, as the definite phrase would more likely be understood as encoding a universal quantification.

The kind of corrective inference underlying this part-to-whole interpretation of plural definites is of a similar nature as that regulating the decoding of scalar implicatures. As pointed out before, in saying *Some children are red-haired*, I may also refer to a stronger value in the scale entailed by *some* (i.e. *all*); and if this were my actual communicative intention in the conversation, my using *some*, instead of *all*, would be uncooperative. In a similar way, if my intention is to say that only *some* (and not all) of the girls have gone to a nearby pub (licensing a reference to the totality of the girls), the use of a definite phrase like *the girls* would contravene my interlocutor’s expectations on the global meaning of the plural definite in the sentence. So, on this account, both presuppositions and scalar implicatures would be subject to analogous mechanisms of semantic homogeneity, yet the distinctive feature of presuppositions under homogeneity constraints is still their resistance to negation. In (36)

(36) The girls haven’t gone to a nearby pub

the negated predicate does not apply to a sub-part of the totality entailed by the girls, but to the totality itself. On the contrary, if (28) is negated, as in (37)

(37) Some children are not red-haired

the scalar implicature (“all children are red-haired”) is negated, too. In fact, if it is not true that some children are red-haired, the same truth condition would not hold for any stronger value along the same scale.

Because of the above considerations, I believe presuppositions and implicatures to instantiate different types of implicit meaning. Although they may resemble in the mechanisms by which they leave some content unexpressed, they attain communicative goals with different illocutionary strengths²¹. In terms of their illocutionary function, implicatures resemble overt assertions, which accords them a highly dynamic status in communication. In contrast, presuppositions are contents which, similarly to topics, display low informativity and should therefore be regarded as informational frames, rather than as informational goals.

1.2.4. Theoretical perspectives on assertion

The concept of ASSERTION has been at the center of much debate in the philosophy of language and related disciplines.

Roughly speaking, assertion refers to a speech act by which something is claimed to be true. In traditional philosophical trends, the correlation between assertion and truth has often been a constitutive one, in the sense that truth has been characterized in terms of assertion and assertion in terms of truth.

So, by saying

(38) The dwarf slept in the elf's house

²¹Interestingly enough, de Saussure (forthcoming: 287) describes implicatures as contents “qui sont ouvertement partie de la communication pertinente et sont déterminées pragmatiquement”, and presuppositions as contents “qui ne sont pas partie de la communication pertinente et elles sont déterminées linguistiquement”.

the speaker's assumption that "The dwarf slept in the elf's house" must be true in order for the assertion to be felicitous.

In defining assertion, Strawson (1949; 1950: 205) pinpoints a clear-cut distinction between occurrences such as (39) and (40)

(39) The dwarf slept in the elf's house

(40) "The dwarf slept in the elf's house" is true

He claims that uttering (40) does not amount to making a new assertion, since a previous one is endorsed. Utterances containing a truth predicate as in (40) realize what Price (1987: 207) called a *reassertion* act, in which an assertion – which is by itself an expression of truth – is restated as true by means of a truth predicate.

In a 1918 paper, Gottlob Frege had already stressed the importance of differentiating between an *assertoric content* and an *assertoric force* in an asserted proposition: the former proceeding from the truth value of the proposition itself, the latter from the speaker's act to express it. On this conception, Frege portrays assertion as an outward sign of judgment, namely an act by which a belief is formed or reinforced.

Contemporary philosophers have been more intensely concerned with delineating an actional notion of assertion, framing it as a conversational act relating the speaker to a proposition. This speaker-proposition relation is what Searle (1969) assumed to entail different *directions of fit* of speech acts, i.e. ways in which acts of a certain type are related to the world and vice versa. Based on different directions of fit, Searle (1975) nailed down a taxonomy of speech acts, among which he singles out: (a) ASSERTIVES (committing the speaker to the truth of a proposition), (b) DIRECTIVES (causing the hearer to take action on something), (c) COMMISSIVES (committing the speaker to future actions), (d) EXPRESSIVES (expressing the speaker's attitude towards a proposition), and (e) DECLARATIVES (changing the reality in concordance with the proposition uttered). Expectably, assertions are included in the first group, as they compel the speaker to align his informative contribution with the portion of external reality referred to.

Stressing the relation between the communicative context set and the propositions uttered by speakers in a conversation, Stalnaker (1978: 323) maintains that "to make an assertion is to reduce the context set in a particular way, provided that there are no objections from the other participants in the conversation. The particular way in which

the context set is reduced is that all of the possible situations incompatible with what is said are eliminated. [...] assertions change the context in order to make clear that the context on which an assertion has its essential effect is not defined by what is presupposed before the speaker begins to speak, but will include any information which the speaker assumes his audience can infer from the performance of the speech act". So, in Stalnaker's view, assertion ends up covering all discursive phenomena that do not fall within the domain of conversational presuppositions.

With regard to Searle's speech acts classification, it must be pointed out that the association between committal attitude and assertion dates back even to Pierce's 1934 (ibid.: 384) work on *Belief and Judgment*, in which the idea of commitment is rendered in terms of communicative responsibility:

to assert a proposition is to make oneself responsible for its truth

As a consequence, by asserting a proposition, the speaker vindicates his entitlement to its truth when attempts at challenging it hold. (This is also related to the fact that in producing an assertion, the speaker "puts forward a claim on our attention and to our belief", cf. Toulmin 2003 [1959]).

By the same token, Pagin (2004 [2003]) maintains that

it is plausible that when a speaker asserts that *p*, she in some sense commits herself to the truth of the proposition that *p*. She puts her cognitive authority behind it, so to speak, and has to *suffer some measure of social humiliation if what she says turns out false*. This idea of commitment can also serve to distinguish between assertion proper and weaker constative forms, such as guesses and conjectures, since these differ from assertion with respect to commitment. So *incurring a commitment seems to be a necessary condition of making an assertion*. (italics mine)

It must be pointed out that, if responsibility is a socio-interactional consequence of assertion, belief is not its epistemic rationale. In fact, albeit speakers are commonly expected to assert what they believe to be true, assertion is by no means the exact linguistic correlate of a belief state, since also lies can be assertively expressed. For instance, let us suppose a little boy is not willing to go to school and knows his mother won't allow him to stay at home without a sensible reason. He might strategically pretend to be sick and opt for the following deceptive strategy:

(41) My stomach hurts

In asserting (38) he manifests his entire commitment to the truth of the fact stated, although this latter is not supported by any belief whatsoever. Pagin (2004 [2003]: 13) formalizes this condition in terms of non-compliance with SINCERITY RULES (Searle 1969), which brings to the subsequent reformulation of assertion:

to assert that P is to utter a sentence which means that P in such a way as to commit oneself to the truth of P and being insincere if not believing that P.

This property appears sketched in one of Searle's five constitutive rules for making assertions (Searle 1969). In the fifth, he states that asserting a proposition *p* essentially consists in making an utterance which "counts as an undertaking to the effect that *p* represents an actual state of affairs" (Searle 1969: 66). With this background in place, Pagin (2003: 12) then concludes that in making assertions, we make statements which do not mean (mere) propositions, but ways of interacting with them. In this sense, what really matters in asserting propositions is not *how such propositions really are* (i.e. true or false), but *how they are evaluated* by interactants. So, from being a trait of propositions, truth ends up being associated with attitudes, i.e. with speaker-proposition relations (cf. Chapter 2), similarly to what regulates the conveyance of presuppositions²².

What this amounts to is a general optionality of the speaker's belief in making an assertion. The speaker may either believe or disbelieve a proposition, yet the very act of asserting it entitles the addressee to count him as a believer. Put otherwise, an assertion contains the instruction to treat the truth value of some content as being actually vouched for by the speaker. Along these lines, Dummett (1981) proposed to recast assertion in terms of the *impression* of saying something true:

²²Along similar lines, Salvi & Fava (1995: 58-59) outline the pre-requisites for the felicity of assertions as follows: I. The speaker thinks he knows X; II. The speaker thinks his interlocutors doesn't know X; III. The speaker thinks the interlocutor wants to know X; IV. The speaker wants the interlocutor to know X. As it will be contended in the experimental chapters later on, condition IV is one of the most salient properties at the basis of the major processing costs associated to assertive strategies.

A man makes an assertion if he says something in such a manner as deliberately to convey the impression of saying it with the overriding intention of saying something true (Dummett 1981: 300).

Addressing the phenomenon of assertion also poses the problem of accounting for INDIRECT SPEECH ACTS. It is a commonly held idea that assertions tend to be literal, in that the communicative intention supporting the asserted proposition is expected to be superficially encoded. This consequently imposes some reflection on how to categorize indirect assertions of the type in (42)

(42) A: Are you going shopping again?

B: The fridge is empty

As can be noticed, here B's going shopping is not overtly stated; rather, it is logically deduced from the fridge being empty, which means that some food must be bought. In such a case, indirectness does not weaken the assertivity force of the speaker's intentional meaning.

In his 1987 monograph, Récanati classifies indirect speech acts as devices to convey *overtly disguised intentions*, what apparently gives grounds for contradiction, because "illocutionary intentions are necessarily overt" and "I cannot communicate a particular content to someone with a given force unless I get him recognize my intention to communicate it to him" (Récanati *ibid.* 118). However, as hinted at in the previous section (Section 1.1.4, note 7), indirect assertions carry at least two implications: (a) the speaker's desire to communicate a state of affairs S, and (b) the speaker's intention to inform the addressee that he wants to communicate S. He recognizes that communicative intention is a necessary and sufficient condition to endow an utterance with assertive force, no matter how explicit such an intention is; concurrently, both indirect assertions and implicatures can be regarded as genuine assertions in the overall pragmatic effects they bring about in communication. On top of that, it is precisely the function of manifesting the speaker's communicative intention that dichotomically opposes assertion to presupposition (see note 17).

In Section 1.2.1, I have focused on the effect of presuppositions to divert some content from being interpreted as the speaker's illocutionary purpose, because it provides the instruction to treat that content as already shared. Assertion, instead,

instructs to the opposite interpretation. We will see that analogous discursive properties obtain for the topic-focus distinction, but with variations I will zoom in on in the forthcoming sections.

1.3.Topic-Focus and Given-New

1.3.1. Topic and Focus: an introduction

The description of sentences with relation to their thematic structure is a recent research frontier in the domain of general linguistics. Nonetheless, interest in the field has grown rapidly over the last forty or fifty years, as evidenced by the vast and diversified terminology caught on in linguistics literature to describe different states in which information can be found in utterances. In the following sections, I will be concerned with two of the most deeply investigated notional dichotomies in Information Structure (IS) theory: *topic-focus* and *given-new*.

Despite extensive debates on both theoretical and empirical differences between the presupposition-assertion, topic-focus and given-new distinctions, the exact place of these functional pairs in the domain of IS studies has sometimes been blurred, with the result of adopting wrong terminology policies, on the one hand, and misinterpretations of the discursive operations they carry out, on the other.

In the following pages, I will go over seminal and later formulations of the topic-focus and given-new oppositions stressing both similarities and divergences with respect to the presupposition/assertion distinction. I will then argue in what respect topic/focus and given/new contribute to the hierarchical organization of discourse structure and discuss how their informational dynamism deflects from, or converges with, that brought about by presupposed and asserted contents in communication.

1.3.2. From the Prague Linguistic Circle onwards

It is by now agreed upon that earlier observations on the informational structuring of utterances have blossomed within the Second Prague School tradition along with its

most influential current of thought: *Funktionale Satzperspektive* or *Functional Sentence Perspective* (FSP). Nonetheless, a first attempt at describing utterances according to their functional design must be traced back to Weil's works on word order in ancient languages ([1844] 1978), in which the interpretation of IS units' discursive function is laid out as follows:

There is a point of departure, an initial notion which is equally present to him who speaks and to him who hears, which forms, as it were, the ground upon which the two intelligences meet; and another part of discourse which forms the statement (*l'énonciation*), properly so called. This division is found in almost all we say (Weil 1978 [1844]: 29).

Weil's preliminary reflections exerted a strong influence on subsequent formulations of the notions of Theme and Rheme, born within Praguian linguistics. Particularly, Vilém Mathesius (1939) inaugurated the FSP paradigm as an innovative and dynamic strand of research on sentence structure, drawing a line between its formal and functional description. The formal criterion sees the sentence as part of the language system, in which a subject and a predicate are distinguished; differently, the functional criterion regards the sentence as utterance, namely as part of a wider discourse context in which a content is linked to previous discourse and serves as the informational basis for upcoming new information, representing the core of the message conveyed²³. It is within this latter opposition that the labels *theme* and *rheme* started to be used to refer to informational hierarchies in sentences. Mathesius originally defined the theme as *what is being talked about, the point of departure of the speaker's message*, whereas rheme designates *what is being said about it*.

It is worth recalling that Mathesius' systemic differentiation between a formal and a functional level of sentences inherently subsumes von der Gabelentz's (1869) notional opposition between grammatical subject and psychological subject, and that between grammatical predicate and psychological predicate. Quoting Halliday (1985: 31), von der Gabelentz conceived of the psychological subject as the referent the speaker has in

²³Mathesius (1939: 171): "The information-bearing structure of the sentence should be considered in opposition to its formal structure. Whereas the formal structure concerns the way in which a sentence is composed of grammatical elements, the information bearing structure concerns the way in which a sentence is integrated into the factual situation during which it was produced. The basic elements of the formal structure of the sentence are the grammatical subject and the grammatical predicate, the basic elements of the information-bearing structure are the foundation of the utterance, and the core of the utterance".

mind to start with in the production of the clause, while the psychological predicate is what the speaker intends to predicate about the psychological subject.

As far as the interplay between word order and thematic structure is concerned, Mathesius defines the sequences theme-rheme (i.e. [Mary]_T [loves puppies]_R) and rheme-theme (i.e. *It's* [MARY]_R [who loves puppies]_T) as the *objective* and *subjective* order respectively, the latter being driven by the “speaker’s emotiveness”.

In capitalizing upon FSP entailments, František Daneš (1974) implements the notions of theme and rheme within his theory of THEMATIC PROGRESSION (TP). He holds that the organization of information in texts is determined by the progression in the distribution of utterance themes and corresponding rhemes. He believes that TP is at the basis of text connexity and constitutes the “skeleton of the plot” (Daneš 1974: 114). In his view, the reason why some texts appear more or less optimally coherent lies in how the speaker/writer controls the flow of new information that is accumulated as the text unfolds. When this flow is overwhelming, the speaker/writer is compelled to make a choice, which leads to the selection of either one or the other theme, depending on the communicative goal he intends to achieve. In his taxonomy, he includes at least three types of TP: (a) simple linear progression, where each rheme becomes the theme of the next utterance; (b) continuity theme, in which a theme is derived from another hyper-theme; and (c) thematic progression via a chain of derived themes. It goes back to Daneš the introduction of the term *allosentence* to refer to sentences that are equivalent on the semantic level but divergent on the syntactic and pragmatic level²⁴, as is the case of the three sentences in (43).

(43) Mary caught the night train to get to THE AIRPORT

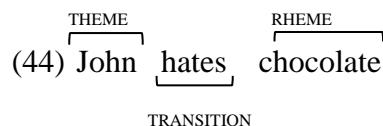
It's ON THE NIGHT TRAIN that Mary got to the airport

MARY got to the airport on the night train

Jan Firbas (1992) further developed the theoretical underpinnings of FSP inaugurating his well-known model of COMMUNICATIVE DYNAMISM (CD). As is known, this approach originated with the aim of accounting for the distribution of dynamic elements within the sentence and assumes that every sentence is oriented (or, better, *perspectived*) towards the element which contributes most to the development of communication. In

²⁴In Daneš's account (Daneš 1966), *allosentences* are grammatical alternatives of a proposition that are available to the speaker although they are not selected for the communicative he intends to fulfil.

the CD model, the sentence is characterized as a *distributional field*, where the syntactic elements instantiate the *communicative units*. Firbas spots a three-way pattern comprising a THEME, a TRANSITION and a RHEME, which he sees arranged as follows:



In a SVO syntactic order, he assumes the subject to correlate with the theme, the verb with the transitional unit (incorporating the informational properties of both theme and rheme), and the direct object with the rheme proper. CD is believed to hang on four main parameters, detected in (a) word order linear modification, (b) the contextual factor, (c) the semantic factor and (d) prosodic prominence. As for (a), he goes back to Bolinger (1952, 1965) stressing the fact that “gradation of position creates gradation of meaning when there are no interfering factors”. As for (b), he claims that the degree to which a unit contributes to the subsequent development of the communication relies on its retrievable vs. irretrievable status. This status proceeds from the interplay between the occurrence of a communicative unit in the sentence and what he calls the *immediately relevant context*, that is, what immediately precedes the sentence in the textual dimension in which it is uttered²⁵. The semantic factor is related to the general likelihood for some parts of speech or grammatical functions to be informationally projected as theme or rheme in discourse. Finally, (d) highlights the role of intonation contours in identifying thematic and rhematic portions of utterances. In most of his works, Firbas places his assumptions on English and, partly, Russian prosody.

In more recent branches of the Prague School (Sgall et al. 1973), the notions of theme (topic) and rheme (focus) have been associated with degrees of CONTEXTUAL BOUNDEDNESS. With contextual boundedness, Sgall et al. refer to the property of one sentential unit to further on information previously introduced in discourse. From this stance, topics are classified as contextually-bound segments, because they are established as informational units “the speaker only reminds of”; they are elements known to the hearer from the context, or from the general conditions of the given

²⁵In Firbas’ outline, the immediately relevant context must be differentiated from a wider context intended as general experience and knowledge shared by speaker and hearer.

utterance” (ibid.: 48). The sentence nucleus, the focus, represents the non-bound element, because it cuts thematic continuity introducing novel information.

A fervent follower of the Prague School inheritance is Michael A. K. Halliday (1985). Much of his speculation on IS revolves around the role of utterance themes.

In regarding the clause as a communicative event, he frames the theme as the unit organizing the clause as a message; precisely, the unit whose selection grounds for the selection of the correlative rhematic proposition. Hence, the use of the term *thematic structure* with reference to the distributional scheme of theme and rheme in sentences. Based on a linear ordering criterion, he identifies the theme as the element coming in first position in the clause, *featuring the starting point for the message, the ground from which the clause is taking off* (Halliday 1985: 38). Consequently, the rheme is what is commented about the selected starting point.

Analyzing the structural patterns of thematic units, Halliday pinpoints several classes of constituents that can receive thematic “clothing” in a sentence. He finds instances of nominal, verbal, adverbial and prepositional groups, up to entire clauses, realizing utterance themes. The following table illustrates how he conceives of these diversified conditions:

Table 1. *Syntactic scope of thematicity in Halliday’s model*

Examples		Constituent structure	
THEME	RHEME	THEME	RHEME
<i>What happened to Mary?</i>			
Mary	has been knocked down by a car	NP	VP
<i>What did Mary do with the hammer?</i>			
With the hammer	Mary fixed a picture on the wall	PP	CLAUSE
<i>What instrument did you play when you were a little boy?</i>			
When I was a little boy	I used to play the drums	CLAUSE	CLAUSE
<i>Did you see Mary at the party?</i>			
No, but I saw	John!	SUBJECT+VERB	NP (OBJECT)

According to Halliday, the selection of either one or the other format for theme realization is due to the modulation of *mood*, a term he uses somewhat interchangeably

with the notion of illocution. He argues that, in plain declarative clauses, theme generally coincides with the grammatical subject, in which case it would be characterized as unmarked. Conversely, if the theme falls on a constituent other than the subject, it receives a marked realization; as examples of this he mentions cases in which adverbial phrases like *suddenly*, *yesterday*, *tomorrow*, or prepositional groups such as *at night* or *in the corner* are realized as thematic and extra-posed in a sentence. But he classifies thematic complements as the most “marked themes” in a declarative clause (e.g. *This, I love more than that*).

1.3.3. Later approaches to Information Structure

One of the most influential notions of the Prague School to have been echoed in more recent speculations on IS is that of *aboutness*, having Mathesius as its main precursor. Reinhart (1982) embraced this notion to provide her outline of *sentence topic*, which she formalizes as expressing an intrinsic relation of “being about” with the comment unit it is associated with (Reinhart 1981: 54). Along the same lines of Heim’s semantic model of definite phrases (Heim 1983), Reinhart argues that the context set (intended, in Stalnaker’s description, as the set of propositions accepted as true at a given time by speaker and hearer) is not a disorganized mass of contents, but a classified set of information items whose place in the speaker’s background knowledge is determined by the “topological” instruction provided by topics. Topics are therefore cues for the construction of the context set, or for the classification of upcoming new propositions; more precisely, they represent an address or FILE CARD (in Heim’s terms) under which incoming information is stored in the context set. In saying *George met Thomas at the station* and *Thomas met George at the station*, the proposition “...met X at the station” is once stored under the *Thomas*-file card, once under the *George*-file card.

The term *aboutness* first spread in IS studies as a logico-semantic notion, identifying the grammatical subject as the sentence topic *par excellence*, and the predicate as the prototypical focus unit, because the proper function of the predicate is to complete the information carried by the subject. But, in cases like (45), in which mapping between the syntactic and the informational structure of the sentence is reversed:

(45) [JOHN]_{FOCUS} [had a nightmare]_{TOPIC}

the subject (*John*) no longer realizes the sentence topic but the information enunciated about the logical predicate (*had a nightmare*). Put another way, the aboutness relation between the two information units in (45) can be paraphrased as in (46)

(46) About the fact of having a nightmare (= TOPIC), I tell you that John (=FOCUS),
had it!

Within logico-semantic frameworks, a widespread approach to IS and, particularly, to focus interpretation, is Rooth's *Alternative Semantics* model (Rooth 1985, 1992), also known as *Focus Semantics*. The underlying assumption of this model is that focus is paradigmatically related to other entities of the same type and that may substitute for it in given contexts. These entities are FORMAL ALTERNATIVES to the uttered focus. In this view, the realization of focus in a sentence is the result of "replacing focused items in S with elements of the same semantic type" (Fox & Katzir 2010: 6). As noticed by Rooth (1992) this property accords focality the effect of generating inferences in discourse. He remarks that the placement of focus on either one or another constituent of the sentence influences the inferences that this constituent gives rise to; and this is due to the set of formal alternatives associated with the focused phrase. For example, in (47)

- (47) a. Cats [can be CARRIED]_{FOCUS}
b. [CATS]_{FOCUS} can be carried

a. and b. project different sets of inferences associated with the constituent on which focus has scope. (47)a. lets infer that whoever owns a cat, he can carry it. By contrast, (47)b. suggests that no other pets, except for cats, can be carried.

The effects of informational structuring on the truth-conditional value of a sentence had already been laid out within contemporary Praguian traditions. Particularly, Sgall et al. (1973) maintain that variations in Topic-Focus Articulation (TFA) of the following sentences change the presuppositions underlying their felicity in given communicative contexts (Sgall et al. 1973: 140).

- (48)a. This time Charles dated MARY
- b. This time Charles DATED Mary
- c. This time CHARLES dated Mary

Focus narrowed to *Mary* in (48)a. requires the utterance to be produced in a context in which the pragmatic presupposition that “Charles previously dated someone other than Mary” holds; (48)b. imposes that the presupposition that “Charles previously did something else with Mary (e.g. he wrote to her, he called her on the phone, etc.)” be satisfied. Finally, (48)c. projects the presupposition that “someone other than Charles previously dated Mary”. As can be observed, changes in Focus position also affect the scope of the temporal operator *This time*, which is on *Mary* in the first sentence, on *dated* in the second, and on *Charles* in the third.

Appealing to cognitively-based motivations, Givón (1983) depicts topicality as a property that all participants to a conversation possess to a larger or lesser degree (Vallduví 1993). Particularly, he identifies it with knowledge interlocutors can assume to share at any moment of the interaction. Referents and events are characterized by certain degrees of topicality – that is, *continuity* with respect to previous discourse – determining the way in which they are encoded in the sentence. In Givón’s account, degrees of continuity/topicality result in degrees of predictability and, in turn, *processability*. On this account, two sets of crucial conditions can affect the expression of topics in discourse, and these are driven by GESTALT PSYCHOLOGY principles²⁶ (Givón 1983: 13):

- *What is continuing is more predictable*
- *What is predictable is easier to process*

and

²⁶Gestalt-centered models of perception provide with a set of rules organizing input data from the external world. These rules are based on the perception of (i) *good shape* (the perceived structure is typically the simplest), (ii) *proximity* (elements are grouped according to distances), (iii) *similarity* (similar elements are generally grouped together), (iv) *good continuity* (all elements are perceived as belonging to a consistent and continuous whole), (v) *common destination* (if elements are moving, those moving consistently are grouped together), (vi) *figure-ground* (all parts of an element can be represented as figure or ground), (vii) *induced movement* (pivotal schemes allowing the perception of objects), and (viii) *meaningfulness* (in case of ambiguous stimuli, good perception will depend on the information caught by the retina). (iii) and (iv) are presumably more germane to Givón’s parameters of topicality.

- *What is discontinuous or disruptive is less predictable*
- *What is less predictable, hence surprising, is harder to process*

Due to these parameters, topic may receive a variety of superficial expressions, ranging from weaker (zero anaphora, unstressed pronoun, stressed pronoun), to stronger forms (full definite NP, full indefinite NP, etc.) (Givón 1983: 17)²⁷.

Givón hypothesizes that this scale is ruled by an ICONICITY PRINCIPLE, in that referentiality strength is somehow mapped onto the surface structure of the constituent realized as the sentence topic. He further detects psychological/motor-behavior forces pushing speakers to select either one or the other expression along the scale. In other words, speaker and hearer are expected to “expend only as much energy on a task as is required for its performance” (Givón 1983: 18). So, there is no point in resorting to indefinite full NPs to express a topic that is entirely active in the receiver’s mental model. In the same way, zero anaphora would be too feeble a resumption strategy when it comes to semiactive or inactive referents: *more linguistic material is needed when chances for a successful recalling of a referent are poor*.

Generative models developed a syntactic representation of IS units that rest on quantificational criteria. In his 1971 work on deep, surface structure and semantic representation, Chomsky recast sentential meanings as featuring a topic-comment or a focus-presupposition articulation, illustrated by the following examples:

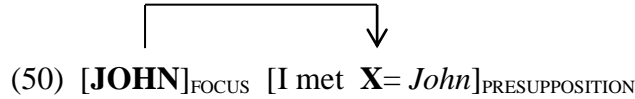
- (49) [Mary]_{TOPIC} [has broken up with her boyfriend]_{COMMENT}
 [MARY]_{FOCUS} [has broken up with her boyfriend]_{PRESUPPOSITION}

As regards the focus-presupposition structuring, he portrays focus as realizing the predicate of the dominant proposition, while the presupposition (which he uses not in the philosophical sense argued in Section 1.1.1, but as information either already known or recently activated in discourse) delimits background information containing a variable to be quantified by the focused phrase. Therefore, on a surface structure level,

²⁷For the sake of completeness, we report the entire scale in what follows: zero anaphora, unstressed/bound pronouns or grammatical agreement, stressed/independent pronouns, R-dislocated DEF-NP’s, neutral-ordered DEF-NP’s, L-dislocated DEF-NP’s, contrastive topicalization, clauses projected by cleft constructions, referential indefinite NP’s (Givón 1983: 17).

the focus is the phrase containing the intonation center, and the presupposition is determined by replacement of the focus by a variable (Chomsky 1971: 200).

Example (50) sketches out this algorithm.



Within a cartographic approach, Rizzi (1997) located topic and focus constituents in a functional projection ranking higher than the sentence phrase, and that he called COMPLEMENTIZER PHRASE (Rizzi 1997, Puglielli & Frascarelli 2008). From the perspective of transformational grammar, information structures like (50) would be derived by raising the focus constituent from an embedded position up to the Complementizer Phrase where, according to a “feature-checking” parameter (Brody 1990), the inflected verb activates [+foc] features on the element to be legitimized as focus. Topic, on the contrary, is assumed to originate in the left or right periphery of the sentence, with no syntactic movement implied in its realization.²⁸

Another well-known formal approach to IS – although in a fairly strong functional tack - is that proposed by Lambrecht (1994) who addresses IS as involving “the relationship between pragmatic function and syntactic form” (Lambrecht 1994: 32). In Lambrecht’s model, IS is “that component of sentence grammar in which propositions, as conceptual representations of states of affairs, are paired with lexico-grammatical structures in accordance with the mental states of interlocutors who use and interpret these structures as units of information in given discourse contexts” (Lambrecht 1994: 5). So, the way utterances are informationally organized within a discourse is basically a matter of how form-meaning pairs between internal representations and verbally encoded contents are generated by speakers.

Shifting onto more contemporary functional views, other outlines worth discussing are those matching information units with the modulation of illocutionary meanings in utterances. In Italian traditions of studies, this modeling has been put forward by Cresti

²⁸To account for different syntactic and discursive properties of Topic and Focus, Rizzi later proposed to split the original CP into two further projections, one dedicated to Topic (*Topic Phrase*), the other to Focus (*Focus Phrase*).

(1987, 1992, 2000) and her School (see also the works of Cresti & Moneglia 2010), who opted for the following designations of topic and comment (focus):

Comment *is the unit conveying the illocutionary force of the utterance and fulfilling its informative purpose.*

Topic *is the domain to which illocution – i.e. the Focus – applies.*²⁹

One crucial piece of evidence to back up topic-focus association with the expression of illocution is provided by what Lombardi Vallauri termed ILLOCUTION CHANGE TEST (Lombardi Vallauri 2001: 157). Applying this test, it can be noticed that only the focal part of an utterance is affected by alterations in illocutionary force. For example, turning the sentences in (51) into negative and interrogative ones, only the truth value of the focal unit is denied or questioned.

(51)a. [If she studies hard]_{TOPIC} [she will pass the exam]_{FOCUS}

b. [If she walks the dog]_{TOPIC} [her mum will be happy]_{FOCUS}

(52)a. Is it true that [if she studies hard]_{TOPIC} [she will pass the exam]_{FOCUS}?

b. It is not true that [if she walks the dog]_{TOPIC} [her mum will be happy]_{FOCUS}

What the speaker asks in (52)a. is not whether “she is about to study hard”, but if, under the condition to study hard, she will pass the exam. Similarly, in (52)b., the speaker does not deny that she might walk the dog, but the fact that under this condition, her mum will be happy. This behavior is sensibly explained as follows (Lombardi Vallauri 2001: 362):

if the aim of the utterance is to assert a certain content and not others, the aim of its negation must reasonably be the negation of this content, and only of this content. The same should be

²⁹In Cresti & Moneglia (2010: 14), “the core of the utterance corresponds to a part, called comment, which necessarily deals with onw prosodic units, and constitutes the information unit whose function is to accomplish the illocutionary force of the utterance. For this reason, the comment I[nformation]U[nit] is necessary and sufficient to give rise to an utterance”.

true for the interrogation and for the doubt about a given utterance. Indeed, this is what happens.

It must be highlighted that a general agreement on the validity of binary paradigms to refer to informational hierarchies has not been completely reached. In some frameworks, tripartite systems have been proposed in which a third unit, functionally distinct from topic and focus, has been considered. A preliminary classification of this sort is that of Firbas', sketched in Section 1.2.2, distinguishing between a Theme, a Transition and a Rheme. Building on this model, Sgall, Hajičová and Partee (1992) developed a tripartite representation of IS categories, including an *operator*, a *restrictor* and a *nuclear scope*, whose distribution in the sentence has some bearing on its truth-conditional value (Hajičová et al. 1998).

A coeval tripartite taxonomy of IS units is that elaborated by Vallduví (1993, 1996), who regards the sentence as consisting of a *focus-ground* patterning, with ground being further subdivided into a LINK and a TAIL. In this system, the link represents the more topic-like, sentence-initial unit indicating where the focus should go in the input information state (Vallduví & Engdahl 1996: 469); by contrast, the tail is defined as the complement of the link within the ground. Borrowed from Dik's Functional Grammar, the term *tail* indicates the exact way in which information is retrieved and entered under a given address, and it typically has a sentence-final position.

Measuring the acoustic correlates of topic and focus, recent inquiries (Lombardi Vallauri 2014, Gagliardi et al. 2012) have set forth a continuum, rather than a discrete partition, between the two units. Using a sample of Italian utterances from different regional varieties and with different informational articulations (Topic-Focus, Broad Focus and Focus-Appendix), Gagliardi et al. (2012) observed two relevant aspects concerning the placement and acoustic effects of the main prominence. First, it has been noticed that the function of prominence (intended by the authors as “a perceptual phenomenon, continuous in its nature, emphasizing some linguistic and segmental units with respect to their surrounding context, and supported by a complex interaction of prosodic and phonetic/acoustic parameters”, cf. Lombardi Vallauri 2014: 223), is to dispense DEMARCATIVE, rather than CULMINATIVE, cues to identify IS units. More particularly, prominence does not indicate *what* kind of unit is being instantiated, but *where* the boundary between one unit and the other is expected to be located by the

receiver³⁰. Secondly, they noted that topic-focus and broad focus sentences often display similar acoustic patterns, meaning that they can be interpreted as interchanging with one another in sentence comprehension. In fact, the authors suggested that, contrary to what traditional classifications point towards,

Topic-Focus and Broad Focus structures are not separate, mutually exclusive structures, but rather the ends of a continuum whose intermediate values are utterances where the boundary is not strongly marked and the distinction between the two possible information structures may remain weakly expressed, under- or unspecified (Lombardi Vallauri 2014: 233).

Within this framework, prominence becomes a necessary and sufficient condition to locate where an information unit ends and the other begins. The classification of information units is then entrusted to other contextual factors such as givenness/newness degrees, communicative intentions and interlocutors' planning of the current conversational tasks. Additionally, the fact that neat differences between topic-focus and broad focus structures are not altogether detectable allows admitting "intermediate conditions" between these two informational articulations, and that "Topic and Focus status is more a question of grey-scale variation, rather than one of black and white values" (Lombardi Vallauri 2014: 233).

It goes without saying that the frameworks and definitions presented in these sections do not exhaust the complex and complicated picture of the micropragmatic structure of utterances³¹. The domain of IS is a highly dynamic thread of research, fuelled by always new challenging findings and lines of investigation. Given the purpose of the forthcoming discussion, I will comply with an illocutionary account of topic and focus, taking focus as the main carrier of the illocutionary force of the sentence (i.e. what the speaker intends to communicate in conveying a message), and topic as the ancillary unit facilitating the comprehension of focus and its integration in the receiver's mental

³⁰What they called the TOPOLOGIC HYPOTHESIS ON MAIN PROMINENCE.

³¹For the purposes of our discussion I have not tackled the well-knownthetic vs. categorical distinction, formulated by Brentano (1874) and subsequently refined by Marty (1918) and Sasse (1987), which is at the basis of the difference between single- and bipartite thematic articulations. In his seminal reflection on the subject, Brentano suggests to characterize the categorical vs.thetic status of a proposition as entailing different types of judgment. Quoting from Lambrecht (1994), thethetic judgment involves the mere recognition or rejection of a particular state of affairs with no commitment, on the part of the speaker, to predicate something about the entities involved in it. Conversely, a categorical judgment is usually expressed in a typical subject-predicate sentence type, whereby a subject designates a time-stable entity in the world and the predicate qualifies the subject-entity in some way.

model of the ongoing discourse. Yet, when needed, accounts from other views will be duly considered.

1.3.4. *Given and New*

If the topic-focus dichotomy has lent itself to multi-faceted interpretations in IS theory, the given-new distinction shows up as even more controversial in this respect.

One of the first attempts at defining different informational statuses of contents can be traced back to Chafe's seminal paper entitled *Givenness, contrastiveness, definiteness, subjects and topics* (Chafe 1976), but preliminaries to this account are also found in some earlier works (Chafe 1974). In his contribution, Chafe (1976) argues that a key aspect in assessing givenness or newness degrees of some information is the notion of CONSCIOUSNESS. Indeed, he regards given (or old) information as

that knowledge which the speaker assumes to be in the consciousness of the addressee at the time of the utterance. So-called new information is what the speaker assumes he is introducing into the addressee's consciousness by what he says (Chafe 1976: 30).

In the most typical cases, assessment of information status hinges on the presence vs. absence of a prior mention of a referent in discourse. So, for example, in the following chain of clauses (Chafe 1976: 32):

(53) There was a small *earthquake* (new). I felt *one* (given) last year at about this same time

earthquake is new in the first clause but, once introduced, it becomes given and allows for being resumed by means of a weaker nominal form (*one*).

Another question set out by Chafe is the duration of givenness status (or statuses) in the receiver's mind. Indeed, he recognizes that "one indisputable property of consciousness is that its capacity is extremely limited. As new ideas come into it, old

ones leave³². The speaker's treatment of an item as given, therefore, should cease when he judges that item to have left his addressee's consciousness" (Chafe 1976: 32). However, he acknowledges that judging when some information has left the addressee's consciousness is not an easy task, since speakers may often fail to represent their interlocutors' mental model, and consequently attribute the wrong status to a content. This is why Chafe prefers to characterize givenness not as a property of what is recoverable (or non-recoverable) from the interactional context, but as a status decided on by the speaker, and

it is fundamentally a matter of the speaker's belief that the item is in the addressee's consciousness, not that it is recoverable. If recovery is necessary there has been at least a slight lapse in the communicative process (Chafe 1976: 32)³³.

Albeit the presence vs. absence of a referent in the receiver's consciousness is a valuable discriminating factor in tracing a boundary between given and new, the idea that these statuses must be treated as dichotomically discrete is (and has always been) an uncertain matter. The Communicative Dynamism model postulates a gradual transition from less to more dynamic units, or vice versa, based on how thematically continuous and expected they are with respect to previously introduced information. So, the more expected and continuous (i.e. given) some information is, the lower its dynamism, the less expected and discontinuous (i.e. new), the more dynamic its contribution. Seen as a gradient, the shift from given to new – or from new to given – is not an abrupt process, but rather admits intermediate degrees in which grey zones, hybrid statuses, are also possible. Consequently, the speaker "can assume something to be in the addressee's consciousness to a greater or a lesser degree" (Chafe 1976: 33)³⁴.

³²Cf. Chafe (1987: 24): "If the total amount of information that can be active at any one time is severely limited, there must be other information that is passing out of the active status, being replaced by other, newly activated material."

³³He recalls this discussion in his 1994 volume where he puts that the status of a new idea can be equated not only with a new entry into the listener's mind, but also with the speaker's judgment that it had such a status (Chafe 1994: 71).

³⁴Cf. also Chafe (1976: 27), in this respect: "The statuses to be discussed here have more to do with how the content is transmitted than with the content itself. Specifically, they all have to do with the speaker's assessment of how addressee is able to process what he is saying against the background of a particular context. Not only do people's minds contain a large store of knowledge, they are also at any moment in certain temporary states with relation to that knowledge...Languages function effectively if the speaker takes account of such states in the mind of the person he is talking to".

The importance of the speaker's beliefs and assumptions about the listener's knowledge states became a rather diffuse concern in the 1970s, and grounded for further investigations on firmer empirical bases. Earlier psycholinguistic tests were aimed at verifying how strongly the speaker complies with the listener's mental representation of the discourse model, and assess the costs related to the manipulation of given and new contents in utterances.

Pioneering attempts in this direction are those made by Clark & Haviland (1974, 1977), claiming that "the speaker tries, to the best of his ability, to make the structure of his utterance congruent with his knowledge of the listener's mental world (ibid.: 4)". This tenet became popularized as the GIVEN-NEW CONTRACT and entails the expectation that sentences consistently feature a balanced alternation of given and new contents, the former serving to link the latter to existing background knowledge. As pointed out by the authors, this pattern is cooperatively-motivated, in that it facilitates the addressee's updating mechanisms and allows him to better modulate his cognitive efforts between the contents already established and those not yet integrated in his mental model. To further substantiate these observations, they ran an experiment in which a number of subjects were presented with short exchanges of the type in (54) and (55):

- (54)a. We got some beer out of the truck
- b. The beer was warm

- (55)a. We checked the picnic supplies
- b. The beer was warm

The beer is supposed to be an active referent in (54), but inactive in (55). Subjects were asked to press a button once they had thoroughly read the sentences in *b*. It turned out that they took much longer to press the button after reading (55)b., as compared to (54)b., revealing more difficult integration processes in the former case, because the referent designated by *the beer* was not entirely active. One may reasonably object that in (55), the concept of "beer" is rendered accessible by the frame activated by "picnic supplies". In fact, a more suitable context to illustrate the newness status of *the beer* would be that in (56):

- (56)a. We went to the cinema
- b. The beer was warm

Clark & Haviland believe that the additional costs needed to process sentences like (56)b. are a telling piece of evidence of the general preference for sentences like (54)b., that is, sentences in which one idea is resumed from prior discourse while the other idea is newly integrated in the receiver's mental model. In other words, the implicit "enforcing" of a Given-New Contract would drive speakers to opt for Given+New sentences such as that in (54)b., rather than for New+New sentences like (56)b.

In their 1976 study, Keenan-Ochs & Schieffelin proposed to investigate how compelling the Given-New contract is for speakers and hearers, carrying out an analysis on a corpus of spontaneous conversations. On a priori grounds, listeners seemed to be generally more likely to "demand" the Given-New contract to be adhered to by speakers. More precisely, listeners are not bound to "accept as given referents that they cannot identify in terms of general knowledge, prior discourse or present context" (Keenan-Ochs & Schieffelin 1976: 338). On their part, "speakers are reluctant to make claims involving individuals or objects that have not been or cannot be easily identified or recognized by the hearer" (ivi: 338).

In a later 1994 monograph, Chafe finds that analogous restraints affect the amount of new ideas that can be conveyed in a single INTONATION UNIT (intended as a speech segment of natural discourse that falls into a coherent intonation contour, cf. Chafe 1987). In his taxonomy of activation states (1994), new ideas are classified as *inactive* (i.e. newly introduced in the discourse model), as opposed to *semiactive* (i.e. inferable from the topic of conversation, although not explicitly mentioned) and *active* (recently introduced in the discourse context and, therefore, given)³⁵. Chafe notices (a) that substantive intonation units – to which the clause type belongs – usually (but not always) convey some new information (Chafe 1994: 108); and (b) that each unit can hardly contain more than one *activation* (that is, more than one new idea) at a time. This second property, known as THE ONE NEW IDEA CONSTRAINT, is arguably the result of both interlocutors' difficulty in coping with more new ideas in a single sentence:

³⁵In terms of the costs required to process information in each of the above statuses, *given* (active) represents the least costly state - because its antecedent is already available in the receiver's mental model - followed by *accessible* (compelling the addressee to more elaborate bridging operations), and, finally, *new*, which is the most costly of all, because "more mental effort is involved in converting an idea from the inactive to the active state" (Chafe 1994: 73).

The fact that in the end we are left with few if any cases in which there are two or more separately activated new ideas within the same intonation unit suggests the hypothesis that *an intonation unit can express no more than one new idea*. In other words thought, or at least language, proceeds in terms of *one such activation at a time*, and each activation applies to a single referent, event or state, but not to more than one. If this is a limitation on what the speaker can do, it may also be a limitation assumed for the listener as well. It may be that neither the speaker nor the listener is able to handle more than *one new idea at a time* (Chafe 1994: 109).

Givón (1975, 1984) had drawn analogous conclusions spotting a particular “strategy of information processing in language such as the amount of new information per a certain unit of *message-transaction* is restricted in a fashion – say “one unit per proposition” (Givón 1975: 202-204). In later works, this trend has been sometimes recalled as the ONE CHUNK PER CLAUSE PRINCIPLE, (Givón 1984: 258-263, “the majority of sentence/clauses in connected discourse will have only one chunk – be it a nominal, predicate (verb, adjective) or adverbial word/phrase – *under the scope of asserted new information*. All other elements in the clause will tend to be topical, background or presupposed information”, [italics mine]).

To me, there is little need to highlight the frequency with which these informational schemes are subverted by language users. By way of illustration, consider the following excerpt, taken from the opening of an interview³⁶ (cf. also ex. (10) in Section 1.1.1):

(57)

Interviewer: You’re – among other things – you’ve been a designer of these fabulous Barney’s windows. Talk a little about how one gets to be a designer of Barney’s windows. Where did that skill come from? And, was you family encouraging and nurturing you? Uh? [he sees Noonan smiling sarcastically]

Noonan:

1. We,, I grew up in this town called Reading, which is outside of London, and it was a
2. sort of very dismal – it’s where Oscar Wilde was in jail – and there was a biscuit factory
3. and all different factories, and it was just dismal. And I thought there has to be
4. something more to life than this. So, my early years, in the fifties, London was very
5. dismal, and then realizing I was gay and thinking: “God, I’m going to end up in the

³⁶<https://www.youtube.com/watch?v=GIVO87Qdm-M>

6. prison, like Oscar Wilde” – ‘cause it’s illegal, hello?! – So, things weren’t looking so
7. great, and then my mum would say: “Or you can get a job at the biscuit factory, or at the
8. metal box factory”. And I thought: “Oh God! You’ve got to be joking!”. So, I used to
9. do freelance display jobs, ‘cause a lot little stores in London – they didn’t have a
10. freelance display person, so I would do these freelance jobs. They were fine and there
11. was extra cash. Then, [*this guy*]_{NEW} [*came by*]_{NEW} and he said: “That’s great! It’s really
12. fun! You should come work for me in L.A...”.

In the text, we can identify a clause containing two pieces of new information, one related to the subject (*this guy*), the other one to the predicate (*came by*)³⁷. As can be seen, none of the items anchors to a textual antecedent, and so they are newly activated in the context provided. In contrast, phrases like *the biscuit factory* (line 7) or *these freelance jobs* (line 10) resume active information, introduced in presentative constructions like *there was a biscuit factory* (line 2) and *I used to do freelance display jobs* (lines 8-9), underlined in the text. *This guy came by* is a plain counterevidence to the aforementioned constraints, and analogous strategies are by no means rare in communication.

In (58), another occurrence is shown³⁸:

(58)

Interviewer: Thank you! So, Helen...you know, you’ve just got voted “The body of the year” in a recent poll, and you – [applause] wait a minute – you beat out Jennifer Lopez!

Mirren: Uh...[*My husband*]_{NEW} [*is working with Jennifer Lopez*]_{NEW} at the moment, so I gotta go to confront her tomorrow, and say “JLo, you are so, so much more beautiful than I am, you know, I bow down to you...”

Here, both *my husband* and *is working with Jennifer Lopez* are newly activated information. Since the excerpt is the very beginning of the interview, we assume that both items have no prior mention in discourse and are combined within the same intonation unit, with no particular disruption in the communication process.

³⁷According to some lines of thought, sentences conveying all-new information would be regarded as instantiating a *broad focus* patterning. However, in assuming the relevance of a communicative dynamism which is independent of the activation state of the information carried, it could well be assumed that a thematic partitioning into a topical and a focal (or comment) units is featured by the utterance considered in the example.

³⁸<https://www.youtube.com/watch?v=5ZmIzec8vFM>

Although just a few examples have been discussed to illustrate this phenomenon, deflections from the informational constraints on clausal intonation units are more widespread than commonly thought; hence, they should not be accounted for as a mere exception to the rule. However, we won't herein address this issue in detail, referring the reader to the subsequent section for extensive debate on the matter. For the moment being, suffice it to say that a more in-depth understanding of the above conversational drifts calls for transposing the given-new distinction to a superordinate level, overriding activation states of contents and reshaping the given-new dichotomy in a *presentational* tack. This objective was *in nuce* subsumed in Halliday's definition of given and new (Halliday 1985: 277):

“the significant variable is: information *that is presented by the speaker* as recoverable (Given) or not recoverable (New) to the listener. [...] the meaning [of given] is: this is not news. The meaning [of new] is: attend to this; this is news” (italics mine).

This stance, however, does not tell the whole story. Indeed, what does “presentation of information” mean? And, how is the addressee supposed to recognize some information being presented as given when it is not, or new when it is not? We will come back to these questions in the final part of this chapter.

More recently, Krifka (2008) proposed a definition of givenness and newness appealing to the notion of COMMON GROUND (CG) content. In his paradigm, CG content is a static representation of knowledge, in that it gathers all contents that are mutually shared by the participants up to a certain point in the conversation (in this sense, CG can be understood as interchangeable with the Stalnakerian notion of Common Ground, given in Section 1.1.1). This repository is constantly manipulated by mechanisms depending on the informational needs of one participant and that should be satisfied by the conversational moves of the other. These mechanisms are governed by a more dynamic dimension of CG which he calls COMMON GROUND management. In light of this opposition

a feature X of an expression α is a Givenness feature iff X indicates whether the denotation of α is present in the CG or not, and/or indicates the degree to which it is present in the immediate CG (Krifka 2008: 262).

Seemingly, this definition does not remarkably stray from Chafe's classification of activation statuses, depending on whether some content is already available in the immediately preceding context. Nonetheless, Krifka apparently adds some fuzziness to the concept of immediate CG, which he seems to intend in a more extended perspective, including not only what has been (or not been) activated in the linguistic or extra-linguistic context, but also knowledge interlocutors share in advance (regardless of its discursive retrievability). Chafe, on the contrary, is quite clear about the relevance of discourse context and prominence in consciousness to establish the given/new status of some information, and that what is known prior to the conversational exchange is a status of a different sort (Chafe 1994: 175).

Whether or not a referent is assumed to be newly activated in the listener's consciousness is a different question from whether or not it is assumed to be already part of the listener's knowledge. Activation cost is manifested linguistically in such phenomena as the use of a pronoun, as well as weak or strong prosody. Sharedness, on the other hand, is one of the components of identifiability, which is manifested in various ways, but most conspicuously in the use of the definite article³⁹.

In the remainder of this chapter, I will attempt to clarify that the differences depending on activation states and those based on previously shared knowledge do not merely involve ease of antecedent retrieval, but also – and more importantly – different cognitive correlates in the human brain, which lends support to the necessity of espousing a separate treatment of the shared/unshared and given/new oppositions in the theory of IS.

³⁹The notion of *identifiability* is one of the most vividly debated in both the philosophical and linguistic literature. For the purposes of the present work, I won't discuss it at length assuming Lambrecht's formulation according to which "the referent of a noun phrase may be considered identifiable because in the universe of discourse of the interlocutors or of the speech community as a whole there exists only one referent which can be appropriately designated with that noun phrase" (Lambrecht 1994: 87).

1.3.5. Levels of Information Structure: Long-Term vs. Short-Term Memory and the effects of information packaging

In the previous sections, we have come across definitional problems arising from diversified approaches to IS phenomena. Besides the kind of operations they carry out in discourse, the categories of IS so far reviewed also exert a different impact on the cognitive organization of contents exchanged in communication. More clearly, they trigger *different mental operations* related to the information items they evoke in discourse. This is another uneven ground in which terminological confusion has sometimes reached its peak, which is why a few more lines in this sense are worth spending.

Among the most glaring terminological inconsistencies is Chomsky's use of the notion of presupposition. In his model, this term is used with a different sense than that claimed in the philosophical tradition. First, he assigns presuppositional status to contents that are not projected by specific presuppositional triggers at all; secondly, he regards presupposition as carrying contents which are either shared prior to the communicative exchange or contextually given; and third, he opposes presupposition to focus, leading to an interpretation of these units as being in complementary distribution with one another, when counterexamples to this (absolute) distinction are anything but scant in everyday speech. (59) offers a clear example of this:

(59) A: Did you buy your car when you got married?

FOCUS/PRESUPPOSITION

B: No. It's [WHEN I GRADUATED] that I bought my car

If we are willing to hold fast to the notion of presupposition provided in Section 1.2.1, viz., a content that is presented as shared by means of particular constructions or lexical items, we had better opt for a different characterization of sentences like (59)B, acknowledging more, inter-independent, levels of packaging, each responsible for different cognitive operations on knowledge construal.

It is known from earlier and later contention in cognitive psychology that input and output information is handled by two autonomous, but interrelated, mnestic centers communicating with one another through mechanisms of integration and retrieval of

contents. These are Short-Term Memory (STM) and Long-Term Memory (LTM). STM is also known as Working Memory⁴⁰ and is a limited store in both duration and capacity (Marois et al. 2005, Sweller 2003). Its function is to monitor awareness of information flow into and out of memory and to manipulate behaviors as part of complex goal-directed actions. When more stimuli are attended to, STM regulates the setting of interfering processes and ensures that the amount of cognitive resources available is devoted to the most purposeful task. Because of the limited amount of resources to draw upon in processing, STM is a selective store and generally hinders the controlled elaboration of more tasks in parallel. Indeed, only one at a time can be efficiently performed (Desimone & Duncan 1995).

Being STM sensitive to the recognition of goals currently attended to, we believe that the processing of topic and focus units is entrusted to this memory store. As expression of illocutionary degrees, topic and focus convey contents that are more or less relevant to the communicative task at hand. Accordingly, a major pool of resources is expected to be devoted to the information attaining the speaker's communicative aim (the focus), and a lesser amount to information serving as conceptual grounding of this aim (the topic).

An older but revealing definition of focus is that of being the “center of interest” of the utterance (Bolinger 1986); so, the fact that more attentional resources are required to process it seems a plausible hypothesis to advance. However, the association between focus and the addressee's current state of attention has often been questioned in the literature, and the concept of “focus of attention” has sometimes been used to identify topics, sometimes to identify focus constituents. For instance, Tomlin (1995) states that topics are the current focus of attention because they convey information that has been recently introduced into the addressee's STM. In Erteschik-Shir's account (1997), left-posed topics resemble focalizations because constituents are extra-posed by speakers to call the hearers' attention on them.

Of course, a lot more work must be done to gain further insights into the processing dynamics related to the comprehension of topic and focus units in discourse. However, the data so far available (Birch & Rayner 1996, Erickson & Mattson 1988, La Rocca et

⁴⁰Most studies in cognitive psychology agree on the fact that Short-Term Memory and Working Memory are not exactly the same store of information, yet not being all the way distinct from one another (see Aben et al. 2012, among others). While ST is used to hold currently available information in temporary storage, working memory refers to memory as it is used to plan and carry out behavior (Cowan 2008). In this sense, it can be regarded as a more dynamic component of the STM system.

al. in preparation) demonstrate that focus, rather than topic, demands major processing effort in reception, even when it carries given contents.

STM is also where activation statuses are run. Following Chafe (1994), we defined *given*, *accessible* and *new* relative to degrees of prominence of some information in the addressee's consciousness. Now, it is a commonly held view in cognitive psychology that consciousness is one of the most significant manifestations of STM activity (cf. Sweller 2003: 220: "Working memory is the seat of consciousness and, indeed, can be equated with consciousness in that the characteristics of our conscious lives are the characteristics of working memory"). Thus, givenness and newness can be regarded as particular states of contents in STM.

After being shortly kept in STM, incoming information may either fade away or further stabilize, reaching a more permanent store: the LTM. LTM is a more lasting and capacious recipient of knowledge whose functioning is not affected by the limitations of STM. Only when LTM contents are brought to STM anew are they subject to its time and space limitations. In LTM, contents are organized irrespective of their purposefulness in the task to be performed. For this reason, we assume presupposition and assertion to be the outward manifestation of LTM contents. Indeed, contrary to the given-new pair, presupposition and assertion status does not call for some information to be recently activated in discourse (to a greater or lesser extent). The term *presupposition* (i.e. "to believe or suppose in advance") indicates knowledge that is attributed to the addressee's common ground before a communicative act is pursued (cf. Chafe 1994: 175, §1.2.4).

So, in (60):

(60) A: What's new?

B: *The sun* is hot today

The sun evokes shared knowledge (we both know that the sun exists, cf. Strawson 1950), which is also newly introduced in the foregoing context.

In the previous section, we posed the problem as to how some information can be interpreted as given or new independently of its real status in discourse. More particularly, what linguistic devices induce this cognitive treatment in the addressee's consciousness? We now call to mind the concept of *information presentation* brought

up in Section 1.3.4, because it is crucial in elaborating on a reasonable answer to this question.

The idea that *knowledge states* (given and new) and *knowledge presentation* (topic and focus or presupposition and assertion) instantiate different descriptive levels of information units has been neglected in several approaches to IS (e.g. Krifka 2008). Yet, its weight had already been appreciated by Praguian scholars like Sgall et al. (1973: 17):

The distinction between topic and comment is autonomous, in the sense that it cannot be derived from the distinction between “given” (i.e. the known from the preceding context or situation, contained among the presuppositions) and “new” (not given)”.

Not many years later, Chafe (1976) revived the same reflection theorizing his popular notion of (information) PACKAGING:

I have been using the term packaging to refer to the kind of phenomena at issue here, with the idea that they have to do primarily with how the message is sent and only secondarily with the message itself, just as the packaging of toothpaste can affect sales in partial independence of the quality of the toothpaste inside (Chafe 1976: 28)⁴¹.

The “sales metaphor” is here called upon by Chafe to mean that the external packaging of some content profoundly affects the representation we get of that content in our mind, and allows us to understand the relevance it bears on the speaker’s current purpose in the ongoing interaction. Topic and focus – and, less remarkably, presupposition and assertion – are among the most efficient strategies languages are endowed with to signal degrees of purposefulness of contents in utterances. However, this function is not fulfilled on the basis of intra-sentential factors only, but also rests upon textual constraints and expectations. More precisely, by topicalizing or focalizing a constituent, not only do we provide cues to interpreting some contents as more or less relevant than others to the communicative task at hand, but we also induce the addressee to categorize them as more or less textually bound to the preceding context, even if on merely *perceptual grounds*. Besides Daneš’s observations on thematic progression in texts, the idea that themes or topics are perceived as continuing with respect to the

⁴¹In a later work, Prince (1981: 224) defines information packaging as: “the tailoring of an utterance by a sender to meet the particular assumed needs of the intended receiver. That is, information packaging in natural language reflects the sender’s hypotheses about the receiver’s assumptions and beliefs and strategies”.

preceding text has also been advocated by Givón (1983, 2002) and Thompson (1985), among others. This property is particularly salient in the syntactic positioning of subordinate adverbial clauses.

According to Givón (2002: 252), the following pair of sentences

(61) *When he arrived*, she left

(62) She left, *when he arrived*

differ in the degree to which the event encoded in the adverbial clause is “felt” as resuming previously introduced information.

In terms of their communicative context, post-posed ADV-clauses tend to have more local, semantic connections to their *subsequent* main clauses. Pre-posed ADV-clauses, on the other hand, tend to have more extensive global, diffuse pragmatic connections to their *preceding* – anaphoric – context (Givón 2001: ch. 18).

In what follows, we report an illustration from Thompson (1985: 62) in which the communicative contrast between a pre-posed and a post-posed adverbial clause is highly noticeable.

(63) “...The Brendan was rushing madly farther and farther out to sea. *To slow her down*, we streamed a heavy rope in a loop from the stern and let it trail in the water behind us *to act as a brake...*” .

In (63), the effect of anaphoric connectivity to the preceding co-text is more strongly achieved by the first *to*-clause, although both clauses carry new, inactive information.

An analogous effect is observed in the following passage, always from Thompson (1985: 63):

(64) “...Tedium became our new enemy. Once or twice we .glimpsed enough sun to make it worthwhile to hang the sleeping bags in the rigging and to try to dry our clothes. But usually the weather was too foggy or too damp for any success. And it was so cold that the next migrant to land on The Brendan, another water pipit, also failed to survive the night and perished. *To pass the time*, there was a shipboard craze for fancy rope work...”

As pointed out by Givón (2002: 253), here “the pre-posed purpose clause *To pass the time* in (64) refers to neither a specific event nor a specific subject/agent in the preceding four chains, but rather to the thematic whole, a meta-distillation of the entire passage”. So, the content it conveys is somehow perceived as uniting all sentences in a texture whose conceptual scaffolding is presented as shared or, in any case, shareable. Remarkable differences are also those evidenced by the distribution of the two conditional clauses in the excerpt in (65), taken from Givón (2002: 253):

- (65) “The rifles spoke again from the sounding board of the rocks, racketing away down the canyons to fade at the desert’s rim. Motionless upon a sun-baked slope, he waited while the sweat found thin furrows through the dust on his cheeks, but there was no further sound, no further shot, nor was there movement within the range of his vision...merely the lazy circle of a buzzard against the heat-blurred sky. *If they had not seen him already*, they would not see him *if he remained still*, and Shalako learned his patience in a hard school...”

Unlike the second conditional clause (*if he remained still*), the first one (*If they had not seen him already*) – appearing topicalized and left-posed in the sentence – more strongly induces to interpret the event of “seeing him” as somehow hanging to an assumption already shared by speaker and hearer.

Looking on the above occurrences, we can concur with the idea that topics act like anaphors in discourse (Lombardi Vallauri 2009), pretty much in the same way as presuppositions are interpreted as anaphors in Van der Sandt’s binding theory (cf. Section 1.3). Viewed in this perspective, topic instructs to treat some information as given because it requires the addressee *to track down its antecedent in discourse, and accommodate a new one when none is found*. So, even when they are referentially new, topics encode *pragmatic givenness* in the overall informational articulation featured by the utterance, which can possibly account for its being on the whole less costly than focus in processing. Conversely, focus, whatever its newness or givenness degree in the receiver’s mind, *always attributes a new pragmatic profile to information*, because it intrinsically provides the utterance and the discourse context as a whole with informational variation. For instance, in the short exchange below:

- (66) A: Did you show the report to your colleagues?
B: No, MY COLLEAGUES showed it to me

the focus *MY COLLEAGUES* in (66)B contrastively resumes an already active item of information. However, this does not downgrade its overall dynamism in the sentence. If communicative dynamism and illocutionary force were only a matter of givenness and newness degrees, sentences like (66)B would turn totally useless, let alone conversationally uncooperative. What makes the focus in (66)B new in any case is the contrastive meaning it conveys, precisely, the fact that it expresses the *speaker's intention to rectify the addressee's assumption about a particular state of affairs*. (Experimentally, the high informativity of given foci has been signalled by the additional effort required to process them, cf. La Rocca et al. in press.)

1.3.6. Further remarks on information packaging

Drawing a line between the level of activation states and the level of information packaging also allows explaining cross-linguistically widespread constraints like the non-iterability of Focus in a sentence, encumbering realizations like (67):

(67) #[MY COLLEAGUES]_{FOCUS} showed it to [ME]_{FOCUS}

In some accounts, these structures have sometimes been classified as MULTIPLE-FOCUS constructions. Krifka (1992: 21) conjectures that information structures of the type in (67) are possible when two constituents carry newly activated information. In such a case, they would project two separate focus units.

Over the last twenty years, this pattern has also been observed in sentences like (68)B.

(68) A: Luckily, Mary drank only water at the party

B: I know. Even John drank *only water* at the party

In 1999, Partee proposed to characterize phrases like *only water* in (68)B as SECOND OCCURRENCE FOCUS (SOF) units. With this term, she indicated a focus unit resuming another focal unit in discourse. What makes SOF atypical in her description is its

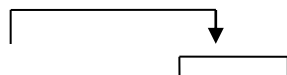
deaccented contour, which she correlates with its givenness status, as (68) shows⁴². In a different tack, Féry & Ishihara (2009) suggest to account for SOF deaccentual profile as a side effect of its phonological and syntactic embedding, as opposed to the phrase *even John*, which is where the main prominence of the sentence would most probably fall. They rightfully noticed that what follows the main prominence is bound to receive a deaccented realization⁴³, and other studies on the prosody of SOF have on the whole confirmed this trend (Howell 2008, Beaver et al. 2004).

One may legitimately ask whether a SOF, in its phonologically and syntactically embedded position, actually fulfills a focal function in sentences like (68)B. Partee believes that the combination with a focus-sensitive particle is a sufficient condition to characterize SOF as a Focus proper. Nonetheless, the semantic-pragmatic status of lexical focalizers like *even*, *only*, *also*, *especially*, etc., is much more controversial than commonly pointed up in much literature on the subject. In fact, whether a focus-sensitive adverb effects focalization or simply combines with elements whose focal status is independent of their presence is still a matter of vivid debates (cf. De Cesare 2004, 2006, 2008 and Ferrari 2004, Lombardi Vallauri 2010).

To further strengthen the functional ambiguity of SOF is its response to illocution change tests. We have seen in Section 1.3.3 that this test enables to differentiate topical from focal units, as only foci fall within the scope of illocutionary force. Concurrently, changing the illocution of sentences with two constituents preceded by a focus-sensitive operator, we would expect variations to affect only the non-embedded focus, leaving the embedded one (the SOF) unaltered.

Consider the sentence in (69) and the illocutionary shifts in (70)a. and b.

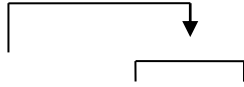
(69) Also Jane only gave biscuits to the three-old children



(70)a. It is not true that *also Jane* only gave biscuits to the three-old children

⁴²Ibid. (p. 215, 216): “Intuitively, it is clear enough what is going on here. In the first sentence, on its straightforward interpretation, we have a normal occurrence of a focus sensitive operator, *only*, associated with focus on *water* [*vegetables*, in her example]. In B’s reply the whole embedded clause containing the focalizer is repeated, and since it is all now familiar, it can be deaccented”.

⁴³Féry & Ishihara (2009: 5-6): “The seeming difference between the accent needed for FOF [First Occurrence Focus] and the one needed for SOF is a consequence of the fact that the prominence on SOF was searched for at a suboptimal place, namely in a post-nuclear position. Post-nuclear material is subject to a deaccenting effect independent of its information structural status”.



b. Is it true that *also Jane* only gave biscuits to the three-old children?

As can be seen, it is not the proposition that “only three-year old children have been given biscuits” to be questioned or denied, but the fact that also Jane – besides someone else - did this. This behavior is indicative of the low likelihood for SOF to be interpreted as a real focus unit by speakers; therefore, sentences like (68)B and (69) should be better outlined as focus-topic structures with only one focus instantiated (i.e. the non-embedded one). So, if my observations are correct, singleness of focus would be preserved also in the case above discussed.

To conclude, let us consider (57) again, here recalled as (71):

(71)

Doonan:

1. Well, I grew up in this town called Reading, which is outside of London, and
2. it was a sort of very dismal – it’s were Oscar Wilde was in jail – and there
3. was a biscuit factory and all types of different factories, and it was just dismal. And I
4. though there has to be something more to life than this. So, my early years, in
5. the fifties, London was very dismal, and then realizing I was gay and thinking
6. “God, I’m going to end up in the prison”, like Oscar Wilde – ‘cause it’s
7. illegal, hello!? – So, things weren’t looking so great, and then my mum
8. would say: “Or you can get a job at the biscuit factory, or at the metal box
9. factory”; and I thought: “Oh, God, you’ve got to be joking!”. So, I used to do
10. freelance display jobs, ‘cause a lot little stores in London – they didn’t have a
11. freelance display person, so I would do these freelance jobs. They were fine
12. and there was extra cash. Then, [*this guy*]_{NEW} [*came by*]_{NEW} and he said:
13. “That’s great! It’s really fun! You should come work for me in L.A...”.

In *this guy came by* we had detected two new contents (or, *activations*, in Chafe’s terms) combined within the same intonation unit. Now, if we are to characterize the sentence in terms of its IS, its most probable articulation would be topic-focus, as sketched in (72) below.

(72) [This guy]_{TOPIC} [CAME BY]_{FOCUS}

In light of the foregoing, it can be deduced that what renders (72) acceptable is the fact that one idea is conveyed as topic and the other as focus. Now, being both ideas new, why did the speaker not present them as two separate foci? In fact, this choice would lead to the same marginal effects observed in (73).

(73) #[THIS GUY]_{FOCUS} [CAME BY]_{FOCUS}

The question is: what makes (72) more acceptable (or, preferable) than (73)? Are these differences contingent on domain-specific (linguistic and semiotic) or domain-general constraints (e.g. learning and reasoning abilities, limitations and potentialities of human information processing system)? Our tentative hypothesis is that the impossibility for focus to be iterated in a sentence is a consequence of *the slender quantity of resources available in STM*. If only one effortful task can be attended to at a time, allocation of resources to more effortful tasks in parallel would be too taxing for the receiver (see discussions in Chapter 3).

A code endowed with the capacity to express more illocutionary purposes in a single communicative act would have rendered human language definitely more adaptive in contexts in which needs of more rapid transactions of information were pressing. But, in order to function effectively in both transmission and reception, such a code had to comply with the capacity-limited nature of our STM system. Since comprehension processes are fuelled by efficient allocation of cognitive resources, these processes are expected to be driven by a clear-cut delimitation of informational hierarchies in utterances, in a way that more resources are directed to information fulfilling the speaker's communicative goal (the focus), and less resources are devoted to ancillary contents whose function is to facilitate the recognition and comprehension of this goal. In the view I'm presenting, this is what packaging probably does: *it provides instructions for a more sustainable distribution of processing energies, so that messages are thoroughly understood with no irreparable dispersal of relevant information.*

1.4. Summary and conclusion

The intricate puzzle of terminologies and designations presented in this chapter is representative, on the one hand, of the growing interest in IS phenomena and their manifestation in language, on the other, of their non-immediate graspability for the linguist. To complicate matters further, there is the daunting problem of adopting either binary articulations – as it has been done in most theoretical frameworks so far – or more complex partitions (cf. Vallduvì 1993, 1996, Section 2.1.3.), up to categorical *continua* (Gagliardi et al. 2012, Lombardi Vallauri 2014, among others). As we have seen, much of the controversy resides in the criteria utilized to locate the boundaries of information units: (a) are these boundaries merely syntactic? If so, how can they account for all possible information structures of a sentence? (b) Are they fixed by prosodic schemes? If so, how can we consistently map them onto the realization of topic and focus units in discourse?

To some degree, the assumption of informational continua, rather than discrete dichotomic oppositions, would allow escaping the hurdle posed by the above questions. However, such a standpoint would also risk to blur the actual differential contribution each information unit brings to the global thematic architecture of the utterance. Syntactic criteria are certainly more suitable for recognizing presupposed and asserted contents (because it is syntactic and lexical triggers that activate presuppositions in discourse), but they can be more problematic for the identification of topic and focus units, if not properly supported by contextual information.

In this chapter, we have gone over traditional and more up-to-date outlines of the presupposition/assertion, topic/focus and given/new pairs setting out both definitional problems and informational levels to which each notional pair more naturally belongs. We have argued that the presupposition/assertion distinction holds on a level interfacing with contents stored in LTM. We have also seen that both the projection and interpretation of presupposed contents is best accounted for within a Discourse Representation Theory paradigm, for it more exhaustively describes conditions in which presuppositions are either context-supported or context-non supported (i.e. to be accommodated). In a socio-interactional frame, presuppositions weaken the speaker's authority and responsibility for some content, thereby reducing its liability to be challenged by the addressee. Assertions perform an opposite function in this respect,

because they posit the speaker's commitment to claim a proposition as true. This property bears upon both direct and indirect assertions alike, which explains why implicatures, as particular instantiations of indirect assertivity, can be viewed as more committal communicative strategies than presuppositions.

The topic-focus partition operates on an illocutionary level of information structuring, that is, a level where communicative goals are framed. Owing to this property, topic and focus manipulate contents stored in STM, because this is where the comprehension of goal-directed tasks is regulated. When presupposed or asserted information is evoked in discourse, it usually overlaps with the topic-focus level, thereby moving to the STM system.

Given and New express activation degrees of some content in the addressee's consciousness and are, for this reason, a manifestation of STM activity. Information imposes different activation costs on the receiver based on how easily he can retrieve it from his conscious attention.

These three functional pairs are independent of one another, although they may intersect in rather flexible ways. If given and new describe notional contents, topic and focus relate to their presentation (or *packaging*) in the sentence, and somehow affect their processing in the human brain. The same holds for presuppositive and assertive packaging, which instructs to treat some content as already shared or not shared, regardless of its availability in previous discourse, and activation in STM.

The aim of this chapter was to provide an overview of the earliest and state-of-the-art literature on IS functional units. In the following chapter, the outlines previously discussed – and, particularly, the illocutionary account drawn upon Cresti's model of IS – will be operationalized within the purview of epistemological conceptions of meaning and its interpretation. In other words, the *evidential facet* of IS will be disclosed that makes provision for characterizing the informational dichotomies under discussion as carriers of meaning of attitudinal evidentiality in discourse.

CHAPTER TWO

Sociobiological perspectives:

*For a unified account of
Evidentiality and Information Structure*

A dimension which is largely absent in studies of epistemic modality, yet which any astute functionalist would immediately suspect to play a probably quite important role in modal expression [...] is information structure.

[Jan Nuyts, *Epistemic Modality, Language and Conceptualization*, 2001, p. 41]

2.1. Preamble

Despite its widespread encoding in the world's languages, evidentiality is still one of the most contentious experiential categories which philosophers and linguists still come to grips with. In languages with obligatory evidentiality, its overt marking expresses the source of information (as in most Native American languages, cf. Chafe & Nichols 1986, Aikhenvald 2004) or the speaker's commitment to truth (cf. the Balkan area, Friedman 1986). In some languages, these two meanings happen to conflate in the same evidential marker (e.g. Estonian and some Australian languages, cf. Aikhenvald 2004). Much debate is also centered on the strategies typically targeted at conveying evidential meanings. Morphological and lexical systems are generally more diffuse; however, languages seem to fall back on a far wider range of devices related to the syntactic level (e.g. complementation), as well as to the domains of modality, tense, aspect, mood and lexical trans-categorization (Aikhenvald 2004).

In this chapter, I will investigate how the encoding of evidentiality can also find expression on the micropragmatic level of utterances. I will argue that this interplay is particularly salient if a *broad* notion of evidentiality is taken into account, that is, a notion embracing the speaker's attitude towards a proposition (i.e. his degree of commitment or responsibility to its truth-conditional value). A *narrow* definition sees evidentiality as the only manifestation of the information source⁴⁴.

In light of the foregoing, the chapter is organized as follows. In Section 2.1.1, the notion of EVIDENCE and its implications for an epistemological and social understanding

⁴⁴This distinction is better expounded in Chafe & Nichols (1986).

of truth and meaning is canvassed. I will then comment on the concepts of “territory” or “domain” of information, together with the stances speakers may take in communicating it. Section 2.1.2 highlights some of the most far-reaching implications of transacting new information in social dimensions which Givón (2002) defined as “our bio-cultural descent”. As put in Aikhenvald (2004), in a number of speech communities, the social cost of new information is also at the basis of obligatory evidential marking. Section 2.1.3 provides a cross-linguistic overview of evidentiality as the linguistic expression of information source and/or speaker commitment to truth. In Section 2.1.4, I will move onto the interplay between evidentiality and the modulation of illocutionary meanings discussing a few data from two Native American languages. This will lay the groundwork for my proposal of a unified account of IS and the expression of evidential values in discourse (Section 2.1.5).

2.2. *Evidence, territory of knowledge, epistemic statuses and epistemic stances*

A major hindrance to defining evidentiality and its scope in the world’s languages is posed by the notion of *evidence* and its correlative attribute *evidential*. As is known, evidence is not a linguistic category proper but pertains to an ontological and a justificational state of knowledge. The *Oxford English Dictionary* defines *evidence* as “an appearance from which inferences may be drawn; an indication, mark, sign, token or trace”, in simple words, what we account for as true or false depending on how we interpret or use available proof.

Earlier and recent philosophers have sometimes called into question the real nature of evidence attributing it sometimes to reality, sometimes to *our knowledge* of reality. It is a common opinion among advocates of justificational semantics (Dummett 2006) that what we know about the world is in fact the particular way we know it; namely, the particular evidence by which we believe that something in the world (a referent or a state) holds true. Knowledge is therefore subject to changing perspectives and observation points which “personalize” the way everybody justifies it. Such perspectives may be taken consciously or unconsciously by the beholder. For instance, I may describe a picture mentioning a number of features while omitting others, simply because not all the features have caught my attention to the same degree. Or, I may

decide to hide something to induce altered representations of the picture in the mind of my interlocutor. In both cases, the piece/s of evidence provided to describe the picture is not an exact reflection of what actually characterizes it in its totality. Arguably, colors, shapes, nuances and people's looks turn out much more approximate and biased than they really are. So, for us there is no other way to report on that picture in a more satisfactory manner, and that is our *preferred justification of the picture*.

McCready (2014) highlights that a peculiar function of evidence in a context is that it changes "the probability of other propositions that are related to it, and revises the set of accessible possibilities to one containing only those possibilities that make the content of the evidence true". But, since the evaluation of evidence undergoes the subject's personal interpretation of it, the assessment of truth value of a state of affairs ends up being an assessment of the subject's stance on it. In other words, truth is the subject's construal of reality: what he is prepared to vouch for as true or false in the state of affairs asserted.

The idea of constructing truth, rather than stating it, has fostered many scholars within the fields of linguistic and social anthropology to look at meaning as a product of the relation between *knowledge* and *agency*. Hill and Irvine (1993) set out challenging questions on the socio-interactional, and not merely epistemic, role of giving and not giving evidence. They theorize that, above any truth-conditional entailment, giving evidence eventuates in constructing *authority*, *responsibility*, and *entitlement* in particular communicative situations.

Of central importance to an approach that emphasizes dialogicality and the social construction of meaning is the connection between *knowledge* and *agency*. To interpret events, to establish fact, to convey opinion, and to constitute interpretations as knowledge — all these are activities involving socially situated participants, who are agents in the construction of knowledge as well as being agents *when they act on what they have come to know, believe, suspect, or opine*. For this reason, the topic of "Responsibility and Evidence in Oral Discourse" seems to us especially apt for furthering this new direction of work, since "responsibility" points toward the agency aspect of meaning while "evidence" points toward the knowledge aspect (Hill & Irvine 1993: 2) (*italics mine*).

Each time we give evidence of a fact, we are *agents* in constructing the addressee's knowledge about that fact; and we are also *responsible* for inducing the addressee to believe it as true or false.

This extended, subject-oriented conception of knowledge, and information in general, is what led authors concerned with discourse analysis and social accounts of meaning to stress the relevance of notions like “territory of knowledge” (Kamio 1994, 1997) and the opposition between “epistemic statuses” and “epistemic stances”⁴⁵ (Heritage 2012). Observations on the linguistic manifestation of these notions have yielded telling insights into both the interactional and cognitive underpinnings of evidential meanings in discourse. For this reason, a brief outline of their definition and implementation in communication studies will come in useful.

Borrowing a concept from ethology, Kamio (1994, 1997) uses the term TERRITORY to refer to the place (speaker, hearer or somebody else) to which some information belongs⁴⁶. Information exchanged in an interaction is either owned by the speaker, the hearer or a third (present or absent) participant. “Own”, in this view, is taken to mean having proof to ground for the truth of a statement. So, if I saw Jamie’s car being stolen by a group of bold youngsters, my knowledge of this fact falls within my territory, which means that I can responsibly endorse its truth. If, instead, *I am told* that a group of bold youngsters have stolen Jamie’s car, the same event would be outside my territory of knowledge, so I would not be held responsible for its truth.

Studying the use of quoting expressions in Japanese, Kamio noticed that the condition of information territory compellingly regulates the way speakers use quotational expressions or even evidential markers. In general, Japanese speakers seem to be bound to use quotative expressions when some information does not belong to their territory of knowledge. (1) shows an example of this use (Trent 1997: 105):

(1) a. *Go-shujin no kaisha doo*

Your-husband POSS company how?

“How is you husband’s company doing?”

b. *Chotto dame mitai. Raigetsu heisasuru-koto ni kimatta-tte.*

no-good it.seems next.month close-COM DAT decided-QUOT

⁴⁵In the following sections, I will take the notion of *epistemic stance* as intended by Mushin (2001), although she uses the term *epistemological stance*, to which we prefer the former since, in our view, “epistemological” is more closely related to the disciplinary approach to the description of knowledge rather than to particular attitudes towards it. In Mushin’s account, epistemological stance is about the construal of information with respect to the status of knowledge (Mushin 2001: 29).

⁴⁶See Kawanishi’s interview to Kamio (Kawanishi 1994) for a more extensive discussion on the development of the notion of Information Territory in human language.

Shujin ga kinoo itteta wa

Husband NOM yesterday said RAPP

“It seems that it is not doing well. I heard they decided to close the company next month. My husband told me yesterday”.

For the cases above, Trent (1997) holds that, although in Japanese a wife is allowed to speak about her husband’s life with direct forms, in (1)b. she chooses to respect her husband’s information territory, thereby using quotative markers (Trent 1997: 105).

Kamio’s original investigations on speakers’ management of information territories hanged on the assumption that “the territory of information status dictated whether or not a speaker would use a direct or indirect grammatical form” (from Fox 2001: 175). However, other studies on spoken Japanese (cf. e.g. Trent 1997) pointed at reversed patterns in this respect, in the sense that speakers often use indirect forms for information that they could treat as belonging to them. Others use direct forms to report information that is outside their territory. Trent (1997: 104) sees such a reversal in examples like the following:

(2) a. *Masako-san, kekkon suru mae ni esute janai kedo, nannka*

marriage get before TEMP aesthetic NEG but something

kayotte-ta-no yo

go(STAT)-Past-NML VOC

“Princess Masako frequently went to somewhere like aesthetic salon before she got married, I’m telling you”.

b. *Sugooooi johoo ga*

Extravagant information NOM

“What an information source you have!”

Here, speaker *a.* resorts to a direct form to report on information that might be thought as belonging to somebody else (e.g. Princess Masako). Fox (2001: 175) points out that speaker *a.* “is heckled by her co-participants precisely on the point of evidence, indicating that she has claimed too much intimacy with information that is not “hers”.

The state of affairs described might have been read or heard about by speaker *a.*; nonetheless, he is not compelled to present it as learned indirectly.

This fact allows looking on the concept of territory of information not as a static repository of knowledge which we increment or draw upon depending on what we communicate or understand at any given moment of the interaction. Rather, we can act upon it in many ways: we can move some information from one territory to the other taking or offloading responsibilities for its truth. This process reflects a *transition from the state of knowing something to the state of taking particular attitudes towards that something*. (cf. Mushin 2001: 52, “In terms of conceptual structure, one can say that when verbally representing a piece of knowledge, speakers necessarily take a stand on how they acquired the information, how they know it”.)

In a recent paper, Heritage (2012) addressed the interplay of knowledge and speakers’ attitudes formalizing an opposition between EPISTEMIC STATUSES and EPISTEMIC STANCES. His conception of epistemic status is akin to Kamio’s notion of territory, in that it designates what is known, how it is known, and persons’ rights and responsibilities to know it (Heritage 2012: 6). He maintains that, despite the vagaries associated with different communicative situations, “it is helpful to think of epistemic status relative to a domain as for the most part a presupposed or agreed upon, and therefore real and enduring, state of affairs” (Heritage 2012: 6).

When it comes to engaging in conversations, we weave moment-to-moment relationships with information holding within the boundaries of our epistemic status, or within those of others. These temporary fortuitous relations have been called by Heritage EPISTEMIC STANCES (Heritage 2012: 6). Epistemic stances mirror the interactional profile constructed by speakers every time they convey propositions in discourse. Heritage believes epistemic stances to be represented by different structural and grammatical realizations of a proposition. As illustration of this, he compares the following three conditions:

(3) *Are you married?*

(4) *You’re married, aren’t you?*

(5) *You’re married.*

For each condition, the proposition expressed falls within the recipient's epistemic status (i.e. his/her marital condition). Variations in assertivity degrees from (3) to (5) hint at different epistemic stances adopted by the speaker with respect to the same propositional content. As remarked by Heritage (2012: 6): "(3)⁴⁷ proposes that the questioner has no definite knowledge of the recipient's marital status, and indexes a deeply sloping epistemic gradient between an unknowing (K-) questioner and a knowing (K+) recipient. Utterances (4) and (5), by contrast, express increasing commitment to the likelihood that the recipient is married, which can be represented by increasingly shallow K- to K+ epistemic gradients". Of course, congruence between epistemic statuses and epistemic stances, with corresponding formats for the propositions uttered, is the optimal condition; but communicative needs may often overturn this pattern. Heritage's observations on the above occurrences highlight the role of *linguistic formats* in the modulation of epistemic stances: higher assertivity increases commitment to the proposition; lower assertivity weakens it.

Apparently, the fact that different stances are taken by speakers on the contents communicated may seem trivial, and the reasons why speakers choose one or the other perspective on knowledge are manifold and often unpredictable⁴⁸. However, there are social realities in which modulating one's stance on some information – especially when questionable contents or contents about third parties are conveyed – is of paramount importance to preserve one's social status in the speech community, thus gaining the others' trust and mutual respect, which is the gateway to social cooperation.

2.3. *The cost of new information and social cooperation*

One of the focuses of much discussion in cultural anthropology and sociolinguistics is the communication of NEW INFORMATION. At first sight, this might appear a futile concern since, as seen in previous sections, the purpose of human communication is to update interlocutors' common ground knowledge with contents they do not share already. However, the reason why much energy from various disciplines has been

⁴⁷Not original numbering of the example.

⁴⁸On this account, Mushin (2001: 58-59) remarks that the range of epistemological stances that might be adopted to represent a particular state of affairs is dependent on the conceptualising individual's assessment of how they acquired their information based on both cultural conventions and interactive goals".

lavished on speculating on this matter is that it is not mere triviality in other social realities in which the transaction of new information has strong implications on socio-cultural grounds, and often turns out more hazardous than commonly thought.

In his 2002 Santa Barbara lectures on Bio-linguistics, Givón emphasizes the relevance of this phenomenon in what he calls SOCIETIES OF INTIMATES. Contrary to widely held assumptions, these societies display many features in common with modern societies; and one point of contact is precisely the way new information is communicated in specific socio-cultural contexts. With the view to investigating similarities between these two social worlds, a few preliminary remarks about small-scale, intimate social communities will come in hand.

Societies of intimates are small-sized communities seldom exceeding 100/150 members. They are generally characterized by a foraging economy, restricted territorial distribution, restricted gene pool, cultural uniformity, informational homogeneity and stability, consensual leadership structure, kinship-based cooperation and non-cooperation with strangers (Givón 2002: 306-309). These groups are regulated by a binding social calculus of customs and conventions which leave little room for arbitrary, manipulative demands for cooperation by one group member over another (Givón 2002: 301). Among the general characteristics brought up above, two are certainly worth commenting on, and these are *cultural uniformity* and *informational homogeneity and stability*.

As pointed out by Givón, the small-scale character of the society of intimates inevitably conducts to “familiarity and a high frequency of personal interactions”, leading all members to rapidly share the same cultural assumptions and background knowledge (as put by Givón 2009: 309, this feature may well have characterized early human social groups: “the territorial stability, genetic homogeneity, cultural homogeneity and great cultural stability of pre-human primate societies, taken together, point to the most-important parameter of pre-human and early –hominid communicative ecology – informational stability and homogeneity. When all members of the social group know each other intimately, when the terrain is stable and well-known to everybody, and when the culture is time-stable and cultural diversity is minimal, then the bulk of relevant generic knowledge – the conceptual-semantic map of the physical, social and mental universe – is equally shared by all group members and requires no elaboration. In the intimate social unit, day-to-day specific episodic information is also

largely shared, by virtue of the ever-shared immediate situation. The communication system that springs out of such social ecology is neigh predictable”). This condition is at the same time the cause and consequence of social cooperation:

This rigidity of social structure and the limitation of social choices is an important ingredient of the high degree of predictability of the social behavior of all group members. And this predictability is in turn a major factor in promoting trust and cooperation among members, since each one can almost automatically rely on cooperation and reciprocation in all culturally-governed social contexts (Givón 2002: 308).

High predictability of social behavior and the relatively uniform world-view of group members are a side-effect of the rapidity with which new information spreads, thus soon becoming universal – because of the proximity, intensive daily contact and small size of the group (Givón 2002: 307). Informational predictability is detected by Givón in three basic stores of communicated knowledge: generic culturally-shared knowledge (world knowledge), shared current situation (situation knowledge), the specific action or communication of individuals (episodic knowledge). It is possible that these three conditions of “sharedness” have evolved as a protracted adaptation that – as Givón notices – if cannot be regarded as genetically-encoded, certainly eventuated in strong ritualization and grammaticalization. In other words, these mechanisms ended up being rooted in all members’ linguistic behavior whenever they engaged in communicative interactions. In time, this adaptation increased chances of a more successful evolutionary change.

It would be interesting to further investigate the kinds of communication and ritualization strategies that may have strengthened the bases for social cooperation, namely those more suitable in the attempt to preserve informational stability and cooperative living within the group. An example worth discussing is the case of some small communities of the North and Central America areas, reported by Givón in his lectures. In his volume, Givón (2002) draws on Susan Philips’ field work accounts (Philips 1976) on conversational tenets in the North-American Indian world. Philips pins down six (almost prescriptive) rules regulating caution, circumspection and avoidance in transacting new information. These are: (a) avoid explicit information about past events; (b) avoid identifying participants by name; (c) avoid being identified as source of information; (d) avoid being identified as author of prediction; (e) avoid

citing your source of knowledge; and (f) avoid using explicit negative statements. The driving force pushing speakers in North American contexts to cleave to these and other rules of conversational behavior is, in one expression, *fear of social alienation*. In the society of intimates, one's knowledge soon becomes everybody's knowledge, and this means that information about others is not neutral but may have unpredictable effects on future within-group relationships between members.

Because of their simple and intimate structure, in societies of intimates members know each other well, and new information communicated about someone may soon reach its subject. This means that any information about a member should be communicated without exposing oneself as its direct source. In the same way, it must be avoided to cite somebody else as source, in order to keep him from potential social alienation. Givón highlights that conversations governed by any of the above rules are apparently far from cooperative since, in many cases, truthfulness, explicitness, relevance and avoidance of redundancy are not thoroughly complied with by speakers. In fact, flouting these pragmatic norms is called for in order for the above conversational constraints to be met (Givón 2002: 316). Thus, pragmatic uncooperativeness becomes a *sine qua non* condition to ensure social cooperativeness.

Analogous conversational norms are also found in small intimate societies in some Central America areas. Two representative communities of these regions are the Ute (Uto-Aztecan) and Ngóbe (Panama). It is reported that, among the Ngóbe, directly challenging another member's views in a public forum is highly inappropriate (Givón 2002: 318):

One may allude obliquely to another person's position, but direct criticism is socially unacceptable. The cultural norms dictate an atmosphere of mutual respect and solidarity despite what may be real and serious differences (ibid.).

Givón (2002: 318) points up that for both Ute and Ngóbe societies, blunt imposition of action has often eventuated in social splintering, together with increasing probability for dissenters to disrupt group homogeneity⁴⁹. One way to forestall this is by dodging any form of competition, which is generally manifested in more direct verbal hostility

⁴⁹ Givón (2002: 318): "The imperative of consensual action in societies of intimates springs from the destructive consequences of lingering dissention when majority is imposed. In small intimate societies, the presence of even a few disgruntled dissenters has destructive social consequences, ones that the group seems reluctant to entertain".

towards the alleged opponent. Among the most successful, though bizarre, strategies to tone down one's speech – so that intentions to compete are more attenuated – is what Givón refers to as the principle of IRRELEVANCE OF RELEVANCE (Givón 2002: 317). According to this principle, in a speech speakers are well-advised to go round the central topic of discussion without (directly) bringing it up in their speech. Public talks should be better filled up with topics that are anything but germane to the intended message of the speaker. This allows to pursue non-competition more easily and facilitates reaffirmation of commonality and trust, which are indispensable ingredients to build up and maintain spiritual consensus.

An interesting point Givón makes is that many of the characteristics pinpointed for public discourse in Amerindian societies of intimates are (not) surprisingly found in areas of both small and big town America (but also in analogous social realities in the rest of the world):

Small town America retains many of the salient features of Amerindian public discourse. It frowns on verbal confrontation, it skimps on negation, *it encourages indirection*. There is remarkably little competition for the floor, and speakers are allowed their long-winded say. Above all, when one aims to conduct business, even urgent business, one better visit first – gossip, re-establish social intimacy, reaffirm the bonds of commonality and trust. Only then can one transact business (Givón 2002: 319). [italics mine]

As is expected, political propaganda is a fertile testing ground in which the above conversational protocol receives massive backing. A few examples will illustrate this point.

The following excerpts have been extracted from speeches held by Rick Santorum and Mitt Romney during the 2012 presidential campaign (Lombardi Vallauri & Masia 2014)⁵⁰. In both texts, information that could (or should) be stated explicitly is instead communicated via *implicature* (the relevant occurrences appear in bold-type):

⁵⁰Complete texts can be found on the following links:

Rick Santorum: http://www.washingtonpost.com/blogs/election-2012/post/rick-santorums-michigan-primary-speech-full-text-and-video/2012/02/28/gIQAtFsJhR_blog.html;

Mitt Romney: http://www.washingtonpost.com/blogs/post-politics/post/mitt-romneys-florida-republican-primary-speech-full-text/2012/01/31/gQA8tYKqQ_blog.html.

FROM RICK SANTORUM'S SPEECH:

So we've been – I've been very, very blessed, very blessed with great role models for me, as someone who goes out and tries to do the job I'm doing right now, to balance the rigors of running a campaign and trying to maintain a good and strong family. We all have to do that as Americans. We all have that responsibility, to make both work and work as well as we can, and it's getting harder out there in America. It's getting harder for people to make ends meet, because we have a government that is crushing us every single day with more taxes, more regulations, and the idea that they know better than you how to run your life. That ultimately is about what this race is about. It goes down to the very nature of who we are as American. **Are we a country that believes in big government? Do we believe in the smart and elite in this country to manage us? Or do you believe in free people and a free economy and building a great America from the bottom up?**

FROM MITT ROMNEY'S SPEECH:

President Obama wants to “fundamentally transform” America. We want to restore America to the founding principles that made this country great. Our plans protect freedom and opportunity, and our blueprint is the Constitution of the United States. Together, we will build an America where “hope” is a new job with a paycheck, **not a faded word on an old bumper sticker**. The path I lay out is **not one paved with ever increasing government checks and cradle-to-grave assurances that government will always be the solution**. If this election is a bidding war for who can promise more benefits, then I'm not your President.

As can be noticed, in Santorum's speech, the speaker's opposition “to the smart and elite to manage the American people” is not plainly asserted, but is communicated via rhetorical question, giving rise to a conversational implicature. The same holds for the subsequent occurrence (*do you believe in free people and a free economy and building a great America from the bottom up?*). Here, Santorum is indirectly stating that if he becomes President, he will commit himself to freeing people and economy and building a great America from the bottom up. Using more direct strategies he might have said:

- (6) “I do not believe in the smart and elite in this country to manage us! And, I do believe in free people and a free economy and I will build America from the bottom up!”

In a similar vein, Romney resorts to conversational implicatures exploiting the emphasizing effect of negation. For example, in the first occurrence highlighted (*not a faded word on an old bumper sticker*), he is indirectly communicating that, so far,

Obama has limited himself to spreading faded words on old bumper stickers, instead of realizing American people's hopes. By the same token, with the subsequent implicature (*not one paved with ever increasing government checks and cradle-to-grave assurances that government will always be the solution*), he lets the audience infer that until then the government had only increased checks and cradle-to-grave assurances proposing fallacious solutions. It is easy to imagine how different the impact of the same contents might have been, had they been bluntly asserted as in (7)a. and b.

(7)a. So far, Obama's intentions have only been faded words on old bumper stickers...

b. So far, Obama has only increased government checks and cradle-to-grave assurances....

Opting for strategies like (6) and (7)a. and b., speakers would have displayed increased commitment to the truth value of the statements uttered.

In the light of the properties discussed in Section 1.1.5, assertions facilitate challengeability and critical reaction to contents on the part of the addressees. This is one (or, probably, the main) reason why directness tends to be shunned in public communication. The above examples are a clear demonstration of how speakers can diverge from their epistemic statuses taking on different, less expected stances on the knowledge communicated. In the texts above, the implicatural contents undoubtedly fall within the speakers' epistemic domains, because they actually believe those contents to be true, and certainly have evidence for believing them as such. However, the speakers mitigate the perlocutionary⁵¹ effects of those contents weakening their degree of directness and assertivity in the conversation. (We have argued that conversational implicatures typify a particular kind of assertion, because they imply certain degree of commitment on the part of the speaker; although, being the relevant content not explicitly proffered to the addressee, such a commitment appears relatively more attenuated. This is because, differently than assertion, implicatural content is restored through more elaborate inferential steps. We have seen that with presuppositions this effect is even more intensified.)

Now, it stands to reason that, if no inter-independence of epistemic statuses and epistemic stances was allowed, that is, if natural languages forced speakers into

⁵¹For greater convenience, we recall that the notion of *perlocution* bears upon the consequences that a speech act has on the receiver, namely how his mental and physical status is modified by the act being addressed to him.

verbalizing meanings only in concordance with their actual knowledge states, such interactional “games” would not be possible. In other words, speakers would be compelled to select linguistic strategies only in agreement with the epistemic status of the content conveyed (viz., asserting only contents whose truth one is responsible for, and presupposing only contents that are actually shared by the receiver). In this sense, direct strategies should only be targeted at encoding contents laying within the speaker’s epistemic status, while indirect ones would only correlate with contents being outside his territory, and falling within somebody else’s.

Projecting these constraints into relatively small social dimensions – in which guarantees to cohesion and benefit of the group are (and arguably were) the gateway to selective fitness⁵² – the capacity of human language to freely operate on epistemic statuses and epistemic stances in order to forestall perilous communicative interactions proved extremely adaptive in human verbal behavior⁵³. In my view, this is why new information is so costly⁵⁴ when it is aimed at forging trustfulness and approval. And when it embodies the actual illocutionary purpose of a message, its liability to be only indirectly “instilled” into the addressee’s mind grows even further. It can be conjectured that, because of their fitness, strategies of epistemic stance regulation were retained with increasing communities as well, thus being exploited in contexts in which modulation of commitment and stance proved particularly fruitful (e.g. in political speeches, among others).

It is then easy to understand what bearing all the foregoing considerations have on the encoding of evidentiality in communication. Indeed, Aikhenvald (2004: 357) points out that the distribution of evidential meanings in the world’s languages can be ascribed to cultural conventions such as:

- (i) whether one should be as specific as possible when speaking, or whether a high degree of vagueness is a normal social expectation, and
- (ii) attitudes to the communication of information – whether one should tell people what they want to know, or whether “new information” is regarded as prized goods, only to be disseminated for some appropriate return (Keenan & Ochs 1979).

⁵²Stiles (1994: 439): “It doesn’t matter whether the individual does better or worse: cultural rules force him to work for the benefit of the group. Besides, it is in every individuals’ interest for the group to benefit and survive; without it the individual would perish”.

⁵³Coolidge & Wynn (2008) suggested a similar interpretation for the evolution of indirect speech in human language.

⁵⁴“Costly” is obviously intended here in a social, not in a cognitive, sense.

Relative to these and other parameters, the use of evidential markers is more or less mandatory in the languages of the world. In any case, whatever their nature, the presence of evidential strategies is symptomatic of the general sensitivity of speakers and hearers to the implications of communicated relevant information, since these implications arise from socio-interactive evaluations which often override both truth value assessment and actual epistemic origin of discourse contents.

As anticipated in the outset, my main concern in this chapter is to outline an integrated characterization of evidentiality and micropragmatic facts, proposing an interpretation of IS units as featuring a further level of evidential meanings. The most intriguing connection between these two domains is related to the scope of evidential markers, which is often delimited by the informational architecture of the utterance. In the outline I wish to discuss, IS can be thought to represent a universal strategy of linguistic evidentiality (because all languages have IS), contrary to dedicated language-specific evidential systems which only some languages are endowed with. On top of that, through IS, evidentiality also finds expression in phonology, which is one of the means by which the informational status of sentence units is revealed (to a greater or lesser degree). Prior to a more detailed exploration of this interface, a brief overview of the cross-linguistic functions and manifestations of evidentiality will follow.

2.4. Evidentiality: information source, speaker's attitude and illocution

2.4.1. Evidentiality as information source

It has been estimated that in about a quarter of the world's languages (Aikhenvald 2004) sentences must specify how the speaker came to learn about the information he conveys in a conversation. In these languages, indicating who or what is the source of some information is a requirement of grammaticality and felicitous interaction⁵⁵.

So far, typological research has striven to dispense a systematic taxonomy of the major evidential systems in today's languages, detecting from two-choice up to six-

⁵⁵Most of these languages are spoken along the West Coast of North and Central America, within the Amazon Basin, in some countries of Central Eurasia (Balkans and Caucasus), and in the Himalayan region (Greco 2012: 11).

choice evidential paradigms, encompassing a wide range of epistemic sources: visual/factual; first-hand/non first-hand; inferential/assumed; quotative/assumed, and many more (Aikhenvald 2004). As categories of experience, evidentials can be regarded on a par with other complex systems of classifiers; but, contrary to these latter, they can be freely manipulated, thereby associating inauthentic sources to some information⁵⁶.

As is known, the strong tendency for some languages to mark information source had been first discovered by Franz Boas (1900, 1910) in Native American languages, although the term “evidentiality” caught on in subsequent literature since Jakobson’s work entitled *Shifters, verbal categories and the Russian verb* (Jakobson 1957), in which he used the term “evidential” with reference to the source of the information on which the speaker’s statement is based (Friedman 1986: 168).

The fact that evidentiality had been originally investigated in Amerindian languages, and that these languages display extremely intricate evidential systems, led to the stereotypic assumption that European languages were simply devoid of any such system, and in general of any dedicated strategy to signal one’s information source. As put in Aikhenvald (2004: 5), this has strongly influenced the ways in which “linguists with a firm grounding in European languages came to understand evidentiality”. Indeed, in a Standard Average European perspective, this term was hardly accepted as denoting an autonomous grammatical category; rather, it was preferably regarded as a further manifestation of modality, which explains why the two meanings have often been treated as intersecting with one another⁵⁷. Differently from other world’s languages, evidential meanings in the European linguistic area are mainly conveyed via lexical categories, among which verbs and adverbs are the best candidates.

One of the most generic evidential systems is represented by the distinction between FIRSTHAND and NON-FIRSTHAND information. In languages encoding this evidential opposition, all types of information source (visual, auditory, tactile, etc.) are covered. Cherokee (Iroquoian) is a language in which this opposition is morphologically encoded on the verb stem, and is usually associated with past forms. Two examples are shown below (Aikhenvald 2004: 26):

⁵⁶Aikhenvald (2004: 98): “One can deliberately use a wrong evidential with the correct information”. On this account, see also Nuyts’s formulation of evidentiality which he regards as concerning “the speaker’s indication of the nature (the type and quality) of the evidence invoked for assuming the existence of the state of affairs expressed in the utterance. This does not involve any explicit evaluation in terms of the state of affairs being true or not” (Nuyts 2001: 27).

⁵⁷Nuyts (2001: 27): “The close tie between epistemic modality and evidentiality also surfaces in the conditions under which evidential markings tend to occur, cross-linguistically”.

- (8)a. *wesa u-tlis-λʔi*
 cat it-run-FIRSTH.PAST
 “A cat ran (I saw it running)”

- b. *u-wonis-eʔi*
 he-speak-NON-FIRSTH.PAST
 “He spoke (someone told me)”

The REPORTED vs. NON-REPORTED opposition indicates whether some information originates from the speaker or from somebody else’s narration, and is particularly spread among Caucasian (Lezgian) and Baltic languages (Estonian, Livonian, Latvian). In these systems, the reported term is generally marked on the verb, while the non-reported term is unmarked. Examples (9)a. and b. are from Estonian (Aikhenvald 2004: 33):

- (9)a. *Ta on aus mees*
 He is honest man
 “He is an honest man”

- b. *Ta olevat aus mees*
 He be.REP.PRES honest man
 “He is said to be an honest man”

The reportative marker *-at*, in Estonian, is also used to express the speaker’s distant attitude towards the proposition when he doubts about the reliability of its source. Some languages have developed a tripartite evidential system with direct, indirect and inferential markers. Inferential evidentiality (also called “conjectural” evidentiality) implies that “the action expressed by the verb is not directly known or stated on the authority of the speaker but is only inferred from the circumstances of the case or rests on the authority of the one other than the speaker” (Sapir 1922: 158). An illustration from Wanka Quechua is given below (Aikhenvald 2004: 43):

- (10) a. *Chay-chruu-mi achka wamla-pis walashr-pis alma-ku-lkaa-ña*
 This-LOC-DIR.EV many girl-TOO boy-TOO bathe-REFL-IMPF.PL-NARR.PAST
 “Many girls and boys were swimming (I saw them)”

- b. *Daañu pawa-shra-si ka-ya-n-**chr**-ari*

field finish-PART-EVEN be-IMPF-3-**INFR**-EMPH
 “It (the field) might be completely destroyed” (I infer)

c. *Ancha-p-shi* *wa’a-chi-nki* *wamla-a-ta*
 too.much-GEN-**REP** cry-CAU-2 girl-1p-ACC
 “You make my daughter cry too much”

In (10)b., the probability that the field is destroyed is deduced on the basis of situationally available cues, but the speaker does not claim authority on the fact stated. Other languages with inferential/conjectural evidentials are Shilluk (a Nilotic language), a few Siouan dialects like Ponca, and some Tibetan languages like Qiang (La Polla 2003, Aikhenvald 2004).

In some languages evidentials can occur more than once in a sentence, as is the case of Tariana (Arawak, Amazonia). As noted by Aikhenvald (2004: 95), this duplication basically serves to mark unexpected information. In the example in (11), the reportative evidential *–pidana* is marked once on the connective introducing the unexpected event, then on the event itself.

(11) *ne-pidana* *diha* *ita-whyane* *disa*
 then-REM.P.**REP** ART.INF canoe-CL:CANOE-FOC.A/S 3sgnf+go.up -
di-nu-pidana
 3sgnf-come-REM.P.**REP**
 “And then (guess what), the canoe came...”

In the European languages, the above evidential oppositions are partly rendered by perception verbs like *hear*, *smell*, *look*, *see*, etc.; modal verbs like *must*, *ought to*, *may*, etc., and correlative expressions in other languages. In (12), some examples are shown (Fox 2001: 168):

(12)
 VISUAL EVIDENCE FOR PREDICTION
 It *looks* like rain
Sembra che stia piovendo
 INFERENCE FROM VISUAL EVIDENCE
 The door *must* have opened by itself

Deben de ser las ocho y media⁵⁸

HEARSAY EVIDENCE

I *hear* you're getting married
On m'a *dit* que tu vas te marier

Adverbs like *supposedly*, *arguably*, *probably*, *assumingly*, etc., more commonly encode dubitative or conjectural evidentiality, as in *She will probably leave tomorrow* or *She is arguably the best*.

2.4.2. Evidentiality as speaker attitude

As interest in evidentiality grew, certainties on its place in the theories of meaning and epistemology began to stagger. When linguists started to search for evidential strategies in the European languages, they became aware of subtle deflections from the original function evidentials had in Native American languages. The most striking differences were detected in the Balkan area, in which evidentiality seems to be more tightly associated with the speaker's attitude towards information, rather than with the source of information itself. Languages with evidential systems of this kind are Bulgarian, Macedonian and Albanian. Earlier reports on Balkan evidentiality are those provided by Friedman (1986), who studied how in these languages the opposition between PERFECTIVE and NON-PERFECTIVE forms of verbs often corresponds to varying degrees of speaker commitment to the proposition is expressed⁵⁹.

In these three Balkan languages, perfective paradigms of verbs descend from a Common Slavic Perfect. Since perfective forms can be used with either an evidential or a non-evidential function, Friedman maintains that evidentiality is not their invariant meaning:

⁵⁸On the evidential nuances of *dovere/deber de/devoir*+infinitive in Romance, cf. Squartini (2004). Interestingly, he notices that in French the construction *devoir*+infinitive does not only convey inferential meanings but can also be found in reportive contexts. He contends the development of reportive uses of *devoir*+infinitive as stemming from its original inferential function (Squartini 2004: 891).

⁵⁹Friedman (1986: 169): "in the languages under discussion, evidentiality does not constitute a generic grammatical category on a level with, for example, mood, tense or aspect. Rather, evidentiality is a meaning, whether contextual or invariant, expressed by the generic grammatical category which indicates the speaker's attitude toward the narrated event".

These forms are thus not special evidential forms but rather forms contextually capable of expressing evidentiality. In pluperfect forms which developed later, during or after the rise of evidentiality, it appears that an evidential meaning can be treated as invariant, though it need not be treated as a separate grammatical category (ibid: 169).

For each paradigm, inflected forms may be definite or indefinite. Definite forms are used to specify the speaker's personal confirmation of the truth of a statement (i.e. direct evidentiality), whereas indefinite forms express a non-confirming attitude (indirect evidentiality) (Friedman 1986: 171). Definite past has sometimes been regarded as encoding a [+witnessed] feature, because it is frequently used to refer to events or states the speaker himself has beheld. However, Friedman finds this condition much less prescriptive than commonly assumed. He describes a situation in which a Bulgarian friend of his was discussing about who, among his colleagues, had attended a conference he (the friend) had not been able to attend. Although his only source of information was a report, in talking about one of them, the man made the statement in (13), using a definite past form.

- (13) *Beše* *tamo*
 Be.PLUPRF.DEF.(she) there
 “(She) was there”

Regardless of the actual origin of information, the use of a definite past form in (13) commits the speaker to the truth of the proposition and exposes him as its direct source, although he has never witnessed the fact described. So, the stance he takes is that of treating the information as belonging to his own epistemic territory.

The correlation between the definite past and the speaker's commitment to truth is best demonstrated by the ungrammaticality of (14) and (15) (Friedman 1986: 172):

- (14) **Toj ne veruva deka taa go napravi toa* (Macedonian)
 (15) **Toj ne vjarva če tja napravi tova* (Bulgarian)
 “He not believe that she it did.DEF it”

These sentences would be deemed unacceptable by native speakers “due to the logical impossibility of both disbelieving and confirming something at the same time. The one possible grammatical reading of (14) and (15) is if the speaker is actually confirming that she did it despite his belief” (Friedman 1986: 172).

Fluctuations also affect the use of indefinite past forms. It has been said that these forms encode indirect evidentiality, that is, non-confirmation for the truth of a proposition. In Bulgarian, this meaning is expressed by removing the auxiliary in the third person. On a corpus of spoken conversations, Friedman evidences that even when reported information is conveyed by the speaker, the third person auxiliary is not always deleted, as the following occurrences show (Roth 1979):

- (16) *Toj si ja e viždal tam i nakraja*
 He to.himself her **is** saw there and in.the.end

se zapoznali *na ski bili sa na ski*
 (they) met on ski (they) **were** on ski

“He saw her there and finally they met one another skiing – they were on a ski trip”

- (17) *Tja stojala po cjal den na izložbata -i sled tova večer*
 She stood for whole day at the-exhibition and after that evening

se e razxoždala
 (she) **is** strolled

“She would stand (on duty) at the exhibition all day, and in the evenings she would go out for a walk”

The events described are evidentially identical (both are hearsay, reported facts); nonetheless, only in some cases do auxiliaries accompany the main perfective verb (in the examples, auxiliaries have been bold-typed, while the verbs missing an auxiliary particle appear underlined). These vagaries are seemingly contingent on the speaker’s liberty to *perspective* information according to his preferred attitude towards it. Or, from another viewpoint, it is possible that the presence vs. absence of an auxiliary reflect constraints of a different nature, such as the opposition between backgrounding and foregrounding, scene and setting, plot and advancing, among others (Friedman 1986: 177). Now, building on the data discussed so far, a few concluding remarks.

Generally speaking, it has been noticed that in languages with obligatory evidentiality speakers are required being precise about their source of information, and choose the correct evidential marker to indicate it. The point is: how precise are they expected to be? Providing details about the speaker’s source of knowledge is obviously a sign of exhaustiveness and cooperation, but being “sincere” about what information

belongs to whom is by no means an indispensable proviso for an efficient use of evidential markers⁶⁰. As also highlighted by Aikhenvald (2004: 98), “one can deliberately use the wrong evidential with the correct information”. So, ties between evidential markers and the real epistemic status of contents are much looser than traditionally believed (Mushin 2001).

In Section 2.3., we saw that in given social contexts the indication of the speaker’s information source may have repercussions that must be carefully evaluated by speakers before some (new) information is communicated. On the contrary, in other cultural dimensions, being precise about how some information has been learned reinforces one’s social status and likelihood to be trusted by the other group members. In each of these two cases, choosing the correct evidential marker is the outcome evaluation of diverse socio-interactional factors, meaning that the encoding of evidential values is, first of all, a matter of *SUITABLE ATTITUDE* towards the proposition conveyed⁶¹. Correspondingly, what is called *source evidentiality* is the external manifestation of a more “covered” *attitudinal evidentiality*, which is why these two meanings should not be regarded as forming two separate categories in the world’s languages, but as two stages of the same encoding process. The first stage would involve a perspective-taking operation from which the corresponding source marking follows. The scheme below illustrates this process.

⁶⁰Mushin (2001: 53): “Even a superficial glance at the ways in which people use evidential coding indicate that, even in languages with highly grammaticalised evidential systems, speaker’s use of evidential forms does not necessarily reflect the actual means by which they acquired information”.

⁶¹Mushin (2001: 52): “In terms of conceptual structure, one can say that when verbally representing a piece of knowledge, speakers necessarily take a stand on how they acquired the information, how they know it. This stand is their epistemological stance towards the information. Epistemological stance is thus a necessary part of the construal of information, operating in conjunction with other necessary parts (e.g. understanding of spatio-temporal coordinates, the relationship between the speaker and the addressee(s), etc.).”



Analogous views are upheld by Mushin (2001) who regards the linguistic coding of evidentiality as the manifestation of a particular EPISTEMIC STANCE taken by the speaker towards information (see a more extensive discussion on this formulation in Section 2.5). This stance is, more often than not,

about the underlying pragmatic pressures that motivate the conceptualisation of information in terms of a speaker's assessment of her knowledge, and the internal structure of these conceptualisations that result in a variety of mappings onto linguistic structure (Mushin 2001: 52).

She argues that epistemic stance (a term we prefer to “epistemological stance”) is a universal property of all conversational dynamics, and languages may vary in the types of stances taken by speakers on the basis of “how they acquired their information based on both cultural conventions and interactive goals” (Ibid.: 58, 59). On social grounds, the choice of epistemic stances may involve matters of authority, responsibility (Fox 2001), challenging or being challenged by someone, with the risk of falling into disrepute.

The idea that the speaker's subjective stance on truth always affects the way information about the source of knowledge is provided also accounts for the relevance that, in some languages, the linguistic coding of evidentiality has to the modulation of illocutionary meanings, on which we now turn in the following section.

2.4.3. *Illocutionary evidentiality*

Recent field work reports shed light on the existence of another category of evidential meanings known as ILLOCUTIONARY EVIDENTIALITY. To date, extensive accounts of this type of evidentiality have been provided for two Native American languages: Cuzco

Quechua (Weber 1986, Faller 2002) and Cheyenne (Murray 2010). In these languages, evidential markers also encode different illocutionary forces.

2.4.3.1. Cheyenne and Cuzco Quechua evidentiality

Cheyenne is an Algonquian language spoken in Montana and Oklahoma, and is one of the many endangered languages of North America. Verbal forms in Cheyenne are characterized by a templatic structure, with fixed slots for each morphological marker (Murray 2010). This language has a four-way evidential system comprising an unmarked direct evidential (evidence-based commitment to truth) and three overtly marked indirect evidentials (reported, narrative and conjectural). Some examples are given below (Murray 2010: 21).

- | | |
|--|-----------------------|
| (18)a. <i>É-hoo</i> ‘ <i>koho-Ø</i>
3-rain- DIR
“It’s raining, I’m sure” | (direct evidential) |
| b. <i>É-hoo</i> ‘ <i>kohó-nese</i>
3-rain- RPT.SG.B
“It’s raining, I hear” | (reported evidential) |
| c. <i>É-hoo</i> ‘ <i>kohó-neho</i>
3-rain- NAR.SG.B
“It rained, it is said” | (narrative) |
| d. <i>Mó-hoo</i> ‘ <i>kohó-hane-he</i>
CNJ -rain-MOD _B Y-/N
“It’s raining, I gather” | (conjectural) |

Murray (2010) points out that evidential markers in Cheyenne belong to the same paradigm of illocutionary markers, and this is justified by the fact that they occupy the same position in the verbal templatic structure (the first slot after the verb stem), as sketched in (19):

(19)

<u>Interrogative</u>	<u>Imperative</u>	<u>Optative</u>
<i>Né-némene-he?</i>	<i>Némene-stse!</i>	<i>Némene-ha!</i>
“2-sing-Y/N”	Sing-IMP.2SG	Sing-OPT-3SG
Did you (sg.) sing?	“(You) sing!”	“Let him sing!”

In Cheyenne, the absence of an overt evidential marker in a sentence commits the speaker to its truth-conditional value. Specifically, evidentially-unmarked assertions indicate that the speaker has proofs for the stated proposition⁶². The following excerpt provides an illustration of this analysis (Murray 2010: 31):

- (20)a. *Tsé-h-méo-vóona'o ná-hko' éehe é-ho 'éééstse-Ø*
 DEP-PST-early-morning 1-mother 3-incoming.call-DIR
 “Early this morning, my mother called”
- b. *Ného' éehe é-vóon-omóhtahe-sestse*
 1-father 3-all.night-be.sick-RPT.3SG
 “[She said] my father was sick all night”
- c. *#Ného' éehe é-vóon-omóhtahe-Ø*
 1.father 3-all.night-be.sick-DIR
 “My father was sick all night”

Here, the opening context ((20)a.) has set the speaker’s mother as the main source of the father’s sickness. This information is therefore indirect evidence for the speaker. For this reason, he is not allowed to verbalize it using a direct evidentiality marker (in the case above, an evidentially-unmarked assertion), because this would convey the meaning that the speaker has had direct experience of the fact described.

Based on these and other relevant data (also related to the use of indirect and conjectural markers), Murray concluded that the distribution of evidential markers in Cheyenne is more inherently associated with the realization of different speech acts. Precisely, utterances with direct evidentiality marking are endowed with a higher assertivity degree, and therefore hint at a stronger commitment to truth on the part of the speaker.

A similar behavior is displayed by evidentials in Quechua. Quechua designates a group of languages spoken in Central Peru. Some of these are Tarma Quechua,

⁶²Murray (2010: 22): “unmarked sentences carry a commitment to having a certain kind of evidence and are thus treated as having a default evidential”.

Huanuco Quechua and Cuzco Quechua. Earliest studies on Quechua evidentials trace back to Weber (1986), who described their relevance in conforming with four strict socio-cultural norms, which he believes are characteristic of Quechua societies (Weber 1986: 138):

1. (Only) one's own experience is reliable
2. Avoid unnecessary risk, as by assuming responsibility for information one is not absolutely certain
3. Don't be gullible
4. *Assume responsibility only if it is safe to do so. (The successful assumption of responsibility builds stature in the community.)* [italics mine]

In order to comply with the above tenets, speakers use the three evidential markers *mi/shi/chi*, whose function is described in the following terms (Weber 1986: 138):

the utility of *-mi/shi/chi* lies in allowing the Quechua speaker to handily assume or defer responsibility for the information he conveys, thus minimizing his risk while building his stature in the community. With *-mi*, the speaker assumes responsibility, with *-shi* he defers it (to someone else), and with *-chi* he indicates that it is not the sort of information for which anyone should be held responsible (ibid.: 138).

Weber noticed that the scope of these evidentials in the sentence may vary from one local dialect to the other. For example, in Tarma Quechua, they only mark focal phrases (Weber 1986: 145), whereas in Huanuco Quechua they may occur in topical and focal units alike.

- (21) *Hatratruu-mi wataraykaa. Wataykamar-mi aywamusha.*
 On.bush-**DIR** I.am.tied Tying.me-**DIR** she.went
 "I am tied on a bush. Having tied me (here), she went"

In the example, the direct evidential *-mi* is once agglutinated to the rhematic object of the first clause (*hatratruu-mi*), once to the thematic constituent of the second clause (*wataykamar-mi*).

In a more recent survey, Faller (2002) recast the status of Cuzco Quechua evidentials in the framework of *speech act theory*. More particularly, she investigated their behavior as illocutionary modifiers of sentences. In her account, the presence vs.

absence of *-mi* marking (associated by Weber with affecting degrees of speaker commitment) modulate the assertoric force of the utterance (Faller 2002: 165). When *-mi* is overtly marked, the speaker presents himself as having the best possible evidence for the fact stated and commits to its truth⁶³. Then, in

- (22) *Para-sha-n-mi*
 Rain-PROGR.3SG-EVID
 “It is raining” (assertive illocution)

the speaker claims to have witnessed the fact that it is raining. However, similarly to Cheyenne, evidentially-unmarked sentences carry a default meaning of direct evidentiality, although with a slightly attenuated effect than in (22).

- (23) *Para-sha-n*
 Rain-PROGR.3SG
 “It is raining” (assertive illocution)

As put in Faller (2002: 163), what changes from (22) to (23) is that (23) *implicates* that the speaker has the best possible evidence; (22) not only implicates but also *encodes* that the speaker has the best possible evidence⁶⁴ (cf. the distinction between *linguistically* encoded and *pragmatically inferred evidentiality*, proposed by Ifantidou 2001).

The assumption that both *mi*-marked and evidentially-unmarked sentences convey an assertive illocutionary force is demonstrated by the impossibility to deny them once they have been uttered. (24) and (25) below would not be acceptable in Cuzco Quechua because the speaker first lets infer that he has “reasons (or grounds or evidence) that count in favour of or support the truth of the propositional content” (Searle & Vanderveken 1985: 54), then he declares the opposite attitude (Faller 2002: 160-163).

⁶³Faller (2002: 165): “Using *-mi* to explicitly indicate that the speaker has the best possible grounds adds weight to the speaker’s assertion”.

⁶⁴Another function she associates with the use of *-mi* is related to challengeability effects (Faller 2002: 165). “a speaker must have a reason for making the extra effort of using *-mi*, when (s)he could just as well have left it to calculate the evidential value as an implicature. This reason may be that the speaker might already have been challenged or anticipates to be challenged. Using *-mi* to indicate that the speaker has the best possible grounds adds weight to the speaker’s assertion”.

(24) #*Para-sha-n-mi*, *ichaqa mana crei-ni-chu*
 Rain-PROGR-3-mi but not beleive-1-NEG
 “It is raining, but I don’t believe it”

(25) #*Para-sha-n*, *ichaqa mana crei-ni-chu*
 Rain-PROGR-3 but not believe-1-NEG
 “It is raining, but I don’t believe it”

In a different way, if the sentence contained an indirect (irrealis) evidential (-*man*), a subsequent statement of disbelief would provoke no pragmatic infelicity (Faller 2002: 160).

(26) *Para-sha-n-man*, *ichaqa mana crei-ni-chu*
 Rain-PROG-3-**man** but not believe-1-NEG
 “It may be raining, but I don’t believe it”

From a speech act theory perspective, Faller contends that the infelicity of (24) and (25), as opposed to (26), is explained as a violation of the Gricean Maxim of Quality. If a state of affairs is asserted either with or without *mi*-marking, the addressee is entitled to assume that:

- (a) The speaker believes the asserted proposition to be true
- (b) The speaker has adequate evidence that the asserted proposition is true

On balance, Cheyenne and Cuzco Quechua have evidentials whose main function is to graduate illocutionary meanings in discourse. In these systems, direct evidentials (whether expressed through evidentially-marked or unmarked assertions) are likely to increase the assertive force of an utterance, while indirect evidentials (inferential or reported) reduce it. As can be derived from the data just outlined, illocutionary evidentiality posits the speaker’s commitment and responsibility as playing a crucial role in the distribution of evidential markers. For this reason, it can be sensibly thought to represent another manifestation of speaker attitude evidentiality.

2.5. Evidentiality and Information Structure

2.5.1. Epistemic stances and the evidential values encoded by IS units

The data discussed from illocutionary evidentials suggest that at least two levels of evidentiality encoding can be identified. On one level, evidential meanings are *linguistically encoded* in the sentence (as is the case of the strategies discussed in Sections 2.4.1 and 2.4.2); on another level, they are *pragmatically inferred*⁶⁵. Drawing upon this distinction, Mushin (2001) talks about explicit and implicit evidentiality, arguing that in the latter case, information about the source of information or the speaker's commitment to truth must be derived via inferential processes. In this section, I will attempt to demonstrate that if linguistically encoded (explicit) evidentiality is a property of a small set of languages, pragmatically inferred (implicit) evidentiality is a universal category since, even when dedicated markers are not used to express evidential meanings, such meanings may also be implicated by the particular utterance situation or, as is the case in point, the information structure displayed by the utterance.

In adopting a comprehensive conception of evidentiality – including the manifestation of the speaker's attitude towards information (besides its epistemic origin) – I will suggest how implicitly derived evidential meanings also stem from informativity hierarchies realized by IS units. In so doing, I will draw upon Mushin's classification of epistemic stances, among which she identifies PERSONAL EXPERIENCE STANCE, INFERENTIAL STANCE, REPORTIVE STANCE, FACTUAL STANCE and IMAGINATIVE STANCE⁶⁶. Two stances, in particular, will be at issue in the following contention: *personal experience stance* and *factual stance*. To better address this outline, I will group IS units according to the evidential behavior I believe them to display in discourse; therefore, a section will be dedicated to assertion and focus, and the way they convey evidential meanings of personal experience (*personal experience evidentiality*),

⁶⁵Following Blakemore (1987) and other recent traditions of studies, I assume that those aspects of evidentiality that must be derived contextually should be grouped – *mutatis mutandis* – within the domain of grammaticalized evidentiality, because of their reflex on language structure, whether it involves the use of given grammatical forms or the utterance of particular speech acts.

⁶⁶I refer the reader to Sections 2.3.3.1 and 2.3.3.2 for a more detailed account of the personal experience and factual epistemic stances. In Mushin (2001), the INFERENTIAL stance is expressed in the representation of information as inferred or deduced based on some body of evidence; the REPORTIVE stance indicates information acquired by virtue of what someone else has said, and the IMAGINATIVE stance represents information as embedded in some fictional storyworld.

another section will deal with topic and presupposition, and their relation to a factual epistemic stance (*factual evidentiality*).

2.5.1.1. Assertion, Focus and personal experience evidentiality

In previous sections, we have seen that evidentially-unmarked assertions often receive the interpretation of encoding a default direct evidentiality. For Cuzco Quechua, Faller (2002: 123, 124) highlighted that if *-mi* marking encodes that the speaker possesses the best conceivable source of information, simple assertions merely *implicate* this evidential value. This analysis accounts for the unacceptability of sentences like (24), in which a state of affairs asserted by the speaker is subsequently followed by a declaration of disbelief on his part.

It can be easily noticed how analogous constraints would not be unknown to languages without obligatory evidentiality, like English or Italian. As a matter of fact, the following two sentences

(27) *Jane is pregnant, but I don't believe it

(28) *Maria è incinta, ma non ci credo

would trigger the same marginality effect as that in (24).

As rightfully pointed out by Faller, the main cause of this marginality is the adoption of an uncooperative conversational attitude on the part of the speaker; precisely, he is violating the Gricean Maxim of Quality (Grice 1989: 27):

Supermaxim: Try to make your contribution one that is true.

Maxims: (1) Do not say what you believe to be false

(2) Do not say that for which you lack adequate evidence

Following Searle's (1975) classification, we grouped *assertives* in the category of acts that commit the speaker to the truth of a proposition, which makes a belief state (whether actual or merely "pretended" by the speaker) a necessary requirement to make a felicitous use of assertions. So, in saying "Jane is pregnant", not only do I depict

myself as a believer of the fact, but I also imply that I have reliable evidence to assert that fact, which rules out any subsequent declaration of disbelief.

A further cause of marginality in (27) and (28) can be found in the violation of the Maxim of Quantity (“Make your contribution as informative as required. Do not make your contribution more informative than is required”). If an assertion contains no information about a source other than the speaker, this latter is regarded as the one actual source of the proposition. Otherwise he should have said *X told me that Jane is pregnant, I’ve been told that Jane is pregnant*, or the like⁶⁷.

The assumed compliance with the Maxim of Quality – that is, with an evidence- and belief-based representation of a fact - is what endows assertion with the property to convey some information from a PERSONAL EXPERIENCE epistemic stance (Mushin 2001: 59)⁶⁸:

The adoption of a personal experience epistemological stance towards information involves its representation as the product of the conceptualizer’s direct and conscious perceptual experience. In many cases the speaker is the only person who has access to the truth of the information. [...] These are contexts where the conceptualizer has witnessed an externally perceivable event (Ibid.).

It is worth remarking that the way in which assertion personalizes experience is obviously not identical to what we observe in sentences like (29):

(29) Ouch! That hurt!

Here, the event experienced is inherently personal because it involves the speaker as a direct witness and participant. It can be conjectured that personal experience is more overtly coded in (29) by means of an affective exclamation (*Ouch!*) and by the use of what Levinson (2000) calls a “gestural deictic” (*That*), tying the speaker to a *hic et nunc* representation of the event. (In fact, he could not have used the same expression to

⁶⁷In given circumstances, non-adherence to the Maxim of Quantity can also be dictated by reasons of brevity, or the like. What results, however, is that if no explicit indication of other sources is provided, the speaker is recognized as the only source involved.

⁶⁸A crucial point made by Mushin (2001) is that one of the ways in which a personal experience epistemic stance can be linguistically realized is through the mention of private states and speaker intentions (Mushin 2001: 60). So far, we outlined assertion as a communicative strategy by which the speaker’s informative goal is manifestly conveyed, and for this reason it can be regarded as a linguistic correlate of a personal experience stance on information.

report on a past event; ex. **Ouch! I used to hurt my finger...*). Conversely, in a simple assertion like *Jane is pregnant*, the stance of personal experience is inferred, and the inference derivable from the utterance is that

(30)a. The speaker believes and has evidence of Jane's pregnancy

whatever the speaker's belief attitude towards the proposition.

If we can take evidentiality as a meaning that can be either linguistically encoded or merely implicated in communication, it is reasonable to view assertion *as a direct evidential marker that presents the speaker as the main source and witness of a state of affairs*.

One point worth discussing of Mushin's account is related to the effects of personal experience stance on challengeability degrees of some information. She in fact believes that a proposition communicated by the speaker as descending from his personal experience is on the whole less open to challenge:

Adoption of personal experience epistemological stance typically also gives an impression of certainty and confidence – it is the speaker's own version of information. *It would be odd, for example, to challenge information presented from this stance.* [...] The strangeness of challenging information presented as personal experience confirms that this stance generally reflects the speaker's willingness to take responsibility for the information. Challenges may arise, but they felicitously arise only when the challenger is in a position to know more about the original speaker's experience than the original speaker (Mushin 2001: 65). [...]

A similar view is held by Fox (2001: 173) who regards the challengeability parameter as closely related to AUTHORITY, in the sense that “if one has authority to claim something, then perhaps that claim is less open to challenge. As can be noticed, this description is diametrically opposed to the account I gave of assertion, stressing its likelihood to vindicate the speaker's entitlement to truth when attempts at challenging it hold”. My position, in this respect, falls into line with Givón's classification of propositions and, particularly, with those that, being “asserted with relative confidence, are open to challenge by the hearer and thus require – or admit – evidentiary justification” (Givón 1982: 24).

In my view, in discussing the effects of assertion on challengeability degrees, one should differentiate between amount of evidence and degree of speaker commitment to

that evidence: *challengeability does not depend on both factors to the same extent*. Strictly speaking, what exposes someone to critical reaction is not only the amount of evidence he can draw on to claim a proposition as true or false, but also his supposed intention to modify the receiver's status about the evidence provided. As Récanati (1986) put it, with assertions such an intention is overt and is therefore directly displayed to interlocutors, because it represents the speaker's main contribution to the exchange.

If the only requirement to assert something were the possession of evidence, there would be no difference between (31)a., b. and c.:

- (31)a. Jane is pregnant
- b. Jane may be pregnant
- c. Peter told me that Jane is pregnant

All three sentences provide information about the source of the proposition that "Jane is pregnant". In (31a), the source is believed to be the speaker who, in absence of explicit indication about some other source, is assumed to have learned the fact from direct experience. In (31b), the source is still identified with the speaker, although his evidence is less strong and based on the interpretation of available cues (e.g. Jane's recently suffering from nausea or her stomach being more swollen than usual). Finally, in (31c), the source is someone other than the speaker.

What changes from (31a) to (31c) is precisely the strength with which the speaker commits to the truth of the proposition. Such a difference can be more clearly appreciated applying what MacFarlane (2008) called a RETRACTION TEST, similar to the contrasts observed in (23) and (24). As seen before, this test is aimed at retracting one's belief attitude towards a statement. As shown in the Quechua examples, retraction does not apply to evidentially-unmarked assertions, whereas it fits perfectly (or almost perfectly) sentences conveying second-hand, reported information.

- (32)a. *Jane is pregnant, but I don't believe it
- b. *Jane *must* be pregnant, but I don't believe it
- c. #Jane is *probably* pregnant, but I don't believe it
- d. Peter *told me* that Jane is pregnant, but I don't believe it

The sentences in (32) feature a gradient from more assertive to less assertive strategies, which affects the acceptability of subsequent declarations of disbelief. It can be easily observed that the one case in which a speaker can disassociate from a proposition is when the responsibility for its truth is deferred to someone else. This variation is also suggestive of how strongly assertion ties the speaker to a stated truth and, particularly, to his subjective confirmation of that truth to the receiver. (In this sense, (32) can be recast as a subjectivity scale, where (32a) represents the most subjective strategy, and (32d) the most objective one. Cf. the following discussion on the notion of subjectivity/subjectification.)

To me, the reason why *Jane is pregnant* in (32a) is more challengeable than the indirect counterparts in (32c) and (32d), is that in (32a) the proposition is uttered to *induce the receiver to believe it as true* (as the pragmatic goal the speaker wants to achieve by making an assertion is to update the receiver's common ground about a new proposition he does not already share), which is not the effect observed in (32c) and (32d). This is what, in my opinion, makes the receiver's epistemic status and the potential reaction to its manipulation more vulnerable to asserted, rather than to presupposed or second-hand reported information. Thus, what is relevant to challengeability is not *what we communicate in a conversation* (the locutionary level), but *what we do with what we communicate* (the illocutionary level), namely the packaging we choose for the content to be conveyed.

On top of that, there is also the previously debated concern of *indirection* in both private and public communication. We have seen that in given social realities, this practice acts more like a constraint than like an option and that, in some cases, speakers are strongly advised to avoid being identified as the source of information, since taking a personal experience stance on knowledge may expose a speaker to potential disrepute. We have also seen that indirection is very often the language of commercial and political propaganda, which are by definition targeted at persuading people, thus forging their consensus. So, if direct strategies epitomized an efficient deterrent to critical reaction, why are they not preferred over indirect ones? In other words, why do speakers prefer not to assume responsibility to truth if this would keep them from being openly discredited by their interlocutors?

It must be highlighted that the liability of direct assertion to raise a challenging reaction also hinges on the interlocutors' social status. For instance, in private communication, speaker B may feel more confident in addressing a friend (speaker A) in a situation like (33)

(33) A: I will visit the Eiffel Tower

B: No, you won't

than his Linguistics Professor (speaker A) in a context like (34)

(34) A: I will give you a high mark

B: No, you won't

So, social status and the symmetric or asymmetric character of the conversation may either intensify or curb the effects of challengeable conversational attitudes.

Seen from a cognitive perspective, the adoption of a personal experience stance can be regarded as the result of a SUBJECTIFICATION process. The notion of subjectification dates back to Bréal's semantics (Bréal 1964 [1900]) and later revived in Benveniste's distinction between *subjectivity* and *intersubjectivity* (Benveniste 1971 [1958]). In more contemporary linguistic thinking, the term was taken up by Lyons (1982) in his epistemological accounts of meaning, and then by Langacker (1990, 2003) to explain aspects of knowledge construal. Visconti (2005) and Traugott (2010) have framed the phenomenon of subjectification as a pervasive force of grammaticalization paths. Among other semantic changes, they discuss that the scalar meaning of expressions like *even*, *also*, *especially*, etc., i.e. focus-sensitive operators, seems to have stemmed from a transition from an objective to a subjective point of view taken by the speaker on a content communicated. As discussed in Visconti (2005) and Traugott (2010), this subjectivized meaning is particularly salient when the scalar particle triggers focalizations in discourse. In order to look into focality as an evidential strategy of the same kind of assertion, a few more points are worth making.

Although the concept of subjectivity/subjectification⁶⁹ is an old one in epistemological branches of linguistics and philosophy, a useful characterization to consider is that proposed by Lyons (1982):

The term *subjectivity* refers to the way in which natural languages, in their structure and their normal manner of operation, provide for the locutionary agent's expression of himself and his attitudes and beliefs (Lyons 1982: 102).

Lyons' focus in the above formulation is on the linguistic endowment the speaker can rely on to encode particular attitudinal states towards knowledge.

In a more recent paper, Nuyts (2005) discusses the epistemic entailment of taking subjective stances on knowledge. One of these involves the speaker's assumption of responsibility.

An evaluation is subjective if the issuer presents it as being strictly his/her own responsibility, it is inter-subjective if s(he) indicates that s(he) shares it with a wider group of people, possibly including the hearer (Nuyts 2005: 14).

In the same lines of Lyons, Visconti (2005) places an emphasis on the grammaticized output of subjectification processes, where "grammaticized" does not indicate the semantic bleaching of given expressions but rather the grammatical devices by which subjectivized perspectives find encoding in a language.

Among the strategies which languages fall back on to express subjectification, Traugott (2010) highlights the following:

- raising constructions, in which the "speaking subject" differs from the "syntactic subject" (Benveniste's *sujet d'énonciation* vs. *subject d'énoncé*), e.g. *She's going to give a lecture* vs. *There's going to be a lecture*;
- illocutionary uses of speech acts and mental verbs (*I recognize the Senator from California*);
- epistemic modals (*That must be wrong*);
- concessives (*while*);

⁶⁹Albeit we are using the two terms interchangeably, Traugott (2010) rightfully points out that *subjectivity* refers to a synchronic state of the phenomenon, whereas *subjectification* indicates the diachronic process it brings about.

- focus particles (*even*);
- discourse markers (*besides*)

With respect to focus particles, she argues that “they typically derive from expressions that used to have more objective meanings, often quite concrete meanings (e.g. Eng. *even* “level, equal, like”; *only* “unique, solitary”, It. *perfino* < Lat. *per-finis* “limit, boundary”), and later developed subjective and modal nuances whereby they expressed “the speaker or writer’s perspectives and attitudes as constrained by the communicative world of the speech event, rather than by the so-called real-world characteristics of the event or situation referred to” (Traugott 2006: 343).

For Italian, this development can be appreciated in the increasing mobility of the scalar particles and their increasing capability of combining with different constituents. For example, *persino* originally selected prepositional phrases (PP) and complement clauses (CC)⁷⁰. But, when new, emphatic meanings began to be associated with its use, it could also introduce verbal (VP), adjectival (AdjP), determiner (DP) and adverbial phrases (AdvP). The evolution of a subjectivized meaning of the particle is dated by Visconti to the XVI^o century, and the occurrence in (35) is a fitting example of this turning point (Visconti 2005 [2001: 11]):

(35)

*Ivi a non so che giorni, fra Tiberio ritornò al giuoco cor un certo abito, che proprio pareva un capitano. Egli aveva una cappa rosada, cor una banda di velluto larga un palmo, calze di velluto bianco federate di tela d'argento [...]. **Perfino** [una catena di oro di sesanta scudi]_{DP} aveva* (P. Fortini, *Le giornate delle novella dei novizi*, 21, 1530-1540 [LIZ])

“A few days later, friar Tiberio came back with a certain outfit, looking like a captain indeed. He had a pink cloak with a white velvet band, white velvet socks lined with silver and all covered with silver lace”... Even a sixty scudi gold chain he had...”

⁷⁰Such distributions are best represented by the following instances (b. and c. have been taken from Visconti 2005 [2001: 10]):

- ...E lodansi alcuni quali esposero **persino** [*la propria vita*]_{DP} per serbare integro officio alla amicizia (Leon Battista Alberti, *I libri della famiglia*, 1433-1434).
- ...le voleva bene, allora! Egli [*la temeva*]_{VP} **persino** (F. Tozzi, *L'amore*, 42)
- Era molto inquieta, e mi parve **perfino** [*dimagrata*]_{AdjP} (F. Tozzi, *Giovani*, 61)

Both Visconti (2005 [2001]) and Traugott (2006) maintain that when scalar particles developed emphatic meanings they also acquired the function of projecting the speaker's personal evaluation and attitude on the contents they introduced in discourse. It must be added that, although scalarity is an intrinsic semantic feature of scalar particles, irrespective of their actual micro-pragmatic status in the sentence, the subjectivizing effect is more strongly tied to focality⁷¹. As a matter of fact, when the particle is found in the backgrounded part of the sentence, the speaker's attitude it expresses towards the item falling within its scope is perceived as less subjective, somehow detached from the speaker's viewpoint, and more widely shared. This is particularly noticeable in Italian, in which a good number of scalar particles can occur either in the topic or in the focus of the sentence. The two examples below show a topical realization of *persino*.

(35) [Viaggiando con un amico, fidanzato-fidanzata o **persino** con un cane]_{TOPIC} [metterete alla prova questo rapporto]_{FOCUS}. Viaggiare può essere stressante e ognuno gestisce questo stress in modo diverso. E' quindi probabile che vivrete momenti cruciali per la vostra relazione, che potrà rafforzarsi o invece rompersi: tornerete a casa più uniti di prima o, al contrario, non vi parlerete mai più.⁷²

(36) [Se **persino** la prevenzione del tumore al seno è materia di speculazioni politiche]_{TOPIC} [significa che siamo alla frutta]_{FOCUS}⁷³

(37) [Quando **persino** il PD rinnega il comunismo sovietico]_{TOPIC}, [qualcuno deve pur raccogliere la fiaccola]_{FOCUS}⁷⁴.

⁷¹In this respect, Traugott (2010: 7-8) suggests that, among other things, subjectification meanings are recruited by the speaker to encode and regulate the speaker's perspective on factors such as (a) who does what to whom, (b) how the proposition is related to speech time or the temporality of another proposition, (c) whether the situation is relativized to the speaker's, and (d) *which part of a clause is viewed as topic or focus*. [italics mine]

⁷²<http://www.ef-italia.it/blog/language/8-modi-per-migliorare-se-stessi-viaggiando/>

“Travelling with a friend, boyfriend-girlfriend or *even* with a dog/_{Topic}, /you will try out this relationship/_{Focus}. Travelling may be stressful and everybody copes with stress in a different way. It is thus likely that you will go through crucial moments of your relationship, which can either strengthen or break up: you'll get back home stuck together or, conversely, you won't talk to each other anymore.

⁷³[If **even** prevention against breast cancer is a matter of political debate]_{TOPIC} [it means that we are at the bottom of the barrel]_{FOCUS}.

⁷⁴[Because, when **even** the PD denies the Soviet communism]_{TOPIC}, someone else must carry the torch onwards]_{FOCUS}.

In all three cases, *persino* is in a subordinate adverbial clause realizing the topic unit of the complex sentence. In Italian, this use of *persino* would be unmistakably perceived as backgrounded and certainly less emphatic.

If subjectification entails some degree of commitment or responsibility on the part of the speaker, such a degree is definitely less strong in (35), (36) and (37). So, focality may have been the actual effector of the subjectivization process in discourse; and subjectification, in turn, may have endowed the particle with the present-day scalar meaning it displays⁷⁵.

In assuming this viewpoint, we may ask what makes focus a strategy to subjectivize meanings in discourse, that is, in what sense is a high degree of commitment and responsibility related to the focalization of contents? In Section 1.3.3., we proposed to follow Cresti's interpretation of topic and focus ("comment" in her terminology) and treat the focus as the unit encoding the illocutionary force of the utterance. An intriguing connection between illocutionary force and responsibility has been put forward by Alston (2000) who, building on Searle's notion of *speaker's obligation*, discusses the speaker's taking responsibility⁷⁶ for an utterance as both a necessary and a sufficient condition for the utterance to count as an illocutionary act. Along similar lines, Adams (2006) highlights that an utterance is classified as an illocutionary act to the extent that the speaker takes responsibility for the obtaining of the state of affairs described. Accordingly,

an utterance places the speaker under the obligation to take responsibility for the truthfulness or the performance of an utterance. *Such obligation is monitored by socially entrenched rules of communication determined and implemented by the community to which the speaker belongs* (Adams 2006: 41). [italics mine]

⁷⁵In an ongoing study (Ganfi & Masia, in prep.), it has been proposed that scalarity did not properly emerge in the particle as a result of a subjectification process, but most probably shifted from a concrete, spatio-temporal to a more abstract frame represented by the receiver's expectations on a communicated proposition.

⁷⁶According to Alston (2010: 70-71), the essence of responsibility can be depicted as follows: "The utterance is made the illocutionary act it is, apart from any conventional effect production that is essentially involved, not by any "natural" facts about the speaker – his beliefs, perlocutionary intentions, or whatever – but by a "normative" fact about the speaker – the fact that he has changed his normative position in a certain way by laying himself open to the possibility of censure, correction, or the like in case the conditions in question are not satisfied. What the speaker does, again apart from the conventional effect production, to make his utterance a token of a certain illocutionary act type, is to "stick his neck out" in this way, making himself the one who is to respond if the conditions in question are not satisfied".

Another crucial point Adams makes about Alston's concept of "taking responsibility" is that it "sharpens the nature of illocutionary acts as they clearly include the dimension of the speaker's total *involvement of the self*" (Adams 2006: 41). This is where, in my view, the relation between subjectivity and responsibility finds a more suitable grounding. If illocution entails the speaker's assumption of responsibility, whatever content is presented as the illocution of the sentence, its truth will be communicated with a stronger epistemic involvement and commitment of the speaker. This said, it can be deduced that focus, as opposed to topic, constructs a more subjective representation of knowledge because it is through the illocution encoded by focality that the speaker expresses his own responsibility and commitment to truth.

To sum up, both assertivity and focality characterize the speaker's socio-interactional role as epistemically involved in the representation of a state of affairs. More precisely, in asserting or focalizing a content, the speaker manifests himself as a committed source of it. We argued that for assertion the interpretation of a personal experience stance is inferred by virtue of the Gricean Maxim of Quality, by which the speaker is assumed to believe the asserted content to be true, and to have adequate evidence for it.

A similar line of reasoning has been followed for the function of focus. In utilizing an illocutionary definition of focus (Cresti 2000; Cresti & Moneglia 2010), we characterize it as a discursive device to increase one's responsibility for the truth of some content. Since illocution can be conceived of as the intention in producing an utterance, this intention entails a believing and committal attitude on the part of the speaker. Therefore, whatever content falls within the sentence illocution (and, therefore, the sentence focus), it will tie the speaker to an evidence-based truth.

In conclusion, because of their "subjectivizing" function in discourse, assertion and focus realize a *personal experience type of evidentiality*, which makes them similar to other strategies of direct evidentiality in the world's languages.

2.5.1.2. *Presupposition, Topic and factual evidentiality*

With a personal experience epistemic stance, the source of knowledge is identified with the speaker; with a reportive stance, the source is attributed to somebody else's authority. In other cases, hints at any source of information may simply remain untold.

Mushin highlights that this is the kind of stance taken by speakers to communicate information that is believed to be shared by everybody; hence, explicit indication of the primary source is deemed irrelevant. In her taxonomy, this stance is referred to as FACTUAL (Mushin 2001: 74):

Adoption of a factual epistemological stance is reflected in the absence of any representation of the source of information (and its status) in the construal. Adoption of a factual epistemological stance typically implies either that the information is assumed to be known by anyone in the speech community as general cultural knowledge or, more generally, that the source of information is unimportant to the establishment of the validity of the information.

Mushin argues that, at least in English, speakers are generally bound to adopt a factual stance to report on “universally accepted world truths” (Ibid.: 74), i.e., information that is epistemically neutral. For example, statements like

(38) The earth revolves around the sun

(39) The snow is white

admit no subjective interpretation of the states described, since they can be ascertained by anybody and require no further verification of the source’s reliability. Consequently, the use of either direct or indirect evidentials in these cases would hardly be felicitous.

(38a) ??Probably, the earth revolves around the sun

(39a) ??I can assure that the snow is white

Information presented from this epistemic stance entails the speaker’s epistemic detachment from the representation of a fact and the adoption of an objective perspective on it (Mushin 2001: 75)⁷⁷:

Adoption of a factual epistemological stance requires that the conceptualizer disassociate herself from the representation, resulting in a maximally objective construal. [...] In other

⁷⁷As opposed to the more subjective viewpoint implied by the personal experience epistemological stance.

words, the speaker does not “own up” to the fact that what they are talking about is their own representation of events, and not a description of the events themselves.

In the same way as personal experience stance, Mushin claims that low challengeability is also an epistemic effect of presenting knowledge as factual, since, if the truth of a statement is assumed to be shared by everybody, directly challenging it would turn into a counterproductive and uncooperative conversational move.

Linguistic devices employed by speakers to exchange factual information are manifold and obviously differ from language to language. Absolute truths like (38) and (39) are expressed by means of declarative sentences, but information presented as shared may find a number of encoding formats. Presupposition is one of these. The definite description in (40a) and the subordinate clause in (40b)

(40)a. *The present King of France* is bald

(40)b. *When Jane discovered her husband’s affair* she kicked him out of the door

respectively present the existence of the present King of France and the fact that Jane discovered her husband’s affair as common knowledge.

Following extant literature on the subject, we defined presupposition as “content the speaker conveys as to be taken for granted by the receiver, either because it is already shared at the moment of utterance or because it is not relevant to the communicative goal to be attained in the conversation”. We also discussed that presupposed information reduces the speaker’s commitment to its truth, because that information is assumed to be already agreed upon by the receiver. This possibly explains why certain evidential expressions cannot be associated with presupposed information in a sentence, as the mismatches in (41)a. and b. show:

(41)a. *When Jane [*apparently*] got pregnant, her parents bought her a new house

b. *It’s strange that [*it seems*] to be raining

In these cases, information the speaker wants the addressee to treat as already shared and granted is encoded within the scope of an inferential/conjectural evidential, whose function is to weaken the speaker’s certainty on truth, because more reliable evidence is still to be gathered on the basis of inferential processes.

(41b) is one of the cases of ungrammaticality that Kiparsky & Kiparsky (henceforth, K&K, 1971) correlate with the combination of certain epistemic and presentative expressions like *it turns out*, *it is true*, *it is possible*, *I believe*, etc. with presupposed dependent clauses. They notice that factivity of a clause hinders uses like those shown below (K&K 1971: 349):

- (42)a. *The fact of John's being ill turns out
b. *John's being ill is true/is false

However, they do not look into the constraints inhibiting these uses of factivity, which is what I will attempt to do in the follow-up of this section.

As K&K rightfully point out, speakers may either assert (directly or indirectly) or presuppose a proposition to be true. Since factivity arises from presupposing the truth of a proposition, the same truth cannot be directly asserted at the same time. Stalnaker (1978: 325) draws an analogous conclusion in the following terms:

A speaker should not assert what he presupposes to be true, or what he presupposes to be false. Given the meaning of presupposition and the essential effect ascribed to the act of assertion, this should be clear. To assert something incompatible with what is presupposed is self-defeating; one wants to reduce the context set, but not to eliminate it altogether. *And to assert something which is already presupposed is to attempt to do something that is already done.* [italics mine]

In using a construction like *John's being ill*, the speaker in (42a) is presupposing the state that "John is ill". This proposition is communicated as something the hearer is assumed to know already, and therefore as factual (although it may involve accommodation). Thus, associating a truth predicate to presupposed content amounts to re-stating its truth-conditional value as well as the speaker's commitment to it. The anomaly resulting from this can be explained in terms of violation of the Maxim of Quantity. We have seen, for assertion, that when specifications about sources other than the speaker are not provided, the receiver is entitled to regard the speaker as the main source of the asserted proposition. In the cases in (42), deflection from cooperational rules of manner and quantity takes the opposite direction, namely that of providing *more information than strictly necessary*. Let us clear up this point.

In the previous chapter, it was argued that presuppositive packaging dispenses the instruction that the truth of some content must be assumed to hold, with no further verification on the part of the receiver. If the truth of a previously presupposed content is presented as information to inform the receiver about, he will have to make the effort to construe that truth again in his mental model, thus engendering no actual update of his common ground. The unacceptability of (42a) and (42b) most probably results from the violation of the Maxim of Manner, and precisely the Submaxim by which the speaker is advised to “be brief and avoid unnecessary prolixity”. In both sentences, the receiver would be required to accept *twice* the truth value of the presuppositions projected. If the receiver is asked to learn about the truth of a state of affairs whose truth he already knows and agrees upon, he would gain no beneficial cognitive effects in terms of common ground update. As a result, any processing demand on his part would turn useless, thus contrasting with basic principles of relevance⁷⁸.

A similar situation can be observed in the use of performative verbs like *state*, *maintain*, *assert*, *conclude*, etc. to introduce factive clauses, as illustrated in the following examples (K&K 1971: 347):

- (43)a. *I *maintain* your saying so
- b. *We may *conclude* the fact of his having proposed several alternatives
- c. *I *assert* the fact that I do not intend to participate

As sketched in Section 1.2.4., the projecting predicates in (43) all belong to the assertive type of Searle’s taxonomy of illocutionary forces. Assertive performatives generally tie the speaker’s words to an external state of affairs since he openly commits to its truth value. Owing to this property, presupposed propositions cannot fall within the scope of this category of performatives, since these latter would impose the speaker’s commitment to a truth value that is presented as already agreed upon – namely, supposed in advance - by the receiver.

Because of their factual nature, factive clauses would also be incompatible with predicates conveying conjectural meanings which, due precisely to this epistemic value, have been classified by K&K as non-factive (Ibid.: 347).

⁷⁸Cf. Sperber & Wilson (1986: 254): “Human cognition tends to be geared to the maximisation of relevance”.

- (44)a. Everyone *ignored*/**supposed* Joan's being completely drunk
 b. I *regret*/**believe* having agreed to the proposal

In (44), the predicates *suppose* and *believe* decrease the speaker's certainty on the truth of the dependent proposition, and this conflicts with its presuppositive status in the sentence. Also here, information presented as evidence-based and undisputable by the speaker cannot be included in the scope of a predicate that reduces the strength of available evidence. In terms of source manifestation, a few concluding remarks. Generally speaking, the examples in (42), (43) and (44) all hint at a difficulty of presupposition to be projected under the scope of both direct and indirect evidential expressions. In other words, in presenting some content as presupposed, the speaker can neither *re-commit* to its truth, nor distance himself from it; that is, *epistemic neutrality* is the one stance to opt for. This constraint had also been pinpointed by Anderson (1986) who characterized presupposition as one of the categories of propositions deemed incompatible with the scope of evidential expressions⁷⁹.

These other categories are imperative utterances, infinitive subjunctive clauses, counterfactuals (Anderson 1986: 278) and indirect questions.

- (45)a. *[*I hear*] Do the dishes! (imperative)
 b.*I asked John to [*apparently*] come (infinitive subjunctive)
 c.*If John had [*apparently*] arrived, he could help us (counterfactual)
 d. *I wonder whether she [*probably*] went to the party (indirect question)

However, the fact that presupposition cannot contain evidential expressions does not mean that it cannot convey evidential values itself. It rather means that it already encodes its own evidentiality. Indeed, if we assume evidentiality to be (among other things) the manifestation of a particular attitude taken by the speaker on a proposition – resulting in the signaling of a certain degree of sourceness on his part – presupposition subsumes an epistemic stance by which the *speaker decides to hide any identifiable source for the proposition communicated*; or, as contented for factual epistemic stance, it encodes a *source identified in the entire speech community*, crucially including the addressee(s): what we can call a SHARED SOURCENESS. Interestingly, if focality and

⁷⁹ (Ibid.), p. 277: “Evidentials are normally used in assertions (realis clauses), not in irrealis clauses, nor in presuppositions”.

assertivity encourage the interpretation of a subjective perspective on knowledge, topicality and presuppositivity can be regarded as creating a context of *intersubjectivity*, as information is communicated from the perspective of both speaker and receiver. This is how Nuyts (2001) outlines this condition:

Shared evidence – or the assumption of shared evidence – leads to an intersubjective view of the state of affairs expressed by the speaker (Nuyts 2001: 114)

In my view, the intersubjectivity effect is what accounts for the weak challengeability of presupposition in discourse. When contents are presupposed, no source of knowledge is on display to be addressed, or receivers themselves are called upon as co-source of the information communicated⁸⁰.

Nailing down the features of factive and non-factive predicates, K&K noticed that a factive interpretation can also arise from complement clauses in sentence-initial position. They ascertained that, if factive predicates can project complement clauses either in sentence-initial or in sentence-final position, non-factive predicates can only have sentence-final complement clauses within their scope (K&K 1971: 346). The examples below illustrate this difference.

- (46) That there are porcupines in our basement *makes sense to me*
It makes sense to me that there are porcupines in our basement

- (47) *That there are porcupines in our basement *seems to me*
It seems to me that there are porcupines in our basement

- (48) *That Jane has left for Paris *is likely*
It is likely that Jane has left for Paris

In their outline, factivity does not only depend on the meaning of the projecting predicate, but is also a property of the syntactic position of the projected clause. They contend that the anomalies in (47) and (48) hinge on the factive interpretation associated

⁸⁰Cf. de Saussure (2013: 8): “we shall say that presupposition accommodation prompts for the commitment of the Hearer to its truth without requiring his conscious consent”.

with the sentence-first placement of the projected clauses, which is why their combination with a non-factive predicate is not possible⁸¹.

It must be noticed that, while a factual stance seems to be tied to presuppositions irrespective of their degree of familiarity or newness for the interlocutor, with topics, the adoption of this stance is generally more evident when they encode information that has already been introduced in prior discourse. In such a case, the encoding of topical information within the scope of direct or indirect evidential expressions makes the sentence less acceptable. Consider the example in (49)

(49) A: The baby is hungry. He keeps crying all the time

B: No. *[He *probably* cries]_T [because he is tired]_F

Here, the sentence in B would be grammatical only if the evidential adverb were understood as having scope over the focal sentence *because he is tired*. The activation of the idea that the baby is crying places that content within the interlocutor's epistemic domain and identifies it with knowledge shared by the speaker and hearer. This means that any subsequent attempt to cast uncertainty on its truth (typically, using indirect or conjectural evidentials) is simply ruled out. Once some content has been introduced in the universe of discourse of speaker and hearer, and its truth is taken for granted by both of them, recalling it within the scope of evidential expressions that mark the speaker's uncertainty or doubt about it would result in an epistemic "clash".

There are cases, though, in which the use of indirect or conjectural evidentials is not compatible with new topics either. This effect is highly noticeable in some kinds of subordinate final clauses. Consider the context in (50) and the options provided in *b.*, *c.* and *d.*

(50)a. What does Mary do to pass the time?

b. Well, *to [*probably*] make her mum happy, she walks the dog

c. Well, *in order to [*probably*] make her mum happy, she walks the dog

d. Well, *with the purpose of [*probably*] making her mum happy, she walks the dog

⁸¹K&K (1971: 346): "the factive vs. non-factive senses of the complement do not really correspond to the application of any particular transformation, but rather to the position of the complement in surface structure. [...] it is much easier to say that the initial position itself of a clause is in such cases associated with a factive sense".

The marginality effect of (50)a., b., c. and d. would dissolve if the adverb had scope over the main clause⁸².

In a different way, when conveying new information, other types of subordinate clauses seem to pose no restriction on being encoded within the scope of evidentials. This is the case, for example, of some clausal and concessive clauses in thematic position.

(51)A: Why does she fly to Paris?

B: Well, since she's [*probably*] pregnant, she wants to stay to her parents'

C: Well, although she's [*probably*] pregnant, she wants to leave her hometown

At a glance, it can be thought that different degrees of incompatibility may depend on different gradients of certainty (i.e. factuality) of the clauses, but this would be contradicted by the behavior of causal sentences (e.g. 51B) which display a similar degree of certainty as the purposive type, and, arguably, even a higher degree. In Italian, and in a number of Romance languages, lower certainty of a fact can be appreciated in the use of the subjunctive mood, which typically expresses irrealis values. Particularly, in Italian, purposive sentences may bear either the subjunctive or the indicative mood, depending on how certain a particular state of affairs is presented by the speaker, whereas causal sentences can only be at the indicative form⁸³.

(52)a. Affinché si superino i suoi esami, è necessario studiare molto

b. Per superare i suoi esami, è necessario studiare molto

c. Poiché vuoi superare i suoi esami, dovrai studiare molto.

d. *Poiché voglia superare i suoi esami

On balance, while factual values can be easily associated with conditions of given topicality - because information that is introduced in discourse becomes part of the

⁸²b. To make her mum happy, she probably walks the dog

c. In order to make her mum happy, she probably walks the dog

d. With the purpose of making her mum happy, she probably walks the dog

⁸³Cf. Salvi & Fava (1995: 51): "L'indicativo caratterizza le asserzioni categoriche non qualificate in termini di possibilità e necessità, sulla cui verità, di diversa natura, il parlante si impegna". [Eng. translation: "the indicative characterizes categorical assertions, non qualifiable in terms of possibility or necessity, on whose truth, whatever its nature, the speaker commits to"].

common ground of both speaker and hearer – their connection with new discourse topics is still a bit controversial and calls for more in-depth investigation. The few cases of incompatibility between new topical sentences and evidential expressions are not convincing enough to relate what we called “factual evidentiality” to all conditions of topicality, but more consistently to contexts of given topicality.

Summarizing, presupposition and topic endow some information with the status of being already possessed by the message receiver. In so doing, they reduce the speaker’s commitment and responsibility for its truth, because the receiver is called upon to participate in the “sourceness” of that information. The socio-interactional function of these units is therefore to encode a *factual evidentiality* in discourse, yet to extents hanging on the factors (and limitations) above discussed.

2.6. Summary and conclusion

In this chapter, I investigated the socio-interactional effects of information packaging, and I did this invoking the notion of evidentiality. I argued that the status of this category in epistemological studies is particularly contentious since its manifestations in the world’s languages are manifold and often serve multifarious purposes in communication. I started addressing the complex notion of evidence that bears upon a multi-layered representation of knowledge. I argued about whether the justification of evidence depends on the assessment of truth-conditional values or to the speaker’s particular perspective on them.

The idea that truth-conditional values are sometimes regarded as pertaining to a domain other than the perspective taken to convey them has prompted many scholars to differentiate between a locus where some information belongs (*speakers’ epistemic statuses or territories*), and a locus in which it is placed at any moment of the ongoing interaction (*epistemic stances*). Put in other words, some information may be encoded as something the speaker can be held responsible for – since he has adequate evidence to believe it as true – or as something on which the speaker claims no authority, as somebody else is pointed at as the direct source of that information. The fluctuation of information from an epistemic locus to the other is grounded in our ability to freely take

whatever stance in the communication of some content, thus modifying our socio-interactive role with respect to it.

If the flexibility in choosing different stances on information may seem a commonly expected communication strategy, it is not so in particular social dimensions in which new information has a social cost for the communicator who is advised to mitigate the impact of transacted content modulating his stances on it, in response to contingent communicative needs.

In Section 2.3., the socio-interactive dynamics of some small social communities have been addressed. These communities have been described by Givón (2002) as “our bio-cultural descent” and are characterized by a high degree of cultural homogeneity and informational stability, which is why the communication of new information is regulated by strict provisos and conversational norms. The social repercussions of communicated new information are indeed a great concern in small-scale communities like these. Aikhenvald (2004) correlated the social treatment of new information in given speech communities with the distribution of evidentials in the corresponding spoken languages.

In the world’s languages, evidentiality may correlate with the encoding of at least three different meanings identified in the source of information, the speaker’s commitment to truth or the illocutionary force of the utterance. For the purpose of the discussion, I considered a broad notion of evidentiality, i.e. a notion encompassing both the adoption of a particular attitude on the part of the speaker and the manifestation of his source of knowledge. This extended notion of evidentiality allowed capturing striking similarities between the functions accomplished by evidentials in the world’s languages and the properties displayed by the categories of IS in discourse.

Building on Mushin’s classification of epistemic stances, I contended that focus and assertion reflect the adoption of a personal experience epistemic stance in which an event is presented by the speaker as something he has adequate evidence for and can therefore endorse as true. We have seen that assertion gains this pragmatic meaning by virtue of the Gricean Maxim of Quality. Even in the absence of any explicit indication of the source, assertion shows a similar behavior as any other direct evidential, in that it carries the inference that the speaker is the actual source of the proposition expressed. Differently from utterances with overtly-marked evidentiality, assertions generate the inference that the information source must be identified with the speaker (*pragmatically*

inferred evidentiality). What makes assertion and focus plausible manifestations of first-hand, evidence-based sourceness is also their intrinsic semantic-pragmatic meaning of *subjectification*. If this can be easily evinced for assertions, it has also been argued for focalizations. In Traugott's outline, subjectification is described as the driving force of the grammaticalization of focus operators. I sought to demonstrate that the subjective value they encode is particularly salient when focalizations are involved (given that, in some languages, these operators may also be found in non-focal contexts, e.g. Italian). I tried to explain this appealing to the illocutionary nature of focus (according to Cresti's definitions provided in Chapter 1). Expressly, since focus embodies communicative intentions, the speaker's socio-interactional profile is expectably more committal with respect to the truth of focal information, as opposed to topical information. Accordingly, focalized content increases the likelihood of a challenging reaction on the part of the receiver.

With presupposition and topic, the speaker takes a detached and more objective stance on a content communicated, because this content is assumed to be already shared by both interlocutors. Because of this property, the use of topicalizations and presuppositions tie the speaker to a factual epistemic stance, in which no explicit source is indicated, because the property of sourceness is shared among speaker and receiver. I have pointed out that this stance is less open to challenge, which means that by encoding some content as topic or presupposition the speaker exerts caution on its transaction, thus safeguarding his social status and reputation in the opinion of others.

Now, besides the attempt to look into the connection between information structure phenomena and the adoption of different epistemic stances in communication, the integrated account herein proposed also traces a possible route to inspect the socio-biological constraints on the emergence of IS units. Sociobiology has the main objective to explain how advantageous social behaviors evolved and in what way they increased the fitness of a species or group of species. If caution exerted on new information was a social pressure to strengthen and maintain within-group cooperativeness, this pressure elicited adaptive responses which became entrenched in the group members' verbal behavior. In time, the gradual automation of such responses became grammaticalized in the language (Givón 2002), leading to the emergence or re-functionalization of strategies that adequately encoded the source of information or speakers' particular attitudes to it. From this standpoint, it can be hypothesized that the evidential precipitate

of IS phenomena may have appeared in human language as a *functional spandrel*⁸⁴ responding to social constraints on content transaction. These constraints are still visible in small-scale societies today, but can be assumed to have held for early human communities as well. Indeed, if a safe transaction of new information is a motivating force that guarantees social fitness, there is nothing odd about admitting that analogous social biases might have regulated dynamics of proto-communication as well. What is more, in big- and small-town social realities, speakers engaged in given communicative interactions manifest similar concerns towards contents which are new, challengeable and often about third parties. Since the main purpose in these cases is to foster commonality reinforcing bonds among interlocutors, any risk of critical reaction to communicated contents should be avoided; a condition that only *safer* communicative modalities allow to meet.

So, to conclude, the evidential use speakers in bigger and complex social dimensions make of IS units may reflect the social function these units developed in interactions unfolding in smaller face-to-face groups. This function fixed in the strategies of information packaging as an adaptive solution to modulate epistemic stances, and was later retained up to present-day realizations of information structures in communication.

⁸⁴In evolutionary biology, a *spandrel* is a phenotypic trait that has been derived from another original function, and is not a direct by-product of adaptive selection. In this sense, the evidential function of IS units can be interpreted as the result of an exaptation process from other functions IS was originally designed for. Born in the architectural domain to indicate the triangular space between the tops of two adjacent arches and the ceiling, this term has made its way into biology thanks to Stephen Jay Gould and Richard Lewontin.

CHAPTER THREE

Experimental perspectives
on Information Structure processing:
A literature review

*“The mind is like an iceberg,
it floats with one-seventh of
its bulk above water”*

[Sigmund Freud]

3.1. Preamble

By the first half of the 1970s, IS became one of the major concerns of psycholinguistic and (later on) neurolinguistic research. Studies in these fields have yielded telling insights into the cognitive and neurological underpinnings of sentence processing and, more precisely, into the impact exerted by different informational articulations on the mechanisms of information integration and retrieval.

In this chapter, I will present some of the most influential and groundbreaking threads of experimental research on the processing of presupposition/assertion, topic/focus and given/new dichotomies, discussing both empirical and theoretical implications of related findings. To this end, the chapter is organized as follows.

Section 3.2 homes in on the main psycholinguistic literature on IS units. Section 3.2.1 outlines earlier and more recent psycholinguistic investigations on the processing of presupposed and asserted contents in utterances, and discusses differences in processing strategies between presuppositional and implicatural contents. In Section 3.2.2, I will outline psycholinguistic studies on topic-focus structure and its interplay with the processing of given-new information.

In the second part (Section 3.3), I will move onto later frontiers in neurolinguistic strands, describing some of the most frequently used brain imaging techniques, together with the measurement methodology most typically associated with electroencephalographic research, i.e. EVENT-RELATED POTENTIALS (ERPs). In Section 3.3.1, another methodology is expounded that measures brain electrical activity through the detection of rhythmic changes in different frequency bands. In Sections 3.3.2 and 3.3.3, an overview of the neurolinguistic literature on IS processing is provided. Section 3.3.4 introduces a more recent paradigm in the studies on sentence processing. This

paradigm considers the role of context in influencing discourse representation and subsequent predictions on the informational architecture of sentences. This part reports on approaches to sentence processing complying with *expectation-based* models. These models have been invoked to account for the processing effects of modifying information structural patterns more or less expectedly with respect to an established discourse representation. An overview of the neurolinguistic literature on IS processing is provided in Section 3.3.5, for presupposition and assertion, and in Section 3.3.6, for the topic-focus and given-new pairs.

3.2. *Psycholinguistic background on IS units*

3.2.1. *Psycholinguistic perspectives on presupposition vs. assertion processing*

It is a well-established idea that pioneering research on presupposition processing must be traced back to Hornby's experimental work entitled *Surface structure and presupposition* (Hornby 1974)⁸⁵. In a false information recognition test, Hornby measured the frequency of perceptual errors related to the interpretation of false presupposed content. In his experiment, subjects were required listening to a cleft or pseudo-cleft sentence⁸⁶ before being shown a picture which either misrepresented the presupposition or the assertion of the sentence. The task was to decide whether the sentences correctly described the picture. Results demonstrated that more mistakes were made when the misrepresentation involved the presupposition rather than the assertion. This effect has been related to the capacity of presupposition to draw attention away from some information, thus making its comprehension less immediate for the receiver.

In a 1975 paper, Loftus discusses similar findings studying the impact of presuppositive wording of utterances on knowledge representation. She ran an experiment in which a number of subjects were presented with a short film about a car accident and were subsequently asked to answer questions about it. Some of the

⁸⁵Seminal investigations on the phenomenon are reported in earlier papers (Hornby 1971, 1973), although in these works the notion of presupposition – associated with complement clauses of cleft constructions in the tasks performed by the subjects – is what we preferably categorize as topic.

⁸⁶The status of clefts and pseudo-clefts in terms of presuppositionality is still uncertain. For some, dependent clauses projected by cleft constructions are indeed truth presuppositions; for others, they are merely topical.

questions contained false presuppositions, others true ones. It was observed that false-presupposition questions induced most of the subjects to comply with the false content and consequently provide wrong answers to the questions addressed. Along the same lines of Hornby, she concluded that presupposition is likely to introduce some information into the receiver's mental representation of given states of affairs "without calling attention to it" (Loftus 1975: 572).

Another insightful account of the effects of sentence structure on information processing is that of Langford & Holmes (1979). In their study, they compared recognition times of false information when it was encoded in the assertion and in the presupposition of the sentence. Subjects had to read short texts followed by a pair of target sentences: one contained a false piece of information in the presupposition, the other one carried the same false item in the assertion. They noticed that subjects took much longer to verify sentences with false presuppositions than sentences with false assertions. This different response to false information has been explained by the authors in terms of sensitivity of the human information processing system to what they called a STRUCTURAL HYPOTHESIS (Langford & Holmes 1979: 379):

Once the surface structure of a sentence is processed, not only does it influence the memory representation of a sentence meaning, but it also serves to direct subsequent verification processes.

On this account, structure is the first level receivers access in message decoding. At that level, they gather instructions on how to update background knowledge.

More recent strands of research have essentially lined up with a DRT (Discourse Representation Theory) approach, since it better served experimental paradigms in which the mechanisms triggered by presupposition processing have been tackled either in context-supported and in context-non supported conditions.

In a 2011 study, Tiemann et al. searched for psycholinguistic evidence of presupposition on the basis of three on-line (reading times) and off-line (acceptability judgments) experiments. Each experiment aimed at gauging the effects of presupposition processing in three conditions: presence vs. absence of presuppositional triggers in a sentence, verifying vs. falsifying presuppositions relative to information provided in the preceding discourse, context-supported vs. context-non supported presuppositions. As for off-line tests, sentences *without* presuppositional triggers have

been judged better than sentences *with* presuppositional triggers; sentences with verifying presuppositions have been judged better than sentences with falsifying presuppositions; and, finally, sentences with context-supported presuppositions have been judged better than sentences with context-non supported presuppositions.

Analogous results have been gathered by Schwarz & Tiemann (2015) who measured reading times with sentences containing the German presuppositional trigger *wieder* (“again”) encoded in three sets of conditions: within or outside the scope of negation (*wieder nicht* “again not” vs. *nicht wieder* “not again”), in embedded or unembedded syntactic position, and in verifying or falsifying contexts. During the trials, subjects had to read sentences with *wieder* in embedded or unembedded position, sometimes related to verifying, sometimes to non-verifying contexts. Results have shown that when the trigger was unembedded and not supported by the preceding context, slow-downs in reading times could be detected. On the contrary, if the trigger was embedded under negation and not supported by previous discourse, reading times were, on the average, faster. According to the authors, the costlier operations required for the unembedded condition can be interpreted as the tendency to anchor the trigger to the immediately preceding context, which eventuates in more complex bridging mechanisms.

Evidence from different experimental paradigms has shed light on interesting interplays between decoding efforts of presupposed information and different presuppositionality strengths of triggers. For example, Jayez et al. (2015) proposed to ascertain the extent to which a rigid classification into *weak* triggers (allowing accommodation, such as change-of-state predicates, definite descriptions, defining relative clauses) and *strong* triggers (less frequently allowing accommodation, such as factives and adverbials) can be maintained. They worked out a rating questionnaire in which subjects were asked to provide judgments of naturalness about sentences with context-supported and context-non supported presuppositional triggers. They found out that triggers commonly regarded as weak were sometimes judged as displaying a strong attitude, and vice versa. This fluctuation hints at the fact that, rather than discrete categorizations, a continuum between strong and weak triggers should be hypothesized, along which triggers may be allotted different presuppositional strengths according to the way their interpretation interacts with the preceding context.

In another study, Domaneschi & Carrea (2015, but see also Domaneschi et al. 2013) investigated differences between the processing instructions dispensed by

presuppositional triggers. Precisely, they tested out Glanzberg’s hypothesis (Glanzberg 2003, 2005) according to which some triggers project presuppositions that require a mandatory repair - what classifies them as *strong*; others allow an optional repair⁸⁷, and are therefore *weak* (here the terms “strong” and “weak” are intended in a different sense than in Jayez et al.’s work). In Glanzberg’s model, weak triggers include iterative adverbs and focus-sensitive operators; whereas strong triggers are mainly represented by definite descriptions and factive predicates. The authors probed the influence of these variables designing an experiment made of two tasks: one requiring the subjects to listen to auditorily presented texts, followed by some comprehension questions; the other consisting in the memorization of a geometric picture. Each text contained a token of the five types of triggers used in the experiment (definite descriptions, factive predicates, iterative adverbs, focus-sensitive operators, change-of-state predicates), all projecting new presuppositions. Interestingly, the results gleaned from the comprehension questions revealed that definite descriptions and factive predicates (i.e. strong triggers) were fully processed in the majority of cases, while the presuppositions deriving from focus-sensitive operators and iterative adverbials were not always processed. So, presupposition repair appears to be particularly sensitive to the nature of the trigger being processed.

Interesting data have also been obtained from assessing addressability degrees of presupposed contents. In Section 1.1.1, I highlighted that presuppositions are generally less likely challenged than assertions. On the basis of acceptability judgments, Cummins et al. (2015) sorted out sets of polar questions, each containing a different category of presuppositional trigger. For each question, four types of judgments were provided (*a.* Responding “yes” but not denying the presupposition, *b.* Responding “yes” and denying the presupposition, *c.* Responding “no” but not denying the presupposition, *d.* Responding “no” and denying the presupposition). An illustration of this testing pattern is reported below.

Ex.

- (1) Did Brian lose his wallet *again*?
 - a. Yes, he lost his wallet again
 - b. Yes, although he never lost it before

⁸⁷*Repair* can be here intended as referring to the accommodation of context-non supported presuppositions.

- c. No, he didn't lose it this time
- d. No, because he never lost it before

Participants were asked to indicate the most felicitous response to the question provided. On the whole, they robustly preferred responses whose continuation did not directly address the information presupposed in the question, namely (a) and (c).

Interesting research work is also that pursued on acquisitional grounds. Over the last twenty or thirty years, a few attempts have been made to understand when and how children start to pin down presupposed information in sentences. Earlier studies (Johnson & Maratsos 1977; Wellman et al. 2001) showed that up to the age of three, children do not properly succeed in making out factive and non factive uses of certain categories of verbs. One of these predicates is *think*, which children often treated as factive. In a recent replication of these studies (Dudley et al. 2015), opposing trends have been noticed. For the experiment, children were presented with two boxes and were told that a toy was hidden in one of them. The experimenter gave clues to the children using sentences with factive and non factive predicates. Results demonstrated that responses to sentences with factive and non factive verbs were significantly different, manifesting children's sensitivity to different epistemic attitudes of the experimenter.

Recent experimental pathways have extended the assessment of presupposition vs. assertion processing costs to iterative adverbs and change-of-state predicates, as in Schwarz's studies (2015, 2014) on the processing time course of the triggers *stop* and *again* as opposed to their assertive counterparts. He used a Visual World paradigm in which subjects were presented with a set of scenes accompanied by auditory instructions. They were asked to search for the correct target picture in compliance with the instruction provided. Some of the instructions contained presupposed, others asserted, information. Shifts in eye-fixations indicated that the subject had processed the content encoded in the critical region. It was observed that in both *again*- and *stop*-trials, fixation times appeared significantly faster for presupposed information, compared to asserted information. The outcome indicates that presupposed contents are immediately available in online processing and therefore entail less costly processing mechanisms.

In another experiment, Schwarz (2015) compared the processing time course of the presupposition triggered by *also* and that of the information asserted by *only*, in a pair of sentences like

(2) *Also* John went to the cinema (ppp = someone else went to the cinema)

(3) *Only* John went to the cinema (ass = John went to the cinema)

Also for this study, the visual scene paradigm was used. The task consisted in tracking participants' eye-movements while visualizing a scene and in the meantime listening to auditorily presented linguistic stimuli. Results depicted more rapid shifts in fixations to target pictures based on the presupposition expressed by *also*, generally in a 0-400ms time window. By contrast, the assertion introduced by *only* arises roughly 400ms later with respect to presupposition, suggesting that presupposed content is generally evaluated prior to asserted content. In the light of the data observed, Schwarz notices that not only does presupposition not involve a processing delay – contrary to what has been found for scalar implicatures – but its availability is also bound to precede that of asserted content.

A widespread belief among advocates of the PRESUPPOSITION AS IMPLICATURE HYPOTHESIS is that the boundary between given classes of presuppositional triggers and given types of implicatural meanings is fuzzier than traditionally conceived in other mainstream paradigms. Such fuzziness has been noticed mainly for change-of-state predicates and scalar implicatures whose implicit meaning is believed to arise from analogous interpretive mechanisms. In fact, experimental attempts so far do not seem to support this stance all the way, since only in some (but not all) conditions are presuppositions processed in a similar way as scalar implicatures. For example, Romoli & Schwarz (2015) conducted a test in which they used both direct (e.g. *Some giraffes have scarves*) and indirect scalar implicatures (e.g. *Not all giraffes have scarves*), as well as different categories of presuppositional triggers. Using a Visual World paradigm, subjects were required matching the pictures with the description provided by the target sentence (containing either a scalar implicature or a presupposition). Results showed that, in terms of reaction times, the processing of indirect scalar implicatures was generally as fast as that of presuppositions, while differing from that of direct scalar implicatures. These findings suggest different decoding mechanisms for direct and

indirect scalar implicatures, with indirect scalar implicatures paralleling presuppositions in terms of processing effort.

A further challenging attempt in the same direction is that made on acquisitional grounds by Cory et al. (2014). This study highlighted stark differences between adults and children's strategies in decoding presuppositions and scalar implicatures, which accounts for *their being derived via different cognitive mechanisms*. They led an experiment in which both adults and children were presented with pictures described by sentences with scalar terms (such as *win/participate*, *some/all*, etc.) which, in given contexts, could receive either a presuppositive or an implicatural interpretation. Participants were asked to identify which of the test pictures the descriptive test sentence referred to and give a justification for the choice made. The judgments gathered revealed that, in conditions in which both interpretations were possible, children were more likely to associate the sentence to the picture deriving the meaning presuppositionally, whereas adults more often drew on implicatural processes. This represents further evidence of the fact that presuppositions and implicatures are *not* subserved by the same interpretation processes. Moreover, the likelihood to select presuppositional or implicatural interpretations for expressions admitting both statuses (like some change-of-state predicates) is sensitive to the way individuals capitalize upon available linguistic and extra-linguistic cues to draw inferences.

3.2.2. Psycholinguistic perspectives on the processing of Topic, Focus, Given and New information

A widely debated issue in research on sentence processing is the general sensitivity of human attentional system to novelty, variation and relevance. In the 1980s, this property received some backing from investigations on the emergence of informational structures in child language. Probing how the distinction between old and new information, topic and focus units, arise in child language, Baker & Greenfield (1988: 4) observed that “the attentional system is geared to variability from the very beginning of life” and that children orient to new information in order to support learning. Those aspects of reality selected within our attentional frame absorb the majority of our processing resources, which implies that those aspects not attended to are not carefully elaborated either.

Although still tentative in many respects, these studies contributed to set out challenging questions of both ontogenetic and phylogenetic relevance on the origin of IS in human communication. Some of these issues will be broached in more detail in Chapter 5. In the psycholinguistic domain, these and other developmental data have found solid confirmation, hinting at a major cognitive investment required for processing focalized contents, as opposed to topicalized ones.

In this section, both pioneering and current strands of research on topic-focus processing will be discussed. Based on the experimental data so far obtained, it will be argued that a property of informational hierarchies is to instruct to different allocation of attentional resources to sentence units, with the result of modifying the addressee's mental representation of the discourse model.

A common habit among scholars concerned with sentence processing is to regard Erickson & Mattson's MOSES ILLUSION TEST (Erickson & Mattson 1981) as the opening gambit towards psycholinguistic traditions of studies on IS processing. The Moses Illusion paradigm was thought up by Erickson & Mattson to study subjects' responses to questions like (4):

(4) How many animals of each kind did Moses take on the Ark?

They noticed that most of the subjects responded "two", without noticing that it was Noah, and not Moses, that took animals on the Ark. Now, this earlier finding raised numerous contentious issues related to the actual assessability of the phenomenon described using sentences like (4). In successive debate, it has been addressed whether the subjects' failure to detect the distorted term should be put down to mere "illusion" or to semantic and/or pragmatic determinants of a different sort. For example, Park & Reder (2004) proposed to account for the effects induced by (4) advancing three arguments, which they referred to as PRAGMATIC, SEMANTIC and COGNITIVE, respectively.

From a *pragmatic* standpoint, the error-detection failure can be regarded as the subjects' compliant attitude to the Gricean Cooperation Principle. Put differently, the subjects recognized the distortion in the sentence, but assumed the speaker's cooperative attitude in meaning the correct term; so, either they ignored the distortion or

they simply avoided addressing the questioner with uncooperative conversational moves.

A *semantic* argument is represented by the conceptual relatedness of the replaced term with the original one. When meaning similarity between two terms is high, the substitution of one term with the other does not engender a stark mismatch. Indeed, Moses and Noah are two important characters of the Bible and both their stories involved water, therefore a semantic overlapping between the two is highly probable. To further substantiate the possible influence of this parameter, Osstendrop & Kok (1990) ran an experiment in which the question in (4) was replaced by that in (5):

(5) How many animals of each kind did Nixon take on the Ark?

Interestingly, in such a case the distortion was immediately recognized by the subjects, probably due to the conceptual distance between the two interchanged terms (*Noah* and *Nixon*).

In a *cognitive* perspective, at least two aspects can be considered. One correlates with the difficulty in fully encoding some information from the input. Precisely, if some information is not attentively processed, it cannot be used to make decisions on its truth value. As Park & Reder (2004) pointed out, this often happens when expectation-driven strategies are carried out in processing. More precisely, it is likely that the subjects anticipated what the experimenter would be going to ask once they had heard part of the question, so the encoding of the distorted term was not necessary to fully understand the question, and was therefore dismissed from the input.

The other route is suggested on the basis of Bredart & Modolo's replication (1988) of Erickson & Mattson's study in which syntactically manipulated versions of the sentence in (4) have been used. Bredart & Modolo's assumption was that the subjects' failure to detect the distortion resulted from the syntactic position of *Moses* in the sentence which, in their view, contributed to draw the addressee's attention away from the term during processing. To test this hypothesis, they replaced (4) with the pair of sentences in (6), in which *Moses* is once realized as the focus of the cleft-sentence (6a), once as its topic (6b).

(6)a. It was [*Moses*]_F who took two animals of each kind on the ark

- b. It was two animals of each kind that [*Moses*]_T took on the ark

In concordance with their predictions, the discrepancy was more straightforwardly noticed by the subjects when *Moses* was focal in the sentence, as opposed to when it was topical. Concurrently, they outlined the focality parameter as a decisive factor in enabling or inhibiting error detection in a sentence.

It is also true, however, that other factors – such as the semantic relatedness between two words – may reinforce or weaken the effect of focality, but access to some information is first of all mediated by attentional processes and their selective criteria. So, the involvement of IS biases in the strategies implemented by receivers to direct attentional processes seems quite a plausible stand to take.

Later on, psycholinguistic experimentations on IS processing have more or less strengthened these preliminary achievements by means of reading time or eye movement measurements. These techniques compute processing difficulty tracking the speed of eye and saccadic shifts while reading different parts of a sentence. Slow-downs in reading speed or sight shifts are generally indicative of additional processing demands; on the contrary, faster reading times reveal ease of processing. One of the first reading time studies to be led on IS processing is Birch & Rayner's test on decoding speeds of focal vs. non focal information (Birch & Rayner 1997). For their experiment, they elaborated pairs of sentences such as the following (Birch & Rayner 1997: 655):

- (7)a. It was [*the suburb*]_F that received the most damage from the ice storm

- b. [Workers in *the suburb*]_T hurried to restore the power after the ice storm

As can be seen, the NP *the suburb* is focus in (7a) and non-focus in (7b). The authors observed that the subjects' reading times were generally slower when the NP appeared focalized in the sentence, and faster when it was topicalized. In addition, they were bound to make more regressions on focus than on non-focus contents. This behavior is suggestive of the major costs associated with processing focal information.

Other common paradigms used to investigate the interaction between sentence processing and information structure are represented by change-detection tests. These tests are akin to Erickson & Mattson's Moses Illusion Test, except for the fact that word change is observed in different informational articulations of the same critical sentence.

Sturt et al. (2004) used this testing design to verify how easily the subjects detected substitutions of a constituent with another when the substitution involved the focal or non-focal part of the sentence (Sturt et al. 2004: 884). An illustration is given below:

- (8)a. Everyone had a good time at the pub. A group of friends had met up there for a stag night. [What Jamie really liked was *the cider*, apparently].
- b. Everyone had a good time at the pub. A group of friends had met up there for a stag night. [What Jamie really liked was *the apple*, apparently].
- c. Everyone had a good time at the pub. A group of friends had met up there for a stag night. [It was Jamie who really liked *the cider*, apparently].
- d. Everyone had a good time at the pub. A group of friends had met up there for a stag night. [It was Jamie who really liked *the apple*, apparently].

In (8b), *the cider* is substituted with *the apple* in focus position, whereas in (8c) the same substitution is operated in non-focus position. Subjects showed to detect the substitution more easily in conditions like (8b), in which the critical NP is brought into the scope of the receiver's attentional focus.

However revealing in its main insights, the validity of this paradigm has been sometimes called into question, especially when later experiments evidenced that lexical substitutions such as those exemplified in (8) were frequently registered also in the absence of conscious awareness, arguably through mechanisms that Ward & Sturt (2007) defined *implicit* (Ward & Sturt 2007: 75: "the cognitive system sometimes registers the fact that a change occurs without this information reaching the level of conscious awareness").

Together with the processing of topic-focus structure, psycholinguistic investigations have also been directed at tracing the cognitive underpinnings of given and new information. Clark & Haviland's exploration of speakers' conversational attitude towards the Given-New Contract Principle can be regarded as a first attempt in this direction although more interesting findings are those obtained using more in-depth techniques, like eye tracking, as hinted at before. Nonetheless, an intriguing report on how givenness and newness degrees are interpreted on the basis of different packaging strategies is that of Irwin et al. (1982) and Bock & Mazzella (1983).

Testing the effects of givenness and newness on visual word processing, Irwin et al. (1982) set up an experiment in which subjects were presented with sets of words, either preceded by the indefinite article *a* or by the definite article *the*. Some of these words were shown twice on the screen, others only once. Subjects were required pressing a button once they had thoroughly read the word. Beyond the expected results that repeated words were processed remarkably faster than non-repeated words, responses also revealed that both repeated and non-repeated words preceded by the indefinite article *a* were read significantly slower than repeated and non-repeated words preceded by *the*. This behavior has been accounted for as the instruction provided by the definite and indefinite article to process some content as given or new irrespective of its familiarity for the receiver. In other words, the informational packaging of the word has some bearing on the interpretation of its givenness or newness for the receiver.

Over the last few years, processing differences have been measured using a variety of experimental protocols and testing conditions. For example, Benatar & Clifton (2014) proposed to verify processing costs in reading comprehension likening given and new information, on the one hand, and new and contrastive (corrective) information, on the other. Using a question-answer manipulation test – in order to encourage the interpretation of the target word as given or non-given – they led three experiments to test three different conditions: (a) given compared to new information; (b) content that is semantically related to another content (via relations of synonymy, hyper/hyponymy, etc.); (c) new compared to contrastive information. All experiments were conducted with eye-movement techniques, detecting the rapidity with which sight shifts from one word to another. The faster the shifts, the lesser the processing demands; the slower the shifts, the greater the effort. The first experiment confirmed the results achieved in previous studies, in that new information was read more slowly than given information. The second experiment yielded faster reading times for words that were made semiactive by synonyms or hypo-/hypernyms in prior discourse. Finally, the third experiment revealed that corrective information was read slower than simply new information.

3.3. Neurological frontiers on language studies: brain imaging techniques

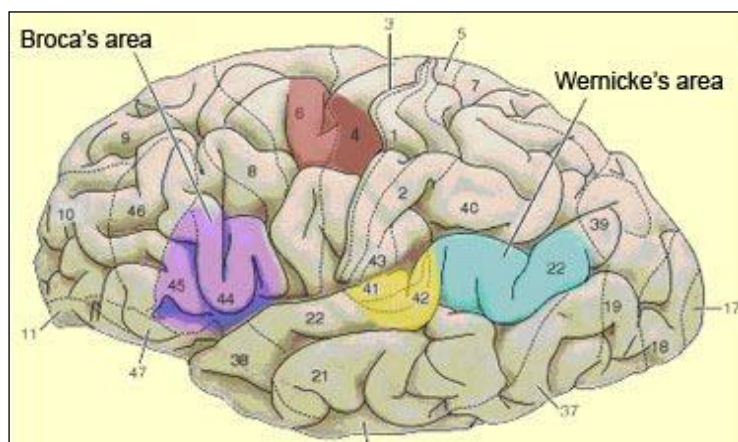
As is known from much literature on the subject, NEUROLINGUISTICS saw its light in the 19th century with the earliest studies on language disorders (the so-called *aphasiological era*), although the term “neurolinguistics” itself made its appearance in the scientific world only in the late 1980s, with the publication of the first Journal (*Journal of Neurolinguistics*) dedicated to the interface of neurology and linguistics (Bambini 2012: 2). The first scientific achievements in the study of the language-brain interaction profoundly benefited from the seminal aphasiological studies whose most significant contributions so far must be owed to Paul Pierre Broca (1824-1880) and Karl Wernicke (1848-1905). Both their investigations on the language-brain interface started with inspections on *post-mortem* brains of patients whose language faculty had been affected by production or comprehension disorders during their last years of life.

Paul Pierre Broca, a French anthropologist and neurosurgeon, studied the case of his patient, Louis Victor Leborgne, who had lost the ability to combine sounds into more articulated strings of words. The only syllable he was able to produce was “tan” – hence the nickname “Tan Patient” with which he is remembered in the literature. A post-mortem examination of his brain revealed a profound lesion in the posterior inferior frontal gyrus of the left hemisphere. This locus corresponds to the pre-motor/motor cortex, responsible for planning, controlling and executing voluntary movements. Due to this damage, the Tan Patient was no longer able to govern facial movements and speech organs as to convert concepts into grammatical strings of words. This particular type of aphasia was named after Broca (BROCA’S APHASIA), and the brain region affected by this pathology became known as the BROCA’S AREA.

A few years later, Karl Wernicke, a German neuropathologist born in Poland, had a Russian patient in his care who was affected by language comprehension disorders. He had no difficulty in combining words into syntactically full-fledged sentences, but he seemed incapable of understanding the meaning of isolated words and that of longer sentences. After his death, Wernicke noticed an injury in the superior temporal gyrus of the left hemisphere, not far from the Broca’s area. He then believed that this area was where comprehension abilities were controlled; so deficits in language comprehension were conventionally referred to with the label of WERNICKE’S APHASIA.

Within the purview of neurosciences, the study of brain functions has been tackled from two main perspectives, commonly referred to as *holistic* and *localizationist*. The underlying tenets of each paradigm revolve around the description of brain functions as either resulting from the synergistic activity of different regions of the cortex, or as relating to the activity of single, neatly delimited regions. Advocates of the former paradigm were Karl Lashley (1890-1958) and Kurt Goldstein (1878-1965). Particularly, Goldstein deduced a holistic organization of brain functions from the fact that when a function in an area is damaged, it could easily be compensated through the capacity of other areas. A localizationist approach was instead proposed by Korbinian Brodmann (1868-1918) who believed that “physical *differentiae* of the brain demarcate functional boundaries” (Mundale et al., to appear). In mapping functions onto specific physiological properties of brain regions, Brodmann pinpointed 52 functionally distinct areas (Figure 1), each displaying a peculiar physiological architecture not shared by other areas. In this sense, Brodmann defends a functionalist view in the description of brain structure⁸⁸.

Figure 1. Brodmann’s map of the brain cortex (Broca and Wernicke’s areas)



⁸⁸Brodmann (1909: 285): “It is a basic biological fact that the function of an organ is correlated with its histological structure. Since every organic form is a product of its development, since, furthermore, its development is the sum of many biological processes, the evolution of organic form, its appearance by histological differentiation is in the last instance a *physiological problem*. Function creates its organs. This seems to justify even him who is generally not used to deduce the function of an organ from its structure, to draw certain conclusions from the structural similarity or dissimilarity of its parts, in brief from the special differentiation of internal structure to the function of the whole as well as of the parts. Although my localizing studies began from purely anatomical viewpoint and I only wanted to solve anatomical questions, the final goal was from the beginning to push ahead the knowledge of function”.

After Broca and Wernicke's discoveries, for many years, it was believed that the language faculty was entirely handled by functions located in the left hemisphere, since both production and comprehension processes seemed to involve this area in the main. However, the advent of BRAIN IMAGING techniques – allowing experimentations *in vivo* – have yielded a much more intricate scenario of language representation in the human brain. Thanks to these techniques, it became possible to ascertain that language processes are subserved by far more complex networks in which both the left and right hemispheres seem to be extensively involved. The unprecedented advantage brought by brain imaging techniques was that they enabled the study of brain activity in online language processing, thus facilitating the investigation of the neural patterns of given language phenomena at all levels of linguistic analysis and in a number of different experimental conditions.

Although highly sophisticated, imaging techniques show language-related brain activity in different ways and with different levels of precision. Some can portray brain processes with high spatial resolution (*high spatial resolution techniques*); others account for cognitive processes with better time resolution (*high temporal resolution techniques*). In what follows, I briefly sketch some of the most widely-practiced techniques in neurolinguistic studies, then zooming in on electroencephalography along with the measurement methodology to which it is typically associated: EVENT-RELATED POTENTIALS.

High spatial resolution techniques are typically identified in the Positron Emission Tomography (PET), Computed Tomography (CT), Functional Magnetic Resonance Imaging (fMRI) and Near Infrared Spectroscopy (NIRS).

PET exploits traces of radioactive material to locate functional processes in the brain. Regions with high radioactivity indicate activation. To carry out the scan, a short-lived radioactive isotope is injected into the subject's blood circulation; the isotope is incorporated in a biologically active molecule that travels to the target tissues allowing their projection in a three-dimensional image.

CT portrays a picture of the human brain based on degrees of X-rays absorption. X-rays are better absorbed by hard tissue and bones, which is why the brain can be represented only in its gross features.

fMRI measures brain activity detecting changes in blood flow and oxygenation levels in response to neural activity. When an area is involved in a particular task it consumes

more oxygen, which in turn increases the need of blood flow. These hemodynamic streams are pinned down measuring patterns of Blood-Oxygen-Level contrasts (BOLD), that allow mapping neural activity onto blood concentration in given brain areas.

NIRS is an optical technique and, similarly to fMRI, detects blood oxygenation in the brain. It shines light in the infrared part of the spectrum through the skull and measures degrees of attenuation of the reverberating light. Attenuation depends on blood oxygenation; for this reason, it is said that NIRS dispenses only an indirect measure of brain activity.

High time resolution techniques are instead represented by the Magnetoencephalography (MEG) and the Electroencephalography (EEG).

MEG is a neuroimaging technique that maps brain activity recording magnetic fields produced by electrical currents naturally engendered in the brain. Both MEG and EEG signals are recorded from currents moving along the dendrites during synaptic transmission.

In the same way as MEG, EEG measures brain electrical activity recording signals from electrodes placed on the scalp. This technique allows detecting changes in brain electrical activity on a millisecond level. Below, a summarizing scheme of the above techniques is provided, together with their functional specialization.

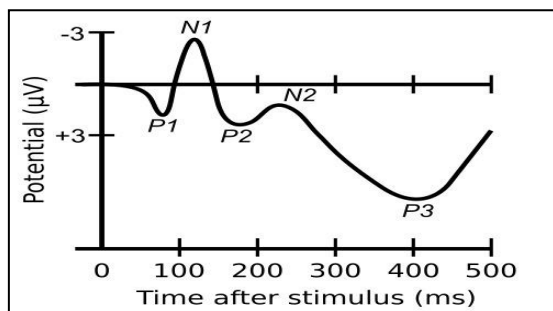
Table 2. *Brain imaging techniques and measurement scope*

HIGH SPATIAL RESOLUTION TECHNIQUES	HIGH TIME RESOLUTION TECHNIQUES
PET It detects radioactive traces carried by blood flows to brain areas involved in particular processing tasks.	MEG It registers brain activity detecting magnetic fields in the brain.
CT It uses X-ray to detect different sections of the brain.	EEG It measures brain electrical activity through electrodes placed on the scalp.
fMRI It detects changes in blood flows and oxygenation in response to neural activity.	
NIRS Optical technique detecting blood oxygenation through light shone through the skull spectrum.	

3.3.1. Language-related neurophysiological components: N400 and P600

Electrical activity can be registered spontaneously or under the effect of sensory stimuli. This latter methodology is referred to as EVENT-RELATED POTENTIALS (ERPs). ERPs are measurements of brain responses to specific external stimuli (be they related to sensory, cognitive or motor events). ERPs generally manifest in waveforms with *negative* or *positive* deflections, generating COMPONENTS. These components are identified by a *latency* (i.e. the time-lag between stimulus onset and its elaboration by the processor), their positive or negative *polarity*, their *amplitude*, and *scalp distribution*. Components are usually named after their polarity and latency, using the letters N or P to indicate a negative or positive polarity associated with the time-window (expressed in milliseconds), signaling when the component in question has been elicited after the stimulus onset. The resulting designations are labels like P300 (*P* = positive polarity; *300* = elicited 300 msec. after stimulus onset), N100 (*N* = negative polarity; *100* = elicited 100 milliseconds after stimulus onset), P600, N400, etc. In the electrophysiological signal, negative components are represented by deflections with upgoing peaks, whereas positive components are characterized by a downward peaking, as illustrated in Figure 2.

Figure 2. *Negative and positive components represented with ERPs*



There is a broad consensus nowadays that positive and negative deflections of waveforms reflect different types of processing or, seemingly, different processing efforts. Two of the most studied language-related components are N400 and P600. Neurolinguistic literature to date has thrown light on several aspects of their function and elicitation in language processing. Particularly, N400 peaking has been associated with the processing of semantically anomalous or unexpected words in given contexts

(Kutas & Hillyard 1980). On the contrary, P600 has been more frequently observed in tasks of lexical meaning integration; but other possible correlations have also been noticed, as in the encoding of ironical meanings (Regel et al. 2011), during online processing of garden path sentences (e.g. *She saw the baby was playing*) and in presence of anomalies in number morphological agreement (Hagoort et al. 1993). Conversely, the elicitation of N400 signatures has also been observed in response to Long-Term Memory retrieval, difficulties in information integration and processing of focal information in utterances (Wang et al. 2011). More outlines will be fleshed out in the following sections.

As remarked in the previous section, EEG is among the techniques that best provide brain responses to time-locked events. On the contrary, it offers extremely coarse-grained topographical maps of where certain physiological events are registered in the brain. Indeed, it can only give indications on the lobes activated in particular processing tasks, but it cannot map the elaboration of given stimuli onto neatly delimited brain regions. Compare the spatial resolution of the topographical maps provided by the EEG technique (Figure 3) with those yielded by fMRI (Figure 4), where the colored areas in the left and right hemisphere indicate blood concentration, and therefore involvement of the area in a particular processing task.

Figure 3. *Topographical maps of EEG measurements*

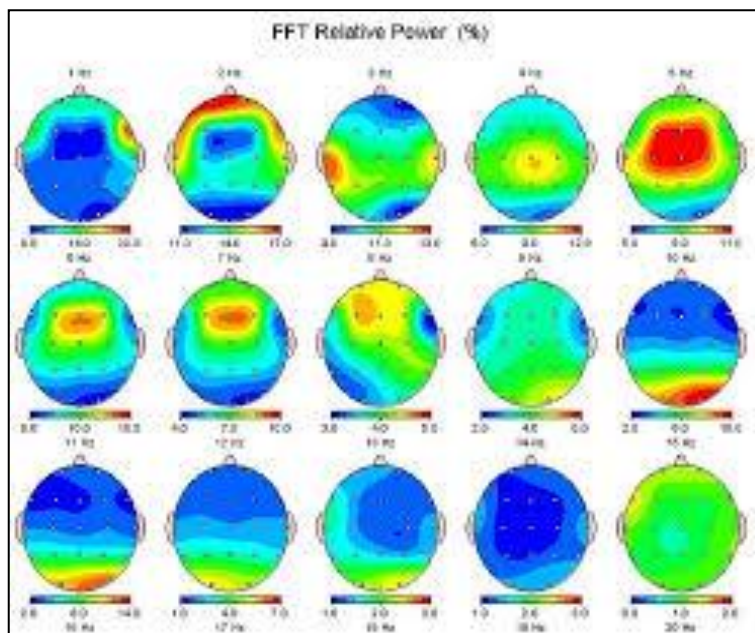
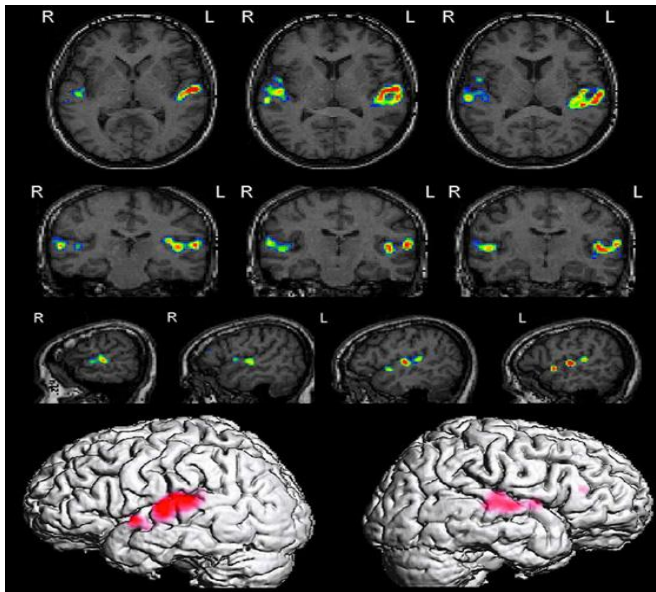


Figure 4. *Topographical maps of fMRI measurements*



On the other side, techniques with high spatial resolution are generally less effective in providing stimulus responses on a millisecond level, due to the sluggishness of hemodynamic flows. Synaptic activity is instead more rapid and is generally recorded all over the brain cortex.

3.3.2. Brain electrical activity and rhythmic changes

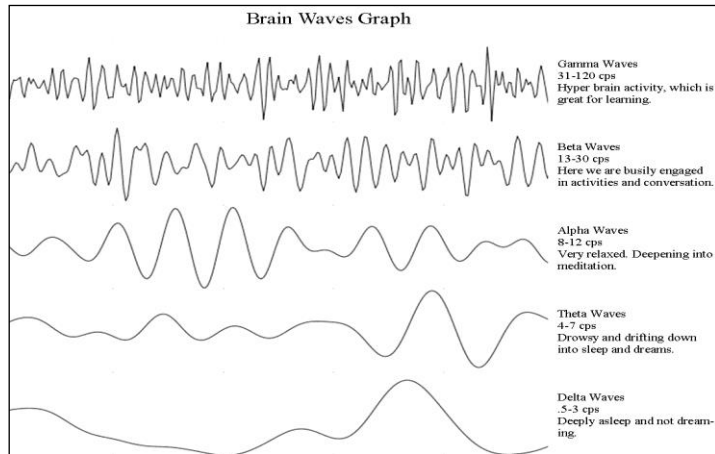
In Section 3.3, I described ERP as a widespread methodology in neurolinguistic studies for measuring brain activity. As already said, this technique registers voltage fluctuations produced by neuronal activity that are generally time-locked to specific sensory or cognitive events. The resulting measurements are the above-mentioned positive or negative components (N200, N400, P300, P600, etc.). However, brain electrical activity can also be investigated probing power oscillations in frequency bands. Frequency bands are represented by different rhythms of brain activity, manifesting at different ranges and amplitudes. Hans Berger (the inventor of EEG in humans) was the first to detect and systematically account for the function of brain waves together with their association with different mental operations. Berger (1929) named brain waves using Greek letters and classified them according to their most salient properties.

Brain rhythms generate when populations of neurons depolarize in synchrony. The detection of a rhythm indicates that some activity is involving assemblies of neuronal cells acting synchronically. Different brain rhythms may oscillate independently of one another or they may overlap, if the same neuronal assembly triggers the same rhythm. Brain waves are distinguished not only for the particular shape they display, but also for their range of oscillation and distribution on the scalp:

- DELTA RHYTHM (δ) oscillates between 0.1 and 3Hz. It is broadly distributed and is elicited in conditions of deep, dreamless sleep, non-attentive mental states and low-level of arousal;
- THETA RHYTHM (θ) oscillates between 4 and 7 Hz. It can have a lateral or a broader distribution, and is generally elicited by information recalling, creative and imagery mental states as well as attentional demands.
- ALPHA RHYTHM (α) oscillates between 8 and 12 Hz. It has a mainly occipital distribution and its frequency increases with closed eyes. It typically indicates relaxing states and meditation (this rhythm is further subdivided into two further sub-bands: low and high alpha, the former peaking between 8 and 10 Hz; the latter between 10 and 12 Hz).
- BETA RHYTHM (β) oscillates above 12 Hz. It may have a frontal or an occipital distribution and is observed during relaxing states with focalized attention. Also here, a higher and a lower sub-band are identified, the former peaking above 18 Hz, the latter between 12 and 15 Hz.
- GAMMA RHYTHM (γ) oscillates at 40 Hz and is generally very localized. Studies so far associate it to active thinking and information integration.

Below, the waveforms of each brain rhythm is shown.

Figure 5. *Brain waves in the EEG signal*



Differently from positive and negative components, the study of brain oscillations cannot be carried out measuring ERPs. Indeed, frequency bands can reveal neural responses to stimuli according to time-locked, but not phase-locked parameters (Pfurtscheller & Lopes da Silva 1999).

On a general basis, the activity of frequency bands is pinpointed in increases and decreases in their power spectrum, that is, in the synchronic or de-synchronic activation of underlying populations of neurons. Increasing synchronization in neuronal activity is called EVENT-RELATED SYNCHRONIZATION (ERS), while decreasing synchronization is termed EVENT-RELATED DESYNCHRONIZATION (ERD). A clear-cut distinction between ERP and ERS/ERD measures is laid out in Pfurtscheller & Lopes da Silva (1999: 1842):

In contrast with the traditional ERPs that can be considered as a series of transient post-synaptic responses of main pyramidal neurons triggered by a specific stimulus, ERD/ERS phenomena can be viewed as generated by changes in one or more parameters that control oscillations in neuronal networks.

Synchronization and desynchronization in each brain rhythm correlate with different mental states or cognitive operations. Specifically, while amplitude oscillations in theta and gamma bands are directly related to effortful processing, those in beta and alpha band are inversely related to it (Bastiaansen et al. 2005)⁸⁹. Put differently, major

⁸⁹Ibid., p. 530, "For both alpha and beta band activity it holds that the amplitude of these oscillations is inversely related to active processing, whereas increases stand for cortical idling and/or inhibition. The opposite holds for the two other frequency bands that have been extensively studied, that is, the theta and gamma bands. Here, it generally holds that amplitude increases are related to the active processing of information".

processing demands determine synchronization effects in the theta and gamma bands, whereas it produces desynchronization effects in the alpha and beta bands (Pfurtscheller & Lopes da Silva 1999: 1847: “The alpha band rhythms demonstrate a relatively widespread desynchronization (ERD) in perceptual, judgment and memory tasks. [...] An increase of task complexity or attention results in an increased magnitude of ERD”).

Activity of frequency bands has also been studied in relation to language processing, although ERP methodology is still prevailing in this field. Earlier experiments have highlighted frontal theta increases in response to syntactic violations (Bastiaansen et al. 2002a, 2002b) as well as different ERD and ERS effects during online processing of open-class and closed-class words (Bastiaansen et al. 2005). In this latter study, it was observed that the decoding of open-class words induces stronger ERS effects in the theta band, and stronger ERD effects in the beta and alpha band. This pattern is indicative of major processing demands required to integrate the lexical-semantic information carried by open-class words.

3.3.3. Towards context-dependent approaches to sentence processing

Many of the psycholinguistic trends outlined in the foregoing sections have privileged experimentations on language processing looking upon isolated words or isolated sentences. Except for a few lines of research, this paradigm has been prevailing in the experimental literature although it reflects a somewhat artificial way to delve into the cognitive and neural patterns of sentence processing. If there is some way to account for language phenomena in more natural conditions is by looking at the CONTEXT in which they come about.

In human communication, context is not only the linguistic or extra-linguistic *locus* of conversational exchanges, but also a repository of meanings, cues, assumptions, worlds and mental representations that make verbal and non-verbal messages intelligible. Stalnaker (1999: 35) calls “context” all

the intentions of the speaker, the knowledge, beliefs, expectations or interests of the speaker and his audience, other speech acts that have been performed in the same context, the time of utterance, the effects of the utterance, the truth value of the proposition expressed, the semantic relations between the proposition expressed and some others involved in some way.

The above parameters are all indispensable ingredients for certain communicative dimension to be called “context”, but one of these has strong implications for the way processing strategies are planned by language users, and these are EXPECTATIONS.

Schumacher (2012) portrays human processing system as an *extremely sophisticated predictive parser*, because it capitalizes on what is made available in the discourse context to anticipate what contents might be encoded in successive utterances, and in what form they are expected to be encountered (Ibid.: 36: “the representational aspect of context forms the basis for how successive information is integrated”)⁹⁰.

Strictly speaking, in both oral and written text comprehension, two essential operations are carried out by the parser; these are *discourse linking* and *discourse updating*. Discourse linking is a “backward” processing operation by which we recognize degrees of dependence of given entities on an already established discourse model. In contrast, discourse updating is a “forward” processing operation allowing both integration of new information and representation of the speaker’s intentions. This back-and-forth mechanism in context processing comes about in two main steps. In the first step,

contextual traits [...] guide processing in a predictive manner, drawing from co-text, situational parameters, interlocutor knowledge, and so on. In a second step, it appears that speaker’s intentions and the assumption of cooperativeness between the interlocutors influence the composition of utterance meaning and construction of the discourse representation (Schumacher 2012: 48).

On this account, predictions can be regarded as the informational grounding for upcoming new information, and allow to “construct appropriate discourse representations under the consideration of speaker intentions” (Schumacher 2012: 48). Now, why do interlocutors need to make predictions about the meanings to be expressed by speakers? Levy (2007) stresses that any processing task entails the evaluation of two interrelated parameters, which he terms RESOURCE REQUIREMENT and RESOURCE ALLOCATION (Levy 2007: 2). On a general basis, in communication we understand that

⁹⁰Cf. also van Berkum (2012: 601), in this respect: “listeners and readers not only keep a record of what is being talked about, that is, the “situation model” or “situational representation”, but they also keep track of how the communicative enterprise itself is getting along, encompassing the “text base” or “discourse record” as well as, for example, inferences about what the speaker may or may not know, and about why this conversation is being held in the first place”.

some linguistic input is cognitively more demanding than others (*evaluation of resource requirement*); owing to the constraints on our attentional system, we have to make do with the small amount of cognitive resources available to select the best strategy that forestalls cognitive overloading (*criteria in resource allocation*). As hinted at in Section 1.3.5, the human parser is limited “and can only pursue one alternative at a time” (Levy 2007: 2), so it has to choose the alternative that minimizes the resources consumed. Alternatives are interpreted first on their structural level, and then on their content level. Surface structure is what makes an alternative recognizable as prior with respect to some other/s. Past this initial step, resources are distributed accordingly, with a major pool devoted to the chosen alternative and a smaller pool to discarded or postponed alternatives.

An ERP study conducted by Hahne & Friederici (1999) revealed that these first-pass and second-pass processes are subserved by distinct neural mechanisms, and that while the former are more automatic and relatively effortless, the latter are generally more controlled and effort consuming. They found out that access to the structural configuration of a sentence elicits an early left anterior negativity (ELAN), whereas the elaboration of content meanings evokes a parietally distributed positivity (P600)⁹¹. This finding seems consonant with the hypothesis that detecting structures, syntactic relations, informational hierarchies, and so on, is a necessary step to conduct correct evaluations on the necessary resources to allocate. Comprehension, on the content level, is therefore ensured by successful allocation of processing resources once the structural patterning of the sentences has been accessed. If resource allocation is not efficiently planned, comprehension difficulties arise. *Expectation* in parsing is one way to avoid such a risk, since it allows “gearing” our attentional system to different processing demands. Knowing in advance what aspects of a sentence’s structure will require more or less effort helps coping with the time limitations related to choosing the most efficient processing strategy as fast as possible.

In a study on language processing rates, Givón (1991, 2002) calculated that the time speed associated with sentence processing is approximately fixed at 250 ms per lexical word and 1 sec per clause, which means that comprehension calls for the immediate establishment of processing priorities. This task is obviously eased by the cues provided by speakers at all levels of linguistic structure. Our competence in a language (be it our

⁹¹Hahne & Friederici (1999: 195): “During the first phase, the parser incrementally assigns the initial syntactic structure on the basis of word category information only”.

mother tongue or a foreign language) is also grounded in the ability to track down these cues and make the correct predictions on the meanings conveyed.

As anticipated in the outset, sentence comprehension is first of all a matter of drawing from previous discourse (or the communicative situation), and the quantity and strength of the predictions put forward depends on how exhaustively and efficiently we make use of contextual information: the greater the amount of cues we can get out of the linguistic or extra-linguistic context, the stronger the predictions. Consequently, if predictions are well-grounded, a good percentage of the sentence information is already gained by the receiver, with actually few contents to be learned from scratch.

Evidence from neurological studies confirmed the role of expectations in processing showing that when these are not met, processing costs increase. As pointed out in Levy (2007: 16), these costs have their main cause in the time required to re-direct a previous analysis:

If an early part of the input causes one analysis to be favored but later parts of the input disconfirm that analysis in favor of another, it can take time for the system to gravitate from the original to the new analysis (Levy 2007: 16).

Electrophysiological data demonstrated that co-textual information “serves as a strong predictor to modulate the N400 amplitude” (Schumacher 2012: 39). Experimentations so far seem to converge on the fact that information that is less expected in a sentence – either because it is new or anomalous with respect to previous discourse – is bound to elicit more prominent N400 peaks (cf. Wang et al. 2011, in the following section).

Now, what implications do all the above considerations have for both earlier and forthcoming findings in studies on sentence processing? As far as the processing of topic-focus structure is concerned, the above psycholinguistic contributions evidenced that focal information is more taxing than topical information, which has been shown by longer reading times or slower eye shifts when focal information is attended to. However, in all these cases, the processing of topic-focus structure was examined with scant or no context introducing the target sentences, with little chance to assess the consequence of setting aligned or misaligned configurations between the topic-focus and the given-new level. Now, this aspect is at the basis of completely reversed scenarios as compared to those delineated by earlier findings in this direction. Precisely, the cognitive load imposed by focus and topic units in sentences does not longer appear

as an intrinsic property of the two units *per se*, but as a property they display based on how they intersect with an already established representation of the discourse model. More particularly, the presence of a context in which sentences are embedded seems to re-direct the processing of sentence contents in conformity with more general discourse representations. Seen from this perspective, the processing of topic and focus units possibly reflects the influence of Gestalt Psychology constraints: *similar elements are perceived as continuous and consistent with one another, which makes them processable with fewer costs. If continuity expectations are not met, more effort is involved in the processing of discontinuous elements, because they bear features which are not shared by other entities previously encountered in the discourse context, and thus not yet active in STM.* Transposed to our core discussion, continuous elements are represented by contents whose activation state and packaging is consonant with what is expected depending on the context set by the interlocutors, whereas discontinuous elements are contents whose activation state and packaging is less expected with respect to the linguistic or extra-linguistic context.

3.3.4. Neurolinguistic approaches to presupposition vs. assertion processing

Notwithstanding the general novelty of electrophysiological studies on presupposition processing, a groundbreaking work in this direction can be found in Wetzel & Molfese (1992) ERP experiment on the online processing of complement clauses projected by factive and non-factive verbs. Their experimental setting consisted in isolated sentences containing either factive (*noticed, revealed*) or non-factive (*maintained, supposed*) predicates presented auditorily. They noticed that, in the factive condition, the processing of the dependent clauses elicited a negative peaking around 850 ms after stimulus onset.

In a context-driven processing paradigm, Burkhardt (2006) conducted an ERP experiment to assess the processes involved in bridging relations testing the effects of decoding Determiner Phrases (DP) such as *the conductor* or *a dancer* when they are either context-non supported (new), inferable (semiactive) or context-supported (given). She noticed that “the interpretation of bridged DPs – i.e. inferable DPs - patterns first with given and then with new information”. In terms of reference establishment, the

processing of bridged DPs takes place less effortlessly at an earlier stage; then, at later stages, additional processing is involved, as the referent is recognized as not completely active in the mental model of discourse (Burkhardt 2006: 165).

Similarly, to measure the effects of saliency of a potential anchor on the integration of repeated and inferred NPs, Burkhardt & Dietmar (2007) searched for the electrophysiological patterns of inferentially-linked NPs as opposed to repeated NPs. Although some previous studies (Gordon et al. 1993, Hagoort et al. 2004) highlighted major processing demands for NPs repeated in their fully-fledged form⁹² – because they are more likely to be treated as information to be newly integrated in the addressee's mental model – the experiment revealed a generally less pronounced negativity, as compared to inferentially bridged NPs. A further aim of the investigation was to assess processing differences between inference-based NPs in conditions in which two salient anchors are available, and conditions in which only one previous anchor is available. In line with other findings, a more enhanced negativity was observed during online processing of inferred NPs with two eligible anchors (Burkhardt & Dietmar 2007: 119).

In another study, Burkhardt (2007) verified the impact of context in the processing of definite descriptions with different degrees of dependency on prior discourse. She used a set of three conditions, such as those in (9):

- (9)a. Yesterday a PhD student was shot downtown. The press reported that *the pistol* was probably from army stocks.
- b. Yesterday a PhD student was killed downtown. The press reported that *the pistol* was probably from army stocks.
- c. Yesterday a PhD student was found dead downtown. The press reported that *the pistol* was probably from army stocks.

The above conditions differ from one another with respect to the degree to which the content conveyed by the definite phrase *the pistol* is entailed by the preceding context. The verb *shoot* bears the entailment that the assassination was perpetrated using a fire weapon, while the same entailment is less immediate in (9b) and (9c), in which the predicates *kill* and *found dead* describe the event in a more general way, and so the use

⁹²This phenomenon is known as REPEATED NAME PENALTY which, in several neurolinguistic investigations on sentence processing is manifests higher N400 signatures, indicating a more computationally demanding operation.

of a pistol must be reconstructed through additional inference. Surprisingly, and contrary to findings reported in other studies (Kutas & Federmeier 2000), changes from condition *a.* to condition *c.* in (9) did not evoke N400 modulations, but differences in P600 signatures (Burkhardt 2007: 1853). Based on the data gathered, Burkhardt proposed an interpretation of P600 elicitation as hanging on different updating mechanisms than those eliciting negative ongoing deflections. In her view, P600 modulations correlate with discourse-level processing, as opposed to lexical-semantic processing, often triggering negative deflections. In this sense, lower P600 deflections are observed for context-supported definite phrases (ex. (9a)) since in these cases the instrument is already part of the receiver's discourse representation. (9b) and (9c) conditions follow with higher P600 deflections, because the evoked instrument is less active in the discourse model and must be inferred or newly integrated in the speaker's mental representation of the discourse. Now, Burkhardt points out that the physiological patterns observed do not seem to relate to stimuli characterized by syntactic reanalysis and/or semantic anomalies (Kaan et al. 2000, Osterhout et al. 1992). Previous studies report on P600 correlation to syntactic and semantic violations, possibly indicating parsing effort. The remarkable implication of Burkhardt's study is that the stimuli used displayed no anomaly of this sort, which means that (a) integration difficulty is not only involved in anomalous conditions, and (b) P600 signatures are indicative of parsing effort targeted at discourse update, rather than integration on the lexical level (Burkhardt 2007: 1854, "Positivity represents the evaluation of incoming information that leads to the updating of the mental model").

In another experiment, Burkhardt (2008) compared integration costs of proper names and those of definite descriptions. Following Löbner's characterization of proper names as *semantic definites* and definite descriptions as *pragmatic definites*⁹³ (Löbner 1985), she carried out ERP measurements during online processing of proper names and definite descriptions in both context-supported and context-non supported conditions. Results evidenced a less pronounced negative deflection for both context-supported and context-non supported proper names, which justifies their classification as strong designators (Burkhardt 2008: 77). In other words, while definite descriptions seem to depend on the discourse context to be fully interpreted (although not always, but

⁹³In his taxonomy, Löbner (1985) outlines semantic definites as entities that refer to unique referents in all possible worlds; whereas pragmatic definites are described as entities that depend on contextual support for unambiguous reference.

certainly more often than proper names), proper names are less strongly bound to previous discourse and can project semantically complete referents even when no prior textual anchor is available, because further linking operations are not necessary for their full encoding.

To assess the impact of context on the processing of consistent vs. mismatched presuppositions, Hertrich et al. (2015) led a magnetoencephalographic experiment testing 20 subjects' response to the processing of more or less expected definite descriptions with respect to a prior discourse⁹⁴. Since stimuli were presented auditorily, brain activity was synchronized to the syllable onsets displaying intonation peaks. The authors observed deflections in the M50 and M200 magnetic fields in response to non-matching presuppositions, that is, in conditions of missing discourse coherence.

3.3.5. Topic-Focus, Given-New and Event-Related Brain Potentials

What we learned from earlier psycholinguistic findings is that (a) topic and focus do not impose the same processing effort, (b) new information is generally costlier than given and inferred information, and (c) information structure triggers some effects on resource allocation in sentence processing and subsequent truth-conditional verification of contents. A number of psycholinguistic studies seem to converge around these general observations, and experiments led with different testing designs have produced rather consistent results in this respect.

However, when the mechanisms underlying the processing of informational hierarchies in sentences have been investigated on neurological grounds, the overall scenario on the cognitive correlates of topical/focal and given/new information showed itself slightly different than commonly believed. To begin with, these studies probed the effects of processing topic vs. focus and given vs. new units assessing how receivers use both contextual and prosodic cues. Particularly, the use of prosodic cues to differentiate

⁹⁴Stimuli consisted in a context followed by a definite phrase either complying with or contravening discourse expectations (Hertrich et al. 2015: 2-3). For example, while in (a) the use of the definite phrase *the polar bear* indeed conforms with the receiver's expectations of definiteness and identifiability,

(a) A: Tina was in the zoo and saw [a polar bear]

B: She observed that *the polar bear* was quite aggressive

in (b)B the definite reference to a single polar bear is less expected because it anchors to a collective and more generic antecedent.

(b) A: Tina was in the zoo and saw [some polar bears]

B: She observed that *the polar bear* was quite aggressive

information statuses and their correlative packaging in utterances has yielded a body of counterevidence to the hypotheses previously put forward in the psycholinguistic domain. Indeed, over the last decade, neurolinguistic approaches to IS have strengthened the assumption that processing costs do not constitute a parameter to be weighed up on the given/new or topic/focus level *per se*, but they are contingent on far more complex interrelations between sentences and the discourse model as a whole, as well as between sentence units and their characterizing intonation contours. This multi-level perspective allowed looking into sentence processing in a number of critical conditions, some more expected than others. Precisely, it has been proven that information packaging properties that are perceived as less expected with respect to prior discourse are also more taxing for the receiver. This trend has been observed when unexpected manipulations involved either syntactic or prosodic features in the sentence. In the following, I will report on some of the findings in neurological frontiers on IS that argue in favor of this interpretation.

A chief concern in investigating the neural patterns of IS units is the role of prosody. In oral communication, prosody is the main distinguishing feature of information units, although its manifestation is often unsystematic and conditional upon language-internal strategies. However, in a number of languages – especially in the most representatives of the Romance and Germanic families – intonation is a decisive factor to interpreting constituents as topic, focus, given or new in discourse. The relevance of prosodic cues to a clear-cut classification of information units is also depicted by their property to drive perceptual processes in sentence comprehension. This aspect has been further investigated by Hruska & Alter (2004) on the basis of EEG recordings. They used sentences with more or less consistent alignments between information statuses of sentence units and their prosodic contours. For the experiment, three thematic structures were considered depending on the scope of new information: broad focus, focus on the predicate (*Verum Fokus*) and narrow focus on the second NP. The authors manipulated prosodic contours so as to have sometimes accented sometimes unaccented new contents. All target sentences were preceded by a context encouraging the interpretation of either one or the other information structure. ERP recordings showed that inappropriate prosodic patterns – with missing accents on new units and superfluous accents on given units – elicited higher negative deflections than conditions with

appropriate accentuation. In other words, given information is verified faster when it is unaccented, and new information is verified faster when it is accented.

Further experimental data on the interplay between prosodic accentuation and sentence processing have been discussed by Baumann & Schumacher in a 2011 work. They elaborated a set of experimental trials in which contents with different activation statuses appeared more or less consistently accented. They wanted to examine whether processing difficulty more strongly correlated with misalignments between the given/new status of a content and its prosodic features. Their target stimuli consisted in sentences with unvaried and unmarked information structure, in which only givenness and newness degrees of contents changed. Correspondingly, they manipulated prosodic contours so that, in some contexts, given contents were unaccented and new contents were accented, while in other contexts reversed accentuation patterns were tested. They noticed that more prominent N400 peaks were elicited in response to unaccented new information, while lower signatures were registered for accented given information. Again, this substantiates the assumption that when prosodic expectations are not met, processing demands grow.

In another study, Wang et al. (2011) carried out an ERP experiment to assess the contribution of context and accentuation – i.e. degrees of focality of a constituent - on the depth of semantic processing. They used WH-questions/answer pairs such as the following:

(10) What kind of vegetable did mum buy for dinner today?

- Today, mum bought EGGPLANT_[CONGRUENT]/BEEF_[INCONGRUENT] for dinner
- Today, MUM bought eggplant_[CONGRUENT]/beef_[INCONGRUENT] for dinner

In (10), the critical words (*eggplant/beef*) appear in four different conditions: (i) it is focal and semantically congruent with prior discourse; (ii) it is focal but semantically incongruent with prior discourse; (iii) it is not focal but semantically congruent; (iv) it is not focal and semantically incongruent. Focality sometimes involved the semantically incongruent term, sometimes the semantically congruent one. On a general basis, more prominent N400 effects were observed for focal words (whether congruent or incongruent), suggesting that more attentional resources are allocated for focus units. On the contrary, semantically incongruent terms elicited weaker N400 effects when they

were non-focal, meaning that they were processed in a more “shallow” manner (Wang et al. 2011: 67).

In another study, Burmester et al. (2014) identified tighter connections of expectation-based parsing with P600 modulations. In an ERP experiment on aboutness topic, the authors wanted to assess the influence of contextual information on the online processing of aboutness subject and object topics in discourse. Based on the assumption that, in German sentences, topicalized objects are harder to process than topicalized subjects, the authors investigated whether difficulty in processing object topics could be modulated by modifying contextual information. For the experiment, four contexts for the Subject-Topic and Object-Topic conditions were sorted out. For both conditions, a neutral context and a context eliciting one of the two grammatical functions as topic were created. In the neutral condition, a question like “What is going on?” was addressed to the subjects. In the topic-condition, the question has a “What about X” – form eliciting either the subject or the object as the Topic of the upcoming answer. Contrary to results gathered in other studies, variations of contextual information essentially patterned with late positivity effects. These effects were particularly evident in sentences with object topics from the neutral to the topic condition. As it was to be expected, the Subject-Topic sentence elicited weaker positive effects in both the neutral and topic condition “supporting the assumption that context information does not play a crucial role for processing of canonical word order” (p. 71).

The study of context-driven processing effects had also been addressed by Cowles et al. (2007) with relation to focus assignment. Using context-sentence pairs such as the following:

Context

A queen, an advisor, and a banker were arguing over taxes. Who did the queen silence with a word, the banker or the advisor?

Target

- a. It was THE BANKER that the queen silenced
- b. #It was THE QUEEN that silenced the banker

the authors noticed that inappropriate words occurring in focus position (e.g. (b)) elicited a negative brain response, precisely a N400 peaking. In other words, the subjects “used constraints based on prior context to form expectations about the information statuses of discourse referents in the answer” (p. 239).

CHAPTER FOUR

Experimental perspectives on
Information Structure processing:
Two case studies

*Here is this mass of jelly – three pound mass of jelly -
that you can hold in the palm of your hand, and it can
contemplate the vastness of interstellar space,
it can contemplate the meaning of infinity,
and it can contemplate itself contemplating
the meaning of infinity.*

[Vilayanur S. Ramachandran]

4.1. Case study 1. Processing cost of presupposition vs. assertion: evidence from Event-Related Potentials

4.1.1. Prelude

Section 3.2.1 reported on the main findings on presupposition vs. assertion processing in the psycholinguistic literature. Both earlier and later experimental contributions in this direction depicted presupposition as a discursive strategy entailing lesser cognitive investment and, consequently, less attentive and relatively subconscious processing. This trend has been observed in studies utilizing different categories of triggers as well as different experimental paradigms.

Recent neurolinguistic threads of research have only started to approach the underlying neural networks of presupposition interpretation, investigating the effects of processing definite vs. indefinite NPs, or differences between types of definite phrases (e.g. definite vs. proper names, cf. Burkhardt 2008). The present study aims to further on these earlier attempts inquiring the electrophysiological correlates (ERPs) of presupposition vs. assertion processing using a sample of definite vs. indefinite phrases and subordinate vs. main clauses. Before elucidating the reasons behind the paradigm adopted, a few more points on the limits of previous experimental settings are worth discussing.

4.1.2. Limits of previous experimental research

Earlier experimental works have addressed presupposition vs. assertion processing adopting categories of triggers whose presuppositional status is still a matter of lively debates. One of these is represented by cleft-sentences. As is known, cleft-sentences are typically made of two informative blocks, one instantiated by the constituent introduced by *It is X*, the other one by the complement clause *that did Y*. As highlighted in Chapter 1, these structures have been described in generative models as projecting a focus-presupposition patterning, in which the use of the term “presupposition” is here intended in a sense other than that adopted in the present work. In fact, in a number of works, this term has been used interchangeably with the notion of topic. One reason why I believe that presupposition is not a suitable term to refer to clauses projected by cleft constructions is that these clausal complements display a slightly different behavior than that of presuppositional triggers proper. Worth mentioning in this regard is the degree of accommodation of clefts.

From a general perspective, almost all presuppositional triggers can project new (informative) presuppositions, with few exceptions for some iterative adverbials (e.g. *also*, *too*). On the contrary, cleft sentences are generally expected to be uttered in contexts in which the information conveyed by the complement clause has already been activated in prior discourse. Consider (1):

- (1) A: It's been a long time since I saw you last. What's new?
B: #It's MARY who's pregnant
C: Mary is pregnant

As derivable from the example, an utterance like (1)B could not be produced out of the blue as a response to the question in (1)A. This restriction would apply also if the event were shared and taken for granted by the interlocutors prior to the communicative exchange. An information structure like that in B is bound to require a previous antecedent in discourse. It would be then more consistent to use a cleft sentence when the complement clause conveys already active information. However, as consensus on the micropragmatic status of clefts is still far from clear in the current literature, we do

not consider them a good candidate to examine differences between presupposition and assertion in online processing.

As discussed in Section 3.2.1, Schwarz (2014, 2015) re-launched the study of presupposition processing using change-of-state predicates and iterative adverbs. In our view, the main problem arising with these paradigms is that, with both change-of-state predicates and iterative adverbs, the assertive counterpart of the presupposed content is gained through massive reformulation of the truth value conveyed by the presupposition. For example, for a sentence like

(2) *Mary stopped smoking*

the assertive version – derived extracting the presupposition projected by *stop* – would be *Mary used to smoke (in the past)*, which is not the same state of affairs as that explicitly encoded by (2). In fact, by uttering (2), the speaker does not intend to communicate that Mary used to be a smoker, but the fact that she has presently interrupted this activity. It follows that, in studies adopting this paradigm, processing costs are measured on non-comparable conditions, because different notional contents are likened.

A similar situation holds for presuppositions projected by adverbs like *also* or *too*. Seemingly, the assertive counterpart of a sentence like *Also John adores fantasy novels* would be “X/someone else adores fantasy novels”. Again here, the truth conditional value of both sentences is not the same, which decreases comparability between the presuppositional and the assertive condition. In our view, these biases should be avoided because they make it more difficult to assess whether differences in processing costs are related to variations of notional contents or packaging strategies.

In light of these premises, it can be conjectured that more reliable comparisons between presupposition and assertion would be achieved using presuppositional triggers whose assertive rewording does not affect their truth conditional value. To the best of my knowledge, triggers more compliant with this requirement are definite descriptions (*The boy* vs. *There is a boy*), factive predicates (*It's a pity that she has to go away* vs. *It's a pity: she has to go away*), defining relative clauses (*The Chinese students that I saw were all listening to Italian music* vs. *I saw Chinese students. They were all listening to Italian music*) and adverbial subordinate clauses (*When I arrived at the*

station, I saw him kissing another girl vs. *I arrived at the station and saw him kissing another girl*). In all these cases, the main content (be it a referent or an event) does not change from the presuppositive to the assertive condition. Basically, it is the external “clothing” it receives that varies. Given the relevance that variations in packaging – and not on notional contents – have for the study herein proposed, we believe this to be a crucial factor to consider.

Another point to make concerns the structure of testing materials, sometimes oversimplified and deflecting from “life-like” conditions of language processing. In more natural circumstances of exposition to linguistic stimuli, the range of presuppositive and assertive constructions we happen to come across far exceeds the samples found in much existing literature. For example, not only do we process definite descriptions like *the girl* or *the cat*, but also phrases like *the approved budget* or *the growing debt*, displaying greater structural complexity and semantic richness.

For the present study, the experimental setting has been structured in concordance with the following criteria:

- (i) with the view to allowing more natural processing conditions, stimuli have been taken from real texts (books, newspapers, magazines, etc.);
- (ii) triggers have been selected among those which do not entail massive manipulation of the notional content from the presuppositive to the assertive condition. For the present study, only definite descriptions and (temporal) subordinate clauses have been used;
- (iii) target stimuli have been structured so as to have short texts made of three sentences each (see Table 3 below): the first two sentences serving as contextual information, the third (target) sentence containing the critical item (presupposition or assertion);
- (iv) both *presupposition*- and *assertion*-sentences are informative (i.e. both convey new information), which allowed avoiding infelicity effects due to unexpectedly repeated assertions⁹⁵.

⁹⁵If some information is made available in the preceding context, recalling it through an assertive strategy would cause unnatural redundancy effects, as the following contrasts show:

a. A: Yesterday, I saw Mary with her little daughter
 B: **I saw her* and she waved at me vs. C: *When I saw her*, she waved at me

Presupposition- and *assertion*-conditions have been divided into two lists, each interspersed with 40 fillers (some with falsified assertions or presuppositions, others characterized by the absence of any presuppositive strategy). Slight modifications to the structure of the stimuli have been necessary in order to shrink variability between the two critical conditions and ensure more comparable measurements between presuppositive and assertive target sentences. In line with procedures followed in the experimental literature, contextual information has not been altered in the two conditions, so that biases due to different discourse representations are avoided.

4.1.3. Method

Participants

Twenty-four monolingual Italian speakers (6 men; 19-32 years old; mean=23,04; SD=4,2) participated in the study after giving written informed consent. All participants were right-handed as assessed by the Edinburgh Handedness Inventory (Oldfield 1971) and received money for participation. None reported neurological disorders, and all had normal or corrected-to-normal vision. The study was approved by the Ethic Committee of the Scuola Normale Superiore (Pisa).

Materials

As explained in the previous section, two conditions of context-target sentence pairs were constructed for presupposition and assertion, similarly to the example stimuli in Table 3.

Table 3 illustrates the three conditions examined in the experiment: *presupposition*, *assertion* and *anomaly* (serving as control condition). Each condition is represented by a short text made of three sentences: two context sentences and a target sentence. The target sentence contains either a presupposition (definite description or subordinate clause), an assertion (indefinite description⁹⁶ or main clause) or an anomalous condition

⁹⁶In order to obtain a symmetric assertive correlate of the presuppositive item, the indefinite descriptions adopted for the experimental design were most of the times embedded in presentative constructions. Since the presupposition presupposes the existence of a referent, the assertion must state it overtly, which is why a mere indefinite description like *a girl* as opposed to *the girl* would not – by itself - be enough to assert the existence of the referent designated. Indeed, a presentative sentence has the precise function to

(falsified presupposition or falsified assertion). Three sets of 40 trials per condition were constructed. Stimuli were interspersed with 40 fillers containing no particular presuppositive item.

The naturalness and acceptability of the target sentences were rated in an offline questionnaire in which participants had to express a judgment on a 5-point scale (see mean averages in Table 5). For the questionnaire, the stimuli were divided in two specular lists with 160 trials each (in concordance with a “between-items” design), identical to those used for the electrophysiological session (see statistical results in Table 4).

Procedure

Participants sat comfortably in a sound-attenuating room in front of a computer screen. Each session began with short training tasks followed by two experimental blocks, each comprising 80 trials ($80+80=160$ trials per list). During the experiment, trials were shown in the center of the computer screen. The two context sentences were presented as a whole and were read in a self-paced modality, while the target sentence was presented word by word. In order to assess the comprehension of the context information and the target sentence, a semantic association task was accompanied to some of the trials. In this task, participants were shown with pairs of words and were asked to respond pressing one of two buttons on the keyboard.

ERPs were time-locked to the presentation of two triggers per each target sentence. The first trigger (T1) corresponds to the last word of the critical region, being it the *presupposition*- or the *assertion*-condition. The second trigger (T2) represents the closure (on the last word of the definite description or the subordinate clause) of the sentence in which the critical presupposition or assertion is embedded. ERPs were measured for the three conditions reported in Table 3. An illustration of the position of the triggers in both definite/indefinite descriptions and subordinate/main clauses is given in Table 4.

The electroencephalogram (EEG) was recorded from 64 Ag/AgCl scalp electrodes mounted on an elastic cap (Easy Cap). Recordings were referenced to the right and left mastoid. The electrooculogram (EOG) was recorded by means of bipolar electrode pairs placed above and below the participant’s right eye and at the outer canthus of each eye.

present the existence of an entity or an event, and this makes it more symmetrically specular to its presuppositive counterpart.

Impedances were kept below 10 k Ω . Average ERPs were time-locked to the onset of T1 and T2 (cf. Table 4). In order to gauge differences between assertion and presupposition, on the one hand, and between assertion and violation (anomaly), on the other hand, a cluster-based permutation test was carried out⁹⁷. In this test, the presupposition and assertion conditions were associated in a time interval from 0 to 1 second after the onset of T1.

Table 3. *Example stimuli for the three experimental conditions*

CONDITION	CONTEXT	TARGET SENTENCE
1. PRESUPPOSITION	Un posto di lavoro, ma anche opportunità di formazione e finanziamenti. Sono gli obiettivi di un itinerario paneuropeo per studenti e giovani ricercatori.	La <u>campagna</u> toccherà 29 città europee in 22 paesi, fra i quali la Romania. [The <u>campaign</u> will involve 29 European cities in 22 countries, included Romania]
<i>Definite description</i>		
<i>Subordinate clause</i>	Conciliare lavoro e famiglia è difficile ovunque, ma lo è particolarmente in Giappone. Solo il 46 per cento delle donne giapponesi mantiene il posto di lavoro dopo il primo figlio.	Quando la moglie torna a <u>casa</u> trova un marito che raramente dà una mano nei lavori domestici, specie se stanco. [When a wife comes back <u>home</u> , she finds a husband that rarely helps in domestic chores, especially if he is tired.]
2. ASSERTION	Un posto di lavoro, ma anche opportunità di formazione e finanziamenti. Sono gli obiettivi di un itinerario paneuropeo per studenti e giovani ricercatori.	Ci sarà una <u>campagna</u> che toccherà 29 città europee in 22 paesi, fra i quali la Romania. [There will be a <u>campaign</u> involving 29 European cities in 22 countries, included Romania.]
<i>Indefinite description</i>		
<i>Main clause</i>	Conciliare lavoro e famiglia è difficile ovunque, ma lo è particolarmente in Giappone. Solo il 46 per cento delle donne giapponesi mantiene il posto di lavoro dopo il primo figlio.	La moglie torna a <u>casa</u> e trova un marito che raramente dà una mano nei lavori domestici, specie se stanco. [The wife comes back <u>home</u> and finds a husband who does not help in domestic chores, especially if he is tired.]

⁹⁷Since EEG signals are two dimensional (i.e. they are collected from different regions of the scalp and are elicited at different time points), an averaging is required either on a selected set of channels or a selected set of time points.

3.

ANOMALY

Paolo Conte è un vero avvocato e ha praticato la professione nel foro di Asti. Ad oggi, non sono mai andato ad Asti, ma so che la cittadina è nota perché Carducci la definì repubblicana.

Quando ci andai il cielo era davvero nero, e infatti annunciava l'alluvione di Genova.

[When I went there, the sky was dark; indeed, Genoa's flood was coming up]

Table 4. *Position of the triggers where ERPs have been measured*

DEFINITE DESCRIPTION/INDEFINITE DESCRIPTIONS
<u>Context:</u> “L'emancipazione delle donne in Medio Oriente passa anche per il crimine. Bojana Mitic, di origine serba, ha partecipato al "colpo del secolo" alla gioielleria del Wafi Mall di Dubai.
<u>Target:</u> Assertion: C'è stato un bottino (T1) che non è mai stato trovato (T2) , ma la polizia sta indagando Presupposition: Il bottino (T1) non è mai stato trovato (T2) , ma la polizia sta indagando
SUBORDINATE CLAUSES/MAIN CLAUSES
<u>Context:</u> Angelo Frigeri è stato accusato di aver ucciso due coniugi nel loro negozio di calzature. I fatti sono accaduti in un quartiere vicino Napoli.
<u>Target:</u> Assertion: Una telecamera lo ha ripreso (T1) quando erano circa le 13.30 (T2) , e aveva ancora in mano la pistola. Presupposition: Quando una telecamera lo ha ripreso (T1) erano circa le 13.30 (T2) , e aveva ancora in mano la pistola.

4.1.4. Predictions

Based on the findings discussed in the previous sections, we believe that two possible scenarios can be predicted. In line with the psycholinguistic data commented in Section 3.2.1, additional processing demands can be expected for assertion relative to presupposition. Eye movement studies revealed longer fixation times and slower eye shifts when asserted information is read, and more rapid eye movements and faster fixation times while reading presupposed information. In terms of the components involved, it is possible that either P600 or N400 signatures are elicited. In Burkhardt (2007), it was observed that P600 modulations are sensitive to difficulty in integrating information into the mental model of discourse. The newer the information, the greater the P600 effect. In our study, both presupposition and assertion in the target sentences

are new, which means that the same cost should be imposed on the receiver in both conditions, with possibly no particular variations in the P600 signature. Arguably, differences in processing efforts may be expected for the different packaging conditions of the same information items, with costlier mechanisms involved in the processing of assertion, and less costly for the presupposition.

From another perspective, it can be hypothesized that context-driven processing strategies are involved. In such a case, we should expect that processing follows the path of expectations on information packaging criteria (cf. also the studies discussed in Section 3.3.4). On this account, presupposition would be expected to convey contents already introduced in discourse, while assertion would be preferably associated with new information. In this other scenario, presupposition would impose major costs – with possible modulations of the N400 signature - indicating unexpected incongruence and discontinuity, because it conveys new contents, which are typically less expected to receive presuppositive packaging.

4.1.5. Pre-testing measurements

Table 5 presents the statistical results of the pre-testing questionnaires with which the naturalness of the target sentences, relative to the context provided, has been gauged. Two ANOVA tests have been calculated to assess (a) the significance of the global interaction between presuppositional and assertive strategies (independently of the item instantiated), and (b) the interaction of definite description subordinate clauses.

Table 5. *Statistical analysis of naturalness judgments*

Items	Mean	SD	F	p-value
<i>Subordinate clauses</i> (SC)	3.31	1.44		
<i>Definite descriptions</i> (DD)	3.35	1.47		
SC x DD			0.046	0.83
Conditions				
<i>Assertion</i> (ASS)	3.37	1.43		
<i>Presupposition</i> (PPP)	3.33	1.45		
ASS x PPP			0.606	0.45

As can be noticed, in none of the cases is the interaction significant, meaning that assertive and presuppositional strategies, on the one hand, and definite descriptions and subordinate clauses on the other, have been rated as equally natural in the contexts presented.

4.1.6. Electrophysiological results

As can be noticed from the grand averages in Table 6 and Table 7, the most striking differences between assertion and presupposition at T1 are observed only for definite vs. indefinite descriptions. Notably, these differences are mainly reflected in modulations of the N400 signature, with major deflections to be found in central [$F=5.25$; $p=0.03$] and parietal [$F=5.28$; $p=0.03$] electrodes (C5, C3, C1, Cz, C2, CP5, CP3, CP1, CPz, CP2, CP4, P5, P3, P1, Pz, P2, P4, PO3, POz, PO4). By contrast, for the subordinate vs. main clause comparison, no significant differences have been detected, as shown by the similar waveforms of the signals for the presupposition and assertion condition.

Another aspect to notice is that the observed negativity does not seem to show up in the canonical 300-500 ms time window, but rather in a delayed 400-700 ms window, which may depend on the structure of the stimuli used.

At first blush, it is not easy to account for the null effect in the subordinate vs. main clause contrast. On merely speculative grounds, it can be surmised that in the subordinate and main clauses, the critical word on which the effect has been measured is preceded by a greater amount of linguistic material that may bias and somehow direct the processing of the critical word, both on the content and on the packaging level. Some stronger empirical evidence in this respect would come from a comparative study on different presuppositional triggers aimed at probing processing differences between them⁹⁸.

If related to the trends contended in the rest of the psycholinguistic literature, the findings reported in the present discussion suggest slightly divergent paths for presupposition vs. assertion processing. Precisely, in the study presented, presupposition

⁹⁸As reported in the previous chapter, experimental work in this direction has already been undertaken within the psycholinguistic purview (cf. Domaneschi & Carrea 2015), but no neurophysiological investigations on the subject are as yet available.

seems to impose more effortful processing than assertion, thus confirming the role of expectation-based parsing strategies (cf. Wang & Schumacher 2013; Hertrich et al. 2015, among others). As previously shown, in our experiment all critical conditions were preceded by a context, each made of two sentences not longer than 20 words.

Besides creating more natural conditions of sentence processing (because linguistic messages are typically exchanged against the background of a shared prior discourse), the presence of contextual information also constrains the subjects' mental representation of the discourse model so as to induce expectations on both the content and packaging of upcoming utterances. So, as also demonstrated in other studies, when these expectations are not met, sentence processing becomes more taxing. In the case we investigated, presupposition is expected to resume content already introduced in prior discourse, whereas assertion is expected to convey novel information. Therefore, an informative presupposition contravenes the receiver's discourse-driven expectations much more strongly, as compared to an informative assertion, which is generally a more expected condition in discourse. Needless to say, this does not run counter the naturalness of both presuppositions and assertions in context-non supporting conditions, but merely reflects different updating mechanisms when prior expectations are generated by receivers.

Table 6. *Grand averages at T1 for definite descriptions*

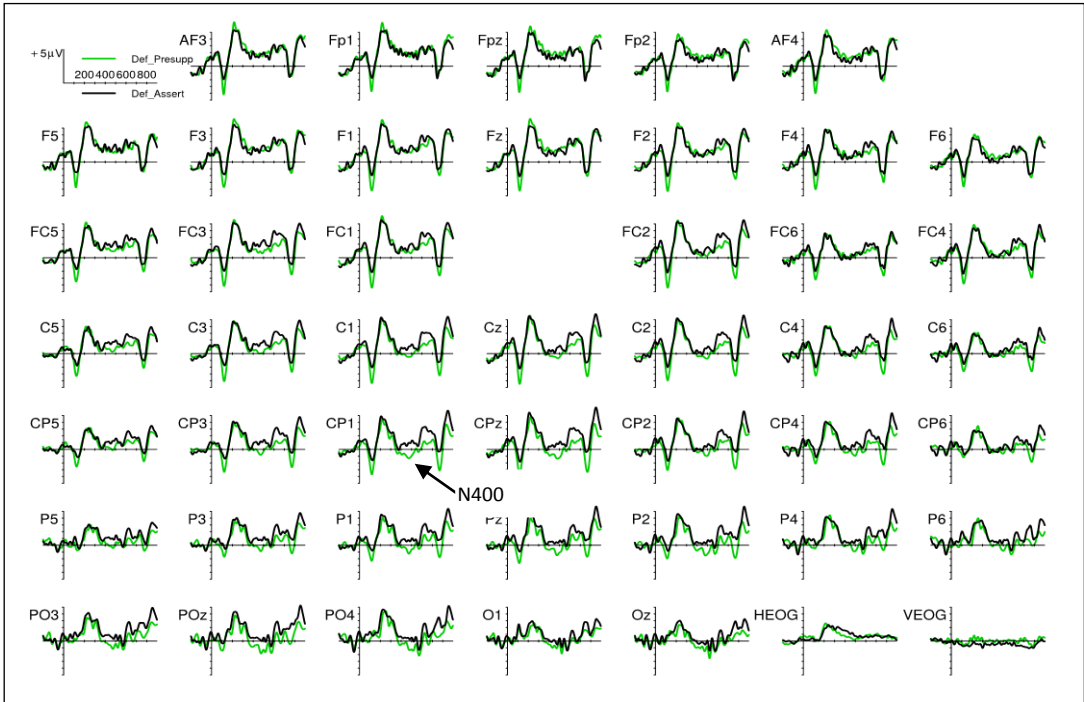
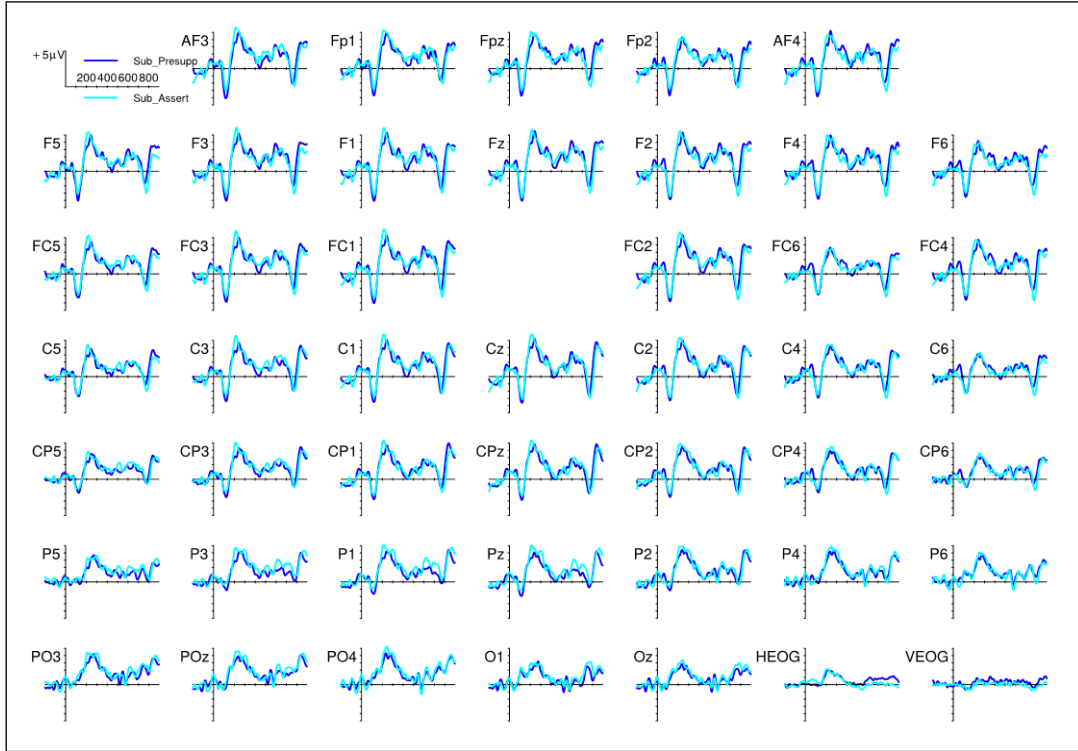


Table 7. *Grand averages at T1 for subordinate clauses*



4.1.6.1. Critical points of the experimental setting used

Although the general results point towards consistently distributed amplitudes of the N400 component for the presupposition-condition (mainly for definite descriptions), a reflection is called for on some of the limits of the experimental protocol adopted, many of which possibly bear upon the ecological nature of the stimuli used.

As for the position of the first trigger (T1), T1 does not always occupy the same position in the presuppositive and assertive critical region. In some presupposition-target sentences, T1 involves the second word, in other assertion-target sentences it falls on the fourth or fifth word (e.g. *Il bottino*_{T1} *non è mai stato trovato* vs. *C'è stato un bottino*_{T1}, *che non è mai stato trovato*). This variation may contravene the expectation to find new information encoded at the beginning of the sentence, when it is more expected to occur in sentence-final position, according to the Given-New principle. Controlling this variable, however, was not an easy task since, in order to obtain a

“true” assertive counterpart of the presupposition-condition, the indefinite description needs to be embedded in a presentative construction (e.g. *The lion* vs. *There is a lion*), which occasionally led to positional variation of the critical items.

Another point is related to the part of speech, length and number of syllables of the critical words at T1 (where ERPs were measured). Ideally, these parameters should be the same for all trials. The relevance of length has been assessed in the processing of lexical vs. function words (Bastiaansen et al. 2005), in which lexical words are likely to impose more effortful processing than function words (although it is possible that such a difference results from variations in semantic, rather than in structural, complexity). Given the ecological structure of the paradigm adopted, it was not possible to keep this parameter constant for all the trials. As for the part-of-speech parameter, no significant investigation so far has revealed differences in cost between word classes in online processing. fMRI studies (Romagno et al. in press) have only measured topographical differences between verbs, nouns and adjectives, but with no compelling evidence of varying degrees of effort.

Because of the wide range of sources drawn upon for the construction of the testing materials, critical presuppositions/assertions sometimes displayed variations in their frequency of occurrence. In fact, it has been discussed (Kutas & Federmeier 2000) that modulations in N400 peaking are also contingent on how frequently an individual has encountered a particular word in his experience, as well as on the context with which the referent designated by a word is most typically associated. For example, in a context like *I went to Jane’s house*, the following continuation: *Her spider was horrible*, is certainly less expected than *Her dog/cat was really cute*, because spiders are less typical house pets than cats and dogs. So, prototypicality may alter the cognitive investment required in word processing.

Some other biases may derive from the range of presuppositional triggers utilized for the study (and for whatever study to be pursued in the same direction). Recent psycholinguistic investigations (Domaneschi et al. 2013, Domaneschi & Carrea 2015) have thrown light on possibly distinct mechanisms underlying the processing of presuppositional contents, based on the particular trigger projecting it. More precisely, accommodation – i.e. the condition in which the costs of presupposition vs. assertion processing has been tested – seems to be more demanding for given classes of triggers than for others. In our design, the sample of definite descriptions has been chosen

among possessive or genitive phrases (*my family, Jane's car*), DefArt+N phrases (*the lady*) and demonstrative phrases (*this bill*). Among the three categories, the demonstrative phrase is on the whole more resistant to accommodation since, in most cases, a demonstrative adjective is expected to link the introduced referent to a prior antecedent in discourse or in the extralinguistic context. This means that information updating may turn more difficult for presuppositions projected by phrases with a demonstrative determiner than for those encoded in genitive and DefArt+N constructions.

4.1.7. General discussion and conclusion

Due to our present state of knowledge, we cannot gauge the true extent of the above-mentioned variables in the electrophysiological results observed. However, what is striking of these results is that they seem to deviate from the trend we expected in concordance with the main findings reported in the psycholinguistic literature. In this literature, presupposition is regarded as inducing less effortful strategies in sentence processing, we predicted that its online processing might require less cognitive expenditure, possibly manifested either in N400 or P600 modulations. On the contrary, in our study, and for the parameters we measured, presupposition turned out to be more demanding than its assertive counterpart. Considering the systematicity in timing and distribution of the N400 effects, a consistent neural pattern may correlate with the processing of presupposed information in discourse. On a priori grounds, this pattern is suggestive of the influence of context-driven processes, according to which presupposition may induce the expectation that the information item conveyed has a previous textual anchor. In Chapter 1, I said that this is not a *sine qua non* condition for some content to be presupposed, but the contexts provided may induce the subjects to formulate predictions on the packaging some contents will receive in the upcoming sentences. Therefore, subjects might expect new contents to be communicated via assertive strategies and contextually available contents to be resumed presuppositionally. It can then be supposed that, similarly to topic, presupposed information triggers a *backward linking effect* instructing to look for an antecedent in

previous discourse, which must be *ex novo* established in the context set when none is already available, thus slowing down integration processes⁹⁹.

To conclude, it can be hypothesized that the effort required to compute presuppositional meanings may change depending on the condition of sentence processing. Expressly, the absence of a discourse context may induce the receiver to dedicate less attention to a presupposition and more attention to an assertion irrespective of the givenness and newness degree of the information conveyed (probably on the basis of bottom-up processes, cf. the discussion in Section 3.6). Conversely, when a discourse context is present, this context creates a “world” in which the activation (or non activation) of some contents leads the receiver to generate expectations on their packaging in subsequent sentences (possibly following top-down criteria, cf. Section 4.3; see also van Berkum 2012: 592, “some discourse-dependent N400 effects hinge on the precise message-level representation established for the discourse at that point”). We will come back to this discussion in the last section of this chapter.

4.2. Case study 2. Processing effects of informational alignments and misalignments in Topic-Focus structure: evidence from EEG rhythmic changes

4.2.1. Prelude

This section describes and discusses the results of another EEG experiment aimed at measuring rhythmic changes in different frequency bands in response to topical and focal sentences in texts. The texts have been elaborated so as to have both aligned and misaligned configurations between activation statuses of contents and their topical or focal packaging in the sentence. Therefore, given contents are sometimes associated with topical, sometimes with focal packaging, and the same goes for new contents (La Rocca et al. in press; Lombardi Vallauri & Masia 2015). The main purpose of the analysis is to assess the efficiency of brain processing in response to information

⁹⁹On this account, the N400 effects may also be “fully compatible with a memory retrieval account, in which N400 amplitude is a general index of the ease or difficulty of retrieving stored conceptual knowledge associated with a word, which is dependent on both the stored representation itself, and the retrieval cues provided by the prededing context” (van Berkum 2012: 592).

structural cues to givenness and newness statuses of contents relative to prior linguistic contexts.

In the study proposed, stimuli are sentence-long, which is why an analysis of the power spectrum of frequency bands, rather than a measurement of ERP time-locked components, proved more suitable. Due to the experimental setting, the elicitation of ERP time-locked components would have been difficult to nail down, because of the possible overlapping of components related to contiguous units within the same sentence. Conversely, the quantification of rhythmic activity in different frequency bands allowed us to look into the processing patterns of IS units as realized by entire sentences.

4.2.2. Method

Materials

As anticipated in the outset, four specular couples of texts have been created. Specular means that the same item of information (whether given or new) is topic in one text (Text A) and focus in the other (Text B), or vice versa. Keeping the same notional content unaltered in the two specular conditions permits to avoid cognitive biases caused by different discourse representations (cf. Section 4.1.2). (13) provides an illustration of the pattern described.

(13)

LIST A¹⁰⁰:

Context:

¹⁰⁰**LIST A:**

Context:

As adults, we are generally bound to fear negative feelings. In this sense, [*that unsatisfied needs generate dependences*]_{NEW/TOPIC} is very frequent. Our weaknesses are revealed [*by the manifestation of these dependences*]_{GIVEN/FOCUS}. In these cases, many feel comfortable drinking some wine with a friend. [*After sipping some wine*]_{GIVEN/TOPIC}, [*the pain disappears for a while*]_{NEW/FOCUS}.

LIST B:

Context:

Given our tendency to fear negative feelings, [*we often develop dependences related to unsatisfied needs*]_{NEW/FOCUS}. [*When these dependences come about*]_{GIVEN/TOPIC} we discover our weaknesses. In these cases, many feel comfortable drinking some wine with a friend. And [*pain disappears for a while*]_{NEW/TOPIC} [*sipping some wine with somebody*]_{GIVEN/FOCUS}.

Da adulti, siamo generalmente inclini a temere le emozioni negative. In questo senso, [*che si sviluppino dipendenze legate ai bisogni non soddisfatti*]_{NEW/TOPIC} è molto frequente. Le nostre debolezze ci vengono rivelate [*dal verificarsi di questo tipo di dipendenze*]_{GIVEN/FOCUS}.

In questi casi, molti si rifugiano nel bere un po' di vino con un amico. [*Dopo aver sorseggiato qualche bicchiere di vino*]_{GIVEN/TOPIC}, [*per un po' il dolore svanisce*]_{NEW/FOCUS}.

LIST B:

Context:

Data la nostra inclinazione a temere le emozioni negative, spesso [*sviluppiamo dipendenze legate ai bisogni non soddisfatti*]_{NEW/FOCUS} [*Quando si verifica questo tipo di dipendenze*]_{GIVEN/TOPIC}, scopriamo le nostre debolezze.

In questi casi, molti si rifugiano nel bere un po' di vino con un amico. E [*il dolore per un po' svanisce*]_{NEW/TOPIC} [*sorseggiando qualche bicchiere di vino con qualcuno*]_{GIVEN/FOCUS}.

In Context A, the sentence *che si sviluppino dipendenze legate ai bisogni non soddisfatti* (“that unsatisfied needs generate dependences”) carries newly activated information, also realizing the topic unit of the sentence. The same information item, in the same activation state, appears focalized in Context B (*sviluppiamo dipendenze legate ai bisogni non soddisfatti*, tr. “we often develop dependences related to unsatisfied needs”).

Based on different alignment conditions, the following combinations obtain: Topic/Given (TG), Topic/New (TN), Focus/New (FN) and Focus/Given (FG). The number of occurrences per each condition is: 13 for TG, 29 for TN, 11 for FG and 28 for FN. All texts have been presented auditorily; one list has been listened to by a group of $N_A = 27$ subjects, the other list by $N_B = 27$ subjects (other than the former group).

We recall that in Chapter 3 (Section 3.3.1) we characterized the activity of frequency bands as differently relating to processing demands. Expressly, amplitude increases (ERS) in theta (θ) and gamma (γ) band correlate with working memory load. Conversely, in alpha and beta bands more effortful processing causes amplitude decreases (ERD). In light of this, we expect misaligned combinations between activation statuses and information packaging to impose major processing demands than aligned combinations, with variations foreseen in the θ , γ , β and α bands, although with different oscillatory behaviors. Notably, misaligned conditions are expected to elicit

ERS effects in the θ and γ bands, and ERD effects in the α and β bands, since misaligned conditions overturn packaging expectations, thus causing more difficult integration of upcoming information into the addressee's register. More precisely, misaligned conditions – with given information patterning with focus and new information with topic – are expected to elicit synchronization effects in the θ band and desynchronization effects in the α and β bands, since these conditions overturn packaging expectations, thus leading to less efficient integration of information in the addressee's register.

4.2.3. Data recording

54 healthy subjects (20-35 years old) participated in the study, after giving written informed consent. EEG signals have been acquired using a 19-channels cap (GALILEO Be Light Amplifier; original sampling rate: 256Hz). For the study, only female subjects have been considered¹⁰¹. Subjects were comfortably seated in an insonorized dimly-lit room. Electrodes were placed on the scalp according to the standard 10-20 montage and impedances were kept below 10 k Ω . Recordings have been referenced to the AFz position. Texts were presented auditorily and EEG recordings were time-locked to the listened utterances by synchronizing the signals marking each critical sentence on the raw traces. Ongoing EEG activity lasting four minutes has also been recorded for each subject before the performance of the processing task.

4.2.4. Data pre-processing

For reasons of space, only the spectral analysis of frequency bands is reported in this section. Further statistical and cross-spectrum analyses are more extensively discussed in La Rocca et al. (in press).

In a pre-processing stage, a Common Average Referencing (CAR) has been applied to signals in order to reduce artifacts associated with inappropriate reference choices. Signals were then segmented into epochs time-locked to the onset of each critical

¹⁰¹Signals recorded from other male students were removed from the dataset, due to the high number of artifacts.

region. Trials with non-removable artifacts have been removed from the analysis, so the resulting epochs amounted to 38 per each subject¹⁰². Filtered epochs were further time-locked to the following set of contrasts: N/F vs. N/T, G/F vs. G/T, N/F vs. G/T and N/T vs. G/T. Since the purpose of the analysis was to detect differences in frequency bands' activity, a computation of the POWER SPECTRUM DENSITY (PSD) has been carried out. This measurement allows assessing the contribution of each EEG rhythm to the differences observed in the above-mentioned contrasts; more precisely, it indicates how the strength of a signal is distributed in the frequency domain (Stoica & Moses 2005). Another relevant measure when the study of frequency band activity is approached is the so-called SPECTRAL COHERENCE (COH). In signal processing theory, Spectral Coherence indicates the cooperation of populations of neurons during cognitive processes of different nature. Neural spectra change depending on how synchronous the activity of different neural populations is, in response to given processing tasks. Technically, coherence quantifies the level of synchrony between simultaneous recorded signals at a specific frequency f .

4.2.5. Results

Our purpose in this study was to verify whether information structure violations induced a more demanding processing of sentence contents with respect to their activation state in the contexts provided. On this purpose, paired-sample t -tests have been run. The *null hypothesis* to be rejected is that no significant differences in terms of brain responses are to be predicted between expected and unexpected information packagings.

Given the general aim of the analysis, a False Discovery Rate (FDR) method has been employed that yields p -values corrected for multiple comparisons. Due to the number of variables to deal with (frequency bands, channels, channel pairs, etc.), the FDR analysis proved more suitable for our study (see a more detailed discussion on this methodology in La Rocca et al. submitted).

As far as the packaging of new information is concerned, significant differences in the processing of F/N and T/N are observed for the α rhythm in central, parietal and

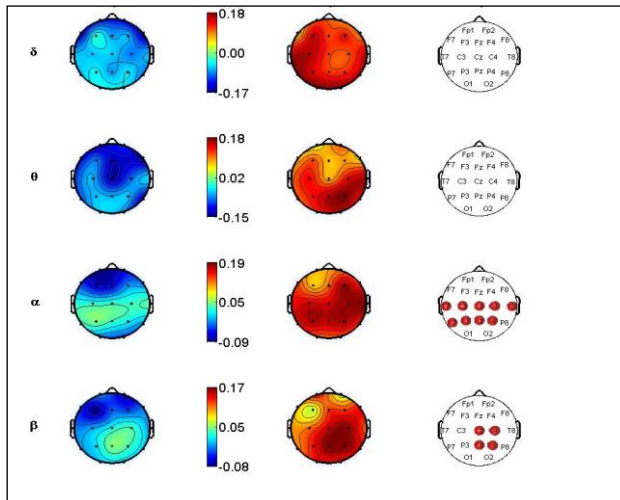
¹⁰²The amount of analyzable epochs has been computed on the basis of an anti-aliasing filtering procedure aimed at removing interfering artifacts from the critical stimuli.

temporal regions, and for the β rhythm in right centro-parietal regions of the brain¹⁰³ (p -values of the Regions of Interest for the two brain rhythms ≤ 0.05) (See Figure 6 below).

Analogous effects of aligned and misaligned information structures have also been noticed for the packaging of given information. Particularly, significant differences between F/G and T/G are found in the θ band (ERS) with a greater temporal power in the F/G condition (Figure 7). Also in the α and β bands a major posterior connectivity is shown in greater cross-hemispheric fronto-parietal coherence for the F/G condition.

A third, comprehensive analysis comparing all alignment and misalignment conditions depicts remarkably lower values in the β frequency band mainly distributed in the posterior region (Figure 8).

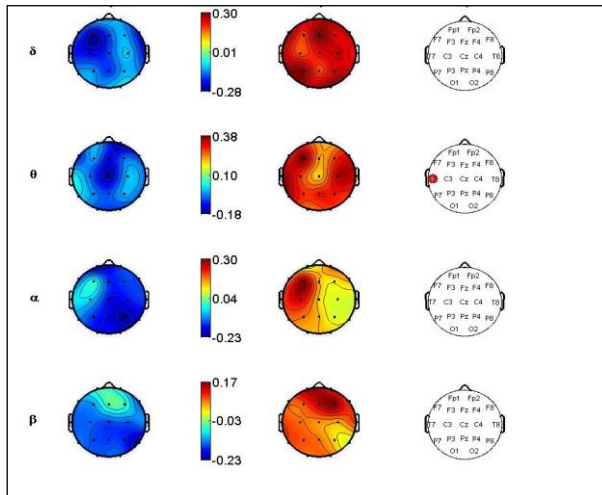
Figure 6. Analysis of N/F vs. N/T. PSD contrast



In the α band, ERD effects are mainly observed in the TZ, C3, Cz, C4, T8, Pz, P4, electrodes (central, parietal and temporal region), whereas in the β band, they are registered in the Cz, C4, Pz and P4 electrodes (right centro-parietal region).

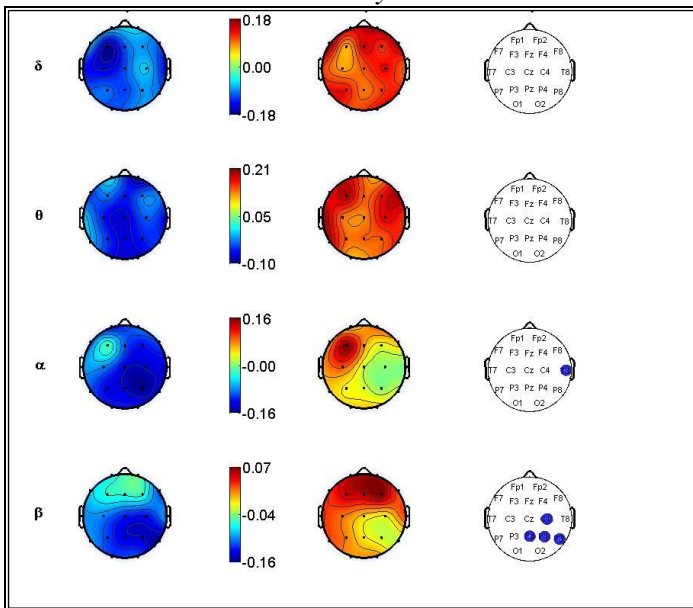
¹⁰³Cf. La Rocca et al. (in press, p. 16-17): “The results in these two frequency bands suggest a larger ERD [Event-Related Desynchronization] for the T/N condition, which could indicate less efficient processing due to the misalignments between packaging and informational status. The observed significant differences are supposed to be determined by an increasing difficulty in integrating information needed for language understanding in the misalignment condition, due to the search of a missing antecedent in prior discourse”.

Figure 7. Analysis of G/F vs. G/T . PSD contrast



In the θ band, ERS effects are basically limited to the Tz (left-temporal) region.

Figure 8. Misalignment vs. Alignment. PSD in the multivariate analysis



Multi-channel analysis yielded more prominent variations in α (right temporal, T8) and β (right centro-parietal region, C4, Pz, P4, P8) bands.

4.2.6. Discussion

Although probably tentative in many respects, the results obtained from the analysis proposed reveal that information structures compliant with the combinations G/T and N/F is subserved by neural mechanisms that differ from those supporting the processing of less expected combinations (i.e. N/T and G/F). Larger synchronization effects (ERS) in the θ band, and desynchronization (ERD) effects in the α and β bands for the N/T and G/F conditions, as opposed to aligned correlations (i.e. G/T and N/F), are indicative of increasing costs caused by decreasing efficiency in information processing. Specifically, when new information is encoded as topic, the receiver is instructed to treat it as contextually given and search for a missing antecedent in the foregoing discourse (*anaphoricity* is one of the textual effects of topicality, cf. Givón 1983). The fact that no textual anchor can be found for the N/T condition eventually compels the receiver to accept that he has to open a “mental slot” for the new information, which eventuates in extra processing.

Interestingly – but not surprisingly – the effects of focality override those of activation degrees (cf. higher amplitudes in the θ rhythm), in that Focus seems to impose additional processing effort for both given and new contents. This is probably due to the fact that focal information is recognized as the most salient information of the utterance and the speaker’s communicative purpose, thus calling for more attentive processing (Lombardi Vallauri – Masia 2015).

Similarly to the experiment discussed in the foregoing section, these findings allow looking at sentence and information structure processing from a *Gestalt psychology* perspective. As anticipated in Chapter 1 (note 15), according to Gestalt psychology principles, similar elements are perceived as continuous and consistent with one another, which makes them processable with fewer costs. If continuity expectations are not met, more effort is involved in the processing of discontinuous elements, because they bear features which are not shared by other entities previously encountered in discourse. In the phenomenon investigated, continuous elements are represented by contents whose packaging is consonant with the activation state of the content conveyed, i.e. with what is expected depending on the linguistic and extra-linguistic context set by the communicative exchange; whereas discontinuous elements are

contents whose packaging is less expected with respect to activation states of contents as established by the linguistic and extra-linguistic context. Therefore, keeping perceptual continuity amounts to reducing demands on IS processing, whereas interrupting continuity expectations increases the effort required of the receiver to fully integrate information in his mental model of discourse.

4.2.7. Concluding remarks

The results obtained from the present study seem to confirm previous findings on the role of discursive expectations in topic-focus processing. In this respect, the following conclusions can be drawn:

- When sentences are embedded in a larger discourse context, their processing depends on the expectations stemming from that context; these expectations may involve the activation status of contents, or their information packaging with respect to the receiver's mental model of discourse.
- Since the most typical informational structuring entails given contents patterning with topical and new contents with focal packaging, when this configuration is overturned predictions on the communicative dynamism of the upcoming utterance must be reviewed, which causes *additional processing demands*.
- Probing the power spectrum of frequency bands, we found that α , β and θ bands are significantly involved in online processing of information articulations more or less consistently matching with activation states of notional contents: misaligned packaging triggers *synchronization effects* (ERS) in the θ band, and *desynchronization effects* (ERD) in the α and β bands, in conformity with their expected behavior when processing demands grow. These results are indicative of a major cognitive investment in response to unmet expectations against an established mental representation of the discourse model.

4.3. Information Structure processing between bottom-up and top-down modalities

The overview literature presented in Chapter 3 and the two case studies described in Chapter 4 brought attention not just to the heterogeneous scenario of experimental findings on the study of sentence processing, but also on the possible involvement of two processing mechanisms depending on the presence vs. absence of a prior discourse context. Let us elaborate a bit more on this point.

We have seen that in much earlier investigation on the processing of presupposition/assertion and topic/focus, isolated sentences were used. This implied that the sentences to be processed by the subjects were all new, with no previous discourse representations allowing to expect particular activation states or packaging formats of subsequent sentence contents. In that condition, subjects could only be guided by degrees of informational prominence provided by packaging cues. In other words, only the recognition of presuppositional, assertive, topical or focal *packaging* could “tell” the subjects what piece of information counted more or less in the message and, correspondingly, what amount of cognitive resources devote to it. In studies on information processing, this modality is typically known as *bottom-up* or *data-driven* (Wolfe et al. 2003, Goldstein 2010), because it capitalizes on the structural cues of incoming information as well as on the way these cues influence higher-order conceptual representations. It is commonly assumed that the human processor resorts to bottom-up mechanisms when it is not able to direct processing on the basis of pre-conceived expectations. When this condition obtains, the message receiver does not know anything in advance about the upcoming information, whose “external structure” provides the main guidance for processing.

So, it can be conjectured that in experimental settings based on isolated sentences, an efficient strategy to avoid waste of processing resources is to devote more attention to contents that are asserted or focalized – because they are more likely to be interpreted as the speaker’s main goal in the communicative task at hand – and less attention to contents that are presupposed or topicalized because they are generally perceived as backgrounded. Since, without a context, processing strategies cannot be planned in advance, the only way to ensure efficient retention of information is by *following the instructions provided by packaging*. Thus, a bottom-up modality typically consists of a cue-to-representation direction of sentence processing.

When the role of context was taken into account in subsequent studies, a different direction of information structure processing was highlighted. As we have seen, this

direction entailed an expectation-to-cue procedure, commonly indicated as *top-down* or *theory-driven*, because processing starts with pre-established representations or *schemas* somehow impinging on the way incoming information is decoded. The implication of a top-down modality is that the cost associated with information processing not only depends on the surface structure of the input stimuli, but also on how consistent they are with respect to already existing frames or representations. When a discourse context licenses upcoming sentences, the parser is able to plan processing strategies in advance. If the information structure of each subsequent sentence turns out to be compliant with what the parser has anticipated, processing costs are reduced. If, on the contrary, information structures collide with the expectations formulated by the parser, the cost of processing misaligned packaging is higher. Just like packaging cues, expectations allow speeding up resource allocation since they prepare the attentional system to a different distribution of efforts.

So, what the experimental findings so far suggest is that the processing of IS is possibly subserved by two (or even more) distinct mechanisms depending on the particular conditions of sentence processing. In this sense, the attentional system exploits information packaging cues in different ways. When no context is available, packaging guides attentional processes in efficient ways, with subsequent influences on the mental representation of contents. In such a case, IS units serve the function to support bottom-up mechanisms in sentence processing. When a licensing context is available, information packaging fulfills the function of confirming expectations on the distribution and activation status of sentence contents, thus supporting top-down mechanisms. Since the presence of a discourse context makes provision for a pre-conceived analysis of upcoming sentences' IS, when this analysis is contradicted by unexpected packaging, the receiver must "run" a new analysis modifying his anticipated assumptions, which causes additional processing.

Now, although clear-cut distinctions between different conditions of IS processing have been highlighted by earlier and recent findings, these general trends have never been recast as the reflection of top-down and bottom-up mechanisms in the literature. Obviously, we cannot be sure whether the experimental facts observed can be explained in this way. However, the fact that the most striking differences can be noticed precisely in the transition from context-non embedded to context-embedded processing paradigms is suggestive of some crucial role played by the *context*-parameter. Bearing

in mind that empirical research on the processing of IS is still too scant to derive conclusive generalizations, in the rest of this work I will use the terms bottom-up and top-down as useful working labels to refer to the effects triggered by the presence vs. absence of a prior linguistic context in the interpretation of IS units.

4.4. Summary and conclusion: Chapter Three and Chapter Four

Chapter 3 provided an overview of the main experimental perspectives on IS. I presented earlier and more recent studies on presupposition vs. assertion and topic vs. focus processing in both psycholinguistic and neurolinguistic investigations.

It has been argued that a bunch of psycholinguistic works converged around the property of presupposition to induce less effortful processing than assertion. More specifically, presupposition seems to correlate with less conscious and less controlled strategies of sentence processing, as false information recognition tests demonstrated. Analogous differences were noticed for the topic-focus structure in which more effort seems to be associated with the processing of focus, as opposed to topic units. Throughout the chapter, I pointed out that these patterns are most probably related to the experimental settings used. More particularly, in many of these studies, the processing of IS units was assessed on isolated sentences, with no prior discourse licensing the interpretation of upcoming contents as active or inactive in the context provided. The critical sentences, therefore, were all new for the receiver, with variations detected only on the packaging level.

Using a terminology diffused in much psychological and psycholinguistic contention, we subsumed these “packaging-effects” under a *bottom-up* or *data-driven* modality of sentence processing, as they stem from the processor’s sensitivity to the structure of the stimulus (/information) attended to. In the case in point, processing is guided by the structural properties of sentential information, rather than by its activation degree as set by the ongoing interaction.

More recent neurolinguistic research furthered on the psycholinguistic inquiries gauging expectation-based parsing effects. These models emphasized the role of context in formulating expectations on the meaning and structure of upcoming sentences in a conversation. Applied to IS, electroencephalographic studies on the processing of information units showed that, when a sentence is processed against the background of already established representations of the discourse model, these representations influence the expectations formulated on the distribution of given and new contents in upcoming sentences, as well as on their packaging relative to the speaker's communicative goal.

The experimental literature discussed suggests that major costs seem to be involved with unexpected information structures. More particularly, topical and presuppositive packaging is expected to be associated with given and (previously) shared information, respectively, whereas focal and assertive packaging more expectedly correlate with new and unshared information. Indeed, this is a typical alignment in communication; and when it is reversed – that is, when new and unshared contents receive topical and presuppositive encoding, and given and shared meanings conflate with focus or asserted units – processing demands increase. So, the presence of a discourse context determines the way subsequent sentences will be dealt with by the processor and imposes some constraints on the representation of discourse contents in the receiver's mental model. Since these constraints do not follow from specific structural properties of incoming information, they are conceptually-driven; therefore, in opposition to the bottom-up modality above mentioned, we termed this direction of IS processing *top-down*. The experiments on the processing of presupposition vs. assertion and topic vs. focus, described in Chapter 4 (Sections 4.1 and 4.2, respectively) lend support to a strong influence of context in inducing top-down processing mechanisms. Based on EEG recordings (detecting event-related brain potentials in one case, and changes in brain rhythms in the other case), it was shown that unexpected correlations between packaging strategies and activation degrees of contents cause additional processing effort. The ERP experiment on the processing of presupposed vs. asserted information revealed that new presuppositions (that is, presuppositions not supported by encyclopedic knowledge or by the preceding discourse context) elicit larger amplitudes of the N400 signature, indicating difficulty in integrating some information into the mental register of discourse, due to its incongruent packaging. Added to this

incongruence effect, there is also the linking function associated to the anaphorical nature of presupposition. Presupposition (and topic to a greater extent) instructs to look for an antecedent in previous discourse, and this eventuates in a more taxing operation if no antecedent is found (because a new one must be construed). Although these results should be reinforced with some additional evidence, the preliminary trends observed are quite revealing and provide some ground to assume that the costs related to presupposition processing massively depend on how the discourse context impinges upon the interpretation of contents. Similar effects have been noticed for the experiment on topical and focal sentences, in which patterns of event-related synchronization and desynchronization in the frequency domain have been measured. Also in this investigation, expectation-driven or top-down effects have been noticed in unexpected configurations between activation degrees of contents and packaging features. Specifically, whenever given information patterned with focus and new information with topic, more prominent synchronization effects in the θ band, and desynchronization effects in the α and β bands were elicited. In the same way as the presupposition/assertion pair, also the processing of topic and focus seems to dictate different modalities and efforts depending on the presence vs. absence of a prior context of discourse.

As contended throughout the chapter, communication entails that uttered sentences are most of the time exchanged in a linguistic or extra-linguistic context that necessarily activates some contents in the interlocutor's memory. So, in this view, more natural paradigms to test sentence processing would be those considering the impact of contextual (and co-textual) information, in other words, conditions in which interlocutors rely on some established discourse representations. However, there are cases in which sentences are uttered out of the blue. Consider the following exchange:

A: What happened?

B: There has been an accident this morning

Here, the linguistic context provides no grounding for the utterance produced by speaker B. Since no expectations are available to speaker A in the exemplified interaction, the only way to process speaker B's utterance is by falling back on bottom-up strategies. So, speaker A will allocate his processing resources according to how he

draws the divide between formal features marking higher informativity and those marking lower informativity in the sentence.

It has been remarked that resource allocation is optimized in bottom-up and top-down processing strategies alike. The sensitivity to structural differences of stimuli – underlying bottom-up mechanisms – speeds up the distribution of attentional resources. Immediate detection of more and less relevant units of information avoids spending too much time figuring out what the speaker's communicative intention is in the conversation. If this intention is assigned a specific linguistic correlate – i.e. focus or assertion – a major pool of resources is immediately directed to it, and is therefore more rapidly grasped. Thus, the fact that the processing system recognizes focal or asserted information as to be devoted more careful processing prevents the available resources to be dispersed on less relevant contents, with the result of not retaining the more relevant ones.

Similarly, the capability of capitalizing on previous discourse representations, grounding for predictions on the distribution and information structuring of upcoming contents, helps planning processing strategies in advance, which allows coping with the high speed of language processing. When expectations guide sentence processing, it is much easier to figure out what contents are going to be verbalized in subsequent sentences and in what packaging they are going to be encoded. Crucially, we can draw such inferences on the basis of our representation of the communicative dynamism of the discourse context as a whole. For this reason, when expectations are not met, we are forced to revise our pre-conceived analysis of sentence contents and elaborate on a new one, which calls for more time and a major cognitive expenditure.

The earlier and later experimental findings on the processing of IS units prove that the presupposition/assertion and topic/focus oppositions have detectable correlates in the human brain. The diverse empirical scenarios delineated in the psycholinguistic and neurolinguistic traditions of studies may lead to assume that these correlates are fuzzier and less systematic than commonly predicted. Indeed, if the first experimentations on topic-focus structure pointed towards more effortful mechanisms underpinning focus processing, as opposed to topic, some later neurolinguistic studies found out that this feature becomes less clear-cut when the influence of a prior discourse is taken into account. Analogous behaviors have been noticed for the presupposition/assertion dichotomy. Since Hornby, psycholinguistic investigations evidenced a generally less

demanding processing for presupposition, as compared to assertion. However, the ERP recordings presented in Section 4.1 showed that *unexpected presuppositions*, as opposed to expected assertions, tend to involve more effort, expressed by higher peaks in the N400 component. Understandably, given the diverse – and not always convergent – interpretations on the function of N400 modulations in language processing, it is not straightforward to come up with univocal explanations for the involvement of N400 deflections in our results but, for the time being, we can only be content with drawing some *ad interim* conclusions. Among the reasons why N400 peaks may have manifested in response to presupposed information is the linking effect elicited by presupposition which turns out more demanding than usual, because it has no previous contextual antecedent. So, we assumed that the encoding of some new information in the presupposition of the sentence contrasts with the expectation that a textual anchor must be found, when this is not the case.

CHAPTER FIVE

A Bio-linguistic perspective on Information Structure

It is, no doubt, extremely difficult even to conjecture by what gradations many structures have been perfected, more especially amongst broken and failing groups of organic beings; but we see so many strange gradations in nature as is proclaimed by the canon, “Natura non facit saltum”, that we ought to be extremely cautious in saying that any organ or instinct, or any whole being, could not have arrived at its present state by many graduated steps.

[*On the Origin of the Species*, Charles Darwin, 1859

Chapter XIV°, p. 460]

5.1. Preamble

Over the last thirty years or so, studies from different disciplines have been deeply concerned with unveiling the evolution of the language faculty and its complex architecture (Lieberman 1984; Pinker & Bloom 1990; Kirby 1997). The mainstream views on this issue equate language with an evolutionary product subject to adaptive changes typical of other organisms of the living world. Discovering the nature and impact of these changes thus becomes an essential step to look into how they interfered and paved the way for the emergence of language complexity.

Seen from an interdisciplinary perspective, the most widely debated motivations of emerging complexity in human language involve, among other things, the need to:

- (a) exchange information in a variety of contexts;
- (b) achieve cooperation fine-tuning with the interlocutors' conversational behavior;
- (c) speed up message transaction by empowering the information load of utterances;
- (d) construct or preserve common knowledge and assumptions which form the basis for a shared cultural terrain.

These and other pressures are grounded in *external* and *internal* constraints, the former relating to the social groups individuals belong to – the norms, conventions and forbiddances they are subject to as members of a speech community - the latter affecting the structure of the cognitive system in the execution of given linguistic tasks. Although language is a domain where these constraints are particularly visible, they are by no means language-specific.

Pursuant to common trends in evolutionary biology, I will address the aforementioned social and cognitive factors as *nurtural* and *natural* biases, respectively. Traditionally, the term *nurture* indicates the influence of environmental and cultural factors on the development of individual behaviors; on the contrary, *nature* points towards the inborn endowment of the individual, namely, his biological “pre-wiring” developed as the result of genetic inheritance. In the study of human evolution, the encounter between nurture and nature is a necessary one. The complexity of human nature cannot be fully grasped if only natural or nurtural constraints are considered; and we assume that language does not lag far behind in this respect. The nature/nurture interaction we will explore in this chapter is outlined on the level of Information Structure whose manifestation in linguistic messages reflects the action of socio-interactive forces (nurture), on the one side, and the limitations on information processing (nature), on the other side. The organization of the chapter is as follows.

Section 5.2 presents some state-of-the-art literature on the development of topic-focus (or topic-comment) structure in human communication. So far, the only systematic account we have knowledge of is Krifka's laterality model (Krifka 2007), whose theoretical and empirical underpinnings appear controversial in many respects. In Section 5.3, a more extensive discussion of attentional selectivity is provided, together with the two major effects stemming from this limitation: Divided-Attention Deficit and Psychological Refractory Period. Section 5.3.2 lays out some ontogenetic evidence of

the emergence of IS units in child speech. Section 5.4 introduces the evolutionary part of the chapter in which both the socio-interactional and experimental perspectives on IS outlined in Chapters 2, 3 and 4 are built on to delineate possible scenarios of the evolution of the presupposition/assertion and topic-focus dichotomies in language. In Section 5.4.1, the functional shaping of IS units is tackled from a socio-interactional perspective, i.e. as the response to environmental pressures on the transaction of information (especially when questionable information or information about others is involved). Section 5.4.2 sets forth two processing-based developmental accounts reflecting the experimental findings debated in Chapter 3, in which both bottom-up and top-down effects on IS processing are brought home to.

5.2. Earlier accounts

It is by now well established that one of the most striking features of human nature is the functional asymmetry of the upper and lower limbs. As studies so far demonstrated, this property originates from a physiological pattern known as BRAIN LATERALIZATION (Toga & Thompson 2003). Roughly speaking, this property entails differential functions for the two halves of the cerebral cortex. Thus far, still many questions remain unanswered as to when hemispheric specialization begins to show up in human beings.

Ever since Broca's century-old discovery of cerebral asymmetry in language functions, it was believed that lateralization did not emerge before the child honed the ability to understand and produce message strings in his mother tongue. Some later behavioral studies on infants suggested that hemispheric functional asymmetry most probably arises by at least 2-3 months of age (Best 1988), since pre-linguistic input is rich and structured enough to require a complex organization of information in the child's brain.

Studies in primatology (MacNeilage et al., 1984) reported on similar brain asymmetries in higher primates, although they appear definitely more coarse-grained and less specialized. The more systematic asymmetry detected in humans possibly reflects the interaction between hemispheric laterality and highly sophisticated activities

like verbal communication, which might have contributed a far more pronounced differentiation between the two limbs.

By the late Sixties (Annette 1967) and Eighties (Guiard 1987), interest grew in establishing systematic parameters to assess hand preference and dominance in individuals. A diffuse paradigm in studies on motor behavior is Guiard's Kinematic Chain Model (Guiard 1987). Guiard depicts motor differences between the two hands in terms of their spatial and temporal resolution. She argues that the motion of the two hands essentially varies in two respects: (a) the movement of the non-dominant hand is typically executed before the movement of the dominant hand, and the former serves as a frame of reference for the latter; (b) the non-dominant hand produces motions on a more coarse-grained scale in both time and space, whereas the motions of the dominant hand are quicker and more precise.

Building on MacNeilage et al.'s opposition between *frame* and *content* (MacNeilage et al. 1984)¹⁰⁴, Guiard argues that the functional differentiation between dominant and non-dominant hand can be boiled down to the following characterization:

The left hand delineates «frames» into which the activity of the right hand inserts «contents». It is important to recall that no movement can be thought of without a spatial reference (Guiard 1987: 4).

An underlying assumption of this outline is that, in object manipulation, the non-dominant hand typically holds the object, whereas the dominant hand acts upon it.

In a 2007 paper, Manfred Krifka capitalized upon the foregoing findings on human brain laterality to address a further challenging issue: the emergence of topic-comment structure in human communication. Much in the fashion of Reinhart's file card model of information structure, Krifka defines the topic as an entity being selected from the common ground of speaker and hearer and the comment as what is being predicated about this entity. Discursive properties so elucidated allow identifying remarkable similarities between the functions allotted to the dominant and non-dominant hand in the execution of tasks, and the operations typically carried out by topic and comment units in discourse. That is how he sketched this parallelism:

¹⁰⁴The *frame/content* theory was developed by MacNeilage (1998) and MacNeilage & Davis (1996) to account for the way consonants and vowels combine to shape the structure of syllables. This structure is called *frame*, and the meaning or function carried by the created sequence is defined *content*. This modeling has been proposed as a preadaptation for the evolution of language structure and complexity, along with its characterising dual nature.

The aboutness topic “picks up” or identifies an entity that is typically present in the common ground of both speaker and hearer or whose existence is uncontroversially assumed. This corresponds to the preparatory, postural contribution of the non-dominant hand when it reaches out and “picks up” an object for later manipulation. The comment then adds information about the topic, which in turn corresponds to the manipulative action of the dominant hand (Krifka 2007: 83).

The complementarity feature *in nuce* contained in Krifka’s description is precisely what topic-comment structure and human upper limbs seem to have in common. Topic and comment (or focus) are complementary units, in the sense that the successful comprehension of one hangs on the successful comprehension of the other. Each unit contributes to the determination of the informational load of the sentence, and therefore to its pragmatic function in the ongoing exchange, although focus performs a more salient function in this respect (because it conveys the speaker’s communicative intention).

An intriguing, though contentious, implication he derives from this interpretation is that limbs’ functional asymmetry might have embodied a preadaptation for the development of topic-comment articulation in communication.

The similarities between asymmetric bimanual coordination and topic-comment structuring, and the different roles of the two hands in gesturing, suggest that the manual coordination, typical for humans and perhaps for higher primates, may be a preadaptation that facilitated the development of topic-comment structure in communication. The basic idea is: humans and their immediate ancestors have acquired or refined, possibly over several millions of years, the ability to manipulate small objects by grasping and positioning them with the non-dominant hand, and modifying them with the dominant hand. Once established, this way of handling objects in the real world was the model for the treatment of objects in communication (Krifka 2007: 88).

Krifka argues that the plausibility of this developmental hypothesis gains further strength if a gestural origin of language is taken into account. As a matter of fact, the idea that earlier forms of communication relied on the visual-gestural channel has been extensively debated in the scientific literature (Corballis 2003), and studies on animals’ gestural communication as well as later advances in research on sign languages (Stokoe 1960, Cardona & Volterra 2007) have partly substantiated this view.

Obviously, the emergence of language complexity calls for explanations that cannot be exhausted with merely hand-to-mouth developmental assumptions. Many of the design features of human language today are most probably the response to recurrent adaptive problems posed by cultural, semiotic, environmental and cognitive pressures in early humans' environmental niches. These pressures interfaced with one another in all interactive tasks we happened (and happen) to carry out. If the impact of these multiple forces can be easily appreciated in dynamics of phonological, morphological, lexical and semantic change, it is even more noticeable in distributional criteria of information in utterances.

Another critical issue in Krifka's point is represented by the notion of *handedness*, since it denotes a phenomenon which several studies on the subject have often approached with due circumspection. A first point to consider is that brain lateralization is almost never total, and consequently hand dominance is almost never absolute. On a general basis, whether we are right- or left-handed, we occasionally allow the other brain half to lead in the execution of some tasks.

The reason for the caution towards an absolute differentiation of the dominant and non-dominant hand lies in the fact that no systematic criteria are nowadays available that can uncontroversially assess an individual's laterality. In fact, experiments to test both performance and preference of one or the other hand in given tasks have yielded extremely variable results. In particular, as far as performance quality is concerned, Rigal (1992) stressed that practice with specific activities is a crucial factor in refining hand skills ("performances of both hands are very close when one ability is not overpractised", cf. Rigal 1992: 12) and maintained that, although we might prefer to use one hand instead of the other in the production of particular movements, both hands could be used with almost the same efficiency. Other studies (Özcan et al. 2004) have demonstrated both hands' dexterity in a range of different performances, involving grip, strength, precision and sensitivity tasks. Results have shown that depending on the activity, right- and left-handers sometimes displayed differences in the use of their dominant and non-dominant hand, in both time resolution and precision, while sometimes no significant differences could be detected. This means that task difficulty can hardly be gauged in an absolute sense, for a manual operation may be deemed complex by an individual, but not by the other, which means that hand preference often results in subjective and circumstantial vagaries.

Further confirming evidence of this is gained from the behavior of handedness in professional musicians. A number of studies based on psychomotor tests and ERP recordings¹⁰⁵ (Jäncke et al. 1997 and Jäncke et al. 2000) depicted a general neutralization of manual performance asymmetry due to the gradual improvement of the non-dominant hand skills (Jäncke et al. 1997: 429, “The main finding of this study is that consistent right-handed musicians exhibited a reduced degree of hand skill asymmetry [...] The reduced degree of right-hand superiority was mainly due to a left-hand gain and not to a right-hand loss of skills”). Playing instruments, more than any other activity, imposes extensive training of both hands; and, if this takes place between the ages of 4 and 11,

it can be speculated that early hand skill training interacts with cortical organization of hand motor dominance *leading to improved performance of the non-dominant hand* (italics mine) (Jäncke et al. 1997: 430).

Another intuitive, but not trivial, aspect in accounting for the role of handedness is related to the difference between oral and chirographic cultures (Ong 1982). In chirographic cultures – that is, those with a fully-developed writing system - the dominant hand is very often associated with the preferred hand in writing (almost 90% of the world population, in this sense, is right-handed), although this hand often shows very poor performance in other tasks where precision and fine-grained movements are called for. To this, it must be added that Krifka’s model is too narrow and partial in its scope, since it only stresses the speaker’s viewpoint in structuring information in sentences, when the role of the message receiver is likewise important. Indeed, the way outbound information is ranked does not merely express the speaker’s criteria in distributing information states, but also the addressee’s priorities in processing them; and to these priorities the speaker must align with in order to achieve his intended goals in communication.

¹⁰⁵ Interestingly, it has been observed that in professional pianists a smaller amount of neural networks is activated when bimanual activities are performed. On the contrary, in non-musicians the simultaneous employment of both hands relies on more extensive neural activation,(cf. Jäncke et al. (2000: 182): “the highly trained pianists are most likely controlling lesser “degrees of freedom” for these tasks, thus enabling them to control uni- and bimanual movements much more efficiently with smaller neural networks than non-musicians”).

As I will try to explain in the following section, these priorities are conditional upon the selective nature of the human attentional system whose performance is restrained by a remarkable paucity of processing resources.

5.3. *When selectivity matters*

Let us imagine we are looking for a thick, green-velvet book entitled *On the Origin of the Species* written by an Englishman named Charles Darwin. Let us imagine that this book is in a big room full of shelves, stiffed with dozens of other books displaying different colors, shapes and covers, and regarding different topics. The book we are looking for is somewhere in between this mess and is not immediately identifiable at first sight. So, how can we avoid an effort- and time-consuming search?

If we have a clear-cut image of the book in our mind, we understand that some features must be attended to more painstakingly than others, which means that we need to select from the input only those features that are salient in our mental representation of the book. As a result, all books which are not green, do not have a velvet cover, are not about the Origin of the Species and have not been written by Charles Darwin are all the way discarded from our perceptual field. In this way, our attentional frame is narrowed down to those books more or less consistently matching the above mentioned features. Within this reduced attentional frame, we operate further selections helping us reach the intended target¹⁰⁶.

Although apparently cumbersome, this task is carried out fairly automatically, with no particular hindrance or hesitation on our part. However, our capacity to differentiate between relevant and non-relevant external input (a process known as *pertinentization*), and use it to attain given goals, did not evolve in our cognitive architecture as the product of a unique, big developmental step. Rather, it emerged as a response to enduring and recurrent adaptive problems requiring immediate solutions for both individual and social benefits.

¹⁰⁶Givón (2002: 225): “As cognitive psychologists have shown repeatedly, mental representation is a highly selective process. The portion of reality that reaches mental representation can only arrive there via a powerful but narrow and reductive channel, that of selective attention. Such extreme selectivity is just as true of the fully automated visual information system of the retina and optic nerve as it is of the higher cortical information processing capacities that support human language”.

The need to select incoming information and organize it according to parameters of relevance, purposefulness and cost clings to a particular feature of human information processing system, namely its *capacity limitation* (see anticipations in Chapter 1). More precisely, our attentional memory is poorly equipped to allow retention of too many stimuli at once, and any attempt at devoting the same amount of attentional resources to several stimuli simultaneously presented is bound to fail. Actually, since attention distribution between competing stimuli is not possible, some consequence must have derived from this limitation. If we assume that the design of a particular feature is also the result of the function for which it has been selected, the inability to efficiently attend to more tasks at once must have contributed to increasing adaptiveness in information processing. Indeed, this is what Coolidge & Wynn (2005: 8) contended in a recent paper:

Certainly, the ability to attend to relevant stimuli, and filter out irrelevant stimuli, and the ability to make quick and efficient decisions would have been favoured over static processes.

Resource allocation is therefore sensitive to stimulus selection, and only when a stimulus is deemed relevant enough to the attainment of an intended goal is it allotted the majority of the resources available. Calling back our previous example, the thick, green-velvet book by Charles Darwin can be found with relatively low effort only if the non-relevant traits are dismissed from our attentional frame, so that processing energies are expended only for those traits that are more central to the identification of the object we are looking for.

Two of the most extensively debated precipitates of the above mentioned limitations are known as DIVIDED-ATTENTION DEFICIT (DAD) and PSYCHOLOGICAL REFRACTORY PERIOD (PRP), on which a few lines are worth spending.

5.3.1. Divided-Attention Deficit and Psychological Refractory Period

It is generally well accepted that lack of both practice and familiarity with an activity may make it difficult to execute it efficiently; and difficulty grows even further when several novel tasks must be attended to in parallel. As anticipated in the previous section, the reason why the quality of our performance is so deeply sensitive to degrees

of novelty of a task is that attentional resources are too limited to be equally shared among contemporary stimuli or tasks, which is what happens if all of them must be learned from scratch, but not if some of them are already known. This restraint of human information processing is known as DIVIDED-ATTENTION DEFICIT (DAD). In information processing, DAD effects reduction of performance efficiency when controlled processing (i.e. processing carried out with full investment of cognitive resources) is devoted to an amount of sensory stimuli which is greater than actually bearable by our attentional system. Poor performance quality stems from failure to fully allocate resources to more than one stimulus, meaning that none of the stimuli attended to is in fact thoroughly processed.

A rather contentious issue in the domain of cognitive psychology is related to the modifiability of DAD constraints in time. For example, it has been observed that practice strongly induces automation and improves performance (Hirst et al. 1980). If a task is repeated in time, it no longer requires decisions on the part of the doer and is carried out more automatically, that is, falling back on strategies which either impose lesser effort and “cause no interference with [other] ongoing activities” (Hirst et al. 1980: 106). This mechanics has received cogent experimental backing (Hirst et al. 1980, Lien et al. 2006) which led some scholars to raise the question as to whether divided-attention constraints really originate in a fixed pool of resources or in the individual’s level of skill (Hirst et al. 1980: 98). According to this second interpretation, the more familiar we get with some task, the more skillfully we can perform it simultaneously to another. From this standpoint, developing automation abilities enables bypassing the limitations imposed by a so-called *cognitive bottleneck*, thus better succeeding in multi-tasking performance. It must be pointed out, though, that automation helps coping with bottleneck limitations, but does not actually efface them. Lien et al. (2006: 90) put this more straight resorting to the following metaphor:

As a physical analogy of a bottleneck, consider traffic crossing a one-lane bridge. Spacing out traffic could entirely eliminate bottleneck delays, but would not eliminate the underlying bottleneck limitation: Still only one car can pass at a time.

In other words, whatever the automation skills, the cognitive bottleneck is always operating and selective to one novel stimulus at a time. Notably, this bottleneck is a structural deficit of controlled, and not of automatic processes. Since automatic

processes call for a lesser cognitive investment, they are generally engaged to attend to routinized and repetitive stimuli, and do not interfere with controlled processes because they do not vie for the allotment of the pool of resources available.

The properties of these two processing modalities had been first investigated by Shiffrin & Schneider (1977a, 1977b, 1984) who, on the basis of a series of experimental findings, proposed the following characterization (Shiffrin & Schneider 1984: 269):

Automatic processing is generally a fast, parallel, fairly effortless process that is not limited by short-term memory capacity, is not under direct subject control, and performs well-developed skilled behaviors. [...] *Controlled* processing is often slow, generally serial, effortful, capacity-limited, subject-regulated, and is used to deal with novel or inconsistent information. [...] *all tasks are carried out by complex mixtures of controlled and automatic processes used in combination*".

The present-day and evolutionary implications of this two-modality processing are manifold, and certainly have contributed to its emergence in the human cognitive system. For example, Schneider & Chen (2003: 531) claim that controlled mechanisms alone would not have borne the weight of too many inputs to elaborate at a time, so automatic processing mechanisms – being more resistant to external pressures and interferences – (could) allow more processes to occur in parallel.

A further advantage of leaning on automatic processes also stems from the need to cope with the speed of processing rates in natural language, on which a few more points are worth making.

In his lectures on Bio-linguistics, Givón (2002, Ch. 5, p. 163) argues that

one of the most striking facts about human language is the amazingly stable flow-rate of its two major information-processing units: *words* and *clauses*. Whether taken from natural oral communication, psycholinguistic experiments or measurements of neurological activation, the temporal flow of *word*- and *clause*-processing appears remarkably stable, averaging ca. 250 msecs. per lexical word and 1.0 sec. per event clause.

He derived these estimates from the average processing rates of words and clauses in Kalam and English. Kalam is a Papua New Guinea language with both an agglutinative and inflectional morphology; conversely, English words display a definitely more isolating morphological structure. Against the background of human attentional

limitations, Givón (2002: 256) concludes that the extremely fast pace of language processing

imposes severe limits on the contextual details that can be attended to. It also places a prime on transferring as much as possible of the processing load to automated, sub-conscious systems that run faster and in parallel without interfering with the rather narrow channel of conscious executive attention.

In his argumentation, the need to transfer part of sentential information to automated systems reflects the observance of a principle that suggests to

attend first to the most urgent task

In communication, as well as in other non-linguistic activities, the most “urgent task” is most typically identified with the purposeful, new information to be attended to. Therefore, since we have resources for one (novel) task at a time, “the most urgent task” should be immediately detected, otherwise the few resources risk to be wasted, with the result of dismissing relevant information from the input. If automatic channels can be exploited for up-taking contents deemed less relevant, we will have enough resources for attending to other relevant contents.

What the above discussion boils down to is that the inability to divide attention on more tasks is a deficit until we become capable of exploiting automation to elaborate more stimuli at a time. When controlled and automatic cognitive channels are used in combination, more (novel) stimuli can be elaborated at a time, with overall bearable costs for the processor. In this way, only one stimulus is required effortful processing, but more novel stimuli are processed (less effortfully) in parallel.

Another consequence of the structural limitations of the human cognitive architecture is the fact that when two targets are presented at a short interval, processing the first target delays the processing of the second (Sigman & Dehaene 2008: 7585). In the psychological domain, this phenomenon has been termed PSYCHOLOGICAL REFRACTORY PERIOD (PRP). Generally speaking, when an individual is required responding rapidly to two stimuli in parallel (or stimuli close to each other in time) some interference is always likely to occur. When this happens, response time to the

second stimulus is often delayed by several hundred milliseconds (van Selst et al. 1999: 1268).

Experimental findings as yet (Welford 1959; Pashler & Johnston 1989; McCann & Johnston 1992) have highlighted that the PRP effect is triggered by the inability to carry out central operations for two tasks at the same time. Based on investigations conducted with different experimental settings, Navon & Miller (2002) stressed the role of a single serial bottleneck regulating the amount of resources to be allocated to each target stimulus. This restriction produces what Navon & Miller (2002) have called *queuing*, meaning that the second of two simultaneous tasks is postponed or has to wait for the processor to gather the necessary resources to carry on processing.

Similarly to DAD, also PRP constraints may have arisen to meet the need to cope with and categorize the overwhelming environmental input we constantly deal with. The fact that attention discards or postpones stimuli that cannot be thoroughly elaborated ensures processing efficiency. In experiments requiring subjects to bring attention to more target stimuli in parallel, subjects' performance proved to be definitely more prone to error (Hirst & Spelke 1980, Ruthruff et al. 2006).

5.3.2. *Emerging selectivity: ontogenetic evidence on Information Structure development*

What we learned from the psycholinguistic findings discussed in the previous chapter is that the human cognitive system clearly differentiates between more and less familiar aspects of the linguistic input. As already debated, unfamiliar aspects are also more taxing for the processor because they have to be learned from the ground up. However, developmental studies in child language (Bates 1976, Baker & Greenfield 1988, Narasimhan & Dimroth 2008) revealed that it is by attending to new contents that early information structures arise. These studies also demonstrated that children's information structure follows a transition from a new-old to an old-new patterning, which seems to hang on variations in the processing strategies adopted to distribute information in utterances and to represent it in the mental model of discourse. An interpretation that can be adduced to account for this word order shift rests upon the role of context, gaining increasing relevance as linguistic competence grows. In what follows, I will try

to account for this hypothesis drawing upon some studies on children's treatment of new and old information in both comprehension and production of linguistic messages.

Some pioneering investigations on the cognitive treatment of novelty by children were conducted on vocabulary learning. Early in the 1970s, Nelson (1973) observed that the emergence of lexicon heavily depended on the novelty of the referents designated by the words the child encountered. Later on, Lempert & Kinsbourne (1985) further verified that early naming raised in children from selective orienting, where the orienting response was elicited by novelty, change and variability.

Along similar lines, Baker & Greenfield (1988) probed the treatment of novel information in children's speech during the one-word to the two-word stage transition. Observing productions of 2-up-to 4/5-year-old children, they observed that at the one-word stage, children's mono-lexical messages typically expressed only new contents:

When the child is at the one-word stage, researchers have found evidence from both naturalistic and experimentally manipulated studies, that he/she will verbally express the most informative element of the situation at hand, using language to reduce uncertainty (Baker & and Greenfield 1988: 5).

The authors explained this pattern as a consequence of the fact that the child's "illocutionary message" (i.e. his communicative goal) is much more complex than the linguistic means he has command of, which means that he must devote his efforts to the intended purpose of the message, typically represented by new information. As the general purpose of human communication is to convey new contents, it follows "from the informativeness principle that the [one] verbally expressed element is the most variable aspect of the event" (Baker & Greenfield 1988: 5).

At the two-word stage, an incipient old-new/topic-focus patterning starts to appear. A number of studies highlighted that, at this point, novel information is likely to precede given information. Contrary to adults' productions, in children's messages words tend to be distributed according to a decreasing order of interest. Studying the development of the topic-comment distinction in Italian, Bates (1976) noticed that the child does not seem to comply with any particular semantico-syntactic constraint, as word ordering seems to follow a sensori-motor procedure: since novel information is the first to be attended in the cognitive experience, it is also the first to be encoded in the sentence. Bates maintains that this procedure is eventually abandoned when the child learns to

evaluate the listener's informational needs (Baker & Greenfield 1988: 7). In their study, Baker & Greenfield also noticed that not only is novelty the driving condition of children's monolexemic messages, but also dictates the criteria according to which two-word messages are constructed. More particularly, they observed that, at the two-word stage, the two units to be combined in a single message tend to be both new. In other words, when topics are given, they are often omitted, whereas they tend to be verbalized when they refer to inactive referents. After all, this habit parallels adults' common strategies in the verbalization of topics, depending on their degree of accessibility in the linguistic context¹⁰⁷. As already hinted at in Chapter 1, the encoding of topicality is regulated by what Givón (1983) termed a SCALE OF TOPIC ACCESSIBILITY (Givón 1983: 17), going from structurally simpler to more complex forms, that is, from the most continuous/accessible to the least continuous/least accessible topic: *zero anaphora* > *unstressed or bound pronouns* > *R-dislocated DEF-NPs* > *neutral ordered DEF-NPs* > *L-dislocated NPs* > *Y-moved NPs* > *cleft/focus constructions* > *referential indefinite NPs*. Both spoken and written language display this general strategy. An illustration from written language is given below:

(1)

"The whole country about them abounded in beautiful walks. The high downs, which invited them from almost every window of the cottage to seek the exquisite enjoyment of air on their summits, were a happy alternative when the dirt of the valleys beneath shut up their superior beauties; and towards one of these hills did Marianne and Margaret one memorable morning direct their steps, attracted by the partial sunshine of a showery sky, and unable longer to bear the confinement which the settled rain of the two preceding days had occasioned. The weather was not tempting enough to draw **the two** others from their pencil and their book, in spite of Marianne's declaration that the day would be lastingly fair, and that every threatening cloud would be drawn off from their hills; and the **two girls** set off together.

They gaily ascended the downs, \emptyset rejoicing in their own penetration at every glimpse of blue sky; and when **they** caught in their faces the animating gales of a high southwesterly wind, **they** pitied the fears which had prevented their mother and Elinor from sharing such delightful sensations.

'Is there a felicity in the world,' said Marianne, 'superior to this? - Margaret, we will walk here at least two hours.'

¹⁰⁷On a general basis, this assumption seems to run counter the experimental findings according to which the verbalization of new topics would be dispreferred in communication, because they contravene discourse expectations, thus increasing sentence processing demands. It is worth remarking, however, that the encoding of new information in topics – which allows compacting more new ideas in a single sentence – is an economic strategy for the speaker who can avoid resorting to separate independent turns for each piece of new information to be communicated. So, it is basically a speaker-oriented communicative strategy.

Margaret agreed, and **they** pursued their way against the wind, Ø resisting it with laughing delight for about twenty minutes longer, when suddenly the clouds united over their heads, and a driving rain set full in their face. Chagrined and surprised, **they** were obliged, though unwillingly, to turn back, for no shelter was nearer than their own house. One consolation, however, remained for them, to which the exigence of the moment gave more than usual propriety,--it was that of running with all possible speed down the steep side of the hill which led immediately to their garden gate.

They set off. Marianne had at first the advantage, but a false step brought her suddenly to the ground; and Margaret, unable to stop herself to assist her, was involuntarily hurried along, and reached the bottom in safety. [from *Sense and Sensibility*, Jane Austen, 1811, Volume 1, Chapter 9]

As can be seen, after their first introduction by means of full proper names, the two characters (*Marianne* and *Margaret*) are subsequently recalled in the text through Ø-anaphors, pronouns or other proforms like the *two girls*. It can be appreciated that the two proper names are almost never repeated, except when they are contrasted with one another, as is the case of the last paragraph. Here, *Marianne* and *Margaret* realize two contrastive topics (cf. Büring 2003, Frascarelli 2008) and, owing to this function, cannot be recalled via null or pronominal forms, otherwise it would be too difficult for the receiver to understand which of the two characters the comment units are being uttered about (as put in Givón 1983: 11, “If no other topics are present in the immediately preceding discourse environment, i.e. the short erasable file, topic identification is easiest. The more other topics are present in the immediate register, the more difficult is the task of correct identification and filling of a topic, especially if those other topics qualify semantically (in terms of their “selectional restrictions”) for the role within the clause which the topic in question occupies”), as the marginality of (2) shows:

(2)**They** set off. *Ø/**she* had at first the advantage, but a false step brought her suddenly to the ground; and *Ø/**she*, unable to stop herself to assist her, was involuntarily hurried along, and reached the bottom in safety.

On the contrary, if no ambiguity arises from resuming the two referents with less complex forms, direct repetition of the full proper nouns would instead amplify redundancy effects, with possible additional effort for the receiver (cf. Repeated Name Penalty effects¹⁰⁸). Broadly speaking, the use of a full NP is more consonant with the

¹⁰⁸ According to the Repeated Name Penalty hypothesis, following a sentence like *The girl was walking along the seashore*, a subsequent sentence using the fully-fledged NP *The girl* again would increase

expectation that a new, inactive referent is being introduced, but in (3) this expectation is not met.

- (3) **Marianne** and **Margaret** gaily ascended the downs, rejoicing in their own penetration at every - glimpse of blue sky; and when **Marianne** and **Margaret** caught in their faces the animating gales of a high southwesterly wind, **Marianne** and **Margaret** pitied the fears which had prevented their mother and Elinor from sharing such delightful sensations.

Thus the following three parameters – among others - seem to affect the explicit encoding of topical units in an utterance:

- (a) Recent activation of an entity in previous discourse;
- (b) Presence vs. absence of other referents sharing some semantic features with the topicalized discourse entity;
- (c) Inclusion of the discourse entity in a chain of contrastive topics

It follows that the transition from one form to the other in Givón's scale responds to the interaction of two counterbalancing forces: *economy* and *clarity*¹⁰⁹. So, the likelihood for a topical entity to be fully expressed or entirely omitted depends on how easily it can be reconstructed by the receiver while decoding sentence meaning.

Going back to child language, a compelling case study on emerging information structures is that conducted by Narasimhan & Dimroth (2008) on the distribution of given and new contents in early two-word messages. Based on the premise that old-before-new instantiates a basic universal order in natural languages, the authors assessed the extent to which the same principle regulates informational structuring criteria in children's early combinatorial patterns. Testing a number of subjects between 2 and 5 years of age, they observed that, contrary to adults, children massively preferred to encode new information in sentence-initial position. Seemingly, this patterning is displayed even if children's ambient language provides cues to the opposite ordering. It was indeed noticed that the old-before-new ordering appears later on in child speech. As suggested by the authors, this fact can be put down to communicative and/or cognitive biases which are not the same for children and adults.

processing demands (often manifested in larger amplitudes of the N400 signature), as opposed to a corresponding pronominal form (cf. Gordon et al. 1993 and Gordon & Chan 1995).

¹⁰⁹ Language change seen in the perspective of the interplay of economy of effort and clarity traces back to Martinet (1955) who inaugurated this approach in his study of phonetic variations in languages.

Our findings are surprising given that the old-before-new order has been shown to have information processing value for speakers owing to the increased availability of previously mentioned referents for early positioning during speech productions. Children's preference for the new-before-old order demonstrates that the processing considerations influencing linear ordering in adults do not play the same role during the early stages of children's productive word combinations, but develop during later childhood (Narasimhan & Dimroth 2008: 326).

It can then be conjectured that the new-before-old ordering reflects selection preferences in the communicative situation, rather than accessibility degrees of the mentioned referents. On this conception, "children's ordering of new referents first may reflect a propensity to give priority to novel or changing elements in a situation for the purpose of speaking, a tendency that may also be reflected in which aspects of a situation they select for encoding" (Narasimhan & Dimroth 2008: 27).

Another aspect that can be invoked to account for children's deflection from adults' linear ordering of information is the different use of *contextual information*, where by "contextual" I mean cues available in the extra-linguistic situation or in the discourse model, as well as assumptions about the interlocutor's mental states at each utterance time. For example, a good number of studies (Dunn 1988, Karmiloff-Smith 1992, among others) revealed that children's ability to make use of contextual information is generally poor before the age of five. This difficulty is particularly evident in the way children between 2 and 4 use pronominal forms. As is known, in using pronouns adults generally evaluate the cognitive accessibility of a referent for the receiver. This assessment is based on many factors, including the "perceptual availability of the referent in the immediate non-linguistic context and mention of the referent in the immediately preceding discourse" (Campbell et al. 2000: 1338). Added to this is the fact that assessing the accessibility of a referent entails representing the receiver's mental and knowledge states in our mind, something that children before the age of five fall short of doing efficiently (Flavell et al. 1990); and this may explain why they do not get the correct use of pronouns in discourse. Seen from the perspective of information structure and activation statuses, it can be thought that linguistic context has a major influence in adults' information distributional criteria than in those regulating children's two-word messages. But, in what sense would this influence be exerted?

To begin with, linguistic context is more ephemeral than extra-linguistic context, thus keeping track of all the activated referents in discourse is much less straightforward a task. Forming a mental representation of the discourse model entails abstracting from the *hic et nunc* situation and relying on a less concrete and more symbolic communicative dimension. More precisely, discourse results from a particular mental representation of reality. The mental model of discourse allows participants in a conversation to anticipate information and make assumptions about other participants' knowledge states, which empowers our ability to make general predictions on the subsequent development of the interaction. All contents we come across in the linguistic input are related to an established mental model of discourse according to evaluations of familiarity degrees (Givón 2002). Therefore, some contents will be judged as more or less familiar with respect to other contents already belonging to our common ground knowledge and world representation. This mechanism seems to be regulated by the same prototypicality judgments by which we categorize experience (Rosch 1978)¹¹⁰: those elements of experience which share some features with elements we have already encountered will cost less in processing. Those which are more peripheral with respect to already encountered elements will be more demanding.

It is widely assumed that the ability to capitalize on our interlocutor's mental states is regulated by the well-known THEORY OF MIND hypothesis (ToM, Premack & Woodruff 1978). It can be thought that, in the absence of this ability, children's conception of context is basically that of an external situation in which they select referents and verbalize propositions about them: the *hic et nunc* usage of context hinted at before. So, the child forms representations of the discourse model which he can control – and keep track of – less efficiently than adults can do. (A mental representation of the discourse comprises not only what we know at any given moment of the interaction, but also what we assume the receiver already knows. This second aspect requires the ability to attribute mental states to other interlocutors.)

¹¹⁰This way of organizing input information reflects a principle that Elenor Rosch calls cognitive economy (Rosch 1978). According to this principle, the human processor wants to gain as much information as possible from the environment while conserving the finite number of resources available. To achieve this maximisation, the processor has to categorize a stimulus not only as similar to some other, but also as different from this, to some extent. As Rosch put it, a major purpose of categorization is to reduce “the infinite differences between stimuli to behaviorally and cognitively usable proportions. It is to the organism's advantage not to differentiate one stimulus from others when that differentiation is irrelevant to the purposes at hand” (Rosch 1978: 29).

Thus, the tendency to attend to novel inputs first may be an efficient and less-consuming strategy for the child's emerging cognitive architecture. Assumingly, this architecture is still unable to handle and organize large amounts of information in short periods of time, which is a task adults can carry out more rapidly and on the basis of a highly-structured encyclopedic knowledge, facilitating top-down inferences and the formulation of predictions. In children at a pre-ToM age, the interlocutor's mental model of discourse still has poor significance for the attainment of their communicative goals, so the structure of their messages is not adjusted to the interlocutor's processing mechanisms, but rather reflects the children's particular way of knowing things, with novel contents occupying a prominent position in their mind as well as in their linguistic messages. By the time the child learns to coordinate with the receiver's mental model of discourse, his criteria in distributing information will essentially comply with the strategies that more efficiently support his interlocutor's ability to recognize and compute his communicative intentions. The placement of more familiar contents before less familiar ones in a sentence precisely meets the interlocutor's expectations of informational continuity and linearity with respect to his established mental representation of the ongoing discourse.

5.4. *A closer look at evolution*

When dealing with the big, puzzling problem of language evolution, scholars – be they philosophers, linguists, cognitive neuroscientists or behavioral psychologists – are always faced with the daunting problem of adopting a “language-to-brain” (Christiansen & Chater 2008) or a “brain-to-language” approach (Pinker & Bloom 1990, Bickerton 1995, Jenkins 2000). By and large, both views seek to delineate the most plausible direction of the emergence of language structure and complexity. With “direction” I mean the interpretation of language complexity as either the *cause* of some precise brain complexity, or as the *consequence* of it. A high-pitched debate on this issue has tied down linguists working within different theoretical and empirical purviews. On the generative side, it has often been contended that the human brain has developed devices specialized for language acquisition and use (Lightfoot 1999). This viewpoint holds that these devices have been selected for purposes of language use only (e.g. the Language Acquisition Device hypothesized by Chomsky 1965; Briscoe 2000). On the functional

side, instead, language is believed to be subserved by domain-general mechanisms, subsequently co-opted to support linguistic activity (Croft 2001, Givón 2002, Christiansen & Chater 2008).

At the basis of this ideological branching is the conundrum posed by assuming or disclaiming the existence of a Universal Grammar (UG). As is known, Chomsky (1980) portrayed UG as a set of grammatical principles obtaining for all languages and all language users. The condition for these principles to hold for all natural languages and all speech communities is that they consist of abstract rules, not constrained by any particular functional biases. Evolutionarily, this standpoint collides with the assumption that language complexity might have resulted from natural selection and adaptively-motivated changes (Pinker & Bloom 1990, Kirby 1997, Simone & Lombardi Vallauri 2010).

If they do not entirely reject a universal apparatus of grammatical rules, functionalists tend to “dovetail” the universality of these rules with the general design features of language users and use, rather than to those of languages themselves. Notably, functional linguists are interested in explaining *what is universal in speakers and hearers* that make (and made) languages so similar to one another. This concern pushes the search for universals towards assessing the role of perceptuo-motor, social, pragmatic and cultural constraints on language evolution. A broadly debated hypothesis is that, in time, language has been shaped to adapt to these “endogenous” and “exogenous” forces (Christiansen & Chater 2008)¹¹¹ to a greater or lesser degree. The most intuitive reason behind this belief is that language must be learned by the forthcoming generations, and, by the same token, linguistic messages must be understood by the participants in an interaction. In order for these conditions to be met, language/s must have adapted to the nature of language users, especially to their learning, processing and cultural priorities. If we look at language as a BIOLOGICAL SYSTEM – as is often the case in most evolutionary theories in linguistics studies – we might assume that it evolved in time to adapt to the constraints imposed by our physiological *paraphernalia* and the social information¹¹² deriving from our cultural niche.

¹¹¹Christiansen & Chater (2008: 490): “the structure of human language must inevitably be shaped around human learning and processing biases deriving from the structure of our thought processes, perceptuo-motor factors, cognitive limitations, and pragmatic constraints”.

¹¹²The term *social information* is here intended in the sense of Mesoudi et al. (2006: 407), that is, as information concerning interactions and relationships between a number of third parties.

So far, different components of language structure – from sounds to syntax – have been addressed in an evolutionary perspective. Krifka’s account presented in Section 5.2 can be regarded as the first systematic attempt at proposing a developmental route for Information Structure. Although intriguing in its general premises, this outline seems to neglect some far-reaching implications of realizing informativity degrees in utterances. The stance taken in the following sections suggests that these implications are grounded in both social and cognitive pressures, the former looking on the individual’s profile as a social interactant in the speech community (*nurture*), the latter highlighting his nature as information processor, relying on an extremely capacity-limited memory store (*nature*).

5.4.1. Information Structure as shaped by nurture

One of the most challenging issues for social anthropologists interested in disclosing human complex behaviors is explaining the rationale behind the so-called MACHIAVELLIAN or SOCIAL INTELLIGENCE (Humphrey 1976). The Machiavellian Intelligence theory states that brain expansion and advanced cognitive processes in humans and higher primates are adaptations to the “special complexities of their social lives”, rather than to less social environmental problems like foraging, finding shelters or territory defense. However, it is now common knowledge that man is not the only social animal on earth, which is why some scholars claim the term “social intelligence” to be less appropriate to refer to this particular ability of humans and higher primates. (Humphrey 1976, Byrne & Whiten 1988). In fact, the crucial aspect the designation “social intelligence” really tries to capture is the complex nature of human societies, characterized by shifting alliances and coalitions (Mesoudi et al. 2006), as well as manipulative and sometimes deceptive relationships interwoven in particularly intricate and sophisticated ways.

In his masterpiece, *Il Principe* (1513), Niccolò Machiavelli refers to this ability as political intelligence, meaning a particular art of manipulation in which the others are socially manipulated in order to meet the benefits of the user. The most noteworthy behaviors to be associated to Machiavellian Intelligence are manifested, among others, in attitudes of: (i) blaming and forgiveness, (ii) lying and truth-telling, (iii) making

alliances, (iv) making promises, (v) misleading and misdirection. These and other behaviors can be subsumed under more general abilities such as folk psychology, mind-reading and coordinated cooperation.

As our interactions are constantly regulated by the adoption of the above mentioned behaviors, Humphrey (1976) defines the human species as an extremely efficient calculating creature:

Social primates are required, by the very nature of the system they create and maintain, to be calculating beings; they must be able to calculate the consequences of their own behavior, to calculate the likely behavior of others, to calculate the balance of advantage and loss – and this all in a context where the evidence on which their calculations are based is ephemeral, ambiguous and liable to change, not least as a consequence of their own actions. (Humphrey 1976: 309)

Broadly speaking, the social calculations individuals make hinge on the priorities imposed by the local environment. These priorities may change depending on the size of the group, its internal structure, its relevant institutions and historical and cultural background. Meeting these priorities amounts to increasing one's fitness and chance for survival within the group, strengthening its internal cohesion and competitiveness in interdemetic selection¹¹³.

It is generally agreed upon that an organism's response to external pressures – whatever their nature – triggers behavioral modifications that increase his chance of outwitting potential competitors in the struggle for survival. If the newly-selected modification turns into a successful solution to the environmental problem to be confronted, this trait tends to be reinforced and later retained in the socio-cultural endowment of the organism¹¹⁴. This mechanism brings about a process Lewis (1969) called CONVENTIONALIZATION, by which more stable and recurrent practices are rooted in a community because of their selective success.

Conventions depend upon a special kind of support from the wider community. For a behavior to become conventional in Lewis's sense, it must be common knowledge in the community that all

¹¹³On top of that, socio-cultural identity and identification with other group members is a strong propelling force of an individual's norm-abiding behavior (Castelfranchi 2000).

¹¹⁴Orbell et al. (2004: 4): "In an evolutionary model, there must be a process by which individuals' actions during their lifetimes are translated into relative reproductive success, thus that allows for selective retention in the population of whatever attributes produced that success".

will conform to it on the grounds that they expect all others also to conform. [...] *Thus speakers in general are considered to operate according to a global coordination process sensitive to constraints arising from their common knowledge of that community's language system* (Garrod & Doherty 1994: 185). [italics mine]

Garrod & Doherty (1994) further remark that conventions typically arise out of precedents – members previously faced a particular problem within the group and adopted solutions to avoid facing it anew – or out of predictions on the social consequences of a problem they have not faced yet.

In the domain of human communication, a compelling example of how languages responded to socially adaptive pressures is offered by the grammatical encoding of evidentiality. In Chapter 2, we have seen that in many world's languages, evidentials are used to show one's trustfulness and reliability, which increases and preserves his/her social status in the community and in the opinion of others. Aikhenvald (2004), for example, discusses the social importance of a correct use of evidentials in some Central American and Amazonian communities such as Jaqi (Central Andes), Tariana (Arawakan, Brazil) and Tucano (Tucanoan, Amazonas). Among the Jaqi people, "a minimum competent use of discourse devices – [to which evidentials belong] – is a prerequisite to a claim to human status" (Hardman 1986: 336). Similarly, in Tariana- and Tucano-speaking communities, an individual's status in the community correlates with the ability to speak the language correctly. Precisely, in these societies, one's identity is defined by the language he/she inherits from his father, and the more proficient his level of use, the more authentic his Tariana or Tucano identity in the opinion of others. As remarked by Aikhenvald (2004), in societies like these, being precise about one's information source really has become an *adaptive strategy selected and retained by speakers to strengthen their affiliation with the community*. The adaptiveness of evidentials in the regulation of conversational dynamics gains further strength if one considers the relatively small size of the communities in which complex evidential systems have diffused. In these social realities, not complying with a correct use of evidentials amounts to legitimizing other members to smear the speaker's reputation¹¹⁵. Therefore, evidentials may have emerged as discursive features enabling

¹¹⁵Aikhenvald (2004: 359): "Being specific in one's information source appears to correlate with the size of a community. In a small community everyone keeps an eye on everyone else, and the more precise one is in indicating how information was acquired, the less the danger of gossip, accusation and so on. No wonder that most languages with highly complex evidential systems are spoken by small communities".

speakers (in given speech communities) to dispense precise information about one's source of knowledge, with the result of pre-empting misunderstandings or uncooperative conversational moves.

Evolutionarily, the retention of a novel feature in the structure of a biological organism is dictated by *habit* (Mayr 1976: 106, "The new habit often serves as the pacemaker that sets up the selection pressure that shifts the mean of the curve of structural variation"). Drawing on Hodgson (2009), "habits are submerged repertoires of potential behavior, and they can be triggered or reinforced by an appropriate stimulus or context". Habits stem from past experiences and produce automated behaviors in response to recurrent problems. In automatizing behaviors, habit reduces fully rational deliberation on given sensory inputs, thus allowing humans "to cope with complex sensory environments" in which large amounts of information are exchanged. As noted by Hodgson (2009: 6), the use of habits becomes more and more necessary as the complexity of the environment grows¹¹⁶. And growing complexity means growing informational variation and enhancement of the socio-cultural thread. So, habit meets the need to plan efficient behavioral responses to what the pressures of decreasing informational stability require.

In Chapter 2, we reported on some of the most salient characteristics of societies of intimates, portrayed by Givón (2002: 301) as "our bio-cultural descent". We have learned that, in these communities, "new information spreads rapidly and soon becomes universal, due to proximity, intensive daily contact and small group size". As argued by Givón (2002: 316), this makes the communication of new contents particularly costly since, when they are questionable, false or about other group members, their potentially negative effects may jeopardize the socio-interactional status of the speaker.

To some extent, the fact that in some social realities the transaction of new contents is costlier than in other contexts may seem to contravene the assumption that human communication is based on the exchange of new information. However, because of their small-scale dimension, in these societies, not only is communicated new information not neutral (because its effects – whether positive or negative – have immediate

¹¹⁶Ibid. p. 6: "The higher the ratio between the complexity of the environment, on the one hand, and the informational and deliberative capacities of agents, on the other, the more that agents have to rely on something like habit, and the more efficacious it becomes in the circumstances. Habit is a vital psychological mechanism to deal with complexity and change".

repercussions on the rest of the community), but its source is also more easily identifiable by the other members¹¹⁷.

“When an individual belongs to a relatively small group in which many people have direct experience of her qualities and shortcomings and where they can express and compare their opinions with some freedom, then her actual behavior may play an important role in reinforcing or compromising her reputation. Of course, gossips may themselves be incompetent or not quite honest, but ordinary epistemic vigilance is relevant to assessing both gossipers and gossip. [...] When an addressee has to decide whether or not to believe an unfamiliar source of information, she may have no other basis for her decision than her knowledge of the source’s reputation, which she is unable to assess herself and, which she is likely to accept for want of a better choice” (Sperber et al. 2010: 381).

If a speaker turns out to be an unreliable source of some information, his socio-interactive profile becomes more vulnerable to addressability and critical judgment. Obviously, this does not act like an outright ban on the transaction of new information – as this would deprive communication of its primary reason – but, it is possible that, in given social realities or communicative situations, caution and avoidance of commitment to truth have become more stringent concerns for a successful communication. (This acquires some plausibility if we consider the socio-cultural structure of primary groups, where almost all private and public contexts are socially shared¹¹⁸, meaning that any attempt at modifying them is under the direct control and vigilance of the other group members.)

¹¹⁷ The following passage from an ethnological record (Grottanelli Vinigi 1966) crucially zeroes in on this point: “Besides rigid provisions imposed by tradition, other reasons induce members of a community to conform with social norms in small [ethnological] societies. Here, the consciousness of cultural variability across time is reduced to a minimum, due to the absence of a written tradition. Isolation reduces contacts with peoples and groups of a different culture. *The demographic exiguity entails that the individual is known by the majority of the people surrounding him, so that his behavior and actions never elude the other members’ vigilance.* In these environments, the individual does not have many opportunities to learn about the existence of traditions other than his: the only forms of life, production and behavior are those he learns from his companions, who have grown up observing the same social constraints. In these cases, any intention to depart from tradition is lacking, since the individual knows nothing else besides his own tradition”. (Grottanelli Vinigi 1966: 323) [italics mine]

¹¹⁸ Cf. Krier https://www.youtube.com/watch?v=4vZpf9HD_ms, “The primary group is the world, the social world. Hence, the people that you work with are also the people you tend to live with, the people you’re related to, the people you worship with, the people you celebrate with, the people you grieve with”.

Now, it can be cogitated that, in time, the caution exerted on new information and its social implications may have paved the way for the emergence of *automated speech behaviors* by which different epistemic stances taken by speakers towards contents found possible correlates in the language system and were more suitably adopted in compliance with the requirements of the socio-interactional task at hand. These linguistic correlates possibly resulted from *grammaticized* or *exapted* linguistic material whose design reflects the function they have been selected to fulfill: *modulate degrees of epistemic commitment to the truth of some information*¹¹⁹. Orbell et al. (2004) formalized this conception in their principle of RATIONALITY IN DESIGN, laid out as follows:

A focus on design requires asking a series of engineering questions, most importantly about the *correspondence between the problem to be solved and the mechanism to be “designed” by natural selection to solve it*. Granted that a particular adaptive problem was a repetitive part of the ancestral environment, what design solutions has natural selection produced in response? And thinking as a “reverse engineer”, what adaptive pressures in the ancient environment are most likely to have led natural selection to “design” particular complex structures – presumed “adaptations” – that we observe today? (Orbell et al. 2004: 14) [italics mine]

With respect to our discussion, we can recast Orbell et al.’s question in the following way: granted that a safe transaction of information represented a possible adaptive problem of our ancestral environment and that - in a spirit of social cooperation – the effects of questionable contents or contents about other members should be limited to some degree – what remedy (among others) have selective pressures designed in human language to cope with this constraint? In the follow-up, I will try to answer this question drawing on some of the issues addressed in Chapter 2. On this purpose, a quick recap of speaker attitude evidentiality and its correlation with IS phenomena will be worth a few lines.

Following Mushin’s (2001) classification, we used the notions of *personal experience stance* and *factual stance* to indicate respectively a condition in which the speaker presents himself as a direct, first-experience source of some information and a condition in which information is communicated as shared knowledge, with both the speaker and receiver as its source. In terms of challengeability, a personal experience

¹¹⁹This passage entails that a particular trait is first spread within a single generation and then passed onto the next generations.

stance renders some information more challengeable because the speaker is more strongly committed to its truth, whereas with a factual stance, the challengeability of information is reduced because both the speaker and receiver are committed to its truth, and the speaker is then not pointed at as its only epistemic source. I discussed plausible analogies between these stances and the discursive properties of IS units, proposing an integrated account of evidentiality and IS. I described assertion and focus as the outward expression of a personal experience stance because they package information *subjectivizing* the speaker's perspective on it. I invoked cooperation rules and subjectification processes to depict how the assertion or focalization of contents delineates the speaker as the "principal author" of their truth-conditional value.

By contrast, presupposition and topic have been outlined as the linguistic manifestation of a factual epistemic stance. With presupposition, this stance is conveyed by the expectation that some information is already shared by the receiver; for topic, discourse givenness is a more likely condition for epistemic factuality. With this in mind, the following questions can be raised: in what way did presupposition/assertion and topic/focus prove adaptive to meet the requirements of "controlling" the social effects of communicated new information? And, in what way can the discursive properties of these strategies be mapped onto the *rationality of design* principle set out above?

In order to commonsensically address the first question, it might be useful to resume some of the achievements of the behavioral studies discussed in Chapter 3. What these studies revealed is that interlocutors are generally less bound to address presupposed contents, relative to asserted ones. These results seem to correlate with the perception of *sharedness* induced by presupposition, which encourages the receiver to "feel" committed to the truth value of some information, thereby accepting it. As pointed out by Saussure (2013), this effect characterizes shared and unshared presuppositions alike ("presupposition accommodation prompts for the commitment of the Hearer to its truth value", Saussure 2013: 3). Because of its involvement in the modulation of illocutionary degrees, I assume that topic features analogous properties in this respect. Then, it can be thought that, because of their (implicit) potential to reduce content addressability and challenging behaviors on the part of receivers, presupposition and topic turned out to be an advantageous and adaptive solution to convey new information with little or no commitment on its truth. In this way, any questionable information or information about

other individuals communicated via presupposition or topic is more likely to escape the receiver's epistemic vigilance (Sperber et al. 2010) with a consequent safeguard of the speaker's socio-interactional role in the ongoing conversation. The speaker therefore mitigates the perlocutionary impact of a proposition showing himself a cooperative and "convention-abiding" communicator.

When information is communicated with relative confidence on its truth – so that commitment and responsibility can be taken on by the speaker with no fear to face receivers' challenging reactions – focus and assertion are the most suitable and adaptive packaging to show this stance, because they bear the epistemic meaning that some information is being communicated by the speaker as the illocutionary purpose of his message and therefore as knowledge intended to modify the receiver's common ground. It follows that challenging reactions are typically much stronger when attempts at modifying the receiver's status are on display (Lombardi Vallauri & Masia 2014: 162):

If there is something that can raise a critical reaction in humans, it is the recognition of any attempt (on the part of someone else) to modify their status. This is what defines an assertion. It is an admission that you consider the addressee unaware, and an attempt to modify his/her status into that of being aware, and to become a believer. This may raise a critical reaction, such as "you want me to believe X, but exactly because you want that, there is probably some drawback for me; so, I'd better carefully evaluate, and preferably reject X. This is especially true when the addressee has reasons not to trust the speaker, or to suppose that he or she has some interest or some advantage to be drawn from the addressee, as is typically the case in public communication, contrary to what happens among friends, etc.

So, the entailment that critical reaction is more tightly associated with the presentation of some information as assertion or focus in the sentence provides for an answer to the second question above. In other words, because presupposition and topic present some content from a factual point of view, their design features fit well the speaker's intention to reduce the receiver's epistemic vigilance and critical judgment on that content. Similarly, by encoding some information from a more subjective, experience-based perspective, the design of assertion and focus suits the speaker's intention to increase his commitment and certainty on the truth of that information.

In the view herein presented, the epistemic functions of the informational dichotomies examined can be thought to have been either *selected* or *exapted* in verbal communication. Put differently, the units of IS may have originated in linguistic

messages under the pressure of forces of a different kind (cf. for example, processing forces such as those discussed in the following sections) and were subsequently co-opted to mark out epistemic stances. So, from a socio-biological perspective, it can be hypothesized that

*presupposition and topic have been selected or exapted in communication to indicate a **factual** stance on some information*

*assertion and focus have been selected or exapted in communication to indicate a **personal experience** stance on some information*

As strategies that suitably responded to the “social need” to modulate one’s stance on some information, the evidential function of IS categories became an *acquired character* of the language system to be culturally transmitted from one generation to the other. This process parallels other phenomena that in evolutionary biology have been commonly referred to as BALDWIN’S EFFECT (Baldwin 1896) by which variations that proved adaptive for a culturally established environment are fixed in an organism (e.g. language) and are then passed on to the forthcoming generations. If language and its components change in time to better adapt to the constraints of language users (Simone & Lombardi Vallauri 2010, 2011) and those issuing from the local environment (i.e. the social and cultural niche), the design features of present-day information structures reflect the cognitive and socio-cultural functions they accomplish in communication. As for the latter functions, the following steps can be theorized:

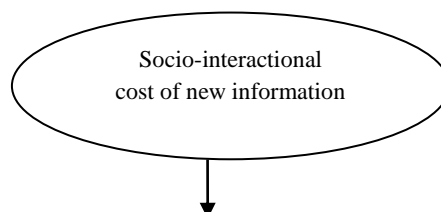
1. In given social realities, and/or in given communicative situations, the speaker’s ability to freely modulate attitudes towards the contents exchanged proved to be particularly useful in the attainment of cooperative interactions (because this allowed speakers to curb face-threatening effects in communication and consequently preserve the interlocutors’ socio-interactional status).
2. Based on the degree of commitment the speaker intends to take on communicated information, he can either opt for a *personal experience stance* or a *factual stance*. Correspondingly, in the former case the information would be expected to be

communicated via **assertive** or **focal** packaging, whereas in the latter case it would expectably correlate with a **presuppositional** or **topical** packaging.

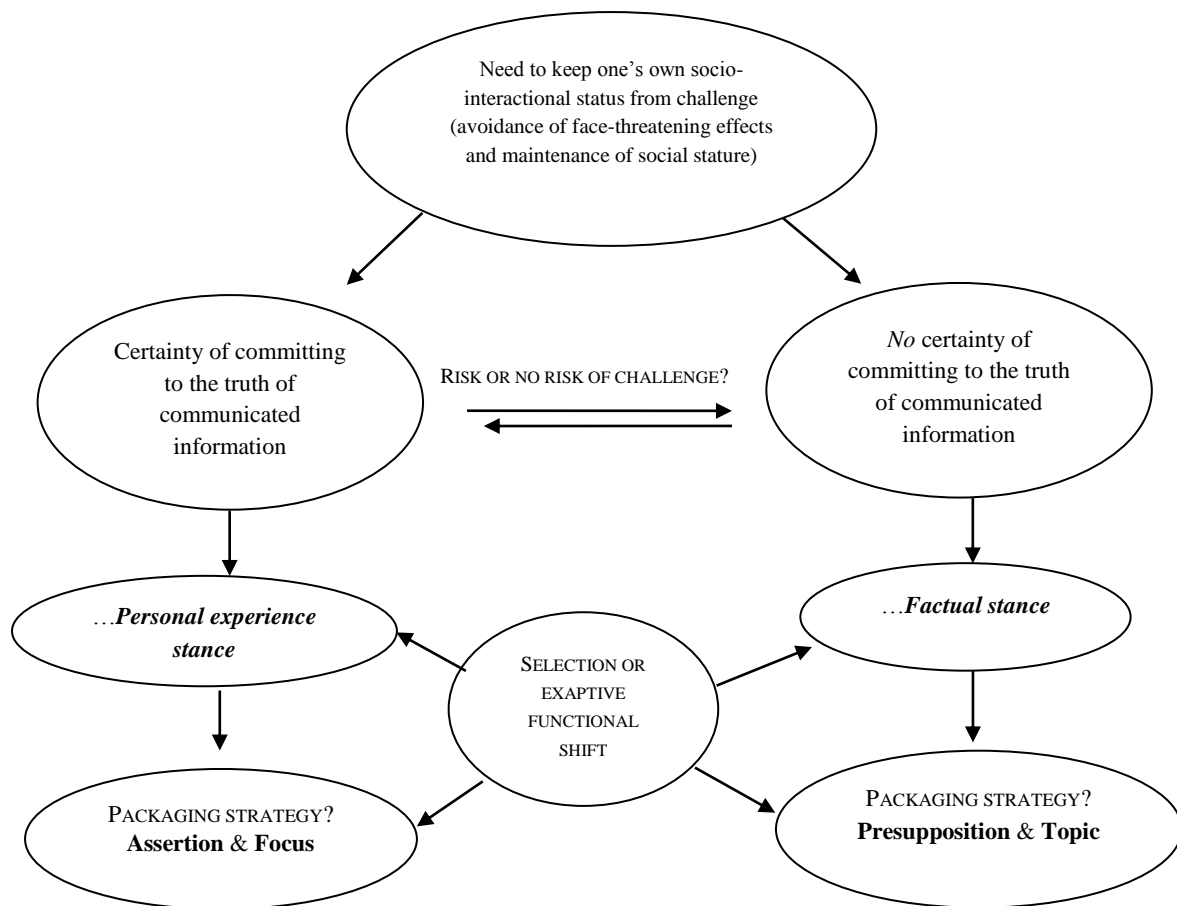
3. From a broader perspective, the association of information units to these epistemic functions may have followed the route of *selective* or *exaptive* processes. That is, the development of assertive/focal packaging may be attributed to its being fit to mark a personal experience evidentiality and, by the same token, presuppositional/topical packaging developed because of its utility to convey a factual evidentiality.
4. Taking a different tack, it is possible that the encoding of these epistemic meanings resulted from a **functional shift** by which other original functions of information units (possibly inhering in their processing underpinnings) have been later exploited to indicate degrees of speaker's commitment on sentence contents. In this sense, a personal experience evidentiality would have found its way into assertive/focal packaging because this "clothing" tends to instruct to a more attentive processing, and factual evidentiality would have found expression in presuppositional/topical packaging because of its likelihood to induce a less attentive processing¹²⁰.

The foregoing passages are schematized below.

Figure 9. *Selection (or exaptation) of IS from a socio-interactional view: mapping IS units onto evidential meanings*



¹²⁰Since, as already said, factual information is generally assumed to be already shared by both interlocutors, it need not be processed carefully. On the contrary, information communicated from a personal experience stance – entailing a stronger commitment on the part of the speaker – is logically less expected to be already known by the receiver, meaning that it is bound to call for more attentive processing.



Now, calling back the opening remarks of this section, it stands to reason that, in the absence of a Machiavellian Intelligence proper, the ability to calculate the social effects of our actions, and choose epistemic stances accordingly, would have been impossible for the human species. On the contrary, since man is a socially intelligent animal – and this makes him “differently social” from other social beings – he can coordinate his thinking, plans and actions with those of other conspecifics. Needless to say, also mind-reading abilities (Premack & Woodruff 1978) are reflected in man’s socially intelligent behaviors, as the chance of planning the most successful behaviors or communicative responses resides in how deeply he can represent other individuals’ mental states in his mind and correspondingly fine-tune with them.

The socio-interactive function delineated for the presupposition/assertion and topic/focus pairs motivates an interpretation of the evidential features of IS as a “social

heredity”¹²¹ accumulated through repeated communicative behaviors. This heredity somehow bridged the gap between the pressures from the socio-cultural environment and the need to select the most adaptive responses to them. As highlighted by Mark Baldwin (1896) in his seminal paper, a great number of features characterizing our behavior and distinguishing it from that of non-human species must be entrusted to the socio-cultural endowment we inherited from previous adaptive changes. The following passage is particularly revealing on the role played by socio-cultural, i.e. *nurtural*, biases on the emergence of human complex behavior:

Some other source is necessary besides natural inheritance. On my hypothesis, it is found in the *common or social standards of attainment which the individual is fitted to grow up to and to which he is compelled to submit. This secures progress in two ways: first, by making the individual learn what the race has learned, thus preventing social retrogression, in any case; and second, by putting a direct premium on variations which are socially available* (Baldwin 1896: 539). [italics mine]

On balance, from the point of view presented in this section - which does not claim to be the only one¹²² - the design features of informational articulations in sentences may have been shaped (among other things) by socio-interactional constraints on the communication of (new) information. In this sense, the categories of IS can be viewed as the most immediate and (arguably) universal strategies speakers can implement to differentiate perspectives on contents. So, the correlation between IS and the encoding of evidential meanings may open a path to the explanation of *how sentence structure might have been shaped by nurture*.

5.4.2. *Information Structure as shaped by nature*

The foregoing discussion allowed us to appreciate a particular domain in which the *form-function* mapping shows up in language structure. Such a domain is defined by the way IS categories are used to convey particular evidential meanings in communication. We have seen that these meanings relate to perspective-taking strategies by which

¹²¹This term has been taken from Baldwin (1896: 553) with reference to the acquisition of functions from the local environment, and it is also considered as a method of determining phylogenetic variations.

¹²²As we will attempt to demonstrate in the following section, also – and most importantly – cognitive pressures might have played a crucial role in molding sentence structure according to degrees of informativity. Seemingly, the socio-interactional pressures here described may have operated independently of cognitive constraints or they may have exploited them, to a lesser or greater extent.

speakers take different epistemic stances on the contents communicated in discourse. From our general framework, we can define these biases as EXOGENOUS, because they depend on habits regulated by local environmental forces (e.g. social cost of new information, face-threatening effects, cooperational constraints, etc.).

Besides influences from the environment, the grammatical output of automated communicative behaviors is also a reflection of our capacity-limited processing system. Grammar, and the devices it generates to provide dedicated encodings to given meanings, is an efficient tool “to compensate the limitations of short-term memory and power of processing” (Lombardi Vallauri 2004). As Lombardi Vallauri (2004) pointed out, given the time restrictions in sentence processing and the limited amount of resources available, deliberating on the use of new devices on the spot “every time one has to translate a thought into an utterance” is not feasible¹²³ (Ibid.: 381-382).

It is better to have routines one can rely upon, in order to “work automatically”. [...] The reasons for the establishment of regularity, no matter of what kind, are therefore, above all, economic in nature. It evidently allows us to reduce the mental load during coding. If speakers were obliged, for every utterance, to decide *ex novo* where to put every element of the sentence and how to signal their functions, they would consume far more energy and would probably speak far more slowly than they do, relying on the habit of conforming to the already established rules of grammar, not to mention how difficult the task of interpretation would be for the addressee (Constraint 9).

Seemingly, grammar is another domain in which the exploitation of *automatic* and *controlled* mechanisms may have proved to be useful and adaptive. (As suggested by Givón 2002, newly emergent grammatical structures may originally have engaged controlled processes and, correspondingly, more effortful cognitive operations. Once learned and stabilized in the language system, the production and processing of these structures was taken up by automatic mechanisms, reducing mental effort and freeing controlled channels for new structures to be learned.)¹²⁴

So the rationale behind the grammatical architecture of natural languages bears on the need to automatize uses and strategies that adaptively responded to the particular

¹²³In this respect, Kirby (1997: 38) observes that “input systems are surprisingly fast. This speed of operation is linked closely with mandatoriness. [...] Time is not wasted making up our minds”.

¹²⁴Givón (1979, 1989, 1993, 2002) maintains that, through the exploitation of automatic processes, context-regulated communicative habits are converted into grammatical rules that speed up information processing and reduce error rate in content transaction.

communicative needs of a speech community, as well as to some particular constraints of language users¹²⁵. These *grammaticalized automated responses* constitute the design features of a language and, from a wider perspective, of the human language faculty itself. Quoting from Simone & Lombardi Vallauri (2010: 210), these features can be identified with “(a) the physical constitution of language users, and in particular (b) their bio-psychological equipment, (c) the material stuff it [language] is made of, and (c) the extra-linguistic context where it [language] operates”.

Contrary to popular ideological trends in generative approaches – according to which the structure of language has no significant relation to the physical endowment of the language user (Chomsky 2005) – functionalist currents of research do stress the role of speakers’ physiological machinery in shaping language structure and its change in time. Differently than the constraints accounted for in the preceding section, I will refer to these natural constraints as ENDOGENOUS, because they bear upon the limits of the human being as information processor, and are therefore part of his *congenital*, rather than *social*, heredity.

Based on the experimental findings discussed in the previous chapters, I claimed that cognitive biases on information processing manifest in two ways which, borrowing a terminology from cognitive psychology, I referred to as *bottom-up* and *top-down* modalities. I have argued that bottom-up mechanisms are bound to be induced when sentences are processed without pre-established context-driven expectations (as in some experimental paradigms), or when they are all new in the communicative situation. We have seen that when this modality is relied on, processing follows the instructions provided by packaging, according to which focus and assertion instruct to more effortful decoding than topic and presupposition. By contrast, top-down mechanisms are guided by expectations induced by a previous discourse context that grounds for the anticipation of both activation degrees and information structure of subsequent sentence contents. It has been contended that, in this condition, the cost of sentence processing also hangs on how consistent the informational articulations instantiated are with respect to pre-conceived discourse representations. The more consonant the information structure with previous expectations, the lesser the effort required of the receiver to process the information carried by the sentence.

¹²⁵Cf. also Hawkins’s remark in this respect (2004: 3): “Grammars have conventionalized syntactic structures in proportion to their degree of preference in performance, as evidenced by patterns of election in corpora and by ease of processing in psycholinguistic experiments”.

Although still much uncertainty resides on the precise neurophysiological underpinnings of IS categories in the brain, both bottom-up and top-down mechanisms seem to be relevant to the processing of information units. For this reason, I propose to discuss the implications of both strategies in the evolutionary accounts that follow.

5.4.2.1. Processing effects on the emergence of IS units: The role of bottom-up (or data-driven) processes

In the preceding sections, I often touched upon the issue of the paucity of resources constraining our working memory system. Far from being a “uniquely human” property of information processing, this constraint is particularly visible in human language and in the way it works in communication.

It is by now widely acknowledged that some communication systems used by animals are unusually sophisticated, but none of them can be equated with human language in terms of recursion, creativity, complexity, flexibility, variation across time and space. What is more, language adapts to manifold and extremely diversified contexts where it allows speakers to achieve as many and diversified communicative goals. Additionally, language is an “intersubjective activity” (Simone & Lombardi Vallauri 2011: 127), meaning that it is constantly adjusted to the needs of an efficient exchange of contents between participants in a conversation. Whatever the speakers’ limits in production and reception, these are reflected in language structure, and this must be so in order for communication to function effectively.

Before explicating how information structure evolved in linguistic messages as the reflex of processing limitations (and, in the case in point, as a device to support bottom-up strategies in given conditions of sentence processing), a few preliminary remarks are needed.

In the introduction to this chapter, I pointed out that one of the goals of human communication is the construction of common ground knowledge. The importance of shared background knowledge in human communicative interactions has been extensively debated in the literature. For example, Saussure (2013: 3) underlines that

Sharing background information is a condition for the predictability of the meanings intended by our interlocutors, as it conditions the added value attached to new information. Shared background

is the necessary basis for a number of abilities and attitudes including that of saving effort of constantly re-establishing the grounds on which our thoughts are elaborated and communicated.

So, a solid system of shared meanings, values and assumptions is also the gateway to reducing production efforts, as the more information is shared by the participants in an interaction, the more of it can be left unexpressed, available only for inferential computation¹²⁶.

In Chapter 1, we saw that one way to streamline information exchange reducing the structure of conversations is by empowering the information load of messages through the combination of more new contents in the same sentence unit, as the example resumed in (10) again shows

- (10) [My English teacher]_{NEW} [announced that we'd be reading 4 books that year]_{NEW}. [When I was a freshman in high school]_{NEW}, [I wrote a short story about a busboy working at a party house]_{NEW}. [My career]_{NEW}, you might say, [had begun]_{NEW}.

As commented on earlier, the strategies in (10) allow compacting more items of new information without resorting to further interactional turns to verbalize them. Hence, the more new contents can be conveyed within single sentences, the less cumbersome – and thus, more adaptive – the structure of interactions. However, given the limitations affecting our working memory system, and our general inability to direct attention to more novel stimuli at a time, how could we cope with such increasing processing efforts? A plausible answer to this question requires a little digression on how computational demands changed in sentence processing.

There is an ongoing (and still unsolved) debate on how multi-unit sentences came into being and, in my view, any question on this issue entails no intuitive answer at first sight, because no compelling cues are nowadays available that might shed light on the original architecture of early proto-sentences. Nonetheless, the idea that single-unit

¹²⁶Humans' ability to share knowledge also proved useful when the socio-cultural dimension of early human groups grew in complexity and articulation, as this allowed pursuing cooperation more rapidly and efficiently (cf. Givón 2009: 41, 42: "The major evolutionary change toward the current stage of human communication involved an increase in the social, physical and informational complexity of human culture. As a result, the informational background necessary to justify – i.e. establish the context for – manipulation could not be assumed anymore to be shared by all members of the speech community, now a society of strangers").

utterances may have predated multi-unit constructions finds some cogent backing in the transition from one-word to two-word messages in children's speech (Section 5.3.2) which, in an ontogenetic perspective, may reveal some interesting and intriguing routes on analogous sentence complexification processes in human early proto-language.

Recent contention (Tallerman 2007; Wray 1998, 2000; Arbib et al. 2005) has been deeply concerned with explaining the structure of early protolanguage. According to some lines of thought (Tallerman 2007), it originally consisted of holistic units that eventually fractionated into more complex combinatorial patterns. Others suggested a componential process by which multi-unit messages emerged through the combination of more isolated units. For the purpose of the present discussion, we won't tackle this issue at length but, suffice it to say that, whatever the process of structural complexification of sentences, such a process involved a more burdensome task for the human processor, that had to deal with both an increase of the informational weight of utterances and the fast processing rates imposed by communication.

When analytic (generative) language became available, segmentation of these holistic utterances began, but the human short term memory capacity proved inadequate to resource its full capabilities (Wray 1998: 47)

Drawing on the experimental results presented in Chapters 3 and 4, the issue I intend to set out in the follow up is that IS cues enabled the human processor to cope, on the one hand, with the increasing processing demands of sentences carrying a greater amount of new information and, on the other hand, with the high processing rates imposed by oral communication. Let us outline this aspect in more detail.

There are cases in which, although embedded in an extra-linguistic context, sentences are not supported by discourse-based shared knowledge, and therefore no expectations interfere with their processing. This is often the case of all new sentences, as exemplified in the following exchange:

A: What's new?

B: There has been an accident this morning

Here, no established co-text can ground for the interpretation of some contents as given or new in speaker B's utterance. As already remarked in Ch. 3, in these conditions,

resource allocation cannot rely on the anticipation of givenness and newness degrees of communicated contents, nor on their packaging criteria. In other words, processing is guided by packaging, but no pre-conceived representations are available on its distribution in the sentence. In this scenario, the informational shaping of sentences into presupposition/assertion and topic/focus units made sentences more easily processable by the limited human brain when the allocation of resources cannot be planned in advance according to discourse-based expectations. From this standpoint, the design of IS units is one that makes sentences uttered without a discourse background knowledge processable via the intervention of *bottom-up* mechanisms. The formal properties of IS units thus proved adaptive to guide attentional processes in a way that resource allocation is optimized and efficiently carried out in compliance with the communicative task at hand. Hence, if nothing can be predicted in advance by the processor on the activation and packaging status of upcoming sentence contents, focal and assertive packaging makes (and made) sure that the content selected by the speaker as informationally more important is also devoted the majority of the resources available. On the contrary, topical and presuppositive packaging makes (and made) sure that some content is processed using an amount of resources that is on the whole more limited, but necessary and sufficient to facilitate the comprehension of the remaining part of the sentence. As a result, the combination of more new contents in the same sentence could be easily dealt with by the brain because some contents are encoded as focus or assertion – giving the instruction to engage more controlled (Shiffrin & Schnieder 1984) and effortful processing channels – and other contents as topic or presupposition – instructing to a more automated and less effortful processing.

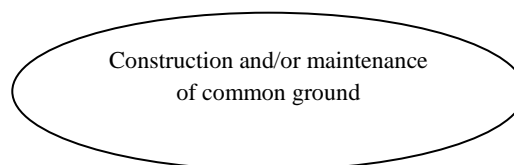
Based on these conjectures, the emergence of IS to support *bottom-up* processing mechanisms can be hypothesized as follows:

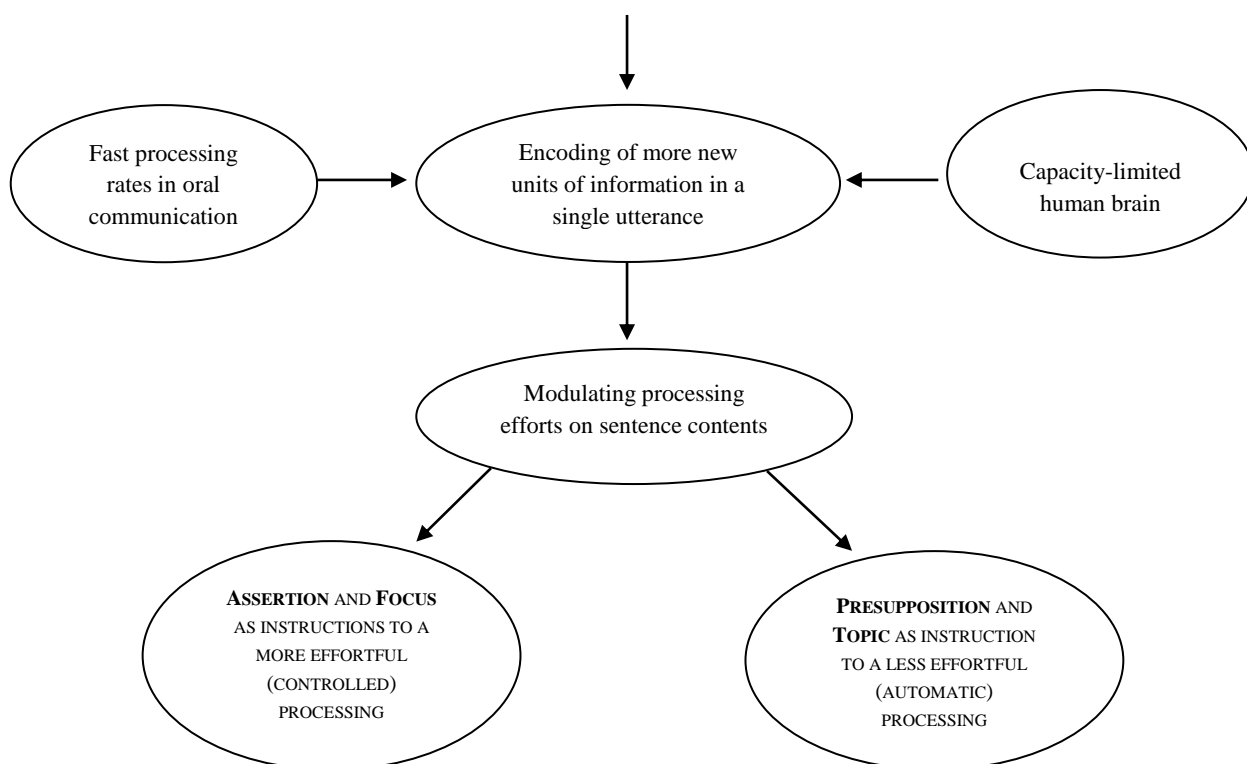
1. Construction and maintenance of shared knowledge called for more sophisticated communicative strategies (preferably) targeted at increasing the information load of messages. This could be achieved by **combining more units of new information** in the same sentence.
2. Given the **limited capacity** of the working memory system, processing resources cannot be equally distributed on sentence contents. Hence, some contents should cost less than others.

3. For this to be possible, some contents should be packaged as **focus** or **assertion**, and other contents as **topic** or **presupposition**.
4. When no discourse-based expectations are available to plan processing strategies in advance, the binary articulation of sentence contents into more or less effortful units speeded up resource allocation, thus facilitating the retention of **relevant information**.

The above passages are sketched out below

Figure 10. *Evolution of IS in support of bottom-up processing mechanisms*





In conclusion, according to the outline proposed, the units of IS represented the selected variation by which – in the absence of prior discourse-driven expectations – sentences combining more new units of information could be processed by the human brain through the exploitation of bottom-up mechanisms. Under such a condition, the processing of information followed the cues provided by packaging and, particularly, by the binomial articulations instantiated by presupposition/assertion and topic/focus, whose design features are adaptive enough to induce the involvement of more effortful and controlled processes for asserted and focalized contents, and less effortful and more automated processes for presupposed and topicalised ones.

5.4.2.2. *Processing effects on the emergence of IS units: The role of top-down (or context-driven) processes*

Scholars in the fields of education studies and psychology have often emphasized the importance of contextual embeddedness of learning and information processing (Cole 1992; Chaiklin & Lave 1993; Goodnow et al. 1993). According to these views, human actions are guided by what has been called SITUATED COGNITION or, put more simply, the projection of our mind into the situation in which an activity takes place. This particular – probably unique – capacity of ours reflects our need to “make sense” of our actions and create coherence with a larger whole¹²⁷. More clearly, this capacity depends on how we ascribe meaningfulness to given activities or behaviors by *contextualizing* them. Contextualization of ideas, actions and behaviors is at the basis of meaning interpretation and integration; all in all, it is at the basis of human learning abilities.

Symbolically expressed ideas are related in a non-arbitrary and substantial fashion to *what the learner already knows, namely to some existing relevant aspect of his structure of knowledge* (van Oers 1998: 476). [italics mine]

Context, then, ties notions and experiences together in order to particularize meanings. Van Oers (1998: 477) further notices that the tendency to cohere and particularize meanings emerges from the perception of the situation as a Gestalt.

It was one of the tenets of Gestalt theory that the organization of the situation strongly influences the process of acting and thinking. Köhler (1947), for instance, conceived of human behavior as a field – dependent process, the dynamics of which were to be found in the organizational qualities of the perceived situation in which the individual was located. Characteristically, Gestalt psychologists assumed that a perceived situation is naturally conceived of as a coherent whole (a Gestalt) in which the meanings of the constituting elements are determined by this whole. (van Oers 1998: 477)

¹²⁷From this perspective, context becomes a decisive factor for meaning construction and interpretation. (cf. Van Oers 1998: 475, “The concrete or ideal field of a sign-meaning unit, that supports the specification of meanings at a given moment in time, is generally referred to as context. Context – generally spoken – then provides for two essential processes: it supports the particularization of meanings by constraining the cognitive process of meaning construction, and by eliminating ambiguities or concurrent meanings that do not seem to be adequate at a given moment; on the other hand, context also prevents this particularized meaning from being isolated as it brings about coherence with a larger whole.

It follows that, whatever situation we happen to deal with, we tend to judge the relevance of its most salient aspects by relating them to some previous knowledge or experience of that situation. Studies revealed that by the age of 5 or 6 children learn to contextualize their actions and those of others, which also allows them to grasp complex relationships between signs and meanings, including meanings which are only implicitly conveyed by given signs.

Besides being essential to learning, contextualization also plays a crucial role in formulating expectations and anticipating the communication of contents. In Chapter 3, I pointed out that this ability strongly supports our capacity-limited information processing. As set off by Levy (2007), the human parser is limited and can “pursue only one alternative at a time”, so it needs to minimize the resources consumed. He also argued that all processing tasks are regulated by prior evaluations of what he called *resource requirement* and *resource allocation*, by which we establish the amount of resources necessary to perform a given task. We have seen that in language processing these evaluations are carried out very fast and depend on an early-stage structural processing of the message. I reported on Hahne & Friederici’s experiment (1999) in which an ELAN component – typically elicited in the 0-200 ms time window – was shown to be involved in a first-level structural processing of the sentence. This superficial type of processing is aimed at gaining *procedural information* on how to allocate resources during a second stage processing, where notional contents are accessed. A first-stage processing allows us to recognize that (i) some meanings are related to one another in the logico-semantic organization of the sentence, (ii) some meanings rank higher than others in syntactic structure, (iii) some meanings are informationally more important than others in the overall communicative dynamism of the message, and so on and so forth. It would be tempting to ask what is the utility of a double-modality processing like this. Put otherwise, why do we need to know part of sentence information in advance?

Since the human attentional system runs on the anticipation of information and its particular packaging, knowing in advance what contents will be encountered in the sentence, and what structural and informational properties they will have, helps gearing our attentional system to different computational demands, which increases efficiency in the planning of processing strategies. What results from this is that, the more we can predict, the less we have to learn from scratch.

Just as in any other processing task, predictions also influence the way we perceive the communicative dynamism of texts. Recalling Daneš's principle of THEMATIC PROGRESSION (Daneš 1974), we normally expect some contents to receive some packaging or another depending on the communicative dynamism of the text as a whole: contents already introduced and active in discourse are expected to be topicalized in the subsequent sentence, whereas contents not yet introduced are typically expected to be focalized.

It must be called back to mind that given (active) and new (inactive) are not linguistic categories and basically depend on the presence vs. absence of discourse antecedents. However, the recognition of different activation statuses of contents is also facilitated by the packaging they receive. In other words, some content is more easily recognized as given if it also patterns with the topic of the sentence, and new content is more easily recognized as such if it matches with the sentence focus. It can be thought that the presence vs. absence of discourse antecedents is by itself a necessary and sufficient condition for distinguishing between given and new contents, and that packaging plays a superfluous role in this respect (although its presence is also relevant to the identification of the scope of the sentence illocution). However, with relation to oral discourse, a further consideration should be made.

As already stressed in Section 5.3.2, oral discourse is ephemeral, and entities that are activated at any given moment of the interaction remain accessible for a short period of time, and are more vulnerable to interference from other competing entities introduced in the same relevant context. This means that, at each utterance time, the retrieval of already activated referents in the *universe of discourse* turns out to be more difficult than retrieving antecedents in external reality. The activation status of extra-linguistic entities is more stable in our consciousness, since their presence or absence from our perceptual field is repeatedly established on sensory grounds. On the contrary, *discourse is a symbolic representation of reality* in which entities or facts are projected to an abstract level, and their activation no longer refers to their concrete presence in the world around the communication event, but to the traces their mention leaves in the receiver's mental representation of the discourse model. Obviously, in a discourse, we may bring up referents that are present in our perceptual field; in such a case, we do not need to recall them with the same frequency with which we recall referents that are absent from our perceptual field, and are therefore less stable in our conscious memory.

So, accessing the activation status of discourse entities – when not related to perceivable extra-linguistic objects or states - is less straightforward a task, and certainly requires some aid in the retrieval process. This is also why oral communication is often teeming with redundant expressions (Ong 1986), which are not likewise frequent in written texts, where we can go back on previously uttered information as often as we want.

The transient nature of orality, as compared to written communication, was highlighted by Ong (1986) in his description of primary oral cultures as opposed to chirographic cultures¹²⁸. Below, I report a crucial passage on this issue from his 1986 monograph *Orality and Literacy* (Ong 1986: 39):

Thought requires some sort of continuity. Writing establishes in the text a “line” of continuity outside the mind. If distraction confuses or obliterates from the mind the context out of which emerges the material I am now reading, the context can be retrieved by glancing back over the text selectively. Backlooping can be entirely occasional, purely ad hoc. The mind concentrates its own energies on moving ahead because what it backloops into lies quiescent outside itself, always available piecemeal on the inscribed page. In oral discourse, the situation is different. There is nothing to backloop into outside the mind, for the oral utterance has vanished as soon as it is uttered. Hence the mind must move ahead more slowly, keeping close to the focus of what it has already dealt with. Redundancy, repetition of the just-said, keeps both speaker and hearer on the track.

Because of the ephemerality of oral communication¹²⁹ and the role of context-driven strategies in guiding information processing, messages would be easier to process if they supported the receiver’s expectations on the communicative dynamism of the upcoming sentences, with relation to the discourse model as a whole. So, in discourse, given contents will be perceived as more continuous than new contents, but their continuity degree is assessed more easily if the packaging these contents receive provides cues to their activation status. Since this status is more difficult to recollect in discourse (because it has to be assessed on the basis of mental recall processes), it must be somehow cued by the speaker in order to facilitate the receiver’s task to relate the

¹²⁸As already hinted at in Section 5.2., chirographic cultures are generally identified in speech communities with a full-blown writing system; whereas primary oral cultures are found in societies in which communication only takes place orally, and sounds have no graphic correlates.

¹²⁹Chafe (1998: 93): “Speech is evanescent. The sounds people make as they talk, and even many of the thoughts expressed by those sounds, quickly fade away. The methods of Western science depend fundamentally on an ability to pin down what one observes, usually in visual form, and to return to it again and again. Speech, itself, does not allow that kind of manipulation. It is true that the invention of writing provided a way to convert sounds and ideas into something visible”.

contents communicated to his established representation of the discourse model. *The packaging ascribed to these contents is therefore an indication of how continuous or discontinuous they must be perceived with respect to the general thematic progression.* In this sense, the categories of IS may have emerged in linguistic messages to support top-down processing mechanisms when discourse-based expectations can be relied on in sentence processing. Consequently, by encoding shared content as presupposition, unshared content as assertion, given content as topic and new content as focus, the receiver is aided in the task of relating these contents to his expectations on the information structure of the ongoing utterances, and on the overall communicative dynamism of the discourse. The two experiments described in Chapter 4, hinting at additional processing effort when unexpected information packaging is encountered in a sentence, provide some empirical support to this account.

In light of the foregoing, we now conjecture a further scenario in which the development of IS in human communication has facilitated sentence processing when predictions on the packaging nature of forthcoming contents can be made. Precisely, when pre-established discourse-based expectations could be relied on, packaging cues were used to access information statuses of contents more easily. If the givenness or newness status of some content was straight away recognized in a sentence, the processor could plan resource requirement and resource allocation strategies more rapidly, so that contents immediately recognized as given were directed a lesser amount of attentional resources – also because given contents are usually less relevant to the communicative aim of the speaker –; whereas those recognized as new were immediately devoted more attention – because more relevant to the communicative task at hand. It is clear that, the faster the recognition of activation statuses, the easier the operations of resource allocation on sentence contents. Consequently, when packaging cues are distributed inconsistently with respect to activation states, the parsing of the sentence must be revised, thus leading to additional processing effort.

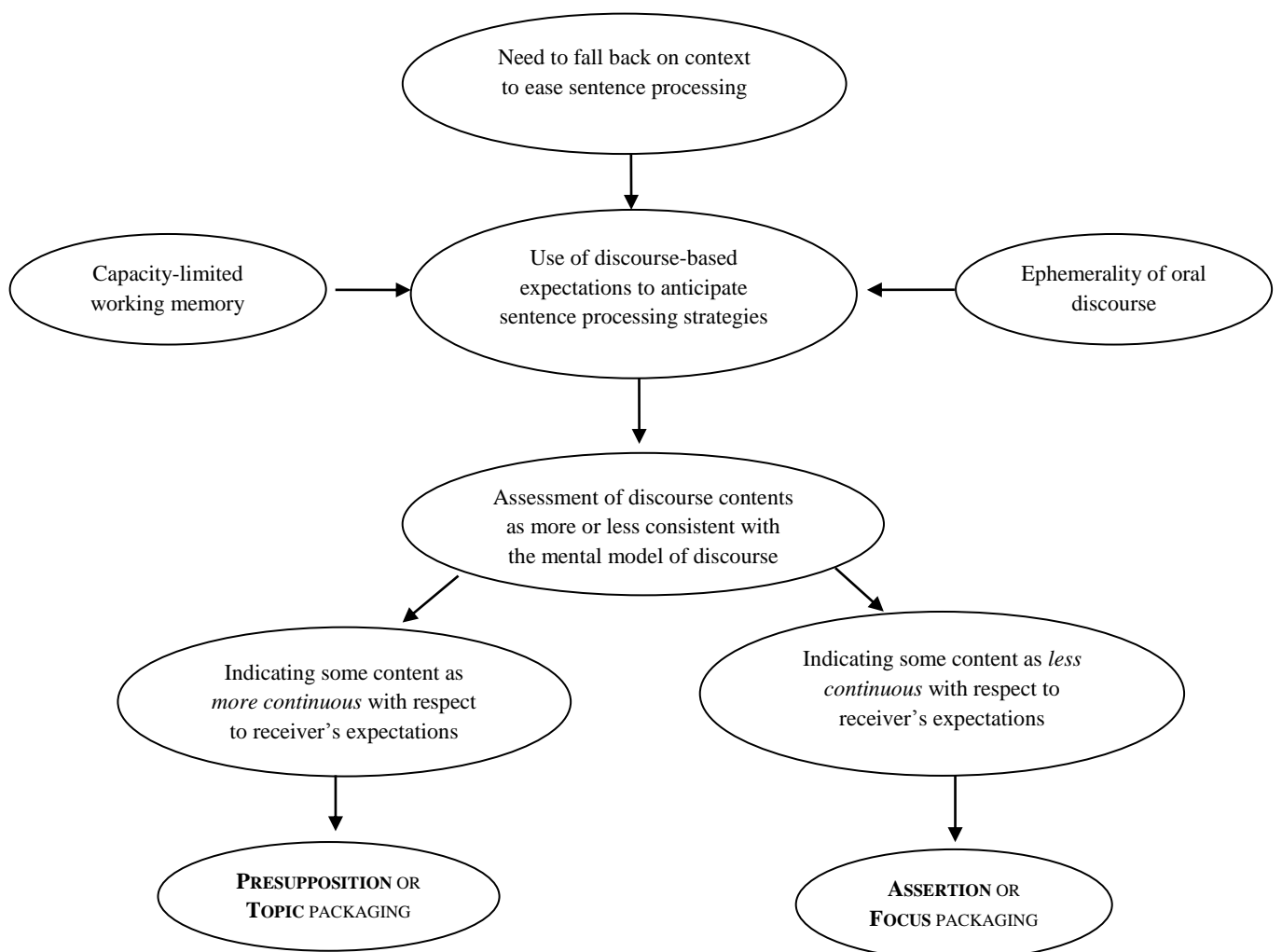
So, the emergence of IS units from the view of top-down processing biases can be delineated as follows:

1. Utterances are produced in a **linguistic context**, and context generates **expectations**.

2. Due to the constraints on our working memory system and the fast language processing rates, expectations are needed in order to **plan** processing strategies **in advance**.
3. The contents encoded in a sentence may be more or less consistent with pre-established discourse-based expectations. In other words, some contents are **more continuous** (given, familiar), others are **less continuous** (new, unfamiliar). Rapid recognition of this status facilitates comprehension.
4. In oral discourse – which is transient and ephemeral – assessing activation degrees of contents is less immediate and needs to be aided by means of specific **packaging cues** to different “knowledge statuses” or “activation degrees”.
5. Therefore, **focal** and **assertive** packaging raised to signal that some content is not yet known and therefore discontinuous with respect to a pre-conceived discourse model. Conversely, **topical** and **presuppositive** packaging surfaced to indicate that some content was already known and continuous – either because previously shared or because activated in discourse.

Figure 11 below portrays this scenario.

Figure 11. *Evolution of IS in support of top-down processing mechanisms*



In the interpretation proposed, it is plausible to assume that early information structures displayed a generally aligned configuration between activation statuses of contents and packaging formats. Put another way, it is possible that topic and presupposition originally encoded only given and shared contents, respectively, while focus and assertion carried only new and unshared information. Indeed, since language activity takes place in context, and context changes in space and time, it follows that in all conditions of language use a distinction is always drawn

between what is known because it has already appeared and what appears for the first time and is therefore new: [It then follows that] every language needs means to express given and new, topic and focus, presupposed and asserted information. (Lombardi Vallauri 2004: 381).

On this account, less typical thematic configurations with old contents patterning with focus or assertion (as in some cases of contrastiveness), and new contents with topic or presupposition may have emerged later in sentences, possibly via *exaptation* processes: categories raised to perform a particular function were later co-opted to fulfill a completely (or almost completely) different function (Gould & Vrba 1982). The plausibility of this transition has been partly proven on ontogenetic grounds. In their study, Baker & Greenfield (1988) noticed that, at the beginning of the two-word stage, children topicalize or presuppose only given contents, and focalize or assert only new ones. Less typical associations tend to emerge at later stages, once the functional distinction between information units is fully grasped (Baker & Greenfield 1988: 7):

It is probably a convenient assumption to see old information, topic, and presupposition as initially undifferentiated, with differentiation occurring in subsequent development. Similarly, it is probably best to see new information, comment, and assertion as initially undifferentiated, with differentiation taking place at later stages.

On balance, in a top-down framework, the development of informational hierarchies may have reflected the need to support processing of the linguistic input against the

background of existing pre-conceived discourse representations. Since contextual embedding entails that expectations on upcoming sentences (and their information packaging) are formed, these expectations must be supported by dedicated signalers of informational continuity and discontinuity (with respect to a previous discourse model). This is what I believe IS units in context-embedded sentences have proved to be adaptive for: *facilitating mental recall operations thus speeding up sentence comprehension.*

5.5. Information Structure and the form-function paradigm

Since Aristotle¹³⁰, the idea that in nature the rationale behind forms is somehow related to the function they have been designed to perform has become a central axiom in evolutionary biology. The legacy of this teleological tenet has made its way into earlier and recent studies on language evolution where it has become one of the key explanations to phonological, morphological, syntactic and semantic change in space and time. The form-function paradigm in this scenario encourages an approach to linguistic variation whereby forms (whatever their status in the language system) gradually and fitfully developed features that made them increasingly more adaptive to the novel functions they were called upon to serve.

On a priori bases, not only does this way of viewing variation allow us to recognize and delve into the many distinguishing features of natural languages today, but also seeks to explain the universality of some traits whose *raison d'être* in the languages of the world should be put down to both language-related and language-independent faculties of the human being. In much literature on the subject (Pinker & Bloom 1990; Christiansen & Chater 2008), these faculties have been referred to as perceptuo-motor, cognitive, cultural, semiotic, physiological, cooperational, etc. It is now widely concurred with that many of these faculties predated the emergence of present-day language systems, and somehow impinged on their developing structure.

¹³⁰“What, however, I would ask, are the forces by which the hand or the body was fashioned into its shape? The woodcarver would perhaps say, by the axe and auger; the physiologist, by air and earth. Of these two answers, the artificer’s is the better, but it is nevertheless insufficient. For it is not enough for him to say that by the stroke of his tool this part was formed into a concavity, that into a flat surface; but he must state the *reasons* why he struck his blow in such a way as to affect this and what his final object was”. (translation from McKeon, ed. 1941, p. 647-648).

For instance, it can be thought that cultural constraints pushed the evolution of given linguistic forms towards the grammaticalization of culturally-relevant meanings in some speech communities, as is the case of evidentiality, which – taken in its broader sense – can be regarded as the upshot of universal epistemic concerns of speakers in the conveyance of particular meanings, although the many ways in which it is encoded in the world’s languages – namely, through more or less sophisticated paradigms of morphological markers (as in the Native American languages discussed in Chapter 2) – hinge on language- and/or culture-specific biases (say, the size of the speech community, or the like, cf. Aikhenvald 2004 on this issue).

On a different note, the rather diffuse subject-initial word order in most languages is deemed to reflect a psychological constraint on the preferred construal of states of affairs, with subject-agent participants typically receiving a more prominent status in the receiver’s mental representation of an event.

So, although *arbitrariness* (i.e., “the detachment of the visible behavior (or structure) from its invisible purposive correlates” Givón, 2002: 4) has long been conceived as the underlying principle of the symbolic structure of language, still much space should be accorded to semiotic *motivation*. To date, debates on the trade-off between arbitrariness- and iconicity-driven pressures on language change are legion and cannot be all the way covered in the present work. My aim in this section is to propose a reflection on how the socio-biological arguments set out in the foregoing chapters might lend themselves to a characterization of IS units, and precisely of the presupposition/assertion and topic/focus oppositions, as components of human language that contribute(d) a successful realization of the form-function mapping hinted at before, either in a synchronic and in a diachronic perspective. Expressly, I maintain that what motivates the connection between the formal traits of IS units and their pragmatic behavior in discourse does not only affect their use in ordinary interactions today, but possibly paved the way for their emergence in time. The arguments I am going to draw upon to address this issue bear on the socio-interactional and processing matters discussed in Chapters 2, 3 and 4.

A first caveat I feel compelled to point out is that the evidential outline of IS units presented in Chapter 2 lacks a cogent body of evidence that might buttress an evidential account of the evolution of IS categories. In fact, a connection can be posited between the selection of packaging strategies and the resulting epistemic attitudes of the speaker

towards information (as the distributional constraints of evidential adverbs within given information structure patterns suggest), but, in my view, such evidence may not be strong enough to back up an ontogenetic and/or phylogenetic route to the development of IS in human communication. This arguably depends on the fact that, while we can assume analogous cognitive capacities and processing limitations between modern and earlier humans (although environmental pressures did affect the cortical organization of the human brain in time), it is much less easy to ascertain comparable dynamics of verbal interaction. A major hindrance, in this sense, is posed by the difficulty in assessing the relevance of given socio-interactional concerns in ancient communicative ecologies, for such concerns were certainly not the same as those regulating communicative interactions today, and were also more strongly conditional upon ever-changing socio-cultural niches. Such a backward-looking investigation would entail not just a reconstruction of emerging linguistic structures, but also that of an *emerging pragmatics*, which is far less straightforward a matter to deal with when behavioral issues of proto-communication are inquired. In light of this uncertainty, I suggested an *exaptive* scenario for the development of evidential functions in the use of IS in discourse. Put differently, the association of information units to specific evidential meanings in utterances may have been driven by the exploitation of the formal features these units were already endowed with, due to determinants of a different nature (possibly involving cognitive or processing biases of some sort). Since these features are (and were) responsible for directing and manipulating attentional processes in some way, they may also have proved suitable to signal different epistemic attitudes taken by speakers towards communicated contents. On this conception, in the proposed evidential account of IS, a form-function mapping would not stem from a constitutive interrelation between the design features of information units and the socio-interactional function they fulfill in conveying evidential meanings, but rather as a *post-hoc* association (or, put differently, as an *epi-phenomenon*) by which the design features of information units have emerged in response to pressures of a different nature and were subsequently exploited to express speakers' epistemic attitudes in conversations. With reference to the epistemic stances outlined in Chapter 2, it can be hypothesized that the marking of a personal experience evidentiality was entrusted to focalization and assertion strategies because of their function of instructing to a more controlled processing. A subjective perspective on sentence contents is more likely when these

contents are new to the receiver and purposeful to the current communicative task. On the contrary, a factual evidentiality would be best associated to information units conveying information to be taken for granted, and therefore instructing to a less controlled processing. So, in exaptive terms, the relation between the encoding of information units in discourse and that of socio-interactional values of commitment and responsibility can be taken as an “*evidential spandrel*” of an erstwhile function of IS in human language.

A more solid empirical grounding on the functioning of IS in communication comes from the psycholinguistic side, and precisely from the investigations on the processing correlates of IS categories. The findings achieved within this thread of research are particularly revealing of how information packaging reflects, but at the same time conditions, precise mechanisms of sentence processing. In describing these mechanisms as bottom-up and top-down (taking these terms as general labels to indicate data-driven and theory-driven processes respectively), I also wanted to point up that either one or the other direction of processing is aimed at avoiding excessive waste of mental energies which, in the domain of communication, ensures a thorough comprehension of the most relevant portions of a message. Therefore, with respect to bottom-up strategies in sentence processing (typically when all-new sentences are conveyed or in conditions where discourse-based expectations are not available to the receiver), processing criteria cannot be planned in advance and can only be chosen in concordance with the informativity cues provided by packaging, with focus and assertion instructing to a higher informativity degree - and then to a more effortful processing - and topic and presupposition signalling a lower informativity degree, thereby inducing less effortful processing operations. From this standpoint, the *form* of information units makes them apt for the *function* of efficiently modulating attentional resources when their allocation cannot be planned beforehand. Correspondingly, the form-function fit in this scenario would result from an adaptive – and osmotic – interaction between packaging cues and mental processes.

From the view of a top-down modality, the formal properties of IS units are overridden by anticipation mechanisms that support predictions on both the truth value of contents and the packaging they are expected to receive in upcoming sentences. Here, packaging cues are built on by the receiver either to confirm previously elaborated representations of the discourse model, or to revise them in case they are not met. When

the information structure of sentences is consonant with the receiver's expectations – relative to the communicative dynamism of the discourse model as a whole – the packaging cues dispensed by information units facilitate conceptual retrieval and mental recall. As already contended in Chapter 4, a consistent packaging “reveals” the receiver whether some content is to be categorized as discourse-active/inactive, knowledge-old/new, or any other likewise status. This information is obtained faster by the receiver if consistent hints are provided to him. Accordingly, the utility of information structural features is to enable and expedite a coherent mental representation of the discourse model. So, the likelihood of presupposition and topic to drive towards a less attentive processing hangs on the fact that they are typically used to carry previously known or activated information. In the same way, focus and assertion increase processing demands because they are more often associated with contents that must be *ex novo* updated in the receiver's mental register, thereby requiring a new mental slot to be opened. As we have seen, any unexpected overturn of this configuration calls for both a content and structural revision of the sentence. Differently than in the bottom-up condition, the form-function mapping in the top-down account of IS processing shows itself as involving a relation between packaging cues and discourse representations.

5.6. Conclusion

This chapter marshals discussions and hypotheses from different scientific domains with a view to delineating possible evolutionary accounts of Information Structure.

As is often the case when evolutionary issues are tackled, reflection on these concerns inevitably touches upon disciplines and currents of thought inhering in different branches of knowledge. The first impression one gains from approaching language evolution from a multi-faceted perspective like this is of a general “puzzle” of scenarios which are difficult to connect with one another, because they try to capture aspects of language evolution from (apparently) unrelated views. For example, a number of studies highlighted the problem of addressing the phylogeny of human language looking at its ontogeny, that is, at how language develops in children. Bickerton (1995) even proposed to reconstruct the phylogeny of human language exploring emerging linguistic structures in pidgin varieties.

A general counterpoint set up against these proposals is that, for both children and pidgin speakers, the emergence of a linguistic system stands on the influence wielded by an already existing linguistic model teeming with a repertoire of forms and conventions that must be learned in observance of their use and manifestation in given communicative contexts. This means that neither children nor pidgin speakers are expected to “invent” a new grammar from scratch, since they build an evolving grammar using the linguistic material provided in the ambient grammatical input. Although endowed with its own distinguishing features, this evolving grammar is in any case constructed upon the same rules of the target language’s grammar. Basically, past a stage of errors, analogical manipulations, reanalysis processes, the child gradually approaches the adult’s grammar. In the same way, the pidgin speaker gets closer and closer to the grammar of the superimposed language he is exposed to.

But, when it comes to phylogeny, any developmental assumption must be tested against a linguistically sterile ambience in which early humans needed to design and forge linguistic elements *ex nihilo*. No previous linguistic model was already available to them, and no communicative behaviors and practices could be imitated from others.

What is more, early humans’ cognitive architecture was obviously different than ours, in that most of the cognitive processes we carry out automatically today, most probably involved more controlled mechanisms in the past. For instance, selectivity affects children’s processing strategies from the very beginning, but it evolved more gradually in early humans’ attentional system as a response to the overwhelming amount of stimuli to attend to in the environment. So, our selective mind is a genetically acquired character. In discarding ontogenetic evidence as a possible testing ground to advance phylogenetic hypotheses on human language, the evolutionary linguist is left with extremely poor “archeological cues” to cling to, and his attempt to provide cogent explanations to language evolution, or some particular components of it, faces insidious threats.

One might object that the world’s languages today offer a multitude of data and phenomena that must receive some explanation on evolutionary grounds. For example, language universals can be regarded as the upshot of evolutionary implications of some kind (Kirby 1997). However, so far, little do we know about what really counts as universal in today’s languages, and this uncertainty resides in a number of different factors, such as (a) the framework within which universals are classified and accounted

for, (b) the type and quantity of parameters that should be considered relevant in the explanation of universals, and (c) the knowledge we have of the design features of language users, which many of the commonalities of natural languages can be traced back to.

If it is true that a sizeable amount of data are today available to the evolutionary linguist, it is also true that it is no easy task to classify them in order to reach well-defined accounts of the evolution of given linguistic structures. It must be stressed, however, that some cues of the language system are more tangible than others and provide more solid grounding for evolutionary speculations. For example, the historical pathways of phonology, morphology and syntax can be reconstructed more easily because of the large body of evidence available. As for pragmatics, things are a little more complicated. As is known from Morris (1938), pragmatics does not only look at language structure, but also at the way this structure is “put to use” by speakers to achieve their intended goals in the conversation. This implies that for the linguist concerned with the development of pragmatic processes, such as those regulating cooperative communication, indirect speech or even IS, also interactional dynamics must be reconstructed, along with all the linguistic and non-linguistic pressures affecting them. Since both micro- and macro-pragmatics explain how speakers make use of context to “functionalize” their messages in communication, whatever account is aimed at unraveling the development of a particular pragmatic aspect in human language must not overlook how a communicative context is formed and how it is made relevant by speakers to make sense of their interactions.

But the notion of context, in itself, subsumes “realities” which are both linguistic and non-linguistic, and that communicate with one another to weave an intricate texture on which communicative interactions take place. The effectiveness of this structure is of paramount importance for the successful functioning of communication. Basically, if a shared context cannot be relied on by both speaker and receiver, most of what we automatically do in transacting information could not be possible or would entail the speaker’s engagement in laborious tasks of explication and disambiguation of contents that cannot be left unexpressed, nor could even be inferred by receivers if some form of common background knowledge cannot be drawn upon by him/her.

In the discussion herein proposed, context has been taken to indicate, among other things, a socio-interactional and cognitive niche impinging upon the way linguistic

messages are structured to fit constraints related to the social and cognitive cost of information. The evolutionary accounts presented tried to put these two types of context together examining their interplay in a scenario of emerging forms of communication. From a socio-interactional perspective, we maintained that, similarly to what Givón observed for today's intimate-scale societies, early communities were possibly characterized by analogous constraints on the communication of new information, which is obviously less neutral than already known information, and its social effects are on the whole more risky. I contended that a way to mitigate these effects is by taking different attitudes on the contents conveyed, depending on the speaker's degree of confidence in committing to the truth of a proposition. Drawing upon the accounts we gave of the presupposition/assertion and topic/focus pairs as evidential strategies, we suggested that the emergence of these units in sentence structure has been influenced, among other things, by the need to comply with socio-interactional biases imposing a certain degree of caution and attention in the transaction of new information.

From a cognitive viewpoint, I proposed an evolutionary explanation of IS that accounts for both bottom-up and top-down processing mechanisms. If we can hold that both mechanisms are involved in the processing of IS, it is possible that both might have intervened in the development of informational hierarchies in linguistic messages.

I pointed out that, when in a discourse context expectations on the communicative dynamism are not available, processing follows a bottom-up modality, namely, the structural information provided by packaging. In this scenario, IS evolved to make sentence processing more compliant with the capacity-limited human brain.

As far as sentence processing is supported by expectations, IS cues are used to support them, that is, to make it easier for the addressee to access different activation statuses of contents, thus relating them to an established mental model of discourse. On this account, packaging formats emerged to facilitate the recognition of some content as given or new, which speeded up mental recall processes in oral communication. It is worth remarking that both bottom-up and top-down "uses" of packaging cues have contributed to optimizing information processing, and that the human cognitive system may have specialized to comply with strategies in response to the processing tasks at hand.

What this assumption boils down to is that, since our working memory system runs on a limited amount of resources, it has to economize them and use them so as to render

perception and cognitive functioning more effective. Both bottom-up and top-down modalities ensure that resources are efficiently distributed by the parser, whether this latter is guided by the structure of incoming stimuli or by already existing expectations. Accordingly, IS cues are exploited in concert with both conditions of sentence processing. Therefore, since context may (or may not) make provision for the formulation of predictions on sentences' information structure, our information processing system must be geared to cope with both ways of "deciphering" packaging instructions.

Given the emerging character of neurosciences and, particularly, of a discipline recently called *neuropragmatics* (Hagoort & Levinson 2014), it is still difficult to make sound generalizations on what neural scaffolding governs the cognitive treatment of IS phenomena. This venture poses even more daunting problems when non-verbalized meanings are at issue. A logical consequence of this is that, if subsequent findings reveal that other modalities are involved in the processing of contents encoded in different packaging formats, the evolutionary issues herein addressed should be probably recast in the light of more up-to-date interpretations.

However, the attempts made so far wish to throw light on the possible rationale behind sentences' dichotomic articulation into presupposition/assertion and topic/focus units. In this light, I proposed to investigate two spheres which I assume have some bearing on the realization of IS in discourse: a socio-interactional (evidential) and a processing sphere. The way each dimension, or the two together, influence the way speakers distribute information in linguistic messages suggests intriguing lines of research, some already undertaken, others which are long overdue.

Following the traces of the most influential currents of thought in the field, I set forth a sociobiological account which I hope might bring some added value to our present knowledge of IS, without obviously neglecting the bond that ties the philosophical and linguistic traditions with the achievements of the later neuroscientific approaches to language study. Indeed, I believe that only an effective "interbreeding" between these branches of knowledge can dispense more accurate tools to describe why and how micropragmatic phenomena take place, and what aspects of the human nature and behavior are reflected in them.

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