

Facilitating Automation in Sentence Processing: The Emergence of Topic and Presupposition in Human Communication

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Abstract Human attention is limited in its capacity and duration. In language, this is manifested in many ways, but more conspicuously in the strategies by which information is distributed in utterances, that is, their information structures. We contend that the pragmatic categories of Topic and Presupposition precisely meet the necessity to modulate attentional resources on sentence contents, and they do this by “directing” certain contents to automatic and others to controlled processing mechanisms. We discuss experimental findings suggesting that presupposed or topicalized information correlates with automatic processing, and we suggest that this association grounded for the emergence of topic and presupposition units in human communication. We also put forth the processing automaticity induced by these units as the (possible) rationale behind their persuasiveness in some specific contexts of language use (e.g. political discourse and advertising).

Keywords Presupposition · Topic · Attentional limitation · Language evolution · Processing automation · Persuasion

1 Protolanguage: A Brief Literature Review

Debates on early protolanguage are now legion (Wray 1998; Tallerman 2007; Smith 2008; *inter alia*). Most have contributed to a deep understanding of how protolinguistic

forms originated and how they became the full-fledged linguistic structures we use today.

To date, contentions on the matter have approached the study and reconstruction of protolanguage from two main perspectives, commonly referred to as *synthetic* (or compositional) and *holistic* (or analytic). In the current literature, (Wray 1998, 2002; Tallerman 2007; Smith 2008), the term “protolanguage” has been used to designate a stage in language evolution represented by “single words, either uttered separately, or strung randomly together in short strings to form unordered and structureless [sentences]” (Tallerman 2007: 1). A crucial point in this characterization concerns the transition from single-unit messages to composite combinatorial patterns. The synthetic and holistic approaches above mentioned have tackled this transition from diametrically opposed perspectives. The synthetic view holds that in the protolanguage stage words appeared first, while syntax emerged later to combine these words in more complex syntactic strings. This stand has been advocated by Bickerton (2000) and Jackendoff (1999), among others. Conversely, the holistic view conceives of protolanguage as a stage in which combinatorial patterns emerged via fractionation of longer (arbitrary) strings, originally devoid of any internal structure (Arbib 2002, 2003; Wray 1998, 2002).

On the compositional side, manifold counter-arguments to the holistic conception of protolanguage have been put forward. Some question the criteria by which internally unstructured holistic units are expected to be fractionated into articulate strings of words: if no internal morphological structure was present, where and how did speakers locate morphological boundaries in the decomposition process? Another point objects to the formulaic account proposed by Wray (1998, 2002) according to which holistic units displayed a formulaic structure with a certain degree of fixity.

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Despite extensive discussions so far, the plausibility of a synthetic or a holistic approach to protolanguage is still a matter of lively debates. Yet, for the purpose of the present work, none of the views above described will be adopted as a general reference framework, since our main concern is to investigate the strategies by which our severely constrained attentional system (Sweller 2003) coped with the increasing processing demands imposed by evolving multi-unit sentences. The processing of evolving proto-units entailed sharing the limited attentional resources on more contents at utterance time. We maintain that this task may have required bringing part of sentential information to less effortful processing channels, by encoding it as topic or presupposition. (A reference to Sperber & Wilson's Relevance Theory account of language evolution is here in order, due to the attention they devote to the role of relevance in achieving "cognitive economy" in communication, cf. Sperber and Wilson 1986/1995.)

In the linguistic tradition of studies, presupposition and topic are not to be intended as outward expressions of automatic processes *per se*, but as ways of linguistically presenting information. In other words, they are linguistic devices, typically prosodic and syntactic in nature, attributing different informational status to different contents of an utterance. Recent experiments (Sturt et al. 2004; Wang et al. 2011; *inter alia*) have shown that linguistic encoding as Presupposition or Topic is likely to induce less costly processing of information, thus leading to cognitive automatism. In the view we put forward, assigning part of sentence information to more automatic cognitive procedures may have led to the emergence of these packaging strategies. These latter thus acquired the function of instructing to a less costly processing modality. Existing data on presupposition and topic processing (cf. Sect. 5) are a cogent body of evidence in support of the evolutionary scenario delineated.

2 Human Working Memory System: Limits, Selectivity, Controlled Versus Automatic Processing

As is known, information processing runs on the activity of two basic memory stores: Short-Term Memory (STM)¹ and Long-Term Memory (LTM). It is well accepted that STM is affected by limits in duration and in the amount of resources it can allocate on different processing tasks. For this reason, attention—primarily handled by the STM system—is brought on few tasks (typically only one) at a time.

¹ In the rest of the present work, we will sometimes refer to the STM store as Working Memory (WM), although this latter identifies a particularly dynamic component of the Short-Term Memory store.

The paucity of the resources fuelling attentional mechanisms implies that once a task or a stimulus is attended, other stimuli are hardly elaborated in parallel, what is known as *attentional selectivity* (Broadbent 1958; Bundesen and Habekost 2008; Deubel and Schneider 2004). This constraint is more compelling when novel stimuli are elaborated, as they are usually learned from the ground up, thus imposing greater processing demands on the human processor (Sweller 2003: 220).

Selectivity is therefore an adaptive solution to an efficient use of the limited resources available, as also anticipated by James in his *Principles of Psychology* (cf. James 1890: 404):

Everyone knows what attention is. It is the taking possession by the mind, in clear and vivid form, of one out of what seem several simultaneously possible objects or trains of thought. Focalization, concentration, of consciousness are of its essence. It implies withdrawal from some things to deal effectively with others.

At first blush, a STM system affected by such constraints appears incapable of executing several complex processing tasks at once. However, in the seventies, Shiffrin and Schneider (1977a, b, 1984) discovered the existence of a double modality of information processing exploiting more and less effortful mechanisms. Notably, they labeled these strategies *controlled* and *automatic*²:

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*» . (Shiffrin and Schneider 1984: 269).

Needless to say, the adaptive implications of a twofold modality like this are remarkable, as it allows human beings to efficiently deal with the huge amount of environmental stimuli in a more sustainable way (Schneider and Chein 2003), and we assume that linguistic stimuli are no exception to this.

² It must be acknowledged that the distinction between *automatic* and *controlled* processes is one of the most contentious ones in the current literature. Indeed, previous experimental research (Hahne and Friederici 1999) on this double-modality processing has revealed that precise electrophysiological components seem to correlate to both modalities with qualitatively different kinds of effort required of the processor (cf. Sect. 5 on this issue). However, for the purpose of our discussion we will comply with Shiffrin & Schneider's definition quoted above.

3 Language Processing Rates and Automation

Wray (1998) argued that emerging sentences imposed heavier processing tasks on the human STM system. Expressly, with emerging multi-unit sentences, attention was no longer directed to a single unit per conversational turn, but to more units at a time (Wray 1998: 47). It is widely thought that inefficient allocation of attentional resources may cause the loss of part of the incoming information (Chandler and Sweller 1992). If comprehension is ensured by attentional focalization (Just and Carpenter 1992; Cowan et al. 2005), whatever content “escapes” the scope of attention is not fully elaborated either. So, how could attentional selectivity meet the processing demands of emerging syntactic complexity? Before broaching this issue at length, some preliminary remarks on language processing rates will come in useful.

In a psycholinguistic experiment, Givón (1991) measured the reading speed of words and clauses in English and Kalam (for other insightful studies on the online processing of sentences and reading times, cf. also Carreiras and Clifton 2004). These two languages epitomize the isolating and the agglutinative morphological type, respectively. Using recordings from reported narratives, Givón estimated general reading time means at about 250 ms per lexical word and 1 s per clause (Givón 2002: 163). These means indicate relatively fast processing rates for both words and clauses, which are surprisingly systematic for both languages.

Besides keeping pace with the rapidity with which words and clauses are usually processed, another task engaging the receiver’s attentional system is represented by what Givón termed *shifting communicative context* (Givón 2002: 242–243). Context is the socio-cultural and cognitive toehold of human communication, and the receiver’s ability to detect the changes taking place in it enables him to make sense of the meanings exchanged in a conversation, be they explicitly or implicitly conveyed. But context is also made of the intentions and perspectives set by the speaker as he opens the communicative interaction, and these continuously change manipulating the thematic progression of the text in unpredictable ways.

Givón reasons that, given the fast processing rates of sentence units, the limited amount of resources which our STM system runs on and the ephemerality of oral discourse, it is difficult to keep track of all these variations, most of which are irrelevant to the communicative task at hand. So, ensuring that the most «urgent and purposeful task» is devoted the necessary amount of attention implies that other less relevant tasks are attended with a lesser cognitive investment, this being possible through less controlled cognitive mechanisms:

[The time constraints on natural oral-auditory language processing are ca. 250 ms per lexical word and

1.0 s per clause]. This extremely fast pace 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 executive attention. (Givón 2002: 256).

Givón also contends that the speaker’s likelihood to represent certain aspects of the communicative context only automatically and implicitly in the mind is *adaptively motivated*. Attentional selectivity imposes the setting of strict priorities, and these are represented by units of information ranked as more relevant than others with respect to the goals to be attained in the conversation.

In the psycholinguistic field, automated processing of sentence contents has been investigated with relation to the cognitive biases induced by different information structures (Erickson and Mattson 1981; Bredart and Modolo 1988; Sturt et al. 2004). It has been observed that in manipulating the distribution of topic-focus and presupposition-assertion oppositions (Loftus 1975; Schwarz 2014, 2015; *inter alia*), the scope of attention is manipulated accordingly, which results in different mental saliencies of the pieces of information provided by the linguistic or extralinguistic context, i.e. in different levels of attention devoted to them.

4 Presuppositions and Topics: A Working Definition

In Stalnaker’s (2002:701) words, «to presuppose something is to take it for granted, or at least to act as if one takes it for granted, as background information—as *common ground* among the participants in the conversation». Similarly (though not in the same general perspective), P.F. Strawson (1964) had defined presupposition as «a presumption, on the speaker’s part, of the possession by the audience of identifying knowledge of a particular item», where «identifying knowledge is knowledge of the existence of a particular item [...]». The occurrences in (1)–from Russell’s popular example—and (2) illustrate these formulations:

- (1) The present King of France is bald
- (2) Pass me the brick, please

In both cases, the referent of the definite description is presented to the addressee as something already known to him. Obviously, presenting some information as already possessed by the addressee cannot be without consequence for its processing. Plain assertions and non-presuppositional phrases in general typically instruct the addressee to *build*

new memory slots for entities or states of affairs that are new in the conversation, as can be seen in (1') and (2'):

- (1') France presently has a King
 (2') I need a brick

Conversely, presuppositions instruct to *recognize* an entity or state of affairs among those already stocked in the context set, or at least to do *as if* things are that way (Gauker 1998, 2002; Stalnaker 2002). It is therefore to be expected that these different tasks involve different processing costs.

In this respect, topics parallel presuppositions on a different discourse and memory level. Like presuppositions, topics lack assertive force (Cresti 2000; Lombardi Vallauri 2009). By presupposing some information, the speaker suggests that it belongs to the common ground which the addressee shares with him. This means that the addressee *accepts* to treat that information as if it is already present in his LTM, though he may not direct his attention to it at the moment of utterance. In realizing certain content as topic, the speaker lets infer that he considers it *given* information (Chafe 1987, 1992), that is, *presently active* in the hearer's STM, as it has been just introduced in the preceding discourse or in the extralinguistic context. In other words, topics tend to encode referents which participants are already thinking about at utterance time. Differently, packaging as focus presents certain content as *new* information, namely as presently *inactive* in the addressee's STM. This condition provides the reason why the focus coincides with the illocutionary aim of the utterance (Cresti 2000): utterances are produced to convey information that is different from what has just been said: information that addressees are not already thinking about. In (3) and (4), only the focus conveys new information, while the topic just provides a semantic background resuming information that has been activated by the preceding turn (given in brackets):

- (3) A-You should forget Jennifer
 B-To forget her_[T], I drink_[F]
 (4) A-I see you drink much
 B-I drink_[T] to forget her_[F]

Again, it can be observed that the task of recognizing some information as already active in one's WM is probably less demanding than the task of understanding a new, inactive referent from scratch and creating a new space for it in one's WM. For example, in the terms of Relevance Theory (Wilson 1975; Sperber and Wilson 1986/1995), presuppositions are regarded as the set of ordered background entailments obtained by just substituting quantified existential variables in all the constituents of the sentence. In the following sections, we will succinctly report on experimental findings that argue in favor of the properties

of topics and presuppositions to effect an automatic processing of some information. In our perspective, topics and presuppositions can be outlined as an adaptive solution to deal with the processing demands of increasingly complex utterances endowed with always enriched pragmatic functions.

5 Online Processing of Topics and Presuppositions: Evidence from Psycholinguistic Studies

In the 1970s, the processing of presupposition/assertion has been addressed by Hornby (1974) and Loftus (1975) on the basis of false information verification paradigms. Analogous testing designs had been used by Erickson and Mattson (1981) for topic-focus structure. By and large, all these studies showed that subjects were usually less likely to recognize false contents when presupposed or topicalized than when focused or asserted. This effect was believed to be induced by the property of presuppositions and topics to «draw attention away from some content», thus grounding for a less thorough attentive elaboration of it.

A similar effect was noticed by Erickson and Mattson (1981) for topical information in a test where subjects were presented with sentences such as the following³: *How many animals of each kind did Moses take on the Ark?* The subjects responded “two” without noticing that it was Noah, and not Moses, who took animals on the Ark. To better gauge the effects of information structure biases, Bredart and Modolo (1988) replicated the experiment comparing two other versions of Erickson and Mattson's testing sentence, placing *Moses* once in focus (e.g. *It was Moses who took two animals of each kind on the Ark*), once in topic position (e.g. *It was two animals of each kind that Moses took on the Ark*). As predictable, the distortion was much better spotted when it involved the focal part of the sentence.

More recently, the processing of presuppositions and topics has been assessed using eye movement and other brain imaging techniques (Birch and Rayner 1997; Schwarz 2014, 2015). For example, Birch and Rayner (1997) and Schwarz (2014, 2015) observed more rapid eye shifts and saccades while reading topical or presupposed information, as compared to asserted or focalized information, meaning that processing ease is likely to be associated to topics and presuppositions.

Within the neurological purview, some pioneering ERP studies have investigated the electrophysiological response

³ Other test sentences always revolved around world knowledge contents (see Erickson and Mattson 1981, for other examples).

to the processing of automatic and controlled processes in language comprehension. For example, Hahne and Friederici (1999) noticed that automatic processing is bound to elicit early negativity patterns (ELAN), usually within the 0–200 ms time window. In fact, automatic processing is a first-pass processing of sentence structure which precedes more controlled cognitive operations, typically targeted at fully integrating structural and semantic information of the linguistic input. These more controlled mechanisms would elicit a P600 suggesting the actual update of a content. The existence of a double-step mechanism of sentence processing 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. In this sense, a first-pass—possibly automatic—processing prepares more controlled mechanisms to a more efficient allocation of the limited resources available.

On this account, the idea that automatic processes are subserved by early negativity patterns, hinting at a preliminary effort made by the receiver to decipher structural information, may seem to run counter to any conception of automation as relatively effortless. Indeed, such evidence raises some question as to what is to be treated as automatic when coping with a first-pass, structural processing.

As is known, both negative and positive components have been extensively broached in the relevant literature. Notably, N400 has been frequently correlated with lexical-semantic integration and prediction (Kutas and Federmeier 2000; Wang and Schumacher 2013), whereas P600 has been often associated with reanalysis due to a wrong syntax-semantics mapping (Osterhout et al. 1994) and new information update (Burkhardt 2007). However, a systematic relation of such components to specific linguistic phenomena is still matter of open debate. Needless to say, some further investigations would certainly provide us with a clearer scenario on the actual neural structures of automatic and controlled processing both in linguistic and non linguistic activities. Yet, for the purpose of our discussion, we will essentially build on what previous studies in the field of cognitive psychology have found on the function of these two modalities in the human processor.

6 A Possible Path of Presuppositions from Economic to Persuasive Aims of Attention Reduction

6.1 Saving Effort on Shared Information

We have suggested that presupposition allows improving effort economy in language use. If content already known to the receiver was encoded in presentative constructions

like those exemplified in (5), the addressee would be bound to treat that content as completely new, to focus his attention on it and to establish it as a new piece of knowledge to be stored in his memory. In (5), all referents are introduced by means of assertions and indefinite descriptions, as if the hearer doesn't know about them:

- (5) There is a country called Croatia. It has islands. There are months. One is called August. During that month, we will go to those islands. Then, we will go to another place. That place is called Plitvice

Each assertion tells the addressee that he must focus on the item being mentioned, and build a new mental slot for something to be called Croatia, one for its islands, one for months, one for August, etc. This results in what we regard as a sort of (pragmatic) *garden path* effect, for the following reason. Presenting some content within the presupposed part of the message instructs the addressee to process that content as something he already knows about, i.e. to look for its previous traces in his memory. When, on the contrary, some content is linguistically presented as asserted, this instructs the addressee to process that content as not identifiable to him, i.e. to build a new mental slot for it in his memory. But if that content is known to him and identifiable, the addressee will realize that he already has its traces in memory. Consequently, he will be obliged to “go back”, re-interpret the message, and attribute to that information a status in his knowledge which is different from the one suggested by its linguistic packaging, ultimately recognizing he already has it in his memory. This going back and re-interpreting the information structure of the message is what we actually suggest to call a “pragmatic garden path” effect.⁴

Such a waste of processing effort can be spared if, instead, the speaker uses presupposing expressions, by which he tells the addressee to process the same contents in the less attentive way that is sufficient for dealing with already known entities:

- (6) This August, before we go to the Croatian islands, we will visit Plitvice

If the existence and identifiability of the month of August and of the Croatian Islands is provided to the addressee as already shared (i.e. presupposed), he will

⁴ “Garden path” effects are usually observed in syntax, when the first part of an utterance suggests a certain interpretation (e.g. *The horse raced past the hedge...*), which eventually proves wrong when the rest of the utterance is processed (*the horse raced past the hedge had no rider*), causing the “going back” to a previous position to take a different path of interpretation. Still, nothing prevents similar reanalysis phenomena to arise also for the informational structure of utterances.

process that content *with less attention*, because it comes with the suggestion that it is something he already knows about, not needing thorough examination any more. Full examination of already known content would entail repeating some effort one has done in the past. A resumptive, “mentally opaque” recollection of the already known (Croatia, the Islands) is enough for the purpose of understanding the part of the message which is really new (we will visit Plitvice).

6.2 Saving Effort on Information that can be Accommodated

On empirical grounds, the hypothesis that presupposition reduces processing cost can be tested by measuring the efforts related to brain activity. Lombardi Vallauri (2014, 2016) already proposed to account for the difference between assertion and presupposition (and for that between focus and topic) in terms of the aforementioned difference between controlled and automatic processing. The brain processing of Information Structure categories is being presently probed in several experiments, either behavioural or involving the measurement of Event Related Potentials (ERPs), i.e. brain responses to specific external stimuli, typically constituted by negative or positive deflections of the waveform that reflect brain activity.

Some results confirm that the same information is processed with less effort when presupposed than when asserted: cf. Tiemann et al. (2011), Schwarz (2014, 2015, Schwarz and Tiemann (2015)). The issue, however, is still a matter of debate. Some experiments have provided critical results in this regard, showing that the presupposition due to certain presupposition triggers can be cognitively more demanding as compared to that projected by other classes of triggers (Domaneschi et al. 2014). Not to mention that the cognitive demand of processing presuppositions can be also determined by the complexity of their logical structure (Domaneschi et al. 2016). Moreover, these experiments typically focus only on some kinds of presupposition triggers. For example, Schwarz (2014) investigates the presuppositions of focus sensitive particles that are typical cases of weak triggers, where the processing of the presupposition is not always mandatory.

Since it is not yet possible to set such questions, for the sake of brevity we will keep referring to presuppositions as if they are—in this respect—an undifferentiated set of linguistic features, although in principle subsequent research may show that our discourse should be extended only to some and not to all of the linguistic constructions usually or occasionally referred to as presuppositions.

In any case, some of the mentioned experimental inquiries seem to highlight that presuppositions may have the function of instructing the addressee to devote less attention to certain content, because more attention is not needed for the message to be fully understood. And, if expressions presupposing their content perform this function, they may also have arisen to fulfil it (Lombardi Vallauri 2016).

Now, language not only allows to instruct the addressee to pay less attention to some content when that content is actually known to him, but also when it is not previously known, provided that the message will be understandable even if that content is not fully examined. When presented with some content as presupposed which does not exist in their memory, addressees perform what is usually called *accommodation* (Lewis 1979). Instead of characterizing this process in the “classical” terms of accommodation, we may consider it as the acceptance—on the part of the addressee—of the presupposed information within the common ground, as proposed by Stalnaker (2002). Also in this view, presupposition may result in less attentive processing, since information accepted within the common ground is bound to be less challengeable.

For example, in (7) the presupposition arising from the change-of-state verb *stop* is expected to be accommodated by the addressee:

- (7) Please, go to the garden and *stop* the irrigation: I want to take a picture of the lawn from my window

In principle, if the addressee is not aware that the irrigation is on, the speaker might say:

- (8) The irrigation of the garden is presently activated.
Please, go there and *stop* it, so I can take a picture of the lawn from my window

But asserting information on the state of the irrigation results in superfluous effort, which is obviously avoided by any living organism, including human beings. A presuppositive packaging of this content is more compliant with the general preference for effort economy. In this way, the addressee can devote to that information only the amount of attention which is necessary for understanding the request. In normal situations, (7) would be preferred to (8), because it saves processing resources and draws the addressee’s full attention where really necessary.

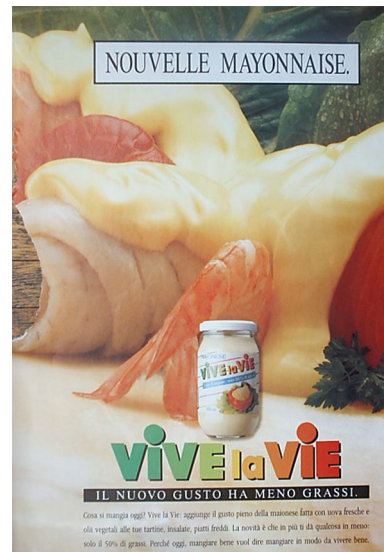
6.3 Avoiding Critical Reaction by Reducing Attention

Besides effort economy, a third function of presuppositions, different in nature, may derive from the first

two. If some information is unknown to the addressee, presupposing it may be aimed at *preventing its full understanding*. Thorough processing of a piece of information allows the addressee to realize when he does not agree with some opinion of its source. But he may accept the same information if he remains partially unaware of its most questionable parts, which typically happens if he pays less attention to them. As a consequence, plain assertion more probably causes some information to be recognized as doubtful, while presupposition more probably causes its doubtfulness to remain unperceived. This has been noticed, though not explicitly related to effort economy, by many authors (e.g. Ducrot 1972; Kerbrat-Orecchioni 1986; Lombardi Vallauri 1995, 2009; Sbisà 2007). Typically persuasive texts such as advertising and propaganda make intense use of this strategy (Lombardi Vallauri and Masia 2014). For instance, definite descriptions were systematically used in Italy to advertise dietetic products in the eighties. The ads in (9–11) used this strategy:



(9) The freshness of Jocca has only 7% fat.



(10) Vive la Vie the new taste has less fat.



(11) Invito The sins of gluttony that don't make you fat.

The main factor directing towards one or the other low-fat product is the hope to find something tasty. Here, while *attention-drawing* trivial truths about being low-fat are asserted, the *attention-diverting* definite descriptions presuppose the existence of such things as “the freshness of Jocca”, “the new taste” and “the sins of gluttony”. These ideas would hardly be believed by anyone if directly stated: “Mayonnaise Vive la Vie is the new taste”, “Invito Weight Watchers are sins of gluttony”. But, if presented as presuppositions, they raise lesser critical reactions.

The headlines of the following Citroën and Renault ads do not assert that the addressees are living with closed eyes, watching the world with those of other people and watching life rather than living it, but they presuppose these contents:



(12) Don't watch the world with someone else's eyes. Open yours.



(13) Stop watching, start living.

The directive illocution (*don't watch the world...*) and change-of-state verbs *open*, *stop* and *start* present as presupposed that the addressees are living poor lives. Such contents would be recognised as evidently false or even offensive by the target, if presented in assertive form: “You are watching the world with other people's eyes!” “You

are just watching instead of living, because you do not drive a Renault Kadjar!” But the ads are successful because, being presupposed, their questionable contents are processed in a less scrupulous way, which makes their falsity and offensiveness less likely to be noticed. Only the proposals of opening one's eyes and living one's life receive strong evidence and attract the resources devoted to controlled processing mechanisms. The presupposed ideas that the eyes are presently closed or that the addressees are not properly living (crucial for the effectiveness of the ads) pass into the addressee's knowledge without undergoing a moment of true focusing, because they are entrusted to more automatic processing.

The fact that presuppositions are effective strategies to “introduce information without calling attention to it” (Loftus 1975: 572) is exploited also in the following Alfa Romeo and Audi advertisements, where the adjective *primo* ('first') presupposes crucial content, namely, that further items of the same kind followed⁵:



(14) ...and I felt grown up with my first Alfa.



(15) It's time for your first Audi

⁵ In other models, implicit contents triggered by partial quantification are described as conversational implicatures.

What the copywriters wanted to do here is presuppose, instead of asserting, that who buys an Alfa or an Audi goes on buying them, which implies that the cars are highly satisfactory. This content, if accepted without critical challenge, will silently reshape the addressee's set of beliefs into one where possessing an Alfa/Audi induces people to buy more Alfas/Audis. If plainly asserted, the same content would draw a stronger *epistemic vigilance* (Sperber et al. 2010).

6.4 Why Presuppositions Developed in Language

We have suggested that, on a psycholinguistic, neurological level, by using presuppositions speakers instruct addressees to pay less attention to certain content. The pragmatic purposes—and effects—of this feature depend on the different statuses contents have, when they are presented as presupposed, in the memory of the addressee, who will have to process them. Three cases are possible, which we briefly resume here below:

- Contents that are actually shared and known to the addressee are preferably presupposed, because this will save him the useless effort to process them *ex novo*.
- Contents that are not actually shared or already known to the addressee, but are universally recognized as true and not questionable, can be presented as presupposed in order to reduce the effort made by the addressee in processing information that can receive minor attention without any damage to the comprehension of the message, thus saving cognitive resources for other more purposeful informational units.
- Contents that are questionable or even false and new to the addressee can nevertheless be presented as presupposed, in order to prevent him from processing them with full attention. Thus, he may not become completely aware of the details of those contents, and consequently believe them to be true.

7 Topics Suggest that Their Content is Already Active in Working Memory

As already said, the function of topic parallels that of presupposition. In both cases, language has developed a means by which the speaker can present some information as already shared by the addressee, either because it is known to him and present in his LTM (for presuppositions) or because it has just been activated in his STM (for topics). We will briefly sketch what the effort-economy contribution of topics may be. Givón (1975: 202–204) maintains that there is a

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.

Spoken language is made of intonation units, mainly corresponding to clauses, each falling into a single coherent intonation contour. Chafe (1987, 1992, 1994) showed that intonation units tend to contain no more than one piece of new information at a time, i.e. no more than one idea that is inactive in STM; a tenet known as the *One New Idea Constraint*:

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).

Still, it can be observed that, under certain conditions, more new referents in a single clausal unit are easily found in communication. If clauses introducing more new items pose a processing problem, instructing the addressee that some items can be processed with less effort can help solve the problem. As a matter of fact, clauses can contain more items of new information if some of them are presented outside the scope of asserted focus, and, consequently, as topics. An example of this can be found in the following oral production⁶:

- (16) *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 your family encouraging and nurturing-uh? (He sees Doonan smiling sarcastically)-No...

Doonan: We, I grew up in this town called Reading, which is outside of London, and it was a sort of very dismal—it's where Oscar Wilde was in jail—and there was a biscuit factory and all different factories, and it was just dismal. And I thought there has to be something more to life than this. So, my early years,

⁶ This is the beginning of a broadcasted interview (<https://www.youtube.com/watch?v=G1VO87Qdm-M>).

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

Phrases like *the biscuit factory* or *these freelance jobs* (underlined in the text) resume information which is already active, having been formerly introduced in presentative constructions like *there was a biscuit factory* and *I used to do freelance display jobs*. In bold type we highlighted a clause containing two pieces of new information, not anchored to textual antecedents: respectively the subject (*this guy*) and the predicate (*came by*). So, *This guy came by* contains two new chunks of information. As suggested in Lombardi Vallauri and Masia (2015), this is possible because the first new item is presented as topic, i.e. as if it was active information, so that it absorbs less attentional resources, leaving enough for processing the focus. In other words, presenting new entities as topics “bypasses” the *one new idea constraint*, because some inactive entities end up costing like the already active ones.

This function of topics is exploited in advertising to background questionable contents, be they given or new. The pro-Europe advertisement (17) diffused in the eighties by the Italian government presents as already shared (in a topical purpose clause) the idea that “entering Europe” is desirable. Preposed, topical purpose clauses always suggest that the aim they encode is already felt as such in the situation (cf. Thompson 1985. This accounts for the oddity of such sentences as “to better cut your finger, you should use a sharper blade”). In fact, in a period when Euro-skepticism was widely diffused in Italy, giving the impression that the desire to “enter Europe” was widely shared is precisely what the advertisement wanted to do, but could not do in the form of focal, asserted information.

Per entrare in Europa, scegli la chiave giusta.

Le piccole e medie imprese dell'industria, dei servizi e dell'artigianato hanno una nuova chiave per entrare in Europa: "La Guida all'Europa".

La Guida all'Europa: È il manuale pratico e di facile consultazione che fornisce informazioni su tutte le nuove opportunità economiche offerte dalla CEE alle piccole e medie imprese.

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Nome e Cognome _____
Attività _____
Indirizzo _____

(17) To enter Europe, choose the right key.

LO DEVI ASCOLTARE PER CREDERCI.

NUOVO SoundDock® 10
Sistema musicale digitale

IL NOSTRO MIGLIOR SISTEMA MUSICALE PER IPOD® E IPHONE®. Quando i tecnici Bose hanno progettato il sistema musicale digitale SoundDock® 10, sono partiti dall'esclusiva tecnologia Bose a guida d'onda, già presente nel Bose® Wave® Music System. Questa tecnologia è stata ulteriormente perfezionata per creare un sistema la cui resa ha impressionato tutti. Il nuovo SoundDock® 10 offre un suono pieno e ricco, dai bass profondi agli alti cristallini di un'assolo. La qualità audio è nettamente superiore rispetto a quella dei comuni sistemi per iPod® o iPhone® e paragonabile a quella di uno stereo di grandi dimensioni. L'interfaccia all'utente™ permette di ascoltare con il suono di qualità Bose la musica presente su un cellulare abilitato. Il telecomando consente di controllare il sistema ed è passabile da una scrivania all'altra (collegata al sistema). Inoltre il sistema è dotato di uscita video per vedere in TV i filmati contenuti su iPod® o iPhone®. Ascoltalo tu stesso: capirai perché questo sistema è unico!

(18) You must LISTEN to it / in order to believe

In (18), the colours of the script suggest that the prosody of the headline has the final purpose clause as a postposed topic: *lo devi ASCOLTARE, per crederci*. Presenting as already active the idea that you need to “believe” something about its sound, suggests a pre-existing situation in which *it is hard to believe that something can produce such a sound*. The same idea, if asserted, would be recognized as exaggerate; but the fact of being in topic provides it as already shared, thus keeping it from thorough examination and criticism.

8 Summarizing Remarks

Probably, presuppositions and topics are entrusted to (more) automatic processing, while assertions and foci undergo (more) controlled processing. Experimental work is being presently carried out to further clarify this issue. Existing neurophysiological data reveal that automatism bear upon particular neural components possibly peaking at very early stages of sentence processing. Given the scant experimental literature on the subject, we take these findings to be a valid gambit to further on research on the double-modality processing herein discussed, yet we considered automaticity as in the account provided in Shiffrin & Schneider’s seminal works (1977a, b), namely as a relatively effortless mental process, which—from the point of view of information structure—we claimed to be associated with the encoding of some information as topic or presupposition.

These information categories may well have been developed to improve language ergonomics by sparing processing effort on some utterance contents. But this may have been only the first step of a more complex evolutionary path. Using a presupposing expression to suggest the addressee that he already knows about something when he actually does (step A), and using the same expression *as if* he does know about that something, because that something is not crucial for the understanding of the utterance (step B), logically and pragmatically follow one another. The availability of linguistic presupposition for step A can be the factual premise for its exploitation in cases belonging to step B. This suggests the hypothesis that in the evolution of proto-language(s), over time, function (B) may have been developed from function (A).

That these economic devices have been further exploited for persuasive purposes (ultimately constituting a step C) is a fact, which we have exemplified from present-day persuasive communication, also because it provides additional evidence for the idea that language can have undergone a “drift” in this domain, from more basic to more developed functions of the same features. It is obviously more difficult to assess when step C took place: since it is the last step of

the described development, it may also have happened in a phase not to be called “protolanguage” anymore.

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