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Contagio semántico y signo lingüístico

por

Camilo Quezada Gaponov

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Profesor Guía: Carlos Cornejo

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In common conversation about people and things present to the senses, the most important “modifiers” and “qualifiers” of the speech sounds made and heard are not words at all, but the perceived context of situation. In other words, “meaning” is a property of the mutually relevant people, things, events in the situation. Some of the events are the noises made by the speakers.

John R. Firth

Introduction

During the second half of the 20th century, a newly emergent paradigm, the Cognitivism, set the guidelines that mainstream research would follow to study human cognition (Gardner, 1987). Given the prominent role that language plays in cognition, many researchers tried to describe and explain the way individuals interpret words. In fact, language interpretation became one of the most crucial problems to be solved in disciplines such as Psychology (Fodor, 1983), Artificial Intelligence (Minsky, 1975, Shank & Abelson, 1977), and Linguistics (Chomsky, 1965).

There are two key assumptions that define the core of the cognitivist approach to language and meaning. The first one is the compositionality of meaning (Hagoort & Van Berkum, 2007). Language interpretation was thought to be attained by decoding linguistic units (such as morphemes and words) having a stable and symbolic meaning which is ultimately parsed and integrated in a higher order unit: the sentence. By this token, the problem of word meaning was conceived in terms of a mental lexicon in which meaning was stored in long-term memory (Cornejo, Ibáñez & López, 2008). The second key assumption is that the meaning conveyed by words and sentences can, and even should, be explained *in vacuo*, that is, with no need to consider any particular real world context. This claim was explicitly defended by Chomsky (1965) and Fodor and Garret (1966).

These two assumptions are complementary inasmuch as they ultimately support the exclusively symbolic nature of knowledge and representation that cognitivists championed, but they are by no means exclusive of Cognitivism. Traces of them can also be found in more recent proposals by Jackendoff (2002) or Hauser, Fitch and Chomsky (2002). In cognitive neuroscience, a very recently published paper by Hinzen and Poeppel (2011) inspects four lines of inquiry tackling the semantic problem by exploring the interface between lexicon and syntax, showing that the compositional or combinatorial approach is still largely present in mainstream researchers studying language. The authors are certainly careful to state the extreme complexity

of the problem and to acknowledge the existence of “non-linguistic” factors or “preconceptual” structures (that is, non symbolic elements), but overall their review makes clear that a significant portion of current research in cognitive neuroscience is highly aligned with the two assumptions above mentioned.

This traditional view of meaning and syntax does have some faults. By stressing combinatorial syntactic processing interacting with various lexical traits embedded in words, this formal account of language interpretation usually neglects pragmatic, contextual factors such as prosody, intentionality, gestures, and social interaction in general. In real life, all of these non-symbolic elements, and probably many others, are usually present and actually shape the meaning of linguistic units. More crucially, context-free formal accounts of meaning and syntax fail to explain the highly plastic connection linking meaning and linguistic signs in everyday circumstances (Cornejo et al., 2008).

Thus, it is quite common to observe a conflict between the postulates of many cognitive theories and what people actually say or interpret when engaged in human activities involving language. One possible reason for this conflict might be the independence assumed between language and the material world. When semantics and syntax are conceived in terms of self-sufficient computations that can in fact interact with the manifold properties of the world and social life but that cannot be substantially altered by them, the final result is a schism between language and world, which are ultimately conceived and studied as two separate domains.

The project here sketched is based on the claim that language is much more linked to the material world physically perceived by individuals than traditional cognitive theories about language usually acknowledge. More specifically, the working hypothesis is that the formal, symbolic, context-free meaning of words that is traditionally studied in cognitive science is just *one* of many semiotic dimensions. When a word is used in everyday circumstances, a highly stable semantic dimension coexists –within the very same word– with a much more elusive and changing dimension closely linked to the perceived material world (that is, closely linked to interlocutors, settings, events, and so on). Of particular interest will be the relation established between words and objects.

In this project, some tools from neuroscience will be used. Therefore, a few central concepts regarding general principles describing the way brain functions will be briefly outlined

at the beginning. After that, the focus will be shifted to the N400 component that will be used in this study. An attempt will be subsequently made to develop a theoretical framework that will try to establish that the meaning conveyed by linguistic signs can be seen as part of a manifold semiotic process in which both a symbolic and non-symbolic dimension can be distinguished. One key aspect of this semiotic process is what will be defined as *semantic contagion*. Finally, the last section of this project will provide details about the methodology and the experimental designs that will be implemented to empirically test the theoretical claims driving the whole project.

The brain as a proactive organ

Several authors have claimed that one of the most important aspects of human brain dynamics and functioning is its “proactive” or “predictive” nature (Van Berkum 2010, Bar 2007, Mesulam 2008). Expanding findings on the neural processes involved in human vision to other cognitive dimensions and drawing on proposals such as the mathematical account of brain functioning offered by Friston (2005), the main idea behind the predictive nature of brain is that human cognition is a highly interactive process in which the brain constantly generates predictions:

The brain is no longer viewed as a transformer of ambient sensations into cognition, but a generator of predictions and inferences that interprets experience according to subjective biases and statistical accounts of past encounters. This top-down, inside-out account of brain activity is not new but is becoming increasingly more important to recent thinking in cognitive neuroscience. Reality according to this approach does not appear to be built one sensation at a time but as an emergent product of the iterative dialectic between externally generated inputs and internally generated hypotheses, expectations, and interpretations (Mesulam, 2008, p.368).

In this vein, cognition is conceived as a permanent interaction (an “iterative dialectic”) between external stimuli and top-down internal processes which ultimately generate predictions, analogies or inferences (Bar, 2007). These top-down processes are highly sensitive to the associations that the brain might have established for one particular input. Thus, the recognition or interpretation of a stimulus is strongly influenced by the previous experiences an individual might have had in past involving that particular stimulus or similar ones. The word *experience*

must be understood in a very definite sense. Since every experience of the world always occurs in space and time, experiencing the world in one particular moment necessarily means to encounter the multiple aspects of the world, that is to say noises, visual perceptions, tactile sensations, bodily sensations like warmth or cold... Experience is multisensory in nature. If experience impacts on memory by shaping “representations”, “associations” or “analogies, (Bar, 2007, Mesulam, 2008), the predictive top-down processes the brain engages in are also necessarily affected by experience. The point can be made then that experience provides *multiple* sources for the brain to establish complex, multisensory associations.

Another key element in this predictive account of human brain functioning is context. When discussing receptive fields in human visual system, Friston (2005) states that “Classical models... assume that evoked responses will be expressed invariably in the same units or neuronal populations, irrespective of context. However, real neuronal responses are not invariant but depend upon the context in which they are evoked” (p. 826). Bar (2007) maintains that

Finally, the activation of associations for prediction will not be as useful if it simply activates automatically all the information associated with the linked representation(s) in memory. Instead, it needs to take into account the context in which this input is encountered, and selectively activate the most relevant associations (p. 286).

This means that when interpreting an external input (whether a word, a picture or an object) human brain makes use of the *actual* context in which the input is perceived. This context does not activate all of the related “information” in brain. Only relevant associations are established, and this is accomplished by means of the iterative dialectic mentioned above. Since the context surrounding any stimulus is always a grounded, concrete experience of the world in space and time, it follows that perceiving or interpreting an input in real life is strongly influenced both by an experiential (external) context and by a history of past experiences which, in turn, has been strongly shaped by the actual multisensory contexts in which the input has been encountered. Needless to say, all of this can bear very important consequences for language interpretation.

N400 overview

During the few last decades, neuroscience techniques like EEG, MEG, and fMRI have been widely used to study human cognition. In the EEG field, ERPs have proved to be particularly apt to address language-related questions because of their high temporal resolution, being the N400 component, first reported by Kutas and Hillyard (1980), arguably one of the most extensively studied ERPs.

The N400 component is a negative deflection of the electrical signal produced by brain activity. It ranges between 200 ms – 600 ms after the onset of a target stimulus, peaking the highest around 400 ms. In the first report of the N400 effect (Kutas & Hillyard, 1980) the by now famous sentence “He spread the warm bread with *socks*” made clear that the target word *socks* elicited an N400 which was not present when the above sentence was ended by the target word “*butter*” instead. Many subsequent experiments proved that the N400 component is highly linked to cloze probability, semantic relatedness between words, word frequency, rhymes, phonological features, and many other properties of words (Kutas, Van Petten & Kluender, 2006). Also, it can be elicited using both written and spoken words, and using either words embedded in sentences or sequentially displayed word pairs.

Along with data supporting the verbal nature of the N400 effect, there is compelling evidence showing that many non-linguistic stimuli can and do elicit N400, including video images (Sitnikova, Holcomb, Kiyonaga, & Kuperberg, 2008), faces (Barrett, Rugg, & Perrett, 1988), still pictures (Ganis, Kutas, & Sereno, 1996), gestures (Cornejo, Simonetti, Ibáñez, Aldunate, Ceric, López, & Núñez, 2009), hand signs (Kutas, Neville & Holcomb, 1987), music (Koelsch 2011), and voice (Van Berkum, Van den Brink, Tesink, Kos, & Hagoort, 2008), just to mention a few non-linguistic elements capable of impacting on the N400 component.

Although a distinction can then be made between studies using linguistic and non-linguistic stimuli to elicit N400 effects, the dominant view in neuroscience is probably still closely tied the *conceptual* nature of the associations that generate the N400 component:

...verbal and nonverbal N400s reflect similar cortical computations occurring in different, but overlapping, populations of neurons. Overall, the extant data suggest that N400 amplitude is a general index of the ease or difficulty of retrieving stored conceptual knowledge associated with a word (or another

meaningful stimulus), which is dependent on both the stored representation itself, and the retrieval cues provided by the preceding context (Kutas, Van Petten & Kluender, 2006, p. 669).

This project aims at showing that the line separating the verbal dimension from the nonverbal one is much fuzzier than generally assumed. Since linguistic stimuli will be used, the N400 effect will be here viewed as a marker reflecting *semantic expectations*. This term adequately encompasses two important ideas that are essential for the whole project. Firstly, the fact that the N400 effect, when observed in language-based experiments using words as targets, is indeed linked with lexical dimensions that can be broadly labeled as semantic, that is, as having to do with meaning. This claim is supported by studies that have shown dissociation between the N400 component and the P600 component (Kuperberg, 2007). In this regard, the work of Paczynski, Kreher, Ditman, Holcomb, and Kuperberg (2006) is particularly revealing. When subjects were presented the sentence “At long last the man's pain was understood by the_____”, non-animate target nouns such as *medicine* and *pens* elicited the same N400 effect elicited by the animate target *violinist*. However, non-animate nouns also elicited a P600 component that was absent in *violinist*. Since neither *medicine*, *pens* or *violinist* were congruent with the sentential context but generated differential effects, it can be said that P600 is linked to syntactic anomalies in sentences, while the N400 is mostly sensitive to lexical or semantic fit.

Secondly, the use of *expectations* is consistent with the above outlined proactive or predictive nature of brain functioning. Top-down processes and predictions in which human brain engages in to make sense of external inputs not only apply to the description of visual processes involving objects, but also to the neural dynamics of language interpretation. Faced to the task of interpreting words, human brain is highly predictive and tries to anticipate what will appear next in a sentence, for instance. When prediction is not supported by facts, when an input following a prime does not match what the brain might have expected by virtue of “subjective biases and statistical accounts of past encounters”, the N400 effect underscores the mismatch. This interpretation of potentials like N400 and P600 is offered by Friston (2005) and Van Berkum (2010).

N400 and language

According to a review by Lau, Phillips and Poeppel (2008), within cognitive neuroscience the N400 effect observed in language and meaning is usually interpreted from one of two standpoints: the integration view and the lexical view. In the former, "...the N400 effect... reflects the process of semantic integration of the critical word with the working context" (921). In this account, the meaning of a word is determined by its integration in a "working context" which is usually a sentence. In the lexical view, "...the N400 effect reflects facilitated activation of features of the long-term memory representation that is associated with a lexical item". The meaning of a word is assumed to be stored in long-term memory and is conceived as conceptual in nature.

Both views emphasize language interpretation as a compositional or combinatorial process. This conception of language has been described by Hagoort and Van Berkum (2007) as belonging to a long-standing tradition assuming that "...the meaning of an utterance is a function of the meaning of its parts and of the syntactic rules by which these parts are combined" (p. 801). Besides narrowing the problem of language interpretation to a nuclear unit (the sentence), the above outlined views consider context in a very impoverished way, usually equating it to the words co-occurring with a particular target word within a sentence.

Of course there are alternative approaches to N400 and language. The work by Hagoort, Hald, Bastiaansen and Petersson (2004) explored the N400 effect using the following sentence: "The Dutch trains are _____ and very crowded". The blank was filled with three adjectives: *yellow*, *white* and *sour*. The three resulting sentences were all syntactically correct, but when the word *sour* was used a semantic anomaly occurred and an N400 was expected (as indeed was the case) because there is no semantic fit between *trains* and *sour*. As for *white* and *yellow*, they do not involve any semantic violation, because they are both consistent with a canonical predication about trains.

However, Dutch trains *are* yellow, as people living in Holland know by everyday experience. As already mentioned, the standard account of language assumes that meaning is highly independent from the material world. Consistent with this, language interpretation has been viewed as a two-step process (Hagoort et al., 2004): the first step involves analyzing the sentence in a bottom-up fashion by means of word integration or lexical activation and syntactic parsing. The second step, once the linguistic (propositional) meaning has been decoded, allows for the verification of the sentence's content against pragmatic factors or world knowledge to

determine whether the sentence is true or adequate. Had this been the case, the target words *sour* (implying a semantic violation) and *white* (implying a world knowledge violation) should have shown, at the very least, different patterns in latency. Nevertheless, the effect for both words "... was identical in onset and peak latency and was very similar in amplitude and topographic distribution to the semantic N400 effect" (Hagoort et al, 2004, p. 439). These findings suggest that world knowledge can influence language interpretation within the same time-frame as semantic knowledge does. This is also consistent with other data questioning multiple-stage models of language interpretation (Kutas, 1993).

Another pivotal study challenging some deeply-rooted assumptions about word meaning is the one conducted by Nieuwland and Van Berkum (2006). Being aware of the well established fact that, at a sentence level, the mismatch between an inanimate agent and a verb requiring an animate syntactic subject elicits an N400 component (Weckerly & Kutas, 1999), they explored the effect of textual context on the N400 potential by constructing fictional short stories in which inanimate nouns such as *yacht* or *peanut* were assigned the agent role in sentences constructed around a predicate requiring an animate argument, such as *cry* or *fall in love*.

In one experiment, they constructed a cartoonlike story revolving around a "dancing peanut". They observed that as the story evolved, the N400 amplitude decreased. In other words, the first time in the story that a peanut was presented as the inanimate subject of a verb requiring an animate one, the N400 amplitude was high, but as the text progressed and it was made clear that the story was a fiction, the N400 usually observed in sentences violating animacy constraints progressively decreased until finally disappear. By the end of the story, the critical sentence "The peanut was _____" was completed with one of two targets: *salted* or *in love*. If the meaning of this sentence, embedded at the end of a fictional story in which peanuts are portrayed as alive and animate, is interpreted in two steps, the first corresponding to a lexical-semantic processing, the target *in love* should have elicited an N400 effect, because it includes an utter animacy violation. *Salted*, on the other hand, should have elicited no N400, since it is a canonical non animate predicate for a standard non animate argument.

The results were just the opposite: *salted* elicited an N400 effect while *in love* did not. These results suggest the interpretation of a sentence can be influenced by elements which go beyond the sentence itself, in this case the story as a whole. A canonical inanimate-inanimate relation at sentence level is perceived by the brain as anomalous because of the prior context

provided by the story. Inversely, an anomalous inanimate-animate relation was perceived by the brain as appropriate because of the same prior context provided by the story.

...the results of our experiments constitute strong evidence that discourse context can completely overrule lexical-semantic violations. As such, they support interactive, “single-step” models of language comprehension, in which local and global context can both immediately influence interpretation, without giving principled precedence to local semantic information (Nieuwland & Van Berkum, 2006, p. 1106).

This study is closely related to a topic that has always troubled cognitive scientists dealing with language: metaphors. The standard semantic theory elaborated by Katz and Fodor (1963) relied on the notion of “semantic primitives” which were thought to be nuclear universal elements underlying lexemes. Among these semantic primitives, animacy was one of the most crucial primitives of nouns, and was seen as feature helping individual to parse sentences (more precisely, the propositions underlying sentences). These sentences, much in line with cognitivism’s assumptions, were always analyzed independently from context. The results of this research prove that human brain does integrate information which goes beyond a particular sentence to ultimately adequate its predictions and expectations. In other words, the text context helps the interpretation of a metaphor in a very dynamic and flexible way, overriding “semantic” violations.

The two experiments just reviewed support the idea that the N400 effect linked to a word is sensitive to elements other than the local sentential context. In the experiment by Hagoort et al., world knowledge generates an N400 peak. In the experiment by Nieuwland and Van Berkum, the discourse context overruled the violation of animacy constraints.

A few other studies can be mentioned to reinforce the idea that the N400 component is not exclusively tied to sentence level processing. For instance, the study by Hirschfeld, Zwitserlood and Dobel (2011) showed an interaction between sentences and visually displayed pictures. Van Berkum et al. (2008) showed that conventional sentences including no anomaly at all could elicit an N400 effect when they were pronounced by voices displaying features not compatible with the conveyed propositional content (for instance, the utterance “Every evening I drink a glass of *wine* before going to bed” pronounced by a child or “I cannot sleep without my

teddy bear in my arms'' pronounced by an adult). In this experiment, the N400 was not generated by linguistic violations, but by the mismatch between the propositional content and the speaker's age or genre. The work by Cornejo et al. (2008) showed that the incongruence between speech and *co-occurring* gestures could elicit an N400 effect when the gestures were not congruent with the utterances.

To summarize, the N400 component can be thought of as an electrophysiological marker of semantic expectations. When confronted to linguistic stimuli (words) the brain rapidly generates predictions based on previously established associations and contextually relevant information. These predictions may transcend the sentence level to include text, world knowledge, voice features, and gestures, among other non-linguistic elements.

Language, grammar, and meaning

Saussure's *Cours in General Linguistics* (1916/1959) ends with this statement: "...*the true and unique object of linguistics is language studied in and for itself*" (p. 232, emphasis in original). Chomsky (1965) explicitly argued that Universal Grammar was to be found in human linguistic *competence*, not in human linguistic *performance*. Saussure and Chomsky are arguably two of the most influential linguists of the 20th century. Although in the surface they may be considered as rivals, deep down their theories are very similar (Cornejo 2004). One key element relating Saussure's Structuralism to Chomsky's Universal Grammar is *time*. More precisely, the way they both relegate time.

It is well known that Saussure (1916/1959) introduced a clear distinction between *synchrony* and *diachrony*, and it is of course true that this distinction does acknowledge that natural languages do change in time (it could be hardly stated otherwise). However, this distinction was introduced to argue that the true, if not only, object of Linguistics as a science is to describe the *system* of relations underlying a language that must be studied synchronically. In a sense, a system described in this fashion can be viewed as a subtle way to emphasize its *timeless* nature, especially when the relations are conceived in highly abstract and formal terms. Saussure's complementary distinction between *langue* and *parole* mirrors this distinction.

Chomsky's notion of competence is even more straightforward in this regard. Universal Grammar belongs to competence, which is to be distinguished from performance, "the actual use of language in concrete situations" (1965, p. 4). The object of Linguistics is to describe how

Universal Grammar's rules and principles can explain human linguistic competence. In this line of reasoning, the words "human" and "universal" imply a theory strong enough to explain language faculty in *any* individual living in *any* society in which *any* language is spoken. Ultimately, this equals to say that the rules underlying UG are timeless: they allow humanity to acquire and use language in any moment of history and in any geographical zone.

This way of understanding the notions of rules and system (as strong enough to be universal and timeless) is closely tied to the numerous efforts undertaken in many social sciences to study their respective objects resorting to a scientific method, which very often translates into describing social facts in the same way as physicists describe world and matter (some of the consequences of this rationale in Psychology and Linguistics have been established by Gould 1981 and Voloshinov, 1929/1986). In the particular case of language, relegating time also implies relegating space. For a process to deploy in time, space is needed. Therefore, to describe language in such a way that the proposed formal relations or rules are valid regardless of time, the physical space in which language occurs must be also relegated.

As for meaning, in the two theories just outlined all of this implies assuming that the concrete words used to interact in human societies possess a meaning either socially fixed (Saussure) or biologically granted by abstract rules coded in genes (Chomsky). In both accounts, the meaning of words is viewed as something that is not substantially altered by the specific spatio-temporal conditions in which words are uttered and exchanged. "True" meaning is something that remains invariant in spite of changes in context. However, real life language situations are necessarily grounded in space in time. Language is always embedded in some context. Since context is dynamic and is constantly changing, it does not easily fit in a "universalist" timeless account of language. The simplest way to solve this problem is to ignore it or considering it as epiphenomenal.

This schism between formally-conceived language and the material world in which is actually used highly resembles the problem detected by Gibson when studying vision (1950). Models of vision used in laboratories to train pilots for flight were highly consistent with the mathematical principles of optics and human vision neural physiological basis. However, it was soon realized that pilots trained in laboratories had severe problems when flying their aircrafts in real life situations. Similarly, the formal descriptions provided by language theories emphasizing systematic, abstract aspects of language blatantly fail to explain, let alone predict, what happens

in real life. The mismatch led Gibson to emphasize that visual perception must be understood ecologically, that is, as something that is intrinsically tied to the real, concrete world inhabited by an organism. Also, he advanced the term *affordance* to underscore “the complementarity of the animal and the environment” (1986, p. 127). He posed that visual perception is affected and shaped by specific environment in which an organism dwells. In an ecological approach, visual perception is the final product of an interaction, a dialectics between a living organism and its environment.

Gibson’s affordance theory applies to language too. In fact, the affordance notion is consistent with the concept of *natural grammar* proposed by Halliday (1994). In Halliday’s view, language acquisition is ontogenetically supported by the concrete experience of a world in which objects and events are physically perceived. He uses the example of a child watching a man as he washes a car. The child can utter something like *man car wash* to convey the idea that a man is washing a car. Taken out of context, these three words so uttered are not sufficient to convey an unambiguous meaning. However, they contain the nuclear elements of a transitive relation (SVO). Ontogenetically, a transitive relation is something that a child can perceive in the world in the absence of language because the entities of the world do engage in transitive relations (as it is the case with intransitive relations, for that matter). What language and grammar provide is a *milieu* for the child to *linguistically code* this relation.

The multiple languages of the world allow persons to code transitive relations in many ways by means of affixes, inflections, case, and so on. Following Halliday’s reasoning, then, there is no need to postulate an abstract UG to explain language acquisition, since the multiple grammars sustaining the many languages spoken on Earth do not spring *in vacuo* but are acquired and used in a material world that affords the linguistic coding of certain relations. In Semantics, the animacy feature supposed to be “embedded” in the words can be simply viewed as an analogical correlate of a world in which some entities are perceived to move and some others are still. Language and world are closely tied.

However, if language and a grammar were absolutely dependent on the physical world they would not allow human beings to communicate the way they do. In an attempt to accommodate UG claims to evidence from Biology and Neuroscience, Hauser, Chomsky and Fitch (2002) inspected the human language faculty within a broad framework that revises some of Chomsky’s early postulates (1965, 1981, 1995). For instance, they made sure to distinguish

human language from animal languages, implicitly granting non-human primates sophisticated communication skills that Chomsky himself had previously denied (1966). Also, they acknowledged the role of word frequency in language interpretation, a notion closely linked to performance and disregarded in Chomsky's first proposals (Biber, 2002).

Two conclusions in Hauser et al. paper (2002) are particularly revealing because they are advanced as features that distinguish human language from other animal communication systems. The first is that

“...most of the words of human language are not associated with specific functions (e.g., warning cries, food announcements), but can be linked to virtually any concept that humans can entertain. Such usages are often highly intricate and detached from the *here and now*” (p. 1576, emphasis added).

The second conclusion is that human language systems are recursive, which allows infinite combinations to be elaborated from a discrete set of finite elements. Of course this combination is guided by rules.

Both conclusions can be rephrased like this: recursivity, that is, *grammar*, allows human languages to transcend the immediate experiential context in which signs are used to predicate about entities which are not present to the senses. If a semiotic system is completely dependent on the here and now, the meaning conveyed by the signs in that system cannot transcend space and time since these signs can only be “meaningful” when they co-occur with their referents. The signs of human natural language, on the other hand, allow people to predicate about the future and the past. This can only be accomplished if those signs are linked to meaning by virtue of a convention or rules. These rules (which are by no means equal to Chomsky's transformational rules) must be more sophisticated than the mere arbitrary assignment of a referent to a given sound. This is already the case in primate species like vervet monkeys, which are able to produce different alarm calls for different kinds of predators but lack the ability to predicate about things which do not co-occur in space and time with the signs they use (Levinson, 2004).

Thus, predication about things and events not present to the senses demands a complex system of conventions. According to Deacon (1998), this system of conventions is grammar, which specifies thematic roles, tenses, mood, and so on. Based on Peirce's semiotic theory

(1894), Deacon stresses that linguistic signs used in human languages are symbols in the Peircean sense that they are both capable of generating meaning in the absence of what is referred and that get their meaning by convention. Both requirements are fundamental for a sign to be considered a symbol. However, as Deacon points out repeatedly, symbols in Peirce's theory also contain an index and an icon. According to Peirce, an index is a sign of something else by virtue of a relation of cause-effect or part-whole. More generally, a sign points or indicates at something else because "...is physically connected with its object" (EP 2:9). In Deacon's interpretation, this connection stems from the co-occurrence of the sign and a referent in *space and time*.

A symbol, then is composite sign. Commenting on Peirce's semiotic theory, Jakobson (1997) states that

The most widely known of Peirce's general assertions is that three kinds of signs exist. Yet the things which are the best known quite easily undergo various distortions. Peirce does not at all shut signs up in one of these three classes. These divisions are merely three poles, all of which *coexist* within the same sign. The symbol, as he emphasized, may have an icon or an index incorporated to it, and "the most perfect of signs are those in which the iconic, indicative and symbolic characters are blended as equally as possible" (p. 1032, emphasis added)

A final important aspect of Deacon's interpretation of Peirce's semiotic theory is what he labels as "the hierarchical nature of reference" (1998, p. 69). Ontogenetically, for a child to master a language it is first necessary that he grasps the indexical nature of signs. This means that children have to establish an association between a sound and an object which is based on spatio-temporal contiguity. Eventually, after these indexical associations have been established, children come to implicitly grasp the system underlying a language: its grammar. Once this accomplished, signs become symbols capable of conveying complex meanings which do not directly depend on experience.

This view is consistent with has been observed in evolutionary psychology since very long ago. Vygotsky (1986) identified a stage in children development in which they understand words not only as referring to a particular object, but also to some properties of that object. At

some stage of a child's evolution the word *cow* does not only mean something like "four legged mammal", but can also mean *milk*. This happens because milk and cow are physically linked or, in Deacon's account, because they co-occur in space and time.

By combining Deacon's approach with Halliday's notion of natural grammar, it can be said that both language and grammar rely heavily on the world experienced in space and time. The physical experience of world is crucial to establish indexical associations that later on grammar refines introducing symbolic, non context-dependent relations. More importantly, not only these relations require experience, but the final product of this process, linguistic signs (symbols) do include an index in them. Therefore, linguistic signs can be said to have an *indexical potential*: the capability to refer something by sheer spatio-temporal contiguity. Linguistics signs have the potential to mean or refer by co-occurring in space and time with other elements.

Semantic contagion

Language is a fact of the world. Whether uttered or written, words are material and are inserted in concrete contexts. In everyday face-to-face interactions, the symbolic meaning of words interacts with bodily movements, gestures, sounds, objects... As was already discussed, human brain is able to generate predictions elaborating on many of the multiple sources that the concrete world offers. Thus, linguistic signs always interact with non linguistic elements to ultimately generate an extremely complex meaning.

To state that meaning of linguistics signs is complex does not translate into saying that its rules or laws are very complicated to find. Here, complex is to be understood as *composite*, as merging several dimensions. Consequently, the starting point here adopted will be that meaning is an holistic process comprising several interacting dimensions. It is of the essence of the meaning of any word to include a social dimension and an individual one, to be stable but to rapidly change when certain circumstances also change. More importantly, words get their meaning by interacting with other words in sentences, utterances, written texts and conversations, but also by interacting with people, gestures, objects, non-linguistic sounds, pictures, and so on.

In this project, an elaboration based on Bréal's concept of *contagion* will be advanced. Michel Bréal, French philologist known for being Saussure's mentor and for having coined the

term *Semantics*, thoroughly studied linguistic change, trying to unravel the principles describing how words change over time, i.e. diachronically. One of such principles is *contagion*:

I have elsewhere proposed the word contagion to describe a phenomenon that is quite frequent and causes that a word grasp the meaning of its environment. It is quite clear that this contagion is nothing else but a particular way for ideas to be associated (1897, p. 221)

Bréals proposal of contagion only applied to the diachronic phenomenon by which the meaning of a lexeme was absorbed by other ones by virtue of their repeated co-occurrence in a syntagm. Bréals examples were exclusively syntactic. The environment he mentions is linguistic in nature: it is what is modernly known as *cotext*, “the immediate linguistic environment in which a unit of discourse of momentary interest to an interpreter (a word, phrase, utterance, set of utterances) occurs and is interpreted in a discourse sequence” (Janney, 2002, p. 458).

Years after Bréal’s proposal, in the studies focusing on linguistic change the notion of contagion started to be labeled as metonymy and to include broader processes of meaning interaction. According to Nerlich y Clarke (1992), the kinds of metononimy identified in Bréal’s wake are:

...the part stands for the whole (also called synecdoche), the cause for the effect, the container for the contained, the form for the function, the material an object is made of for the object, the place for the people who live there, the name of a producer for the product, an article of dress for the person who wears it, the name of an author for his or her work, the object used for the user, the controller for the controlled, the institution for the people responsible, the place for the event, and so on. (p.134)

A careful look at the myriad of examples reflecting semantic change that linguists and lexicologists have been able to identify in many different languages (Traugott and Dasher, 2002) supports the conclusion that there are no laws deterministically explaining the way words change their meaning in time: semantic change is highly random and arbitrary. Also, the semantic change undergone by words reflects how a particular society actually uses these words. Words

are used in historical context by societies and persons possessing values, beliefs, ideologies, technology. In time, some of these dimensions (and probably many others) propagate until “entering” words and eventually shift their meanings. Thus viewed, semantic change is the final result of an holistic semiotic process which is originally microgenetic and strongly determined by indexical co-occurrence.

In this project, the concept of *semantic contagion* will be advanced to refer to a process by which words can grasp their meaning both by interacting with other words in sentence or text and by being embedded in real life contexts. It is believed that this way of conceiving meaning is consistent with Firth’s epigraph at the beginning of this text. Firth’s vision of language and grammar is known to be very different from the standpoints championed by his continental European colleagues, partly because, unlike other linguists, throughout his career he combined theoretical reflections with anthropological field research.

Firth inherited from Malinowski the idea of “context of situation”. Both to Malinowski (1923) and Firth (1950), the meaning conveyed by the words exchanged in real life interactions is intertwined with events, actions and intentions. To fully grasp the meaning of a word used in everyday situations it is necessary to observe the word as part of a living context in which speakers experience the world through their senses. Only then it is possible to apprehend what linguistic signs convey when embedded in “the living reality of language in fluxu” (Malinowski, 1923, p. 306).

The general problem

The most relevant claims underlying this project can be summarized as follows:

- Language is a material fact of the world. Being language concrete, human brain perceives it in an holistic fashion as part of the concrete context in which language is experienced. This allows human brain to engage in predictions which transcend the symbolic-only aspect of language and meaning to include non-linguistic dimensions capable of impacting in semantic expectations. The N400 component might reflect this highly complex process.
- The schism between language and the material world is deeply rooted in many of the theories trying to explain language and meaning. Regardless of the many possible

explanations for this, the fact is that there good theoretical (and empirical) reasons to seriously question the “ecological” validity of this assumption.

- When studied diachronically, linguistic signs can be observed to change their meaning not only because of internal abstract principles which are self-contained in language, but also because words are exchanged and used in concrete contexts in which flesh and blood persons produce and perceive words. These microgenetic “contexts of situation” can drive the process here labeled as semantic contagion and eventually alter words’ meaning.

Given the general theoretical framework, the below described experiments will try to answer the following question: can the meaning of a word be explained in terms other than symbols? More precisely, is it possible to pinpoint in one single word a “symbolic” source of meaning and a “non-symbolic” source of meaning?

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Manipulating objects can impact on N400: Untangling context

Camilo Quezada Gaponov^{a,*}, Vladimir Lopez^a & Carlos Cornejo^a.

^aEscuela de Psicología, Pontificia Universidad Católica de Chile, Santiago, Chile.

Corresponding author:

Camilo Quezada Gaponov, Escuela de Psicología, Pontificia Universidad Católica de Chile, 8940000, Santiago, Chile

e-mail: cquezad@uc.cl

Phone: +56-2-23545883

Fax: (56-2) 2978 2762

1. Introduction

In everyday life, language does not go unaccompanied. When people are reading by themselves, talking to each other or hearing a lecture, words are exchanged and/or perceived in a physical setting in which non-linguistic contextual elements are always present, whether objects, speakers, computer screens, music, smells, noises, etc. Even if contextual elements surrounding language manifestations are diverse and dynamic, they have been largely dismissed because several theories of language claimed that language could be studied irrespective of them, *in vacuo* (Fodor & Garret, 1966). Context was eventually placed into a “pragmatic basket” (Bar-Hillel, 1971) and in cognitive science “two-step” models of language interpretation were advanced to account for the interpretation of non-literal, pragmatic meaning (Fodor, 1983; Forster, 1979). However, results from cognitive neuroscience do not seem to support such a view (Nieuwland & Van Berkum, 2006; Van Berkum, 2009), suggesting instead that meaning is much more sensitive to contextual and pragmatic factors than was thought. If this is indeed the case, it seems sensible to establish what linguistic dimensions are prone to be influenced by

context and pragmatics. In this paper, we intend to address one particular question: can lexical meaning be influenced by a non-linguistic input? More precisely, we intend to explore how perceiving and manipulating an object can impact on a word's meaning as reflected by one specific neural marker: the N400 component. In doing so, we wish to introduce a distinction that may be of methodological relevance when studying language, namely the distinction between *context* and *co-text*.

In language-related ERP literature, the term context is most commonly used to denote the linguistic stimuli preceding a target of interest. Thus, word primes in word pairs, sentences preceding a critical word, and texts framing the appearance of a given word are all referred to as the context modulating ERPs such as N400 and P600. Even if sometimes expressions such as “sentential context” or “discourse context” are also used to specify its linguistic nature, the term context has been long and consistently used to encompass the manifold linguistic-only inputs used in ERP experiments (Hillyard & Kutas, 1983; Kutas & Van Patten, 1988; Lau, et al., 2008). When used this way, however, the term actually conflates two dimensions that in linguistics are considered as different. Catford (1965) is credited as the first linguist to distinguish a situational context from a strictly linguistic one. He introduced, for the latter, the term *co-text* to highlight the fact that when faced with problems such as translating the meaning of a sentence from one language to another, one could discern a clear-cut level of formal relationships in which linguistic units interact with each other by virtue of purely language-based mechanisms, but also another level in which the very same linguistic elements relate to the particular circumstances (context) in which they emerge and are used. Both levels are highly interlocked, so that one set of linguistic formal constraints will most likely determine the way an utterance or sentence can convey a particular meaning in a given concrete situation. Crucially, following Catford (1965), both formal and contextual relationships can impact on the syntagmatic arrangement (syntax) of the words of any given utterance or written sentence as well as their meaning (lexis). Linguists differ on the relevance of context for the study of language, with some authors viewing it as an epiphenomenon (Chomsky, 1965) and some others highlighting its importance in their models (Halliday, 1983; see Van Dijk, 1997, for an intermediate proposal and Beaugrande, 1991, for a

review of mainstream theories in linguistics). Distinguishing between context and co-text has proven to be especially fruitful in domains of applied linguistics in which language is studied as deployed in actual conversations and texts, such as discourse analysis (Brown & Yule, 1983; Schiffrin et al., 2001). In real-life, it is very often the case that content of utterances and sentences cannot be precisely established by considering only the linguistic units surrounding them. The key point is that words' meaning may vary as a function of the impact of two different, although highly interlocked, sources: a) the words surrounding a given linguistic unit of interest (co-text) and b) the non-linguistic situation in which a word, sentence, text or utterance is realized (context). Thus, "cotext is [is simply] the immediate linguistic environment in which a unit of discourse of momentary interest to an interpreter (a word, phrase, utterance, set of utterances) occurs and is interpreted in a discourse sequence[...]" Cotext is a natural consequence of the linearity of language and the sequentiality of talk" (Janney, 2002, p. 458). If language-related ERP experiments are reviewed following this definition, it will be soon be clear that the words that modulate the amplitude of the components for a given target are actually co-text. More importantly, it will be also clear that not all ERP experiments do in fact include context (as here defined) in their designs. Consequently, the amplitude of, for instance, the N400 component, does not always reflect the effects of different contextual conditions. Very often, it reflects the impact of different co-textual conditions, that is, the effects of linguistic units influencing some other linguistic units.

Nevertheless, there certainly are ERP studies that observe how non-linguistic factors such as world knowledge (Hald et al., 2007; Chwilla & Kolk, 2005), genre (Nieuwland & Van Berkum, 2006), speaker (Van Berkum et al., 2008), personal values (Van Berkum et al., 2009), and mood (Egidi & Nusbaum, 2012) can impact on language. Hagoort et al. (2007) showed that a violation of real-world knowledge can modulate the amplitude of the N400 component just as much as a purely semantic (linguistic-only) violation does. In their experiment, the perfectly grammatical sentence "The Dutch trains are *white* and very crowded" elicited the same N400 as did the sentence "The Dutch trains are *sour* and very crowded", simply because Dutch trains *are* yellow. Another example of research in

which context and co-text are experimentally dissociated is the work conducted on co-speech gestures. In this field, language comprehension is observed in a situational context, with utterances co-occurring with non-linguistic elements (gestures). Results in this area show that gestures impact on the N400 component, modulating its amplitude by virtue of their fit with the verbal content of sentences (Wu & Coulson, 2010; Cornejo et al., 2009, see Willems & Hagoort, 2007 for a review). Özyürek et al. (2007) reported an N400 effect for sentences like “He slips on the roof and *rolls* down” when the aurally presented critical word *roll* is simultaneously accompanied by the mismatching gestures of an actor describing with his hands an action consistent with *walking across*. Even if this sentence perfectly complies with syntax and semantics, an N400 effect is observed, driven by the situational context in which the sentence occurs. ERP literature in which context and co-text are treated as different is rare, but does exist. Schumacher (2012) reviewed relevant studies conducted within Cognitive Neuroscience clearly distinguishing both notions, therefore separating co-text effects from context effects and focusing on the latter (see also Schumacher, 2014 and Bambini & Bara, 2012). Also, there is a handful of ERP studies in which the word co-text is used to denote the same as here (Ng et al., 2014; Schumacher et al., 2010). In none of these works, however, an attempt has been made to empirically establish the grounds on which untangling context might be said to be of relevance.

Distinguishing context from co-text is not a mere terminological nuance. It is both a conceptual issue and a methodological one. ERP literature has clearly demonstrated that co-text strongly influences words at many levels. However, establishing the impact of co-text on words does not exhaust the problem of determining how meaning is constructed, even if co-text is arguably a key factor in language processing. Non-linguistic context is always at work when speakers engage in language comprehension or production, but less is known about its effects on syntax and/or meaning. This might turn problematic if findings are expected to model what happens in real life, since naturalistic use of language involves a constant interaction with non-linguistic elements. We believe that a more accurate terminology in which both dimensions are not conflated might help to more precisely discern the actual impact of non-linguistic context on language.

To explore the idea that a non-linguistic element can influence the meaning of a word, we decided to adopt the N400 component (Kutas & Hillyard, 1980a) as a dependent measure because it has proven to be especially important for the study of meaning. There is currently no debate that texts, sentences or word-pairs can elicit N400 effects which are more negative for incongruous stimuli as compared to congruous ones (Kutas & Federmeier, 2011). These effects are viewed as semantic because they were soon shown to be dissociated from some non-semantic properties of linguistic stimuli, such as the physical properties of target words (lower or upper case, Kutas & Hillyard, 1980b), and certain low-level syntactic violations (Kutas & Hillyard, 1983). Lexical priming has been used in ERP studies with the apparent conclusion that when two words are presented in a prime-target sequence, the N400 amplitude for semantically related targets is more positive as compared to the amplitude for non-related targets or nonwords (Hillyard & Kutas, 1983; Kutas & Van Petten, 1988). Even if there is some debate regarding the mechanisms underlying N400 effects elicited by semantic priming (Lau, Phillips & Poeppel, 2013; Kutas & Federmeier, 2011; Lau et al., 2013), it seems safe to claim that “...very few of the inferences gleaned from studies using the N400 as a dependent measure would be substantively affected by the outcome of this debate” (Kutas & Federmeier, 2011, p. 630). The N400 component can be considered as a marker of semantic processing, observable only when some kind of congruous/incongruous relationship can be established between meaningful stimuli (Federmeier & Laszlo, 2009). As such, when linguistic material is used, the N400 is a robust marker of the semantic/conceptual fit between words.

Thus, we designed an experiment to determine whether the physical properties of an object can impact on its semantic representation, as reflected by the N400 amplitude. We implemented a lexical priming paradigm based on word-pairs, which is known to elicit an N400 effect that can reliably be considered as an index of the semantic fit between words. Our design is a 2x3 mixed-factor ANOVA with participants assigned to two groups. The first group was given one object and the other group was given a different one. All participants were asked to read the same text, which explained in length what the received object was and introduced a novel name for it (a pseudoword). The only difference

between both groups was the encountered object. During the experiment, participants in each group were presented three kinds of targets always primed by the constructed pseudoword: words mentioned in the text they read (Co-textual Condition); words not mentioned in the text but consistent with the object they did handle (Object-Related Condition), and words not mentioned in the text but consistent with the object they did not handle (Unrelated Condition). Given this design, the very same set of targets was physically related to the handled object for one group of participants but altogether unrelated for participants in the other group. If the semantic representation of the constructed prime was solely based on its co-textual relation with other words in the text, the amplitude of the N400 component was expected to be highly negative for targets in the Object-Related Condition and the Unrelated Condition, since those words were intentionally excluded from the supplied text and none of them bore any linguistic relation whatsoever with the pseudoword. On the contrary, if the physical perception and manipulation of the objects did interact with the pseudoword, our hypothesis predicted a disordinal interaction, with the N400 amplitude in each group decreasing when targets were object-related and increasing when they were unrelated.

2. Method

Four requirements were considered critical. Firstly, participants would encounter a completely unknown word, since all words convey some degree of variable meaning which will inevitably differ from one person to another because of their personal backgrounds. A carefully designed pseudoword would minimize differences between participants and would provide them with an equal starting point. Secondly, the objects to be handled had to be just as novel and unknown as the pseudoword, to control for relevant prior knowledge and personal histories that might affect results. Thirdly, determining which targets could be soundly considered as object-related was not something that could be arbitrarily established. Therefore, a study was required to control for possible bias. Finally, we decided that the

experiment as a whole (the presentation of the pseudoword, the novel objects, and the generated text) had to be as believable as possible, so as to maximize the expected effects. We addressed all of these constraints when constructing and selecting the materials and when designing the sample, as described below.

2.1. Participants

Forty-three undergraduates from the Pontificia Universidad Católica de Chile were recruited. Undergraduates from technical majors were not sampled to prevent relevant prior knowledge from impacting on the text's verisimilitude. Since meeting this requirement was important for our design, once the experiment was completed we requested all participants to fill a questionnaire in which they were asked whether they had ever heard of the word before, whether had seen the handled object before, and whether they considered the text as plausible. No participants had ever heard of the word before nor had ever encountered any of the objects before. 95% of them judged the text as believable. Only subjects displaying an artifact rate lower than roughly 10% in each experimental condition (i.e. up to two trials rejected per condition) were included in the final sample. After discarding both faulty recordings and participants exceeding the adopted artifact rate per condition in any one of the three blocks considered in the experiment, the final the sample consisted of 34 right-handed undergraduates (18 in one group and 16 in the other one, 24 female, 10 male, mean age = 20.5). All participants signed an informed consent complying with research standards and approved by the Ethics Committee of the Psychology School of the Pontificia Universidad Católica de Chile.

2.2. Stimuli

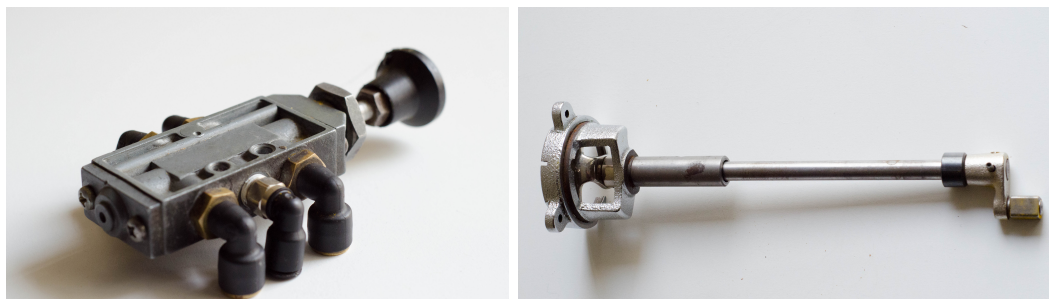
2.2.1. Pseudoword

Seven trisyllabic pseudowords (a most common number of syllables for Chilean-Spanish technical lexemes) were constructed. Three of these words had a CV.CV.CV syllabic structure and four of them had a CVC.CV.CV syllabic structure. In order to select the pseudoword to be used, we conducted a study in which 45 undergraduates were presented the stimuli and asked to freely write down all of the associations that each one of them might elicit. All pseudowords were novel and meaningless, but we anticipated that some of their phonological properties might activate similar existing lexemes, which would result in some degree of unwanted convergence. For instance, the pseudoword *rabuja* consistently elicited the Spanish word *bruja* (*witch*) because of their phonological resemblance, and was thus discarded. The chosen pseudoword (*chirene*) was the one that elicited the highest number of different words, which was assumed to reflect the lowest “semantic” convergence.

2.2.2. Targets

Four highly uncommon objects were selected. Three of them belonged to a pneumatic valve mechanism and the other one was a part of an old sewing machine. To determine which objects were more suitable for the experiment, we conducted a study with 12 undergraduates who first blindly manipulated each object and later on visually inspected it. At both stages, participants were asked to utter all of the words that every object might evoke. All of the evoked words were annotated and subsequently listed. We assumed that words consistently mentioned by different participants handling a given object could be considered as reflecting a particularly salient feature of that object, and so we closely considered how many times a given word was mentioned for each object. Also, we considered the number of different words per object, assuming that a smaller amount of mentioned words reflected a higher degree of object-related salience. Finally, we selected two differently shaped objects weighing almost the same (280 grams and 270 grams), along with a set of object-related words for each one of

them. We decided that words in each set could not overlap, so we excluded words mentioned for both objects. Words pointing at physical features such as color, weight, and sound were also excluded because we considered them as reflecting too general properties potentially shared by many other objects. We obtained 19 object-related words for one object and 20 for the other one. Once defined these two set of words, we conducted a behavioral pilot with 15 undergraduates following the same protocol that participants would later on follow during the EEG experiment. These undergraduates were presented the two set of object-related words and another one belonging to the Co-textual Condition, besides fillers. By inspecting RTs, we finally selected 15 targets per condition. Selected targets ranged from 2 to 4 syllables. They belonged to different semantic domains and part of speech. They collapsed both animate and inanimate words (one of the objects strongly evoked an insect, while the other one highly evoked a blender and some other kitchenware, Fig. 1). Targets for each object also belonged to different categories (see supplementary material, S1). Care was taken to balance words related to both objects considering syllable length and word frequency in Chilean Spanish (Sadowsky & Martinez, 2012). This inductive procedure granted targets an ecological validity, since they were not chosen arbitrarily but carefully selected after a sample of undergraduates encountered the objects and handled them in the same way participants would subsequently do in the laboratory. However, this strongly impacted on the number of possible targets per condition. We set at 15 the maximum amount of targets that could reasonably be considered as physically related to a given object. A higher number of targets, although desirable for an ERP experiment, might have introduced unwanted confounds.



As for “linguistic” targets, a 491-word length text was elaborated and *chirene* was defined as a mechanical part used in industrial engines (supplementary material, S2). This text was used to supply students with a plausible “knowledge network” for the newly encountered pseudoword. It was carefully designed not to include any of the words previously selected as object-related. Eight undergraduates were asked to read the text and afterward annotate 10 words they recalled the most, which helped in selecting the 15 targets finally included in this condition (both syllable structure and word frequency in this condition were balanced to match object-related targets). Since these words were only linked to the pseudoword by virtue of their co-occurrence in the text, this condition was operationally regarded as co-textual. Filler/target ratio was 2:1.

2.3. Procedure

All participants performed the task in the same order. Once the montage was completed, they were asked to blindly manipulate the assigned object. Then, they were asked to handle it and visually inspect it. After having physically perceived and freely handled the newly encountered object, participants were given the text, which provided them with a name for the object (*chirene*) and explained what it was. Upon reading the text, all participants received the same on-screen instructions, followed by some rehearsal trials in which none of the targets or fillers were used. These instructions made clear that word-pairs would be presented. Every word-pair was to be introduced by a red cross. The task would consist of determining, on a self-paced basis, whether the second word in each pair had been mentioned in the previously read text or not. Sequence for each trial was: fixation point (800 ms), prime (400 ms), ISI (300 ms), and target (1000 ms) (see Fig. 2). Targets were always preceded by *chirene*, while fillers were always preceded by some other pseudoword. Considering both fillers and targets, the ratio between words mentioned in the text and words not mentioned in the text was 1:1.

To observe how the expected effects evolved in time, participants performed the task three

times. In Block 1, targets were pseudorandomized making sure that some targets, which were assumed to be prime exemplars of a certain category were presented before some others. In the other two blocks, targets were pseudorandomized to control for possible buildup by semantically neighboring targets presented contiguously. Stimuli were displayed in the same order for all participants. Before starting the second and third blocks, participants were explicitly asked to manipulate again the object and were given the chance to reread the text. To reinforce perceptual effects, during the whole experiment the assigned object in each group was left on a desk, within participants' visual field.

2.4. EEG data

Data was acquired with a Biosemi system and a 32 electrodes cap. Signals were acquired at a 2048 Hz sampling rate and downsampled to 512 Hz, band-filtered between 0.5Hz and 30Hz, and finally processed and plotted both with Matlab and the Erplab plugin for EEGLab (Delorme & Makeig, 2004; Lopez-Calderon & Luck, 2014). Trials were obtained in a time-window spanning from -200 ms to 800 ms, time-locked to the onset of every target. ERP signals were referenced to the mastoids, consistent with literature (Johnson & Hamm, 2000; Duncan et al., 2009). Base line correction was set a 200 ms prior the onset of every target. Artifacts were automatically rejected with a 100 mv threshold and no correction algorithm was used on signals. Because of the limited number of targets per condition and the adopted criterion of 10% as the maximum artifact rejection rate per condition for every participant, only nine channels were selected: F3, Fz, F4, C3, Cz, C4, P3, Pz, and P4 (Fig. 2). This ensured more power to contrast the hypothesis, but precluded fine-grained topographical descriptions and scalp maps plotting. Statistical analysis were conducted with R (R Core Team, 2014). The total number of trials ranged between 234 and 270 trials per condition in one group and between 208 and 240 trials per condition in the other one (442 to 510 in collapsed contrasts, see below), which was deemed as sufficient to obtain a good signal-to-noise ratio (Luck, 2004; Duncan et al., 2009). N400 values were extracted from the 400-450 ms window. All ANOVAs are based on averages per

participant and per condition. Since groups were unbalanced, type II sum of squares was used. Reported p values were adjusted following the Geisser-Greenhouse correction whenever a contrast involved a within condition with more than one degree of freedom (Greenhouse & Geisser, 1959). However, when Geisser-Greenhouse correction's $\epsilon > .75$, p -values were adjusted following the Huynh-Feldt correction (Girden, 1992). We report original uncorrected F values and degrees of freedom for all ANOVAs.

3. Results

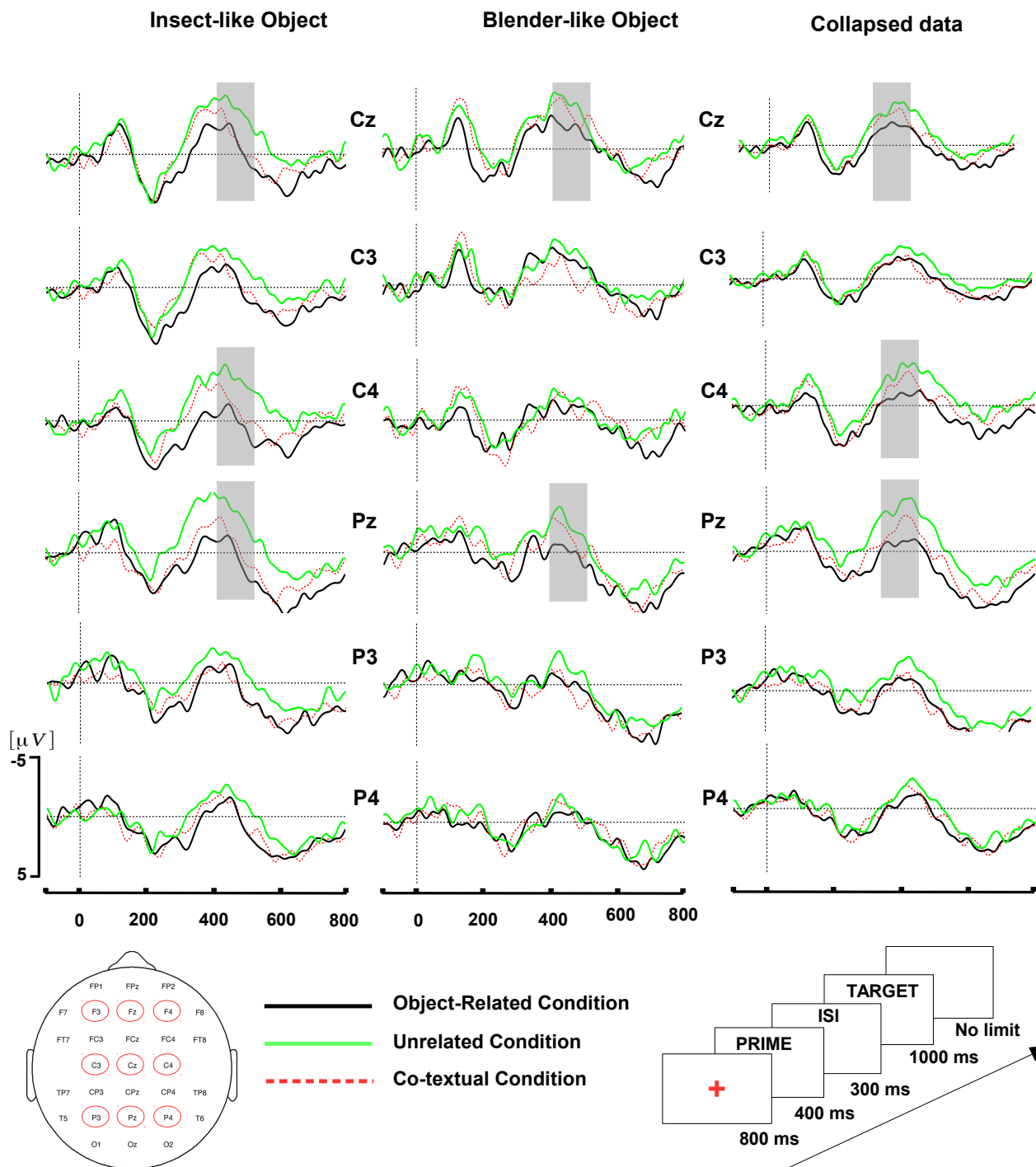
3.1. Behavioral

RTs were inspected in different time-windows in all blocks by means of a mixed-factorial ANOVA, but no interaction or significant differences between groups were found. A statistical significance was observed in Block 2 in the 300-1500 ms time-window, with a main effect for the within condition $F(2, 84) = 6, p=0.03$. Overall, RTs do suggest a facilitation effect for targets related to the insect-like object in both groups, but the effect is too small to be statistically considered. Consistent with this, percentage of responses correctly identifying those targets as not mentioned in the text is above 95% in all blocks for both groups, suggesting a heuristic which made “animated” targets more salient irrespective of the handled object. Accuracy for blender-like object is around 80% with minor differences between blocks.

3.2. ERP

Effects were found the central and parietal regions, especially at Cz and Pz, consistent with literature (Kutas & Federmeier, 2011). Overall, both channels displayed similar values and were therefore collapsed into one ROI in most of the statistical analysis reported in this section. Results for

this ROI in Block 1 showed no significant interaction, $F(2, 64)=0.31$, $p=0.72$ and no differences between groups $F(2, 64)=0.66$, $p=0.4$. A main effect was found for the within conditions $F(2, 64) = 5.03$, $p=0.009$, driven by the negative amplitude of targets in Co-textual Condition. Values for conditions of interest are nearly identical (Fig. 3 A). In Block 2, on the contrary, significant effects were found both for Cz and Pz individually and collapsed.



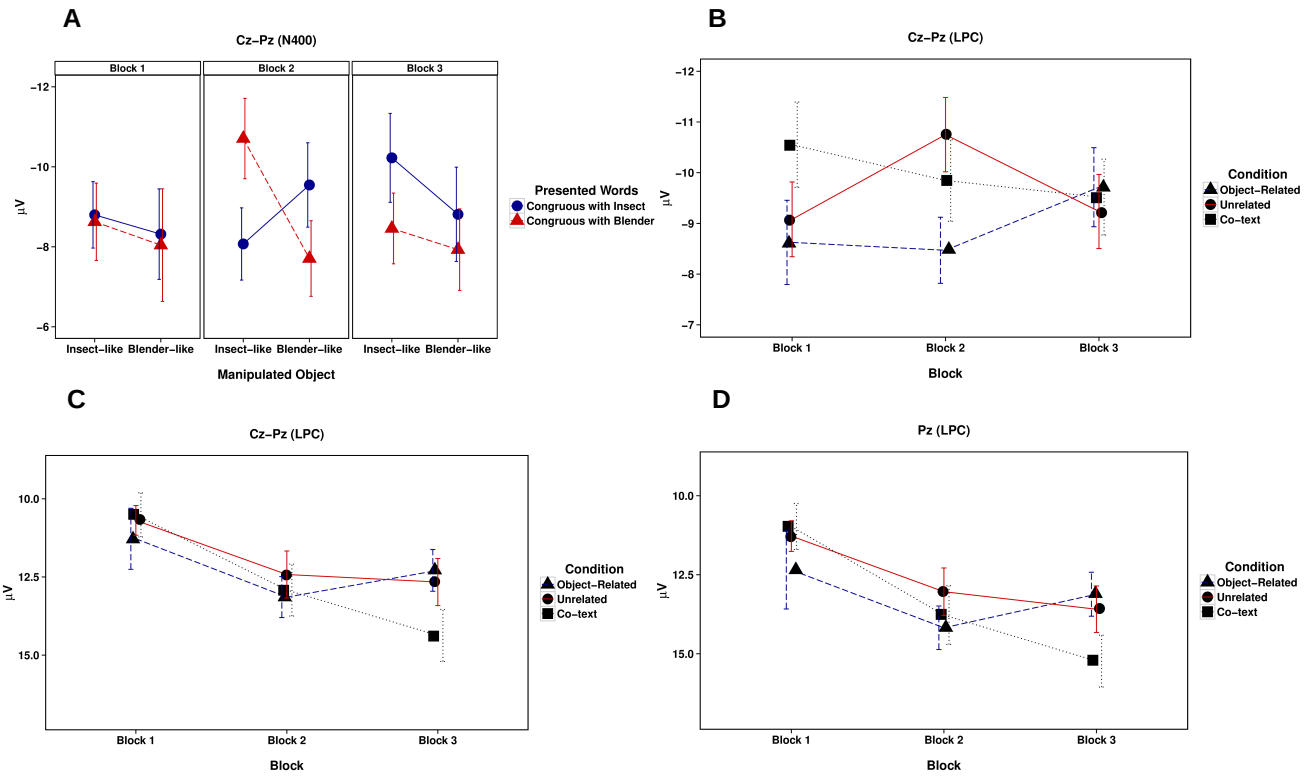
The interaction for Cz-Pz ROI is highly significant: $F(2, 64) = 9.22$, $p < 0.001$, size effect (GES) = 0.068. In the same ROI, no significant differences were observed between groups, $F(1, 32) = 0.0004$, $p = 0.98$, and no main effects were found for the within condition, $F(2, 64) = 0.55$, $p = 0.68$. Orthogonal planned contrasts were conducted by means of a Mixed Effects Model to include the whole data in the comparisons. Results for the conditions of interest are $t(64) = 3.24$, $p = 0.002$, $d = 0.69$ in one group and $t(64) = -2.05$, $p = 0.04$, $d = 0.5$ in the other one. The sign of the t -value in each contrast mirrors the simple effect found in the mixed-factorial ANOVA, as can be seen in Fig. 3 A. As for Block 3, no statistical interaction or main effects were observed. Results for each individual channel in Block 2 are provided in supplementary material (S3). No effects were found for frontal electrodes in any blocks in the selected N400 window.

A repeated measures ANOVA was conducted on the selected N400 window by collapsing data from both groups and recoding targets, Fig. 3B. All targets in the Object-Related Condition were grouped in one single condition for all of the 34 participants. The same was done with targets in the Unrelated Condition (targets in the Co-textual Condition remaining the same). In Block 1, a significant effect was found $F(2, 66) = 4.86$, $p = 0.01$, GES = 0.03, with targets in Co-textual Condition peaking more negatively. In Block 2, significant results were found for channels C4 ($F(2, 66) = 3.65$, $p = 0.03$, GES = 0.03), Cz ($F(2, 66) = 4.54$, $p = 0.01$, GES = 0.03), and Pz ($F(2, 66) = 6.62$, $p = 0.002$). Results for Cz-Pz ROI were also significant $F(2, 66) = 6.8$, $p = 0.002$. A planned orthogonal contrast conducted in the second block between Object-Related and Unrelated targets on Cz-Pz was also significant, $t(66) = 3.68$, $p < 0.001$, $d = 0.55$. No significant differences were found in Block 3.

To inspect the evolution of the effects in time, a trend analysis was conducted on the collapsed data for every condition in the N400 window across the three blocks (Cz-Pz ROI). No significance for the linear or quadratic trends was obtained for Object-Related Condition or the Co-textual Condition, but a significant quadratic trend was observed for the Unrelated Condition, $t = 2.5$, $p = 0.01$ (Fig. 3B). This result further supports the interaction observed in the mixed-factorial ANOVA in Block 2, with

object-related and unrelated targets starting at similar level in Block 1, but with unrelated targets increasing to a negative peak on Block 2 to later on decrease in Block 3.

Finally, analysis were conducted on the collapsed data to observe a possible LPC effect (most visible in the group that handled the Insect-like object, see Fig. 2) in the 580-690 time-window. No significant results between conditions were found when observing individual blocks, but significance was found in a 3x3 repeated measures ANOVA, with blocks and conditions as within factors. In the Cz-Pz ROI, a main effect was found for the block factor, $F(2, 66) = 20.47$, $p < 0.001$, GES 0.06, as well as a significant interaction between blocks and conditions, $F(4, 132) = 3.01$, $p = 0.02$, GES 0.01. A trend analysis was conducted for each condition and strong statistical significance was observed for the linear trend in the Co-textual Condition ($t = 4.87$, $p < 0.001$) and the Unrelated Condition ($t = 2.92$, $p < 0.003$). As for the Object-Related Condition, a significant quadratic trend was observed: $t = -2.01$, $p = 0.045$, somehow mirroring the pattern of the Unrelated Condition in the N400 window, with object-related targets starting at very similar amplitude as unrelated targets in Block 1, positively peaking in Block 2 to later on decrease in Block 3 (Fig. 3, C and D). Unlike targets examined in the N400 window however, when collapsing Cz and Pz this quadratic trend is indeed statistically significant, but only because it is strongest at Pz, differences in Block 2 blurring at Cz.



4. Discussion

Our findings show that the manipulation of objects does impact on the N400 amplitude of object-related targets. N400 values for unrelated targets and object-related targets are almost identical in Block 1, significantly different in Block 2 and finally almost indistinguishable in Block 3. Statistically, this effect is confirmed by the significant quadratic trend observed in the collapsed data for unrelated targets across the three blocks examined. Also, a significant quadratic trend was found when inspecting the LPC for object-related targets across the three blocks examined, which seems to mirror the N400 pattern of unrelated targets. Overall, these findings support the claim that object

manipulation can influence a word's meaning, and that this influence evolves in time.

The interpretation of our results rests on the premise that the pseudoword was perceived as a real word and that the observed N400 effect is linguistic in nature even if we manipulated a non-linguistic element. As for the first point, the work by Perfetti et al. (2005), in which they investigated ERPs for familiar words and for very rare existing words using the same word-pairs priming used here, may be of relevance. They selected real rare words that participants did not know (a situation analogous to the one faced by participants in our experiment) and grouped them in two categories: trained and untrained. In the training, participants read a brief definition for each unknown real word, not unlike the “training” we implemented for targets in Co-textual Condition. When comparing ERPs primed by trained and untrained rare words, they found that unrelated targets primed by untrained targets (that is, unrelated targets primed by real words unknown to the participants) did not elicit an N400 effect as compared to related targets for the same untrained words. On the contrary, unrelated targets primed by trained words (words initially unknown but subsequently learned) did elicit an N400 effect as compared to related targets primed by the same trained words. Their explanation was that “...the unrelated probes to untrained rare words produced no N400 effect, because participants did not know the meanings of the untrained words.” (2005, p. 1289). Given the similarities in procedure and materials, the N400 effect in our experiment across all of the three blocks supports thinking that our pseudoword *chirene* was in fact perceived as a meaningful word. As for the linguistic nature of the above reported N400 effect, the main support comes from centroparietal distribution of the component, which is characteristic of linguistic N400. Typically, non-linguistic N400 is more prominent in frontal regions (Amoruso et al., 2013), but we found no effects in frontal channels.

The interaction we predicted was only observed in Block 2. This is especially revealing because this block is qualitatively different from the other two. Recall that in Block 1 participants manipulated and read the text without knowing what would be the task to come. In this block, N400 amplitude for conditions of interest in both groups were virtually identical. In Block 2 and 3, on the contrary, participants manipulated the objects and reread the text already knowing that they were expected to

determine whether the second word in each pair had been mentioned in the text or not, therefore focusing their attention on the text. More importantly, participants faced Block 2 and 3 having previously encountered the critical targets for the object they handled, if only for the 1000 ms that each word was displayed on screen and presented among the rest of fillers and targets. Considered this way, the N400 amplitude for targets of interest in Block 2 may be said to capture the combined effects of the object manipulation in each group and the previous presentation of the related targets, which is consistent with the highly interlocked relationship between context and co-text (Catford, 1965). Nonetheless, since no instructions whatsoever were given involving either object-related or unrelated targets, these effects are highly implicit and, especially important for our hypothesis, generate statistically different patterns in each group as a function of the handled object.

If all three blocks are considered, the influence of the contextual element introduced in the experiment is dynamic. In the N400 window, effects are completely absent in Block 1, highly visible in Block 2, and non-significant in Block 3. Based on literature on word repetition, one should expect a decay in N400 amplitude as targets are repeated (although a rather mild decay, since N400 amplitude is known to be sensitive to long lags between stimuli presentation, as is the case here, Van Patten et al., 1991). This is in fact what happens with targets in the Co-textual Condition, linearly decreasing across blocks (although this trend is not statistically significant, see Fig. 3B). However, targets in the Object-Related and Unrelated conditions do not decay linearly but follow a quadratic trend, (one of them statistically significant) with a prominently different pattern in Block 2. By Block 3, effects are blurred and all of the conditions are at similar levels. Considering the strong link between animacy violations and N400 amplitude reported in literature (especially when studying sentences, Kuperberg 2007, but also when word pairs are used, Li, Shu, Liu & Li, 2006), the N400 amplitude for object-related targets in Block 2 is particularly suggestive (Fig. 3B). When collapsing data for all participants, object-related targets and unrelated targets are exactly the same in both conditions. Out of these 30 targets, 12 words correspond to either animated nouns (such as *turtle*) or verbs requiring an animated agent (such as *grind*). Thus, 40% of these targets are closely related to animacy features and should have consequently

been expected to elicit a rather large N400 effect. However, this only happened with unrelated targets. Manipulating and perceiving the objects altered the mismatch that the very same targets elicited when they were not physically consistent with the handled objects.

The N400 effect in Block 2 has an LPC correlate, namely the significant quadratic trend observed for the Object-Related Condition in the collapsed data (Fig. 3C and 3D). Interpreted as the old-new effect described in literature for recalled items in memory recognition tasks (Rugg & Allan, 2000, Rugg & Curran, 2007), the increased positivity of the LPC in Block 2 suggests that object-related targets were perceived as already seen, even if they were not intentionally studied and their exposure time was very limited. We interpret this effect as an interplay between objects and object-related words. By Block 3, the LPC increase in positivity is most prominent for targets in Co-textual Condition, which is not surprising because by then words in the text had been read three times and intentionally studied twice. This very same fact might explain the increase in the N400 amplitude for the object-related targets and the unrelated targets in Block 3, since they were not mentioned in the text, which by then might have reversed the effect observed in Block 2.

Finally, it can be argued that since the task was performed only on linguistic materials no claims can be really made about the influence of objects, because they were not the stimuli actually eliciting the N400 effect. This is indeed the case, but it is exactly what we intended to test: it is the *semantic representation* of a word which can be influenced by surrounding, thematically unrelated objects. This representation is best observable co-textually, when words prime words. In our experiment, objects can be said to mediate the semantic fit between a word and different kinds of targets. Ultimately, they are the non-linguistic origin of all of the differences found in Block 2, which amounts to say that contextual non-linguistic elements can modulate the semantic expectations of a word.

4.1. Conclusions

In ERP literature, world-knowledge and co-speech gestures studies have already reported N400 effects elicited by non-linguistic elements. Our study is different inasmuch as we aimed at capturing the influence of concrete objects on the semantic representation of a single word. Instead of a sentence context, targets were primed by a word. Therefore, N400 effects were not elicited by a cumulative online high-order integration of incoming information as is the case for sentences, but rather by the activation in memory of the relevant knowledge associated to a word. We are not aware of any other studies having reported similar effects on lexical meaning using both ERP measures and single-word primes.

Objects were handled in a laboratory setting, but there is no reason to think that they might not produce similar effects in real life. Results reported in world-knowledge studies such the previously discussed experiment by Hagoort et al. (2007) rely, to a great extent, on the familiarity with the non-linguistic environment in which speakers use language. Dutch repeatedly perceive and interact with yellow trains in their daily life, and it is this interaction what modulates the N400 amplitude. In our experiment, participants inspected and handled objects only for a short period of time. Sustained interactions with physical entities might perfectly well consolidate stronger links and thus percolate into the semantics of words.

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The impact of non-linguistic context on lexical meaning: an ERP study

Camilo Quezada Gaponov^{a,*}, Vladimir Lopez^a & Carlos Cornejo^a.

^aEscuela de Psicología, Pontificia Universidad Católica de Chile, Santiago, Chile.

Corresponding author:

Camilo Quezada Gaponov, Escuela de Psicología, Pontificia Universidad Católica de Chile, 8940000,
Santiago, Chile

e-mail: cquezad@uc.cl

Phone: +56-2-23545883

Fax: (56-2) 2978 2762

Abstract

N400 literature has shown that pragmatic elements such as world-knowledge, personal beliefs, voice, discourse, and gestures can influence words' meaning. These findings have expanded the limits of meaning interpretation beyond sentence boundaries. However, many pragmatic elements are still tied to sentences and related to language to varying degrees. The present study explored the effect that non-linguistic contextual elements might have on a word's meaning, as reflected by N400 component. 18 undergraduates watched video-clips and subsequently performed an offline word-pair task. Three conditions were implemented for targets: Video Condition (words pointing to objects appearing in clips), Text Condition (words verbally mentioned in clips) and Unrelated Condition (words not mentioned nor related with objects in clips). Consistent with hypothesis, N400 was significantly more negative for words in Unrelated Condition than for words in Video Condition. A statistical difference was also observed in LPC window, with increased positivity for Video Condition. Results support the idea that non-linguistic elements and context contribute in shaping the semantic representation of a word.

Introduction

Kutas & Hillyard's [1] discovery of N400 component has proved to be most enlightening for research on language and meaning. A negative EEG signal deflection peaking between roughly 250-550 ms after stimulus onset, N400 is currently a most characterized ERP known to be strongly related to language processing and semantic match/mismatch. N400's amplitude varies depending on how related target

and previous stimuli are: the more unrelated, the more negative. Following Kutas & Federmeier [2], N400 studies can be grouped in three chronological stages. The first one (1980-1988) is defined by research aimed at characterizing the new component. During second stage (1989-1998), researchers started to address “...core psycholinguistic questions that had proven intractable to most other dependent measures.” [2]. Debates were sparked and the path was set for new inquiries to be addressed during third stage (1999-2009), when assumptions were challenged and limits were stretched. New questions opened the field to new problems that would continue to be explored in the years to follow.

N400 research conducted during the first two stages is mostly consistent with some postulates adopted by mainstream psycholinguistics for most part of 20th century. One of such postulates is that linguistic meaning is to be found within the boundaries of sentences, because of the compositional nature of language [3]. In this view, words’ meaning is determined by an interplay between lexicon and syntax [4]. One other traditional claim is that language and meaning can be studied irrespective of the particular real-life contexts within which they occur [5]. Consequently, pragmatics was often overlooked by many language researchers, if not altogether disregarded [6]. Ultimately, these two claims are closely linked to the idea that linguistic meaning is first and foremost literal. The semantics of a word is to be found as stored in speakers’ mental lexicon in a context-free fashion [7, 8]. When the meaning of a word departs from context-free literality, it is usually said to enter into the domains of pragmatics or metaphor. In this view then, real-life situational context is a border of sorts separating semantics from pragmatics. Semantics studies words embedded in sentences and considered in their literal, context-free meaning, while pragmatics studies how context adds to and modifies words’ literal meaning.

Since the 2000s, evidence accrued strongly calling into question these postulates. One case in point are “two-step” models of linguistic interpretation [9,10], which claim that sentence-bounded lexical semantics takes precedence over context-based word interpretation. Consequently, anomalous or metaphorical sentences violating words’ literality are predicted to always generate some clash in comprehension. However, N400 studies experimentally testing these models’ predictions have disproved them. In one experiment, Hagoort et al [11] reported that in the sentence “The Dutch trains are... (*yellow/white/sour*)” N400 were observed effects only when completed by *white* and *sour*. The authors’ account is that since Dutch trains are in fact yellow, *white* utterly violated speakers’ world-knowledge. This pragmatic violation elicited an N400 effect regardless of generated sentence being syntactically and literally correct. Moreover, reported effect is virtually the same as the effect observed when the sentence is completed by *sour*. This means that a world-knowledge violation generates the

same effect as a purely literal semantic violation does. Another study [12] reported that the sentence “The peanut was *in love*” did not elicit an N400 effect when congruous with a previous discursive context (a fictional story about peanuts doing human-like things). On the contrary, the sentence “The peanut was *salted*” did elicit an N400 effect when preceded by a story in which peanuts acted like humans. Authors concluded that previous discourse could override predictions based on words’ literal meaning. Crucially, relevant discursive information was located beyond the limits of the sentences within which N400 was explored.

Currently, numerous studies can be found in literature reporting how discourse [13,14], real-world-knowledge [15-17], co-speech gestures [18-20], and speakers’ personal traits [21, 22] can and do modulate the N400 component’s amplitude. They all reinforce the idea that the interpretation of words’ meaning, as reflected by the N400 component, is sensitive to pragmatic factors over and above sentences’ limits. Co-speech gesture studies [23] are yet another particularly illustrative case. Research in this area consistently reports N400 effects when a mismatch occurs between linguistic inputs and concurrent gestures. Results have been observed during online language comprehension, with gestures either priming upcoming words [24] or simultaneously occurring [25]. This suggests that human brain processes language relying on linguistic information as well as non-linguistic clues. Crucially, co-speech gestures studies usually report N400 effects for critical words considered in their literal meaning and primed by syntactically correct sentences. Therefore, they can be argued to show how non-linguistic elements impact on the online semantic interpretation/integration of words by simply co-occurring with words in a given real-life context.

All of these findings are hardly compatible with the claim that N400 component mainly reflects access to the context-free semantic representation of lexical entries stored in memory [26]. Proposals have been advanced to reassess, revise, or reconsider cognitive theories involving language processing and meaning [27, 28]. Consistent with general principles of brain functioning [29, 30], Kuperberg [17] claims that N400 is a marker of a highly predictive process so that during language processing, “...prior to encountering an incoming target word, comprehenders use multiple sources of contextual information to predict or pre-activate upcoming semantic features in a graded fashion, thereby changing the state of semantic memory.” Sources of contextual information include elements such as lexicon, syntax, schemas, situation models, and state of events, but the acknowledgement is also made that “... pragmatic factors may act as reliable cues that weight comprehenders’ message-level inferences, leading to semantic predictions that influence how the N400 is modulated to incoming words.” Therefore, sentential context preceding a word’s appearance determines meaning and N400’s amplitude, but so do extrasentential context and non-linguistic elements. Consequently, situational

context and pragmatics cannot be so easily dismissed when it comes to examining language interpretation and meaning.

Still the point could be made that many of the pragmatical elements manipulated in N400 literature such as voice properties, discourse, world-knowledge, and beliefs all bear some affiliation to language. They could be said to either be completely conflated with language (voice) or to be the ultimate propositional result of sentence processing (world-knowledge and beliefs). A similar point could be made of gestures, since many of them bear some kind of iconic relationship with concepts.

Additionally, certain gestures in some cultures are so conventional that possess meanings of their own. Therefore, many gestures are to some extent interpreted by virtue of either resemblance or convention, both features being characteristic of linguistic signs [31]. Given this, the question may rise as to how far-reaching can everyday context effects really be. Is it possible for completely non-linguistic contextual element to influence the semantic representation of a word? Can this influence be captured if established on non-iconic and non-conventional basis?

The present study was thus conceived to determine whether non-linguistic contextual elements can impact on the semantic representation of a word, as reflected by N400 component. Since no similar studies were found in ERP literature, the decision was made to exclude sentences and syntax from the experiment and to focus on the semantic representation of single words. Also, because of methodological and theoretical reasons (see below), semantic representation was explored using pseudowords instead of real words. Video-clips were used featuring actresses that developed narratives about some rare, novel objects. Each novel object was introduced to participants by means of a legitimately constructed pseudoword. Clips showed familiar everyday items arranged within the settings where actresses delivered their narratives. These items bare no relationship whatsoever with either the story told by the actresses or the novel object being introduced. Three experimental conditions were be implemented: words linguistically related with the pseudoword assigned to each novel object (Text Condition), words linguistically unrelated to the pseudoword (Unrelated Condition), and words unrelated to the pseudoword but linked to the everyday objects appearing in the physical setting of each clip (Video Condition). The final task consisted of the offline presentation of word-pairs, prime being a relevant pseudoword and targets belonging to one of three experimental conditions. ERP literature on word-pairs semantic match/mismatch [33] reports consistent N400 effects when prime and target are semantically incongruent. Consequently, tested hypothesis was that N400 amplitude for target words pointing to the familiar objects arranged in the setting of each clip -Video Condition- would be more positive than amplitude for targets in Unrelated Condition. If objects displayed in the situational context presented in clips were not capable of influencing words' meaning,

targets in Unrelated Condition and targets in Video Condition were expected to elicit equally negative N400 amplitude. Finally, based on results from a previous related study [34] targets in Video Condition were also predicted to elicit a Late Positive Component (LPC) reflecting indexing old/new effect reported in literature (xx).

Method and materials

Participants

22 undergraduates from the Pontificia Universidad Católica de Chile were recruited for the EEG experiment. Participants exceeding a total artifact rate of 10% throughout the three conditions in the two videos of interest (see below) were excluded. Therefore, the final sample consisted of 18 right-handed participants with no neurological or psychiatric history (10 female, 8 male, mean age = 20.5). All participants signed an informed consent complying with research standards and approved by the Ethics Committee of the Psychology School of the Pontificia Universidad Católica de Chile.

Stimuli

Pseudowords

To control for idiosyncratic interpretation of real words, the decision was made to use pseudowords instead. Pseudowords were selected by means of a study which tested seven trisyllabic pseudowords, three-syllabled structure being a frequent feature of technical lexemes in Chilean-Spanish. Out of these seven pseudowords, three had a CV.CV.CV syllabic structure and four had a CVC.CV.CV syllabic structure. To select the most suitable pseudowords, a study was conducted with 45 undergraduates. They were presented all seven stimuli and asked to write down the words each one might evoke in them. Pseudowords being necessarily novel and therefore meaningless, this study was mainly conceived to control for the possible activation of existing lexemes because of phonological resemblance. For instance, the phonological features of the pseudoword *zaborra* systematically evoked the Spanish word *zorra* (*fox* or *vixen*, highly frequent in Chilean slang) and was thus discarded. The ultimate selection criteria for pseudowords was they did not consistently evoked any particular existing words across participants. Thus, finally selected pseudowords (*chirene*, *gértalo*, and the filler pseudoword *rabuja*, see below) were the ones that elicited the highest number of different words.

Targets

In order to keep object-related targets within a manageable range, the decision was made to film two video-clips and gather the objects in groupings of three items each. The rationale for this was that two 3-item settings would provide at least six feasible targets per clip to be subsequently complemented, if needed, by synonyms or other closely related words to complete nine targets per clip. By collapsing the targets in the two clips of interest, each participant would provide up to 18 video-related targets. With an artifact rejection criterion of 10%, 54 targets per participant (18 targets per condition) would ensure an adequate signal to noise ratio to capture an N400 modulation in the EEG recordings.

Target-validation studies

Three types of targets were required for the study, grouped in three conditions: Video Condition, Text Condition and Unrelated Condition. Firstly, 43 undergraduates were presented 16 still images, portraying mostly single objects and some composite items such as flowers in a vase or a coffee-cup on a plate with a spoon. Undergraduates were asked to annotate all of the words each image evoked in them. 18 objects were preliminarily selected. Items with an ambiguous or highly salient emotional valence such as a knife or scissors were discarded. On a second stage, five different groupings were defined. They were arranged and photographed in the very same setting where the videos would be filmed and under the same lighting conditions. Groupings were photographed individually and in different combinations so as to control for the possible interaction between two particular groupings. A final set of 11 photographs were presented to 62 undergraduates who were asked to annotate all of the words that each photograph evoked them. Finally, after inspecting responses for frequency and consistency, four groupings were selected (two per clip, see figure 1a, 1b). Also, 20 object-related targets were chosen based on participants' input, main selection criteria being most frequently mentioned words for items in groupings.

On a third stage, three script-like stories were constructed. These stories were carefully designed so as not to mention any of the 20 targets selected for background objects. They were recorded in audio format, read aloud by a female voice. A study was then conducted in which 12 undergraduates were asked to listen carefully to the audio files and subsequently annotate the 10 words they recalled the most. Also, they were given a list containing 20 object-related targets (words such as *banana*, *lamp*, *computer*). Undergraduates were asked to firstly determine whether those words had or had not been mentioned in each audio file, and secondly rate, on a scale from 1 to 5 how certain they were about it (1 = extremely uncertain, 5 = completely certain). After inspecting responses, two targets were discarded because they consistently elicited an uncertain rating. Finally, remaining 18 targets (nine per clip) were selected for Video Condition. They were individually considered to obtain data regarding part of

speech, syllable length, and word frequency in Chilean Spanish [35]. These data were then used to select from scripts targets for Text Condition. The same process was used to select and balance targets for Unrelated Condition. Thus, targets in all conditions were matched in terms of part of speech, syllable length and word frequency. Balancing and selection took place after clips had been recorded, since actresses on each clip slightly altered the original scripts in order to make them sound more natural. Filler/target ratio for the experiment was 2:1. Table 1 lists all targets.

Video	Unrelated	Text
lamp	comb	suitcase
computer	cocktail shaker	automobile
book	check	watch
light	flower	peace
notes	pill	coil
notebook	tattoo	product
red	run	go down
pen	cup	steam
glasses	sail	war
apple	racket	cement
eat	vote	unite
breakfast	umbrella	bycicle
fruit	wall	cable
sugar	swamp	dress
orange	mirror	toy
banana	drugstore	knob
cup	gate	mud
fork	corridor	lock

Table 1. List of target in all conditions, translated into English. Original targets were in Spanish.

Objects

Three highly unusual objects were selected and arbitrarily named by pseudowords. The rationale was that participants would be more inclined to accept pseudowords as a real words if linked to an item they had never seen before. No familiar object would have been easily accepted as corresponding to some never before encountered (pseudo)word. Unusual objects introduced in videos of interest were tested in a previous related study in which 12 undergraduates manipulated 4 rare objects. All undergraduates reported not ever having encountered any of them before. In the two clips of interest, one novel object was a pneumatic valve, while the other one was a part of the mechanism of an antique sewing machine (figure1).

Task

Before commencing the experiment, participants were verbally told they would watch some clips and afterward perform a simple task. The first clip in each three-clip sequence was introduced by on-screen written instructions. These instructions stated that some video-clips would be played with some actresses telling a story combining historical facts and technical information. Directions stressed the narrative angle of the actresses' explanations, explicitly asking participants to be relaxed and reassuring them about the non-assessing nature of the task. Story-telling was emphasized over technical information to keep participants as open and cooperative as possible to the stimuli they would perceive.

After watching each clip, on-screen instructions let participants know that they would be presented word-pairs introduced by a small cross. By pressing a particular key on a keyboard, they had to determine whether the second word in each pair was or was not related to the just heard story. A different key could be pressed in case of uncertainty. Participants were given no time constraints to make a decision. Sequence for each trial was: fixation point (800 ms), prime (400 ms), ISI (300 ms), and target (2000 ms, see figure 1). All of the targets in the three experimental conditions were preceded by the pseudoword introduced in the clip, while fillers were preceded by some other pseudoword. Considering both fillers and targets, ratio between words mentioned in the text and words not mentioned in the text was 1:1.

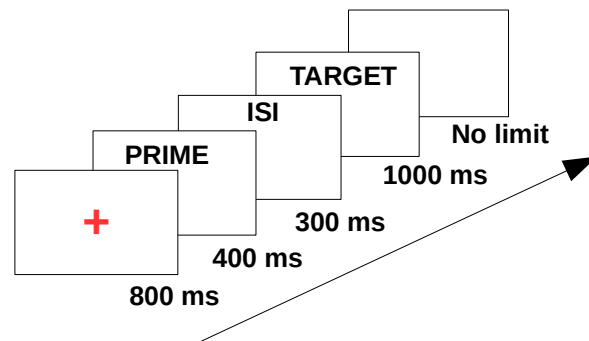


Figure 1. Trial sequence for word-pairs.

Video-clips

Clips were recorded with a Canon EOS 7D digital camera and edited with Kdenlive software. Presented clips had a 1920 x 1080 resolution and a 23,98 frame rate. Audio sample rate was 44.1 Hz and a 128 kb/s bit rate. As for target clips length, one was 3:25 while the other one was 3:56 (filler clip, 2:37). To strengthen pseudowords' effect, a blank screen displaying the name of each object was inserted at the beginning and the end of each clip during four seconds (see figure 2e). Name for the object was also displayed roughly at the middle of each clip while the camera showed a close-up for each object (figure 2f). To reinforce the perception of the background objects, a high-angle lateral close-up of each grouping was presented twice throughout the clips. In these shots, the camera first focused on the object presented by the actresses (blurring the background objects) and then on the objects in the background (blurring the novel object, figure 2d).

When designing the experiment, the anticipation was made that objects in the background would be salient regardless of assigned task. After watching the first clip and performing word-pair task, participants would have likely noticed that some presented targets named objects from the clip. This could have biased performance during the clip viewed next, with participants anticipating targets corresponding to just-seen objects. Since fulfillment of expectations is known decrease N400's negativity, this could have introduced unwanted confounds. Therefore, a filler clip was constructed to be presented in between clips of interest. Like in the other two clips, a pseudoword and a novel object were presented in the same physical setting, along with everyday objects in the background (figure 2c). However, during the corresponding word-pair task, no targets pointed to these familiar objects. Also, no targets were used that could be related to the objects displayed in the other two clips. The purpose of this clip was to control for the prediction process in which participants might have engaged after watching one of the clips of interest. It provided participants with an input for which the heuristics that they would have likely established during the presentation of the first clip would prove wrong. Thus, they would approach word-pair task for the second clip of interest (third clip watched) without the confirmed expectation that words for background objects would be presented as targets. Additionally, the presentation of the two clips of interest was counterbalanced so as to control possible sequence effects. Half of the final 18-participants sample was presented one sequence and the other half a different one, with filler clip always presented in between critical clips.

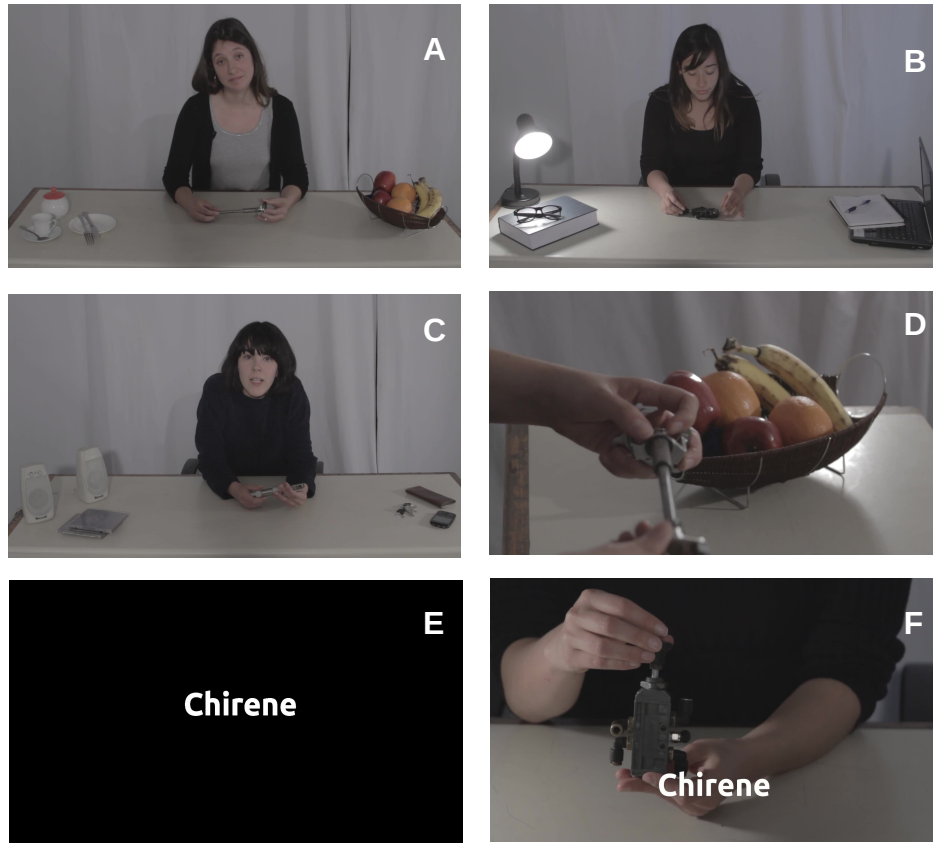


Figure 2. A) and B): Target clips, main view of actresses and setting. C): Filler clip, main view of actress and setting. D): High-angle lateral close-up of a grouping from one of the target clips. All groupings in all clips were presented on-screen in this fashion twice, with actresses' voices in the background. E): Opening and closing frame for all clips. F): Close-up of an actress handling the novel object, with the corresponding pseudoword on-screen.

EEG data

Data was acquired with a Biosemi system and a 32 electrodes cap. Signals were acquired at a 2048 Hz sampling rate and downsampled to 512 Hz, band-filtered between 0.5Hz and 30Hz, and finally processed and plotted both with Matlab and Erplab plugin for EEGLab [36, 37]. Stimuli and clips were presented with PsychoPy software [38]. Trials were obtained in a time-window spanning from -200 ms to 800 ms, time-locked to the onset of every target. ERP signals were referenced to the

mastoids, consistent with literature [39, 40]. Baseline correction was set to 200 ms prior target onset. Artifacts were automatically rejected with a 100 mV threshold and no correction algorithm was used on signals. Because of the adopted criterion of 10% as the maximum artifact rejection rate per participant, only nine channels were selected: F3, Fz, F4, C3, Cz, C4, P3, Pz, and P4 (Figure 4). Channel selection reduced participants' rejection and granted more statistical power, but precluded fine-grained topographical descriptions and scalp map plotting. Statistical analysis were conducted with R [41-43]. Analyzed trials totaled 948, almost evenly distributed between conditions (trials per condition $\approx$ 315). Following Luck [44] and Duncan et al. [45], the number of trials was deemed as adequate to obtain a good signal-to-noise ratio. N400 values were extracted from 400-450 ms window. LPC values were extracted from 500-750 ms window. Data were analyzed by means of repeated measures ANOVA with 3 within-group conditions. Reported ANOVA tests are based on means per participant and per condition. Type II sum of squares was used. When relevant, reported p values were adjusted following Geisser-Greenhouse correction for contrasts involving a within condition with more than one degree of freedom [46]. However, when Geisser-Greenhouse correction's $e > .75$, p -values were adjusted following Huynh-Feldt correction [47]. Uncorrected original F values and degrees of freedom for all ANOVAs are reported. Generalized Eta Squared values (GES) and Cohen's d are provided as measures of effect size for ANOVA tests and t tests respectively.

Results

Behavioral

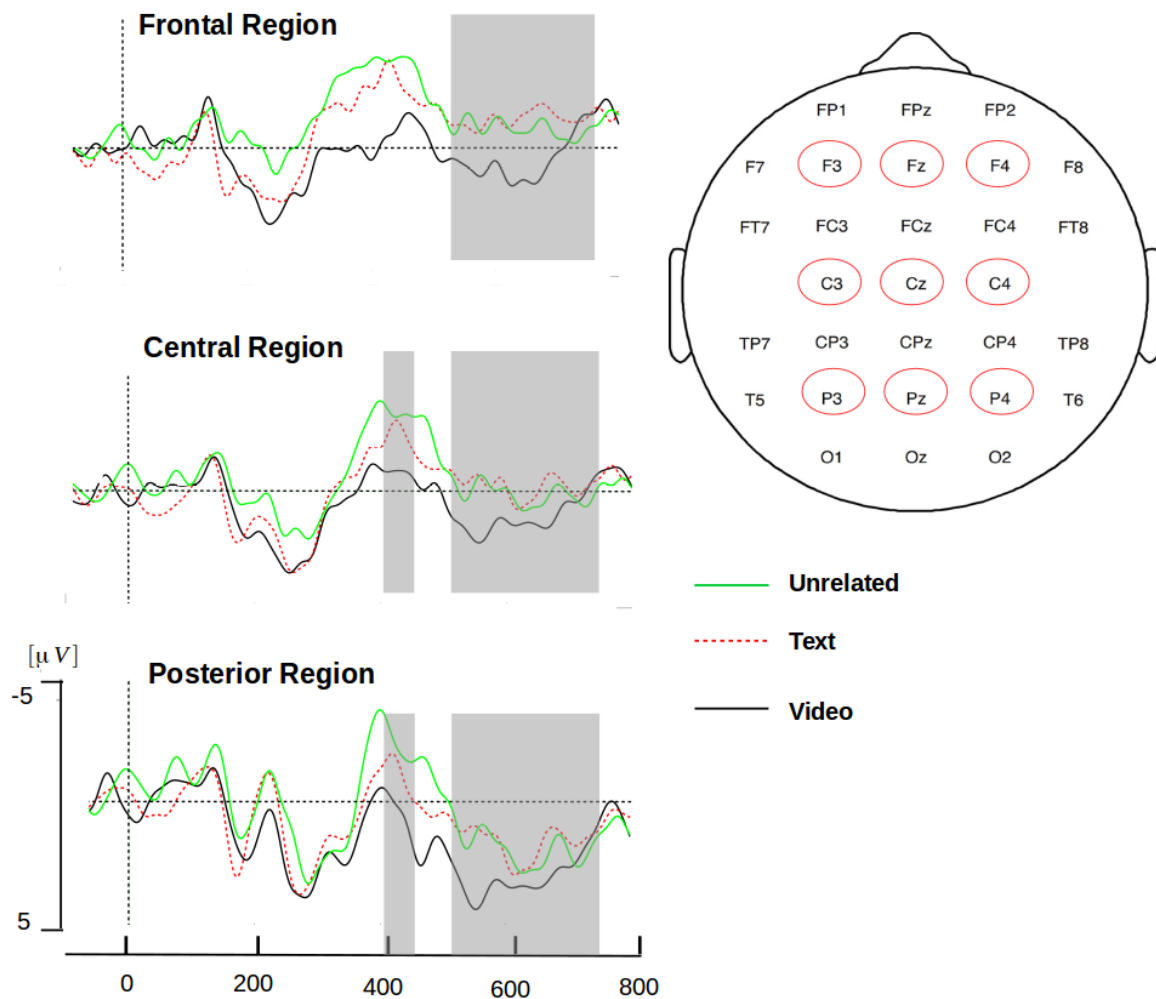
Repeated-measures ANOVAs were conducted on reaction times within different time-windows, but no significant differences were found. As for accuracy, Table 2 shows that Unrelated Condition and Video Condition elicited very similar patterns of responses. A high proportion of "correct" answers identifying the targets as not related with the story told by the actresses.

	Unrelated	Text	Video
Is related	38 (11.45%)	138 (56.56%)	21 (9.13%)
Is NOT related	278 (83.73%)	93 (38.11%)	198 (86.09%)
Not sure	16 (4.82%)	13 (5.33%)	11 (4.78%)
Total	332	244	230

Table 2. Disaggregated responses for behavioral data (300-1200 ms). Percentage patterns for Unrelated and Video-related conditions are very similar, but number of responses are not.

ERP

Effects were found both in left, central, and right channels, strongest in central and parietal regions. Because of this, selected channels were collapsed into three ROIs: Frontal Region (F3, Fz, F4), Central Region (C3, Cz, C4), and Posterior Region (P3, Pz, P4). In all of inspected ROIs, Unrelated Condition consistently peaked more negatively than Video Condition (figure 4).



In selected N400 time-window (400-450 ms), results for repeated-measures ANOVA conducted on each ROI are $F(2, 34) = 2.86$, $p = 0.076$, GES 0.051 (Frontal), $F(2, 34) = 3.48$, $p = 0.041$, GES 0.047 (Central), and $F(2, 34) = 3.69$, $p = 0.035$, GES 0.072 (Posterior). In LPC time-window (500-750 ms) results for each ROI are $F(2, 34) = 3.72$, $p = 0.034$, GES 0.067 (Frontal), $F(2, 34) = 4.9$, $p = 0.013$, GES 0.1 (Central), and $F(2, 34) = 3.63$, $p = 0.042$, GES 0.12 (Posterior). To dismiss possible sequence effects, a dummy binary variable was constructed reflecting the counterbalanced order in which clips were presented and introduced in the ANOVA tests as a between factor. No significant between-group effects were observed, nor any statistically significant interactions in any of three analyzed ROIs. To further inspect data, a Mixed-Effects Model was implemented for N400 data with participants as a random factor and types of targets as a fixed within condition. Orthogonal planned contrasts were implemented and differences between within conditions of interest (Unrelated vs Video) still held both for Central and Posterior ROI, but were also significant for Frontal ROI: $t(34) = 2.14$, $p = 0.039$, $d = 0.49$ (Frontal), $t(34) = 2.66$, $p = 0.011$, $d = 0.59$ (Central), and $t(34) = 2.75$, $p = 0.009$, $d = 0.6$ (Posterior). When introducing the order of stimuli presentation in the model as a between-group factor, differences between within conditions of interest (Unrelated vs Video) remained significant and virtually unchanged.

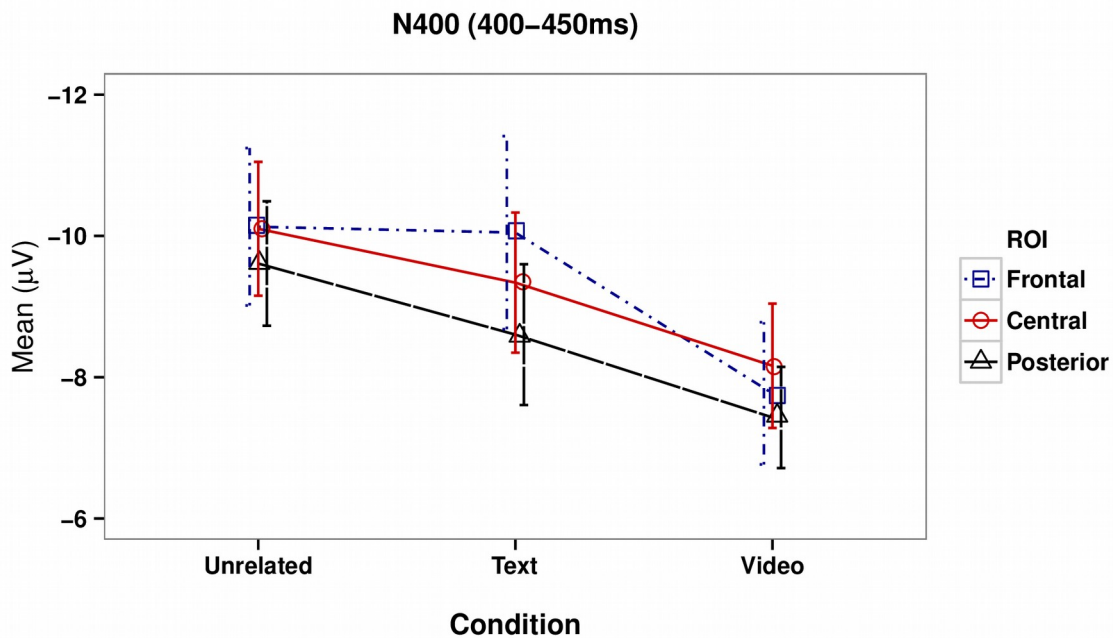


Figure 4. N400 means plot for Experimental conditions and ROIs. Error bars represent one unit of standard error. Negativity is plotted upward.

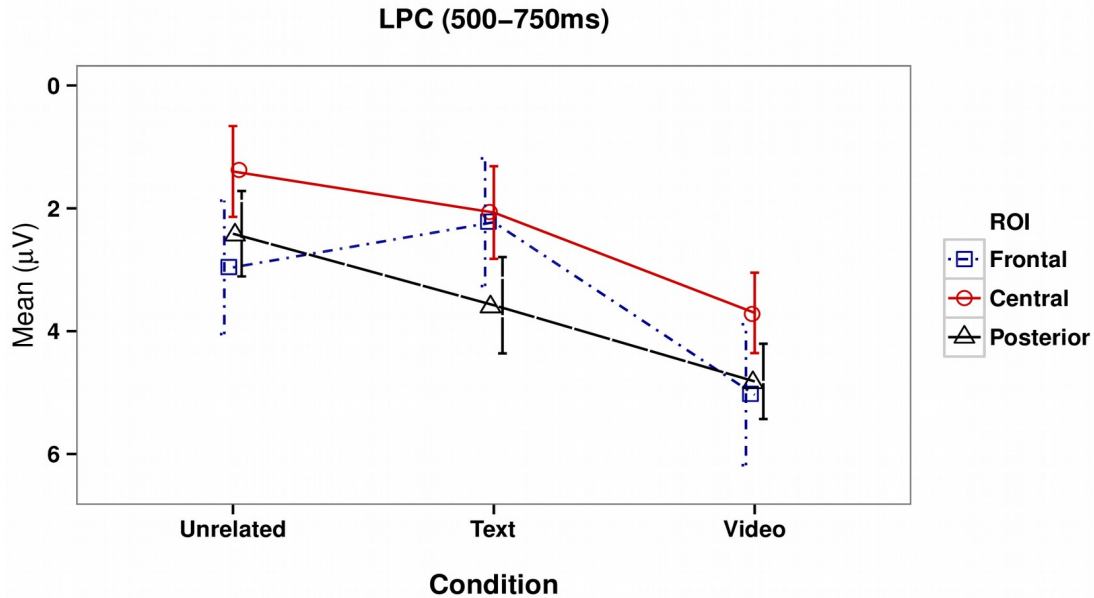


Figure 5. LPC means plot for Experimental conditions and ROIs. Error bars represent one unit of standard error. Negativity is plotted upward.

Size effects for repeated measures ANOVA range from small (N400) to medium (LPC). As for size effects for orthogonal planned contrasts, they range from medium to slightly above medium, which suggests an underlying difference between the two conditions of interest in the experiment.

Discussion

Overall, results support the predicted hypothesis. N400 amplitude for words pointing to background objects in each clip is statistically different from much more negative amplitude observed for completely unrelated words. Effects were very similar in channels from both hemispheres and were strongest in central region and frontal region. Significant statistical differences were also observed in LPC window, with an increased positivity for objects-related words in each video clip. It should be noted that N400 modulation was exclusively elicited by words. When participants performed required task, they sequentially perceived word-pairs presented on a blank screen. No other stimuli, whether visual or auditory, accompanied targets in none of the experimental conditions. Therefore, N400 modulation can be reasonably attributed to match/mismatch between pseudowords naming novel objects and subsequently presented target words. Also, effects are stronger in central and posterior regions and less intense in frontal region, which is consistent with literature characterizing linguistic

N400. Topographically, non-linguistic N400 is known to peak intensely in frontal region [48]. Given this, it seems safe to conclude that observed N400 effect is indeed linguistic and that words for objects displayed in the clips are aligned with pseudowords' semantic representation. If this is indeed the case, it follows that words in Video Condition permeated into pseudowords' semantic representation, or, at the very least, helped "...to pre-activate [pseudowords'] upcoming semantic features" [31].

Crucially, results can only be argued to be extensive to natural words' semantic representation if participants indeed perceived pseudowords as real, meaningful words. One experiment by Perfetti, Wlotko, & Hart [49] provided empirical support for this, even if employing different materials. In their experiment, authors used word-pair sequences with real rare words as primes and semantically related/unrelated words as targets. All primes were very rare real words unknown to participants. Primes were assigned to one of two conditions: trained or untrained. Participants studied rare words in trained condition by means of a text which briefly defined them. However, they did not study words in untrained condition, so that they remained unknown to them. Their results show that unrelated targets following trained primes elicited an N400 effect when compared to semantically related targets following the very same trained primes. However, when primes had not been trained, no N400 effect was observed for target words, whether semantically related to primes or not. The reason advanced for this was that "...the unrelated probes to untrained rare words produced no N400 effect, because participants did not know the meanings of the untrained words." [49]. Procedure and materials in this experiment partially overlap with present study. From participants' perspective, unknown real words are no different from unknown pseudowords inasmuch as they all lack semantic content. Definitions and explanations provided by actresses can be reasonably considered as a training analogous to the one reported in by Perfetti et al., therefore capable of converting pseudowords into meaningful "real" words. Thus, had pseudowords in this experiment been perceived as non meaningful words, accompanying targets should have elicited no N400 effect whatsoever, regardless of experimental condition. However, targets in Unrelated Condition and Text Condition did elicit an N400 effect, suggesting a mismatch with primes' semantic features. Perfetti et al also reported a statistically significant LPC effect for trained words in posterior regions. They attributed this effect precisely to the training required to participants, interpreting it in terms of the old/new memory effect "... that is found for recently viewed and recognized items." In other words, LPC effect in their study reflects the fact that trained words had been recently encountered and studied. LPC effect here reported was only observed for words in Video Condition. Interpreted as reflecting the same old/new memory effect just discussed, this suggests that words in Video Condition were somehow recognized as recently encountered. This finding is particularly interesting inasmuch as participants did not actually read or heard any of these words at any point in the study. All they had access to was the visual perception of

the corresponding objects displayed on a desk, which was seemingly enough to trigger a recognition response.

Present results add to literature reporting how pragmatics and context can impact on language interpretation processes indexed by N400 component. The main contribution is showing that completely non-linguistic elements such as everyday objects can connect with the semantic representation of a word. Importantly, this link was manipulated so as to be both non-conventional and arbitrary, deprived of any iconic groundings. While these findings are consistent with previously discussed literature regarding context and pragmatics, they can be said to stretch the limits of words' meaning further away from their literality. From a theoretical point of view, results can contribute to the debate about the alleged predominance of literal meaning [50]. Closely related to this, findings can also contribute to the long-lasting debate about the relation between context and meaning. One important reason for working with pseudowords was that they provided an equally unbiased semantic starting point for all participants. But since pseudowords were learned by participants during the experiment, the general design might also be considered as a sort of study into words' acquisition. From this point of view, results in the LPC window are particularly remarkable. Increased positivity for targets in Video Condition might reveal an underlying process in which the semantic features of the (pseudo)word being acquired can be conflated with the specific context surrounding the word's acquisition. Of course, one single experiment hardly allows making such an assertion. Still, LPC effects, in conjunction with the semantic dimensions revealed by N400 results, leave room for to this to-be-explored possibility.

Reported findings are clearly in clash with traditional semantics/pragmatics distinction. Given the growing body of data similarly spirited results gathered during the last two decades, the point can be made that this distinction might prove to be more of a working hypothesis than an empirical reality. Here presented results were obtained in a laboratory setting. This raises the question of how far can these effects go in everyday circumstances, as objects and words constantly interact on a daily basis. Would these effects recede or consolidate? If so, how? ERP literature suggests that contexts and pragmatics, in many of their guises, do influence meaning at some deep processing-level. Separating semantics from pragmatics might therefore prove to be artificial and misleading when probing into language interpretation. More importantly perhaps, when literal semantics is favored over contextual pragmatics in language research, a potentially very ample spectrum of research questions are left aside. Ultimately, when research on language disregards situational contexts intentionally disconnects itself from a potentially very enlightening source of information. This is unnecessarily restrictive and in conflict with evidence. The main purpose of this study was to show that semantic representation may not exclusively be about lexical entries and symbolic representation. At the very least, results contribute

to the meaning debate by hinting that when it comes to interpret meaning from words, human brain may be responsive to underexplored contextual sources.

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Albert Sechehaye y el Curso de Lingüística General: a cien años de la muerte de Ferdinand de Saussure

Resumen

Albert Sechehaye es conocido casi exclusivamente como uno de los dos editores del Curso de Lingüística General. Sin embargo, tenía también una visión propia del lenguaje y la Lingüística que sistematizó en diversos trabajos. Este artículo se centrará en uno de ellos: *Programme et méthodes de la linguistique théorique*. Publicado en 1908, el libro contiene disquisiciones que anticipan y preceden nociones como *sincronía/diacronía*, *valor* y *sistema*, habitualmente consideradas como aportes saussurianos. Para poder calibrar adecuadamente el pensamiento de Sechehaye y su relación con el de Saussure, se revisará el contexto histórico de la Lingüística en el que ambos se formaron y se entregarán algunos detalles biográficos relevantes. En vista de las discrepancias observables entre el *Curso de Lingüística General* y los escritos de Saussure, la revisión de las ideas de Sechehaye aporta matices a la lectura de uno de los textos más importantes de la Lingüística moderna.

Palabras claves: Saussure, Sechehaye, Curso de Lingüística General, siglo XIX, método

Abstract

Albert Sechehaye is almost exclusively known as one of the two editors of the Course in General Linguistics. Nevertheless, he did have view of his own about language and Linguistics, which he organized in several works. This paper focuses in one of such works, *Programme et méthodes de la linguistique théorique*, which was published in 1908 and includes disquisitions that foresee and precede notions like *synchrony/diachrony*, *value*, and *system*, commonly regarded as saussurian in nature. In order to adequately gauge Sechehaye's ideas and his ties with Saussure's thought, the historical background in which both linguists were educated will be considered along with some biographical facts. Given the discrepancies between the *Course in General Linguistics* and Saussure's writings, inspecting Sechehaye's ideas might prove useful to read one of modern Linguistics' most important books from a new angle.

Keywords: Saussure, Sechehaye, Course in General Linguistics, 19th century, method

1. Introducción

Como se sabe, el *Cours de Linguistique Generale* (en adelante, CLG), publicado

originalmente en 1916, fue compilado y editado por Charles Bally y Albert Sechehaye a partir de apuntes tomados por algunos de sus alumnos y unas cuantas notas personales escritas por Saussure. Con el tiempo, el libro ejerció gran influencia tanto en la Lingüística como en la Psicología, la Antropología, la Literatura y la Sociología. Saussure se convirtió en un ícono del estructuralismo y adquirió de manera póstuma una relevancia que no tuvo en vida. Sin embargo, hay una asimetría considerable entre las ideas del ginebrino y el impacto atribuido a ellas. Por un lado, son muchos los que hicieron lecturas erróneas o simplemente tergiversaron el CLG (como por ejemplo Derrida, Chomsky, Lévy-Strauss, Lacan o Bloomfield, véase Harris, 2003). Por otro lado, hay razones para pensar que el libro mismo no refleja de manera precisa el pensamiento de Saussure. Bronckart y otros (2010), Percival (2000) o Bulea (2010), por solo nombrar algunos autores, han identificado varias discrepancias entre el CLG y algunos de los textos efectivamente escritos por Saussure. Existen incluso divergencias entre algunos pasajes del CLG y los apuntes de alumnos sobre los que se basó el libro, tal como mostrara Engler (Saussure, 1968).

En este trabajo se explorará la posibilidad de que ciertas contradicciones entre el CLG y las teorizaciones sobre el lenguaje que Saussure esbozó en diversos apuntes y notas personales sean atribuibles a Albert Sechehaye. Se partirá por revisar la elaboración y difusión del CLG en Europa para posteriormente detallar algunos aspectos de la biografía de ambos, puesto que muy probablemente parte de sus diferencias teóricas tengan su origen en los distintos momentos en los que se formaron como lingüistas. Situarlos en un contexto histórico e intelectual particular puede resultar muy iluminador para entender sus propuestas. Posteriormente, se expondrán los elementos más definitorios de la visión del lenguaje que Albert Sechehaye presentara en su *Programme et méthodes de la linguistique théorique** (en adelante, PMLT), publicado en 1908. Finalmente, se revisarán algunas de las diferencias y similitudes existentes entre los escritos de Saussure, el *Cours* y la propuesta de Sechehaye.

2. El *Cours de Linguistique Générale* y sus circunstancias

Durante la segunda mitad del siglo XX se comenzó a desarrollar una línea de investigación historiográfica y teórica que, centrada en la figura de Saussure, estudió en detalle los textos del lingüista ginebrino (Bouquet, 2010). En 1957, Godel publicó un compendio de las fuentes empleadas para la redacción del CLG, incluyendo escritos originales de Saussure. Poco

* Para facilitar la lectura del trabajo, todas las citas de obras escritas originalmente en francés y que no cuentan con una versión publicada en español (lo que incluye el PMLT) han sido traducidas por el autor del artículo. Las citas en inglés, en cambio, se mantuvieron en su idioma original.

después, de Mauro (Saussure, 1972 [1967]) y Engler (Saussure, 1968), publicaron ediciones comentadas y anotadas del CLG en las que se podían observar ciertas diferencias entre el trabajo de Bally y Sechehaye y los apuntes de alumnos que asistieron a alguna de las tres cátedras sobre las que se basó el libro. Tiempo después, Komatsu y Harris (1993) publicaron una versión bilingüe (inglés y francés) de los apuntes de que Emile Constantin tomó como alumno del tercer y último curso de Lingüística General impartido por Saussure en Ginebra entre 1910 y 1911. Estas notas, a las que ni Bally ni Sechehaye tuvieron acceso, difieren en varios aspectos de los demás apuntes empleados en la redacción del CLG (Coelho, 2012). En 1996, se encontraron en Ginebra numerosos documentos escritos por Saussure de los que no se tenía noticia. Conocidos como los *Manuscritos de Orangery*, fueron compilados y editados por Bouquet y Engler como parte de un libro que lleva por título *Escritos de Lingüística General* (Saussure, 2004, en adelante, ELG) y contienen, entre otras cosas, los esbozos de un libro de Lingüística que Saussure nunca terminó y que tenía por título *De l'essence double du langage*. A pesar de no ser un libro acabado, pone de relieve varias diferencias con el CLG, algunas de ellas relacionadas con dos de los conceptos que mayormente definen el célebre e influyente “estructuralismo saussuriano”: la arbitrariedad del signo y la naturaleza del valor lingüístico (Bouquet, 2005). Este hallazgo terminó por dejar en claro que Bally y Sechehaye hicieron algo más que simplemente editar el CLG.

Sin embargo, ya antes de conocerse estos manuscritos algunos autores (Vallini, 1974, y Wunderli, 1976) habían reparado en las discrepancias entre el CLG y las notas sobre las que está basado. Observaron también similitudes entre la obra de Sechehaye y los contenidos del *Cours*, lo que plantea preguntas acerca del alcance real de su participación en la composición del libro. Wunderli llegó incluso a proponer que fue en realidad Sechehaye quien influyó en el pensamiento de Saussure y no al revés. Si bien la tesis de Wunderli resulta extrema, es muy posible que al menos una parte de las ideas presentadas en el CLG pertenezcan más a Sechehaye que a Bally y más a Sechehaye que a Saussure. Hay varios datos que apoyan esto. En primer lugar, el hecho hoy evidente de que el libro contiene afirmaciones reñidas con lo que Saussure realmente escribió. En segundo lugar, el hecho de que el CLG fue redactado por Bally y Sechehaye sobre la base de un texto conocido como *Collation*, elaborado a su vez a partir de los apuntes de algunos de los alumnos que asistieron a las tres cátedras de Lingüística General que Saussure alcanzó a dictar entre 1907 y 1911 (contrario a lo que a veces se piensa, ni Bally ni Sechehaye asistieron personalmente a *ninguna* de esas tres cátedras). Si bien el CLG fue concebido por sus redactores como un proyecto conjunto en el que se pusieron a trabajar el mismo año de la muerte de su maestro, ocurrida en 1913, Bally no pudo participar en la primera

etapa del proyecto debido a que se le acumularon demasiadas tareas (estaba en busca de alguien que publicara su libro *Le langage et la vie*, 1913, se asoció con Léopold Gautier para reeditar los artículos de Saussure y asumió la cátedra de Lingüística General que había quedado vacía con su muerte, Frýba-Reber, 1994). Debido a ello, la *Collation* fue escrita íntegramente por Sechehaye a partir de los cuadernos de apuntes a los que tuvo acceso. Posteriormente, este trabajo fue anotado por Bally y Riedingler y se convirtió en la base sobre la cual Bally y Sechehaye efectivamente trabajaron de manera conjunta para elaborar el CLG (Engler, 2004).

Como Saussure estructuró las tres versiones de su curso de manera distinta, variando las secuencias de las unidades impartidas y cambiando el énfasis de determinados contenidos (Percival, 2000), Sechehaye fue en definitiva responsable de seleccionar los temas y contenidos que serían luego incluidos en el CLG: “Hence Sechehaye, although (presumably) understanding the reservations of Saussure, reaffirms his *structural* theses – including the notion of integrating linguistics within psychology ... – which is tantamount to asserting that *he is responsible for the organisation of the 1916 CLG*” (Engler, 2004: 52, énfasis añadido). Pero Sechehaye no se limitó a revisar y organizar los apuntes de los estudiantes de Saussure, sino que los “interpretó”, al punto de añadir términos que en realidad no aparecían pero que en su opinión resultaban más coherentes (Harris, 2003), como por ejemplo hizo al reemplazar la palabra francesa “*son*” (sonido) por su cuasi homófono (recuérdese que se trataba de apuntes de exposiciones orales) “*sens*” (sentido) en un párrafo en el que Saussure definía el concepto de *langue*. Gracias a este cambio, la definición de *langue* finalmente expuesta en el CLG es la siguiente: “... un sistema de signos en el que sólo es esencial la unión del sentido [*son*] y de la imagen acústica y donde las dos partes del signo son igualmente psíquicas”, (Saussure, 1945: 42). Si, como propone Harris (2003), lo que Saussure realmente expuso en sus cátedras fue una definición tripartita del signo que vinculaba sonido, imagen acústica e idea, la naturaleza física del sonido no permite considerar el signo como una entidad esencialmente psicológica, lo que representa un cuestionamiento muy serio al mentalismo saussuriano y su muchas veces celebrado énfasis en la dimensión psicológica y abstracta del lenguaje.

Otro dato que apoya una mayor influencia de Sechehaye que Bally en la elaboración del CLG, o al menos una mayor afinidad de ideas, es la manera en que ambos prosiguieron sus carreras una vez publicado el libro. Charles Bally heredó la cátedra de Saussure, pero sus intereses teóricos privilegiaban la dimensión afectiva y estilística del lenguaje, algo mucho más cercano a la *parole* que a la *langue*. De hecho, como señala Percival “...when Bally gave his inaugural lecture on succeeding to Saussure's professorial chair in October 1913, he first dutifully and deferentially expounded Saussure's general framework of ideas, but then proceeded

immediately to state quite openly that he himself had reached different conclusions from those of this master” (1981: 42). Sechehaye, en cambio, se esforzó por difundir el CLG. Por ejemplo, la primera mención del libro en Rusia data de 1917 (en una presentación que Karcevskij, futuro integrante del Círculo de Praga y alguna vez alumno de Saussure en un curso de sánscrito, hiciera en la Universidad de Moscú), pero el primer ejemplar del CLG llegó a Rusia recién en 1923 (Seriote, 2010). Antes de eso, Roman Jakobson pudo acceder al libro en Praga en 1920, luego de que Sechehaye le enviara una copia (Koerner, 1997). Dada la relevancia de Jakobson en la lingüística rusa y la conocida influencia que el CLG ejerció en él (Matejka, 1997), este detalle no es trivial.

Un año después de la publicación del CLG, Sechehaye escribió una reseña de 30 páginas que llevó por título *Les problèmes de la langue à la lumière d'une théorie nouvelle* (1917). Publicado en la revista francesa *Revue Philosophique*, el texto es más una exégesis que una reseña y tiene el mérito de ser el primer trabajo que identificó correctamente el valor lingüístico como uno de los ejes centrales en la teoría saussuriana: “This was not a simple glossary of Saussurian concepts, but an attempt to bring out the underlying conceptual organisation of the Cours. In particular he [Sechehaye] was the first to highlight the importance of a set of ideas often ignored by reviews at the time: *value – difference – opposition* – the relatively arbitrary. He concluded more incisively than all his contemporaries: ‘the science of language (*langue*) will be a science of values’” (Puech, 2004: 126, énfasis en el original). Este hecho es especialmente revelador porque la recepción inmediata del CLG fue más bien fría. Como señala Normand (1978), cuando se publicó el CLG la comunidad lingüística europea no consideró que se tratara de un texto particularmente relevante para la disciplina (excepción hecha de Rusia, donde comenzó a ser leído en un momento de efervescencia antiempirista y antipositivista muy favorable para una visión que enfatizaba la dimensión abstracta del lenguaje, Hutchings, 2004). Lingüistas como Meillet, Trubezkoy, Jespersen y otros (Percival, 1981), se mostraron muy críticos hacia algunas de las ideas del CLG, atacando desde nociones como las de *sincronía/diacronía* hasta su énfasis en la abstracción y el implícito desdén hacia aquellos aspectos relacionados con la parole, lo que incluía desde las preocupaciones sociolingüísticas de Meillet hasta las consideraciones emotivo-estilísticas de Bally. Una de las críticas más recurrentes era que el CLG no aportaba nada nuevo a la Lingüística.

Solo hacia fines de la década de los '20 (particularmente en 1928, durante el Primer Congreso Internacional de Lingüistas de la Haya, en el que quedó registro de unos de los primeros uso del término “estructura” para referirse a lo que en el CLG aparece mencionado como “sistema”, Ungar, 2004) se comenzó a considerar que el CLG era un libro innovador capaz

de sentar los cimientos de la lingüística como ciencia, un cambio de actitud que Percival (1981) atribuye a factores como la rivalidad histórica entre lingüistas alemanes y franceses y al hecho de que las nociones propuestas en el CLG fueran lo suficientemente abstractas como para poder ser adoptadas en diversos ámbitos e implementadas de múltiples formas. Saussure, suizo de nacimiento, realizó la mayor parte de su carrera académica en Ginebra, en un aislamiento relativo que hizo que su figura no estuviera fuertemente asociada ni a la escuela francesa ni a la alemana. En otras palabras, el CLG era lo suficientemente neutral como para poder ser adoptado por lingüistas que no se hubieran sentido cómodos defendiendo las ideas de algún otro teórico identificado ya sea con Francia o Alemania, algo especialmente válido, en esa época, para los lingüistas de Europa del Este. En 1931, cuando se realizó el Segundo Congreso Internacional de Lingüistas en Ginebra, Saussure gozaba de un reconocimiento transversal, apoyado de manera importante por los integrantes del Círculo de Praga. Dos décadas después, se lo conocía en toda Europa y el estructuralismo tenía un espacio privilegiado dentro del panorama intelectual de la época.

Como puede verse, la historia de la elaboración y difusión del CLG es muy compleja y en ella se mezclan factores históricos, discrepancias teóricas y conveniencias políticas. En cuanto al origen de algunas de las nociones centrales del libro, es muy difícil determinar qué pertenece a Saussure y qué pertenece a Sechehaye por dos razones. En primer lugar, es muy complicado identificar con claridad las ideas de Saussure. La edición de los *Écrits de linguistique générale* compilada por Bouquet y Engler (Saussure, 2004) contiene no solo los *Manuscritos de Orangery*, sino también una variedad de apuntes y notas que ya habían sido publicados anteriormente y que abarcan unos veinte años (1891 a 1911). Muchos de estos escritos son fragmentarios, no precisan las fechas en que fueron escritos y contienen muchas veces más preguntas que respuestas claras. Como si fuera poco, la edición y publicación de las notas de Saussure es en sí mismo un trabajo de ordenación e interpretación que debe mucho a la subjetividad de los editores. Así, por ejemplo, la organización de las notas efectuada por Bouquet y Engler (Saussure, 2004) ha sido cuestionada por Harris (2003) y Estanislao (2013). Otro de los textos importantes para conocer la línea de pensamiento del último Saussure corresponde a los apuntes que tomara Émile Constantin en la tercera versión de su cátedra. Si bien hay en ellos detalles reveladores, no fueron escritos por Saussure, por lo que conviene mantener prudencia al momento de evaluarlos.

En segundo lugar, es muy difícil saber hasta qué punto influyó Saussure en las ideas que Sechehaye organizó en el PMLT, debido a que al momento de su publicación ya existía entre ellos una relación de maestro-discípulo. De hecho, el libro está dedicado “A mi maestro el Señor

Ferdinand de Saussure”. Otro texto muy iluminador acerca de la visión del lenguaje de Sechehaye, *La stylistique et la linguistique théorique* (1908b), está sugerentemente incluido en un volumen llamado *Mélanges de linguistique offerts a M. Ferdinand de Saussure*. Cabe por tanto suponer coincidencias entre el pensamiento propiamente saussuriano y el de Sechehaye, pero pueden deberse tanto a una afinidad de visiones como a una influencia intelectual.

La obra mayor de Sechehaye, *Programme et méthodes de la linguistique théorique*, es, como sugiere su título, una propuesta programática y metodológica. Esto la sitúa en un plano epistemológico (y, por cierto, filosófico) debido a que busca responder a dos preguntas claves para la Lingüística: cuál es la naturaleza del lenguaje y cómo debe ser estudiado. En Europa, ambas cuestiones fueron intensamente debatidas durante las últimas décadas del siglo XIX y el comienzo del XX, precisamente cuando Saussure y Sechehaye realizaron sus estudios doctorales en Alemania.

3. Ferdinand de Saussure

Saussure nació en Ginebra en 1857. Pertenecía a la aristocracia ginebrina y muchos de sus parientes directos se dedicaron a alguna rama de las Ciencias Naturales, las Ciencias Sociales o las Matemáticas. Se interesó desde muy joven en las lenguas, por lo que su familia, después de que estudiara (en contra de su voluntad) Física y Química durante un año, decidió permitirle viajar a Alemania para realizar un doctorado en Lingüística. Comenzó sus estudios formales en la Universidad de Leipzig en 1876 y obtuvo su grado en 1880. Durante su estadía en Alemania escribió el único trabajo importante que publicaría en vida (el resto de sus publicaciones correspondieron a artículos en revistas): *Mémoire sur le systém primitif des voyelles dans les langues indo-européenes* (1879). Una vez doctorado, se fue a vivir a París, donde permaneció más de diez años (1880 a 1891). Allí, gracias al apoyo y recomendación de Michel Bréal, en esos momentos uno de los lingüistas más prominentes de Francia, impartió clases en la École Pratique des Hautes Études. En esta época conoció a Antoine Meillet, con quien mantendría una larga correspondencia (Meillet participaría años después en la elaboración del CLG, supervisando el proyecto general y ayudando a Bally a sacar adelante la obra, Engler, 2004). En 1891, regresó a Ginebra donde residió y trabajó hasta su muerte, en 1913.

En la época en que Saussure fue estudiar a Leipzig, las universidades alemanas eran consideradas el centro europeo del estudio del lenguaje y su foco principal se centraba en el estudio evolutivo y comparativo de las lenguas. Lingüistas como Franz Bopp y August

Schleicher habían perfilado una disciplina cuya finalidad principal terminó siendo la de reconstruir las filiaciones y parentescos de las lenguas mediante el empleo de un método de análisis que vendría a ser conocido como método *comparativo*. Como señala Jespersen (1922), los comparativistas eran herederos de la tradición romántica alemana y consideraban, en especial Schleicher (un apasionado de la Botánica), las lenguas como organismos vivos, lo que circunscribía su estudio al ámbito de las Ciencias Naturales y establecía un lazo con los principios que rigen las especies biológicas. La concepción de las lenguas como organismos vivos que se caracterizaban por nacer, crecer, decaer y morir las ponía en un plano cronológico lineal, y Schleicher postulaba que la tarea de la Lingüística era la de reconstruir históricamente la evolución y las transformaciones de los idiomas (empleando principalmente de textos escritos en la antigüedad). Bopp, por su parte, se propuso como principal objetivo llegar a identificar el conjunto nuclear de formas gramaticales de la “lengua original” a partir de la cual, planteaba, habían surgido todas las demás.

A mediados de la década de 1870, precisamente en la época en que Saussure llegó a Alemania, un grupo de jóvenes lingüistas comenzó a organizar, en Leipzig, los fundamentos de una nueva forma de aproximarse al lenguaje que buscaba romper con la tradición anterior. Conocidos como *neogramáticos*, los partidarios de esta escuela, que para la Lingüística alemana marcó el paso del romanticismo al positivismo y fue representada por figuras como Hermann Osthoff, Karl Brugmann y Hermann Paul, tomaron distancia de los comparativistas en varios aspectos. Reivindicaron el papel de la oralidad en el estudio del lenguaje. Propusieron que el estudio histórico de los cambios observables en una lengua era más fructífero que la comparación de idiomas diferentes. Postularon que los cambios lingüísticos podían ser explicados en virtud de mecanismos inconscientes correspondientes a leyes fonéticas (en el plano de los sonidos) y analogías (en el plano morfológico). Sostuvieron además que las lenguas no eran organismos vivos sino productos sociales dependientes de los grupos humanos que las empleaban (un autor clave para la adopción de este último punto fue William Dwight Whitney, cuyo libro *The Life and Growth of Language*, publicado en 1875, influyó tanto a los neogramáticos como a Saussure, Alter, 2005). Algunos de estos postulados, como por ejemplo la dimensión social del lenguaje, el papel de la analogía en la evolución de las lenguas y el reconocimiento de la importancia de la oralidad en el estudio lingüístico, fueron bien recibidos por Saussure y estuvieron en mayor o menor medida presentes en sus famosas tres cátedras de Lingüística General (Harris, 2003).

Sin embargo, más allá de sus diferencias, los neogramáticos compartían con los comparativistas la predilección por el estudio evolutivo (diacrónico) de las lenguas, de modo tal

que la Lingüística practicada en Alemania durante el siglo XIX tuvo siempre un carácter historicista con énfasis en el nivel fonético, el morfológico y el sintáctico. En esta Lingüística histórica era habitual trabajar con lenguas muertas (latín, sánscrito, persa, griego, variedades antiguas de alemán, etc.). Cuando se estudiaba un idioma moderno, como propusieron los neogramáticos, se lo hacía para identificar algún principio que pudiera ser aplicado a estados anteriores de la lengua, no para describir lo que Saussure denominaría luego *sincronía*. Ni entre los comparativistas ni entre los neogramáticos había espacio para una noción como la del “sistema” saussuriano. Sechehaye resume esto citando a Hermann Paul, uno de los neogramáticos más reconocidos: “La ciencia de la lengua es la historia de la lengua” (1917: 3). Saussure no encontró en Alemania un entorno de trabajo que lo hiciera sentirse a gusto. De hecho, su *Mémoire* no tuvo buena acogida en Leipzig debido a que las consideraciones históricas acerca de los fenómenos lingüísticos que estudió no eran el centro exclusivo de su trabajo sino aparecían acompañadas de un interés por lo que se puede legítimamente considerar como un sistema de relaciones, algo que Osthoff le reprocharía seriamente (Bulea, 2010). Así, una vez graduado, decidió irse a Francia.

En París, Saussure descubrió que su *Mémoire* había sido recibida muy bien por sus pares y que si bien existía un respeto por la tradición germana del estudio historicista de las lenguas (un hito importante en la carrera de Michel Bréal fue su traducción, al francés, de una de las obras más importantes de Franz Bopp, 1866) esto no implicaba que se aceptaran todas ideas provenientes de Alemania. Especialmente complicada resultaba la concepción del lenguaje como un organismo vivo, pues favorecía una visión jerárquica que permitía distinguir entre lenguas “superiores” e “inferiores”, tal como ocurre con las especies del mundo natural. Sanders (2004) señala que muchos de los académicos franceses que trabajaban en temas de lenguaje (incluyendo a Bréal) eran de origen judío y no se sentían cómodos con una perspectiva que enfatizaba nociones como la supremacía de algunas lenguas y su “pureza”. De ahí que varios académicos prefirieran considerar el lenguaje más como un producto social que un “hecho” natural o biológico, con lo que se sacaba el estudio lingüístico del ámbito de las Ciencias Naturales para llevarlo al de las Ciencias Sociales. Si bien el énfasis en la dimensión social del lenguaje acercaba a la comunidad lingüística francesa a uno de los postulados centrales de los neogramáticos, existía una diferencia importante en lo relativo al marco de referencia desde el cual se estudiaban las lenguas. Los neogramáticos rompieron con la tradición romanticista que caracterizaba a los comparativistas y adoptaron como principio rector el positivismo (renegando de las especulaciones metafísicas y proponiendo un apego estricto a datos concretos de lengua). En cambio, en la Francia de fines del siglo XIX (es decir precisamente durante la época en que

Saussure trabajó en París) el positivismo estaba en declive, un fenómeno observable en la Psicología, la Sociología, la Literatura y las artes en general (Sanders, 2004). En la Lingüística, el ocaso del positivismo dio cabida a nociones abstractas de carácter mental o psicológico.

En definitiva, mucho antes de su regreso a Ginebra en 1891, y mucho antes de dictar las célebres cátedras sobre las que se basó el CLG, Saussure ya había tenido ocasión de conocer de primera mano tanto las corrientes más influyentes de la Lingüística europea como algunas visiones alternativas que trabajaban con postulados abiertamente divergentes a ellas. Es debido a este panorama y estos problemas que el pensamiento de Saussure lidia con temas como *sincronía/diacronía*, *lengua/habla*, la naturaleza del objeto de estudio en la lingüística, la diferencia entre la Lingüística y las ciencias tradicionales.

4. Albert Sechehaye

Sechehaye nació en 1870 en Ginebra y realizó sus primeros estudios superiores en la Universidad de Ginebra, donde conoció a Saussure en 1891, cuando se inscribió en uno de sus cursos. En 1893, tal vez aconsejado por Saussure (Frýba-Reber, 1994), se fue a estudiar a Leipzig, cuna de los neogramáticos. Solo alcanzó a estudiar allí un semestre. En 1894 se trasladó a Bohemia y en 1897 comenzó a trabajar en la Universidad de Göttingen, donde se doctoró en 1902. En 1903 volvió a Suiza y trabajó haciendo clases en la Universidad de Ginebra y en instituciones particulares. En 1908 publicó su primer libro, el PMLT. En 1916, junto a Bally, publicó el CLG y posteriormente escribió varias obras de relativo impacto en la comunidad lingüística. Una de las más destacadas, *Essai sur la structure logique de la phrase* (1926) es el centro de atención de uno de los pocos trabajos dedicados a revisar su obra y su concepción de lenguaje (Frýba-Reber, 1994).

El panorama intelectual del momento histórico en que Saussure se formó en Alemania fue muy distinto del que le tocó vivir a Sechehaye. Una diferencia, muy obvia, es la consolidación de los neogramáticos en la Lingüística alemana, pues cuando Saussure llegó a Leipzig no habían adquirido todavía el peso que tendrían después. Cuando Sechehaye viajó a Alemania, en cambio, ya se habían convertido en la escuela dominante. Otra diferencia es la irrupción de la Psicología experimental de Wilhelm Wundt. Durante la estancia de Saussure en Leipzig, Hermann Paul estaba elaborando su libro más famoso: *Principios de la historia del lenguaje* (1880), uno de los textos fundacionales de la escuela de los neogramáticos y en el que se observa un interés explícito por sistematizar la relación entre Lingüística y Psicología,

concebida esta última como una disciplina experimental y empírica. Como es sabido, Wundt (quien también trabajaba en Leipzig y fundó allí el primer laboratorio de psicología experimental en 1879), fue clave en la Psicología alemana, y su influencia fue particularmente fuerte durante las dos últimas décadas del siglo XIX y el comienzo del siglo XX, es decir cuando Saussure ya había abandonado Alemania.

En 1900, Wundt publicó los primeros dos volúmenes de su famosa obra *Völkerpsychologie*. En ellos abordó cuestiones relacionadas con lenguaje y reafirmó algunos de los puntos que antes defendiera en una polémica académica que lo enfrentó a Hermann Paul. La desavenencia mayor entre ambos tenía que ver con la relación entre pensamiento y lenguaje, más precisamente el pensamiento y la oración:

The word-sentence debate raged over the issue as to whether the word (as a sign of a mental representation) is the building block used to construct a sentence (Paul's view), or whether it is the verbal endpoint of the syntactical decomposition of a global representation in the construction of a sentence (Wundt's view), whether the word or the sentence came first in the evolution and the development of language, and what linguistic functions the word and the sentence serve in language and communication (Nerlich y Clarke, 1998: 186).

Sechehaye no solo estaba al tanto de este debate (que durante la época en que Saussure estudió en Alemania todavía no había eclosionado), sino que en su PMLT dedicó una gran cantidad de páginas a revisar y discutir las ideas de Wundt, lo que marca una diferencia clara con Saussure. Entre los manuscritos publicados en el ELG hay un texto en el que Saussure comenta el PMLT de Sechehaye criticándole, precisamente, su énfasis en el aspecto psicológico:

En resumen, Sechehaye, tras haber reprochado a Wundt, con razón, por haber ignorado el problema gramatical, no llega él mismo a hacerse de él una idea suficiente. Pues la única idea suficiente sería plantear el hecho gramatical en sí mismo, y en lo que lo distingue de cualquier otro acto psicológico, o lógico además. Cuanto más se esfuerza el autor en derribar lo que considera una barrera ilegítima entre la forma pensada y el pensamiento, más nos parece que se aleja de su propio objetivo, que sería establecer el campo de la expresión, y concebir sus leyes, no en lo que tienen en común con nuestro psiquismo en general, sino, al contrario, en lo que tienen de específico y absolutamente único en el fenómeno de la lengua. (Saussure, 2004: 233).

Si bien en el CLG efectivamente se aborda el tema de la relación entre pensamiento y lenguaje y se le asigna un papel de cierto peso dentro de la lógica de la obra, claramente el libro profundiza mucho más otros temas que no son de carácter psicológico. La problemática acerca de la constitución de la oración y su representación a nivel de pensamiento no es siquiera abordada como tal (de hecho, de manera algo paradójica dado su impacto en la Lingüística moderna, en el CLG no se incluye ninguna oración sacada de algún texto real y apenas se mencionan unos pocos ejemplos lingüísticos, Stubbs, 1996). En la obra de Sechehaye, en cambio, ambos temas aparecen desarrollados y el primero de ellos desempeña un papel importante en la discusión acerca de cuál es la naturaleza del lenguaje y cómo se lo debe estudiar de manera científica.

Más allá de la diferencia puntual entre el CLG y la obra de Sechehaye en lo que se refiere a pensamiento (individual) y lenguaje, la abundancia de referencias a la Psicología y al colectivo social en las argumentaciones del PMLT pone de relieve algo ineludible para la Lingüística de comienzos del siglo XX: la “multidisciplinariedad” de las teorizaciones sobre el lenguaje. En un momento de la evolución de la Lingüística europea del siglo XIX, sobre todo cuando los intereses eran mayormente filológicos, era posible aislarse de las demás Ciencias Sociales y trabajar sin recurrir a explicaciones de carácter sociológico o psicológico, entre otras cosas porque se estudiaban preferentemente lenguas muertas y no se presentaba atención a la sincronía o al uso real de las lenguas. Como señala Alter (2005), durante la mayor parte del siglo XIX lingüista era sinónimo de filólogo.

Pero a medida que la Sociología, la Antropología y la Psicología comenzaron a interesarse de manera sistemática en temas de lenguaje, se hizo necesario que la Lingüística se definiera a sí misma en relación con esas disciplinas. Probablemente sea este uno de los aspectos más atractivos del PMLT. En su diálogo con Wundt, Sechehaye elabora una teoría (un programa) y un método que la Lingüística puede seguir tanto para definirse a sí misma como para relacionarse con las demás ciencias, y lo hace de manera integral identificando las raíces epistemológicas y filosóficas que en su opinión más se prestan para estudiar el lenguaje de modo racional. Como ya se dijo, el CLG no posee un grado similar de organización argumentativa, lo que hace del PMLT una obra más interesante aún de analizar.

5. Programme et méthodes de la linguistique théorique

El PMLT está organizado en dos partes. En la primera, (capítulos I a VIII) Sechehaye

desarrolla los puntos definitorios de su propuesta en torno a temas que le sirven para establecer las categorizaciones y subdivisiones que elabora en la segunda (capítulos IX a XV). Las discusiones y análisis más reveladores se encuentran en la primera parte. En esos capítulos se define la noción de “Lingüística teórica”, se explica cuál es su objetivo y cuál debe ser su método. En ellos se incluye también un análisis de la obra de Wundt *Psicología del lenguaje* y se presenta la noción de “encajonamiento” (*emboîtement*), esencial para la propuesta programática general. Este trabajo se centrará en esta primera parte del libro porque es allí donde se pueden observar de manera más clara los vínculos con el CLG. Se partirá por identificar los aspectos más definitorios de la visión del lenguaje que entrega Sechehaye para posteriormente revisar su manera de entender la Lingüística teórica, lo que implica analizar su propuesta de categorización de las ciencias y ponerla en relación con su concepción racionalista del método científico.

5.1 El lenguaje para Sechehaye

Sechehaye define el lenguaje como “... el conjunto de medios que utiliza un ser psicofísico para expresar sus pensamientos” (1908a: 48). La idea que el lenguaje posee tanto una dimensión psicológica como una dimensión física (biológica) está en el núcleo mismo de la propuesta del libro. Para Sechehaye, “El lenguaje es una actividad psíquica del hombre que se ejerce por medio del organismo. La fisiología, la psicología y la lógica deben contribuir, cada una por su parte, a la explicación total” (1908a: 16). Al analizar el papel de estas tres disciplinas, afirma que se ha recurrido mucho, demasiado, a Lógica para explicar el lenguaje, pero que la Lógica por sí sola no permite obtener sino un conocimiento superficial del fenómeno. Así, le otorga un papel muy secundario y prácticamente nulo para dejar en primer plano a la Fisiología y la Psicología como las disciplinas verdaderamente capaces de arrojar luz sobre la naturaleza y el funcionamiento del lenguaje.

El carácter psicofisiológico es entonces el primer rasgo esencial para entender el lenguaje y es también uno de los ejes centrales de su propuesta. Sechehaye es un racionalista y un positivista. En diferentes partes del libro es muy explícito en su rechazo a consideraciones metafísicas y llega incluso a afirmar que para la Psicología, “...el alma es concebida necesariamente como una función del organismo” (1908a: 58). Este rechazo a la metafísica, a las especulaciones que no se sustentan en métodos y ciencias racionales, no es nuevo en la Lingüística. La misma escuela de los neogramáticos, con la que Sechehaye no tenía mayores afinidades, se declaraba positivista, apegada a datos empíricos. Sin embargo, existen grandes

diferencias entre la propuesta de Secheyay y la de los neogramáticos. La principal es que mientras los neogramáticos estudiaban lenguas, en plural, tratando de reconstruir sus evoluciones a lo largo de la historia, Secheyay plantea que lo que en realidad se debe estudiar es *el lenguaje*, algo mucho más general y abstracto que una lengua particular. Es así entonces que se puede apreciar que el comienzo de la primera parte del libro está dominado por dos temas principales: el carácter científico de la Lingüística teórica y la relación entre Lingüística y Psicología.

5.2 La Lingüística teórica como ciencia de las leyes

Secheyay parte su libro reconociendo que la Lingüística se construyó alrededor de hechos lingüísticos establecidos y que “La mayor parte de los trabajos de lingüística se dedican a describir hechos históricos, es decir, hechos ubicados en el tiempo y el espacio” (1908a: 1-2). Utiliza la taxonomía de las ciencias propuesta por Adrien Naville (1901) para distinguir entre “ciencia de los hechos” y “ciencia de las leyes” y ubica la Lingüística practicada tradicionalmente durante el siglo XIX en Europa, con su énfasis en los hechos históricos, la evolución y el cambio (incluyendo también la Gramática Comparada y la escuela de los neogramáticos) dentro las ciencias de los hechos, porque considera que una “... ciencia de los hechos nos da muestras de tener un propósito triple: describir, narrar y reconstruir” (1908a: 3).

Señala que la Lingüística, a diferencia de otras ciencias de los hechos, está en mal pie para reconstruir etapas con el mismo nivel de precisión que se puede lograr en el mundo físico y orgánico. Señala también que mientras en otras áreas se puede afirmar que “Una ciencia que reconstruye el pasado debe poder, mediante una aplicación inversa de sus métodos, predecir el futuro” (1908a: 3-4), en la Lingüística no existe ni la posibilidad ni la pretensión de predecir estados de cosas, porque para predecir se necesita que las causas sean lo suficientemente conocidas y que sus efectos puedan ser calculados de manera precisa. Estas condiciones no son sencillas de obtener en las ciencias de la vida orgánica y no se pueden encontrar en aquellas dimensiones en las que el factor interviniente es el hombre. Las ciencias de las leyes, por su parte, examinan los mismos fenómenos que las ciencias de los hechos, pero lo hacen desde otro punto de vista y con otro propósito:

Junto a las ciencias de los hechos, están, siguiendo a Adrien Naville, las ciencias de las leyes. Estas ciencias estudian los mismos fenómenos, pero los examinan desde otro punto de vista. Detrás del fenómeno contingente buscan encontrar lo general y lo necesario. Partiendo del

postulado científico de que cada vez que se cumplan las mismas condiciones se debe producir el mismo efecto... no se contentan con saber en qué lugar y en qué momento se produjo tal o cual fenómeno, sino que inquieren de manera general por las condiciones de los fenómenos. Las verdades que encuentran no tienen ni fecha ni geografía, son verdaderas en todo lugar y siempre... (1908a: 4)

Ambas formas de investigar no son disyuntivas, sino solidarias. Sechehaye entiende que no puede haber ciencia de las leyes sin hechos concretos, y lo que se debe hacer entonces es observar los hechos empíricos para luego trascenderlos. Para ir más allá del simple hecho bruto hay que utilizar el método racional (común a hechos y leyes). Una ciencia descriptiva (concreta y particular) como la Geología necesita una ciencia racional (abstracta y general) como la Química para poder clasificar y comparar. Es más, clasificar y comparar ya son en sí labores abstractas, por lo que toda labor descriptiva se basa necesariamente en abstracciones. Este carácter ineludiblemente abstracto o abstrayente de la descripción en las ciencias de los hechos y las ciencias racionales (las Matemáticas, la Geometría, la Mecánica, la Física, la Química y la Biología) las emparenta metodológicamente. Para Sechehaye, las ciencias de los hechos y las ciencias de las leyes comparten un mismo método al servicio de dos propósitos distintos:

Estamos entonces en presencia de un solo método que está puesto al servicio de dos fines distintos, y las mismas verdades científicas sirven para construir dos edificios cuyos principios de ordenamiento son diferentes. En uno de estos edificios la ciencia se apega al hecho, al que examina como una ocurrencia real y concreta en la situación topográfica y cronológica en la que aparece, y solamente se preocupa de describirlo, de clasificarlo y de explicar, en cuanto sea posible, las partes que lo constituyen. En el otro edificio también se parte del hecho, pero es ese el único interés por lo factual; lo que se busca son los principios generales del hecho y son estos principios el punto último donde se detiene la búsqueda; se los define, se los denomina, se los justifica racionalmente en la medida de lo posible y, una vez identificados estos principios, en lugar de tratar de reconstruir imperfectamente lo real de la historia se edifica por deducción en cada orden el sistema general de los posibles, del cual lo real no es más que una aplicación contingente. (1908a: 7-8).

El método común a ambos tipos de ciencia es el método racional, que Sechehaye identifica con el uso de la inducción y la deducción: inducción para observar los datos y los hechos, deducción para generar a partir de ellos leyes y teorías que luego son usadas para

explicar los hechos. El estudio histórico de las lenguas, con su interés por la evolución, su énfasis en los hechos históricos concretos y sus ansias de reconstrucción, puede perfectamente ir de la mano de una ciencia que se preocupe de encontrar leyes generales que se apoyen en el método racional: “De la misma manera que trascendiendo la idea de las lenguas particulares podemos concebir la idea del lenguaje en general, podemos perfectamente imaginar una ciencia que aborde el fenómeno del lenguaje considerándolo en su idea abstracta. Junto a esta ciencia encontramos nuestras gramáticas, que nos hablan siempre de una forma particular del lenguaje; esta ciencia será la que denominaremos con el término más cómodo de *lingüística teórica*”. (1908a: 9-10, énfasis en el original).

Sechehaye es consciente de que en la historia de la Lingüística ha habido intentos por hacer teoría más allá de los hechos, pero critica estos intentos por estar mal estructurados y por ir a la zaga de los datos, no delante de ellos, dirigiéndolos: “Una ciencia teórica que no aporte a la práctica ninguna ayuda, que a duras penas la siga en lugar de precederla, está muy cerca de caer en el descrédito y ser considerada inútil” (1908a: 13). Opina que la gramática ha tenido casi desde su génesis preocupaciones prácticas que la han alejado de la teoría. Haciendo una analogía con un coleccionista que junta, cría y clasifica mariposas, explica que una ciencia que solo describa y clasifique sin buscar comprender resulta muy limitada y que para entender el orden de las cosas se necesitan leyes y teorías.

Otro problema importante para Sechehaye es que la gramática ha sido estudiada históricamente como algo autónomo, una entidad especial de alguna manera separada del mundo: “La gramática existe para ella misma, como un conjunto de hechos, un código de leyes de una naturaleza especial, sin un vínculo orgánico con las otras leyes de la naturaleza” (1908a: 15). Sin embargo, “Lo propio de la ciencia de las leyes... es poner cada hecho, o cada elemento constitutivo de un hecho, en relación con otros hechos regidos por las mismas leyes” (1908a: 16). Esto quiere decir que las leyes del lenguaje deben tener relación con las leyes que describen a otras ciencias. Como el lenguaje es para él una actividad psicofisiológica, lo más natural es que las leyes del lenguaje tengan relación con las leyes de la Psicología y la Fisiología.

Hacia fines del siglo XIX y comienzos del XX, se consideraba que el conocimiento de las leyes de la fonética era bastante sólido y que se comprendían con precisión de los detalles anatómicos involucrados en la articulación de los sonidos, por ejemplo. El conocimiento de la dimensión psicológica del lenguaje era, en cambio, mucho más precario. Es en esa dirección donde apunta Sechehaye, postulando que se deben poner en relación las leyes de la gramática con las leyes de la Psicología. Plantea que “...la gramática comparada que no se ocupa más que de los sonidos y de las formas determinadas por sus cualidades materiales es incompleta, y debe

ser acompañada por una ciencia de los *valores*. Puesto que el problema de la evolución de los valores es un problema esencialmente psicológico” (1908a: 18, énfasis añadido). Es aquí donde entra en escena Wundt, a quien otorga el mérito de haber efectuado el primer intento serio por sacar a la Psicología de las especulaciones metafísicas que caracterizaron su origen como disciplina para llevarla a un terreno empírico y racional. Para Sechehaye, el trabajo de Wundt permite comenzar la indagación de las leyes psicofisiológicas que rigen el lenguaje y constituye un puente entre la Psicología y la Lingüística teórica preocupada del fenómeno general del lenguaje.

5.3 Wundt y la noción de gramática

La obra de Wilhelm Wundt que Sechehaye revisa y critica corresponde al primer volumen de la *Völkerpsychologie*, llamado *Lenguaje (Sprache)*, (1900). Como es de esperar, hay críticas variadas a los planteamientos de Wundt, muchas de ellas relacionadas con su desconocimiento o liviandad al tratar temas lingüísticos propiamente tales. Pero la crítica principal de Sechehaye es que Wundt no supo calibrar adecuadamente el papel de la gramática en la descripción de los fundamentos del lenguaje: “...en una palabra, *no comprendió la importancia del problema gramatical*” (1908a: 23, énfasis en el original).

Wundt estudia los fenómenos en los que la actividad del hombre interviene para crear o modificar su lenguaje. No le interesa lo que ocurra con el aprendizaje de la creación o la modificación en el momento en que ellas, convertidas en hábito, se incorporan al conjunto de nuestras disposiciones lingüísticas. Sin embargo, es gracias a este conjunto de hábitos o de disposiciones lingüísticas que los más complejos de nuestros pensamientos encuentran una expresión espontánea y como automática. Es entonces este el objeto sino único al menos principal de la lingüística teórica.

Estos hábitos y disposiciones solo constituyen, en conjunto, un medio apto para expresar el pensamiento gracias a que forman *un sistema* de representaciones de sonidos y de ideas asociados entre ellos de manera apropiada para tal fin del lenguaje [expresar el pensamiento]. Además, en cada individuo este sistema solo existe en virtud de las disposiciones adquiridas en sus centros nerviosos (1908a: 23, énfasis en el original)

Un aspecto clave en este razonamiento es la equivalencia entre hábito y regla: “Quien

dice hábito dice regla, y toda regla constatable experimentalmente posee una existencia real, aunque sea abstracta” (1908a: 24). El sistema de hábitos y disposiciones es entonces un sistema de reglas, tal como lo es la gramática:

Puesto que se denomina *gramática* a las reglas del lenguaje en general, se puede extender el sentido de esta palabra y aplicarla a todo el conjunto de leyes que rigen el lenguaje adquirido por un individuo o una colectividad en un momento dado, a todo aquello que descansa sobre un hábito, una disposición, una asociación de ideas regular, desde la distinción de las articulaciones constitutivas de las palabras hasta los más inasibles rasgos de estilística, pasando por la lexicografía, por la flexión y la sintaxis. Podemos denominar como *problema gramatical* a aquel que se plantea cuando se busca detrás de la gramática el fundamento psicofisiológico de sus orígenes, de sus leyes y de su funcionamiento. (1908a: 24, énfasis en el original)

Conviene destacar aquí dos aspectos. En primer lugar, el papel central que Sechehaye atribuye al sistema. En varias partes del capítulo dedicado a Wundt, le critica no haber sabido detectar la relación entre, por ejemplo, los sonidos particulares (con sus peculiaridades y cambios) y el sistema de sonidos al que pertenecen. Esta crítica se debe en gran parte también a que Wundt organiza su libro siguiendo los cánones tradicionales de la época para el estudio de las lenguas, lo que implica abordar temas de fonética, morfología, sintaxis y sentido (semántica), además de presentar consideraciones acerca de la naturaleza de la frase. Articula también la discusión de cada nivel en torno a dos temas: génesis y evolución, algo coherente con la Gramática Histórica (evolución) y la Psicología (génesis), pero que desde el punto de vista de la Lingüística teórica que defiende Sechehaye, preocupada del sistema de reglas y sus leyes, resulta insuficiente. En segundo lugar, el hecho de que al establecer una equivalencia entre hábito y regla, Sechehaye tiende un vínculo entre el mundo necesariamente abstracto de las reglas de la gramática y el mundo físico, puesto que el hábito o la disposición se ubica en último término “en los centros nerviosos”. Se trata de un punto clave para entender su visión del problema de la gramática y el lenguaje. Para Sechehaye, “El signo responde a la idea por medio de un reflejo y en virtud de un hábito” (1908a: 39). Así, el hábito representa el lazo entre el mundo abstracto de las reglas y el orgánico del individuo, algo que permite luego a Sechehaye coordinar las disciplinas mediante el principio del *encajonamiento* que se revisará más adelante.

El hábito desempeña además otro papel esencial en la revisión de la teoría de Wundt. Para el psicólogo alemán, la dimensión mental de la frase (su relación con el pensamiento) es un tópico de mucho interés. De hecho, es el tema que lo embarcó en la disputa con Paul antes

referida. Ahora bien, mientras Wundt señala que su definición de la frase se aplica a aquellas que se corresponden con un acto espontáneo y arbitrario, enfatizando a la vez el rol expresivo e individual del lenguaje como medio de canalización del mundo interno (descartando por ejemplo las interjecciones de su análisis de las frases), Sechehaye opina que las frases se originan en realidad gracias a una mezcla de hábito (incluso automatismo) y espontaneidad. Señala que hasta la manifestación más espontánea de habla involucra como mínimo un automatismo articulatorio y que “No se puede exagerar la importancia de este automatismo en el lenguaje. Es justamente gracias al automatismo que la lengua tiene una especie de existencia propia, una fijación relativa” (1908a: 39). Sin automatismo, afirma, una lengua estaría condenada a partir siempre de nuevo. Así, el hábito y la disposición, internalizados a nivel nervioso, son el punto de apoyo físico de un sistema de reglas abstracto que tiene una “especie de existencia propia”.

5.4 Psicología individual y Psicología colectiva

Sechehaye afirma que su concepción de qué es el lenguaje y de cómo debe ser estudiado se basa sobre una modalidad específica: la oralidad. Considera que la oralidad es la “forma [de lenguaje] más importante, aquella que ha dado lugar a los desarrollos más fecundos y la que es más conocida” (1908a: 51). Al hacer esto, marca una distancia con la lógica y la gramática tradicional, fuertemente influidas por la escritura tanto en sus herramientas como en sus objetivos. En una especie de resumen de algunos de los puntos centrales de su razonamiento, afirma lo siguiente:

Lo primero que nos impresiona cuando observamos el lenguaje que hablan los hombres es [...] su carácter orgánico; hay un mecanismo gramatical que se compone de convenciones fijas mediante las cuales unas ideas son asociadas a ciertos signos y a ciertas reglas gramaticales relativas a la combinación de esos signos. Se puede traducir esto al lenguaje de la psicología fisiológica de la siguiente manera: el lenguaje hablado descansa sobre un conjunto de hábitos en virtud de los cuales el sujeto parlante asocia unas ideas o grupos de ideas con unos movimientos muy complejos de órganos vocales y con las percepciones auditivas correspondientes. En su totalidad, estos hábitos constituyen un instrumento que permite encontrar un medio de expresión convencional para cualquier pensamiento. (1908a: 51)

Una vez establecida la relación entre el componente psicofisiológico, el sistema de

hábitos y el sistema gramatical, Sechehaye aborda el tema del pensamiento y el de la relación entre el individuo y el sistema. Soluciona el primer punto, el del pensamiento, continuando la cita anterior de la siguiente manera:

Si lo observamos más de cerca veremos además que este instrumento que permite fijar el pensamiento en un acto no es solamente un medio para que los hombres se comuniquen entre ellos, sino que es también el vehículo de *todo* pensamiento discursivo, de manera tal que en los seres dotados de lenguaje el perfeccionamiento de la inteligencia es íntimamente solidario con el perfeccionamiento de la lengua. Veremos además que este vehículo del pensamiento es también el molde del pensamiento y que lo influencia y le impone sus formas. Por lo tanto, los hábitos y las reglas del lenguaje son al mismo tiempo hábitos y reglas del pensamiento, y el organismo gramatical es como el canal por el cual la actividad intelectual debe pasar para poder realizarse. (1908a: 51, énfasis añadido)

Para Sechehaye, entonces, el pensamiento individual solo se realiza gracias al lenguaje hablado, que a su vez debe su existencia a los automatismos, los hábitos y un sistema convencional de reglas. Sin embargo, en realidad el acople entre el individuo y el sistema convencional de reglas no es perfecto. Existe efectivamente una gramática externa al individuo, pero la observación de la realidad del lenguaje muestra que las personas al hablar cometen errores, pronuncian las palabras de manera diferente, emplean tonos y acentos distintos. Por lo tanto, junto al sistema convencional de reglas hay un elemento de variación individual. A este elemento de variación individual lo denomina “*extragramatical*” y considera que es un nivel correspondiente a la psicología individual, es decir, la psicología preocupada de lo que atañe a un sujeto aislado de su medio social. El *elemento gramatical*, en cambio, es parte del sistema convencional de reglas y su estudio corresponde a la psicología colectiva:

El estudio del elemento gramatical en la lengua compete por tanto a la psicología colectiva. En cuanto a los elementos extragramaticales, que no están sometidos a ninguna regla convencional, ellos dependen directamente de la actividad psicofisiológica de la persona que habla. Como no tienen causas externas a la persona misma, deben poder ser enteramente explicados por las leyes de la psicología fisiológica simple o individual. (1908a: 53-54)

El elemento gramatical marca entonces el límite entre lo individual y lo colectivo, entre

lo interno y lo externo. Todo esto no implica, por cierto, que el nivel individual deba quedar excluido de la Lingüística teórica (la ciencia que estudia el fenómeno general del lenguaje). A nivel del individuo, Sechehaye distingue entre lenguaje *pregramatical* y lenguaje *gramatical*. El lenguaje pregramatical es todo aquello que ontogenéticamente construyen los individuos durante su desarrollo para comunicarse pero que no se corresponde con un uso social o una convención, es decir, no está causado por una regla externa al individuo. Por su naturaleza idiosincrática, Sechehaye considera que el elemento pregramatical está en un mismo nivel que el elemento extragramatical (la variación individual en el uso oral de la lengua) e incluye a ambos elementos dentro de lo que denomina *lenguaje afectivo*. El lenguaje afectivo así compuesto es el objeto de la psicología individual, mientras que el *lenguaje organizado* (que responde a convenciones sociales) corresponde a la psicología colectiva. Ambos tipos de lenguaje son de competencia de la Lingüística teórica, aunque, claro está, es el nivel colectivo el que mayor importancia tiene para la descripción del lenguaje.

Por último, cabe hacer notar también que esta forma de abordar el problema de la gramática y el lenguaje permite que Sechehaye divida el estudio de los fenómenos entre aquellos que tienen una directa relación con los individuos (en el tiempo y el espacio) y aquellos que pertenecen al sistema. Esto le permite identificar un componente que denomina *evolutivo* y uno que denomina *estático*. Un idioma cambia en el tiempo tanto desde el punto de vista de la fonética como de la gramática o la morfología, pero “El principio de esta evolución [las transformaciones de la gramática en el tiempo] no se puede, naturalmente, encontrar en la regla misma; un hábito, una disposición adquirida es en sí algo inerte, inmutable” (1908a: 52).

5.5 El principio del encajonamiento

El positivismo tomó impulso en Europa a mediados del siglo XIX con la obra de Auguste Comte. Uno de sus postulados principales fue el abandono de la metafísica a favor de una ciencia que buscara verdades (leyes) basadas en observaciones empíricas cuantificables. Esto implicaba un reordenamiento de las disciplinas científicas y el mismo Comte propuso una clasificación de las diferentes ciencias, pero el tema no quedó agotado con él. Tanto en Alemania como en el ámbito francófono, fueron muchos los que formularon sus propias maneras de ordenar y clasificar la actividad científica. Sechehaye conocía varios de los trabajos más importantes al respecto, incluyendo los de Wundt (1880-83), Goblot (1898) y Naville (1901) (Frýba-Reber, 1994) y abordó el problema en su libro basándose en el principio del

encajonamiento (*emboîtement*).

El capítulo dedicado a describir este principio es fundamental para entender la propuesta general del libro. Las disquisiciones acerca del sistema convencional de reglas, los hábitos, las disposiciones y la posibilidad de estudiar de manera racional un objeto abstracto recurriendo a la Psicología colectiva apoyan la existencia de una Lingüística teórica capaz de complementar una Lingüística histórica cuyo objeto es esencialmente temporal y geográfico (es decir, contingente). Una vez fundamentada la posibilidad (e incluso la necesidad) de una Lingüística teórica, Sechehaye propone para ella un programa y un método, tal como sugiere el título de su libro. Ambas cosas se articulan a partir de la noción de encajonamiento, propuesto como rasgo esencial de las ciencias en general y como principio metodológico ineludible de un quehacer científico racional.

El principio de encajonamiento es “aplicable a todas las ciencias y al conjunto de las ciencias en general” (1908a: 55). Corresponde, según Sechehaye, a lo que Descartes describe de la siguiente manera: “El tercero [precepto] requería conducir por orden mis reflexiones comenzando por los objetos más simples y más fácilmente cognoscibles, para ascender poco a poco, gradualmente, hasta el conocimiento de los más complejos, suponiendo inclusive *un orden entre aquellos que no se preceden naturalmente los unos a los otros*”, (1908a: 55, énfasis añadido). Basándose en esta visión de relaciones de importancia y complejidad, Sechehaye distingue entre dos tipos de ciencias: las Ciencias Naturales y las Ciencias Morales. Al primer grupo pertenecen, en orden de jerarquía, las Matemáticas, la Mecánica, la Física, la Química, la Biología, la Psicología individual y la Psicología colectiva. Al segundo grupo pertenecen la Historia, las Ciencias Sociales, y Políticas, la Filosofía, el Arte y la Religión, pero sin que haya una jerarquía definida entre ellas. Es muy difícil, sin embargo, trazar un límite claro entre las Ciencias Naturales y las Ciencias Morales, por lo que para Sechehaye es posible “... considerar la Psicología colectiva ya sea como la primera de las ciencias morales o como la última de las ciencias naturales” (1908a: 60). El ordenamiento de las Ciencias Naturales se logra gracias al método racional inductivo/deductivo. Cuando se han establecido leyes generales se puede avanzar deductivamente hacia niveles cada vez más particulares. El descenso hacia lo particular va ofreciendo nuevos fenómenos ausentes en el nivel anterior pero que solo se pueden entender en relación a él. Así, por ejemplo, al descender de la Biología hacia el nivel de la Psicología individual aparece algo nuevo (la conciencia y la introspección) que no está presente en la Biología pero que solo se puede realmente conocer desentrañando cómo el nuevo orden de fenómeno (la conciencia) se manifiesta en el medio biológico en la que está encajonado.

Sechehaye distingue tres requisitos indispensable para considerar que una disciplina

está encajonada en otra. El primero es que en la ciencia de primer orden (la que encajona) debe ser posible pensar el objeto sin considerar la ciencia de segundo orden encajonada en ella, pero no se puede hacer lo contrario. El segundo es que los hechos que estudia la ciencia encajonada no pueden manifestarse en estado puro y solo pueden aparecer combinados con los hechos estudiados por la ciencia que encajona. El tercero es que la ciencia encajonada estudia siempre fenómenos más compuestos y generalmente más concretos que la ciencia que encajona. La relación entre la Psicología individual (ciencia que encajona) y la Psicología colectiva (ciencia encajonada) cumple con estos tres requisitos. Se puede pensar el nivel del individuo sin el colectivo al que pertenece, pero no se puede concebir el colectivo sin los individuos. De la misma manera, todo hecho de la Psicología colectiva necesariamente se manifestará acompañado de hechos de la psicología individual, por lo que no es posible encontrar hechos colectivos “puros”. Por último, el nivel colectivo es más complejo (compuesto) y concreto que el nivel individual, en la medida que si bien ciertos fenómenos como la percepción, la apercepción, la representación o las reacciones emotivas caen dentro del ámbito de la psicología individual, hay que considerar que en cualquier individuo perteneciente a una sociedad estos fenómenos de naturaleza individual son moldeados y condicionados por el colectivo en el que los individuos crecen, de modo que la psicología individual solo puede aspirar a describirlos de manera general, mientras que “la psicología colectiva es necesaria para entregar una explicación racional de los fenómenos concretos considerados en su entera complejidad” (1908a: 65).

En cuanto al lenguaje, Sechehaye opina que las teorizaciones de la Lingüística muestran “confusión e incertidumbre” debido a que no hay una preocupación por saber cómo se ordenan y coordinan los distintos niveles y disciplinas que la conforman. Utiliza el encajonamiento para dar apoyo a su distinción entre las ciencias del lenguaje organizado (pertenecientes a la Psicología colectiva e identificadas con el problema gramatical) y las ciencias del lenguaje afectivo (pertenecientes a la Psicología individual e identificadas con el problema pregramatical y el extragramatical). En las ciencias del lenguaje organizado, distingue dos niveles relacionados jerárquicamente y coordinados también por el principio del encajonamiento: el nivel estático de la lengua y el nivel evolutivo de la lengua, cada uno con sus correspondientes disciplinas. Las disciplinas estáticas incluyen la Morfología estática y la Fonología, mientras que las disciplinas evolutivas incluyen la Semántica, la Sintaxis evolutiva, y la Fonética.

Para Sechehaye, el conocimiento completo del lenguaje solo se puede dar gracias a la colaboración entre las disciplinas estáticas y evolutivas. La descripción estática del lenguaje es incompleta y requiere la solidaridad de la descripción evolutiva, capaz de identificar las leyes que explican por qué en tal o cual momento de la historia los hablantes muestran tal o cual

comportamiento lingüístico. Sin embargo, la relación entre ellas es de una *subordinación* en la que las disciplinas estáticas son jerárquicamente más importantes. Esto por “... una consideración de sentido común: para comprender una evolución, es necesario antes saber qué es aquello que evoluciona” (1908a: 128). Solo puede haber evolución si hay estados de lenguas que cambian en el tiempo, y si no hay claridad respecto de qué es un estado de lengua tampoco puede haber claridad respecto de su evolución. De esta manera, el encajonamiento permite relacionar dos tipos de estudios diferentes a los que corresponden disciplinas lingüísticas diferentes, pues 1) se puede pensar el estado sin la evolución, pero no se puede concebir lo contrario, 2) no puede haber evolución “pura” es decir, que no incluya elementos estáticos y 3) el estudio de la evolución y el cambio es más particular y complejo que el estudio de lo estático.

6. Saussure, el *Cours* y Sechehaye

Los tópicos expuestos representan solo una parte de los temas tratados por Sechehaye en su libro y fueron elegidos siguiendo dos criterios. El primero es la importancia de estos temas dentro de la lógica general de la obra. El concepto de encajonamiento y la noción del problema gramatical representan puntos esenciales de la propuesta y la epistemología de Sechehaye. El segundo criterio se basó en las semejanzas observables entre los contenidos del libro y el CLG. Conceptos como el estudio “estático” y “evolutivo” del lenguaje, la relación entre lenguaje y pensamiento o el papel del colectivo social para establecer una gramática y una lengua claramente evocan algunas de las ideas más famosas del CLG.

A nivel terminológico, Sechehaye emplea recurrentemente la palabra *sistema* con el mismo sentido en que es usada en el CLG, especialmente cuando se refiere al conjunto de relaciones abstractas que permiten distinguir entre la Fonología y el estudio de los sonidos materiales del que se ocupa la Fonética. Sin embargo, el mismo Sechehaye reconoce que “Al proponer estos dos últimos términos [Fonología y Fonética] para distinguir la ciencia estática de los sonidos de su ciencia evolutiva, seguimos la terminología que el Sr. F. de Saussure emplea en sus cursos” (1908a: 123). El término *valor*, por su parte, es utilizado también frecuentemente a lo largo del libro con diferentes sentidos: a veces es sinónimo de significado, otras veces de relación. En ocasiones, el uso del término resulta algo confuso y es posible percibir en él algunas similitudes con el concepto de valor presentado en el CLG.

En cuanto a las diferencias entre ambas obras, una de las más sobresalientes se encuentra en la noción de encajonamiento y en el papel que se le adjudica en el PMLT. El uso de

este concepto es un aporte propio de Sechehaye y algo novedoso en las discusiones de la época. De hecho, Adrien Naville, en cuyo trabajo se basó Sechehaye para distinguir entre ciencias de las leyes y ciencias de los hechos, afirmó, al reseñar el PMLT, que

La obra del Sr. Séchehaye se llama Programa y métodos de la lingüística teórica. En ella se encontrará, de comienzo a fin, una teoría sistemática del método que sirve de base para unos programas científicos. Es posible que sea esta teoría la que llame más fuertemente la atención. Una palabra la resume, una palabra bien elegida y muy feliz: el encajonamiento de las disciplinas una dentro de otra. Es imposible edificar todas las disciplinas al mismo tiempo de una manera rigurosa y verdaderamente científica: se impone una sucesión, un comienzo por donde hay que empezar y un orden natural que debe ser necesariamente observado. En la primera ciencia se debe encajonar la segunda, en la segunda la tercera, y así sucesivamente. Afirmando que la palabra encajonamiento es feliz: en efecto, indica dos cosas a la vez, en primer lugar que cada ciencia descansa sobre la precedente, sin la cual no podría constituirse como ciencia, y en segundo lugar que tiene una superficie menor que la precedente, de la cual utiliza solo algunos elementos, descartando aquellos que no le son necesarios. (1908: 177-178)

Como ya se ha dicho, el encajonamiento revela la epistemología racionalista de Sechehaye. Es una epistemología en cuanto implica una forma de conocer el mundo, de hecho, la única que permite explicarlo de manera científica. Para Sechehaye, “Los hechos concretos que la ciencia debe explicar nos aparecen siempre como hechos complejos que incluyen diversos órdenes a la vez. Es por tanto necesario distinguir estos diversos órdenes: caso contrario, ninguna ciencia sería posible, puesto que *solo se puede resolver un problema complejo aislando cada uno de los problemas parciales que se puedan discernir*” (1908a: 56 énfasis añadido). Así, el mundo es un conjunto de hechos y fenómenos y complejos (compuestos) que se pueden descomponer en niveles u órdenes que mantienen entre sí una relación de subordinación. Por ejemplo, se puede avanzar inductivamente desde el orden de la vida para pasar al nivel de la química, luego al de la materia, al movimiento, luego a la forma. Esto es central en el PMLT. El encajonamiento sirve para conocer y entender racionalmente los fenómenos del mundo porque es el mismo mundo el que permite que se lo organice de manera jerárquica en niveles progresivamente más generales o más particulares dependiendo de si se avanza en la inducción o la deducción:

Así el conocimiento de un ser organizado y vivo se obtiene mediante la solución de una serie de

problemas de diverso orden y subordinados *naturalmente* los unos a los otros: problema matemático, problema mecánico, problema físico, problema químico, problema biológico. En cada uno de estos órdenes sucesivos vemos aparecer el “novum”, el factor hasta ese momento ausente o escondido, que no era en absoluto necesario para el orden precedente pero que no podría ser concebido sin ese orden como su medio. La vida, las afinidades químicas, la materia, el movimiento, la forma, estas son las realidades sucesivas en el orden de la inducción.

Cualquiera sea la razón última de este encajonamiento en el mundo, debemos aceptarlo como uno de los postulados del conocimiento científico. Se justifica desde el punto de vista crítico si se considera que la subordinación sucesiva de los diversos órdenes es el *único medio* mediante el cual la inteligencia puede capturar una cosa simultáneamente tanto en su complejidad como en su unidad. (1908a: 57, énfasis añadido)

El encajonamiento es entonces un medio, un método que permite conocer el mundo y que a su vez es compatible con la jerarquía de los órdenes y niveles en los que se pueden descomponer fenómenos naturalmente complejos. Sin embargo, la compatibilidad entre el método y el objeto no implica una necesariamente existencia anterior:

¿Hay un encajonamiento real en el orden constitutivo de la naturaleza? ¿Lo hay en el seno del principio primero de todas las cosas? ¿No será que en verdad no tiene nada de real ni de absoluto y que más bien somos nosotros los que, de una u otra manera, añadimos un principio a las cosas a fin de poderlas conocer mejor? Preguntas de metafísica de las cuales podemos desinteresarnos. La ciencia racional del mundo de los fenómenos nunca irá más allá de los confines donde este principio puede ser aplicado. (1908a: 57)

En otras palabras, la validez del principio del encajonamiento se sustenta en su relación con el plano metodológico y el plano epistemológico sin que sea necesario, para la ciencia racional, establecer o demostrar su realidad ontológica: la pregunta por la existencia concreta del principio es metafísica y en último término irrelevante para la ciencia. Pero si la realidad ontológica del encajonamiento no es relevante en la medida en que cumple adecuadamente su función de método, la existencia de las leyes no está en cuestión. Sechehaye comienza su libro distinguiendo entre ciencias de las leyes y ciencias de los hechos, y se refiere repetidamente a leyes psicológicas o psicofisiológicas, leyes fonéticas, leyes evolutivas, etc. Se puede afirmar, entonces, que si bien para Sechehaye la pregunta por la naturaleza ontológica del principio es irrelevante para la ciencia, el principio mismo, el ordenamiento jerárquico de los órdenes del

mundo (y del lenguaje), permite aislar niveles diferentes que responden a leyes diferentes, es decir, niveles *ontológicamente* diferentes. Quizás sea esta la principal diferencia con Saussure y quizás sea esta también una de las causas de las contradicciones que se pueden percibir al leer el CLG.

Si se revisan las notas, cartas y apuntes escritos por Saussure, se puede ver que no llegó nunca al mismo grado de certeza científica de Sechehaye. Saussure fue siempre consciente de la dificultad que representa el problema del lenguaje y de la complejidad que reviste su estudio. Ni siquiera al final de su carrera, en sus tres cursos de Lingüística general, llegó a un punto definitivo de organización de su pensamiento, pues como ya se dijo cada versión contenía cambios tanto en la secuenciación de los contenidos como en los contenidos mismos. Los apuntes compilados en los ELG muestran cómo algunos de los términos más definitorios y famosos del CLG, como por ejemplo *significado/significante o imagen acústica*, fueron antes tentativamente rotulados por el propio Saussure como *kenoma/sema* y *figura vocálica* (entre otras opciones) lo que permite especular que la terminología que finalmente utilizó en sus cátedras de Lingüística General hubiera podido sufrir cambios en caso de que Saussure hubiera vivido unos años más o se hubiera decidido a publicar una obra propia.

Precisamente, es el problema terminológico en la Lingüística uno de los temas que más complicó a Saussure “... what is important is Saussure’s worry that *metalanguage is a source of error*, hence his hesitations about the appropriate technical terminology for linguistics to adopt” (Harris, 2003: 219, énfasis en el original). El tipo de error al que puede conducir el metalenguaje tiene que ver con la confusión de planos o la separación de ellos. Un buen ejemplo de esto es un pasaje de los ELG en que se aboga por la indivisibilidad de la palabra: “...*queda perfectamente claro que no se debe dividir*, y admitir, por un lado la palabra y por otro su significación. Juntas constituyen un todo” (Saussure, 2004: 93, énfasis en el original). Al explicar su distinción entre significado y significante (distinción que por cierto introdujo recién en la tercera y última versión de sus tres cátedras de Lingüística general), Saussure afirmaba que

Anteriormente, entregábamos simplemente la palabra *signo*, lo que se prestaba a confusión. Pero estos términos [*significante y significado*] siguen siendo equívocos. No hemos dado [al introducir significante] con la palabra que nos falta y que designaría sin ambigüedad posible su naturaleza conjunta [su unidad con significado]. Sin importar qué término se elija (*signo, término, palabra*, etc.) seguirá sin dar en el blanco y se correrá el peligro de designar tan solo una parte [del todo]. Es incluso probable que no exista una palabra tal. (Bouquet, 2010: 40-41)

A Saussure le disgustaba la idea de generar un tecnolecto que favoreciera dividir el signo en dimensiones independientes, pero sin embargo esto es algo que se desprende de manera casi natural al leer el CLG. La organización del PMLT, en cambio, se basa sobre la necesidad racional de separar dimensiones de estudio que si bien pueden ser solidarias son no solo divisibles sino que están naturalmente “encajonadas” y delimitadas, porque, como ya se vio, “... solo se puede resolver un problema complejo aislando cada uno de los problemas parciales que se puedan discernir” (Sechehaye, 1908a: 56). En 1891, Saussure, señalaba que “Un día habrá un libro especial, que será muy interesante de escribir, sobre el papel de la *palabra* como principal perturbadora de la ciencia de las palabras” (2004: 148, énfasis en el original). Esta pasaje está inserto en una reflexión en la que plantea que hablar de latín, románico y francés favorece la idea de que existen realmente “cosas” diferentes que son denominadas con palabras diferentes, cuando en realidad solo existe una sola lengua que se transforma y muta en el tiempo. Las palabras latín, románico, y francés son entonces términos arbitrarios que se usan para denominar distintos momentos de la evolución histórica de una misma lengua. La arbitrariedad apuntada por Saussure puede leerse negativamente, es decir, se puede plantear en términos de que no existe una correspondencia *natural* entre la palabra francés y alguna lengua en el mundo que le corresponda. Para Saussure, entonces, uno de los principales problemas de la Lingüística reside en el uso de una terminología que ayuda a la creencia de que los términos arbitrariamente asignados a determinadas dimensiones reflejan en verdad un estado de cosas natural. Dicho de otro modo, el tecnolecto favorece la reificación de fenómenos o niveles que en realidad son parte de un todo indivisible.

En una carta enviada a Meillet en enero de 1894, Saussure se quejaba “...de la dificultad que hay, en general, para escribir diez líneas con sentido común en materia de hechos del lenguaje” (Benveniste, 1964: 95). Explicaba también su desazón por el estado de la terminología lingüística y que “A mi pesar, esto acabará en un libro donde, sin entusiasmo ni pasión, explicaré por qué no hay un solo término empleado en lingüística al que conceda yo un sentido cualquiera. Y confieso que no será hasta entonces cuando pueda reanudar mi trabajo en el punto en que lo dejé” (1964: 95). Por lo demás, sus escritos no dan muestras de un interés importante por la cuestión metodológica (entendida como la búsqueda de un método general para la Lingüística, pues contienen reflexiones que responden más bien a problemas metodológicos prácticos, Estanislao, 2013). A diferencia de Sechehaye, no quería trazar un programa basado en un método definido que estableciera de manera racional la relación entre la Lingüística y las Ciencias Naturales. Su crítica al PMLT se puede interpretar como una aversión a la idea de que la Lingüística quedara enmarcada dentro de la Psicología. Saussure tenía claro

que existía una relación entre Psicología y Lingüística, pero no estaba a favor de subordinar (o encajonar) la disciplina a ella. Al reflexionar sobre la relación entre los estudios lingüísticos y disciplinas como la Etnografía, la Historia y la Psicología afirmaba lo siguiente:

¿piensan ustedes seriamente que el estudio del lenguaje necesita, para justificarse o disculparse por existir, demostrar que es útil a otras ciencias? He comenzado por constatar que cumple ampliamente esta exigencia [la de prestar apoyo y datos a otras disciplinas] y quizá en mayor medida que muchas ciencias, pero no veo, lo confieso, justificación para esta exigencia. ¿A qué ciencia se le pone esta condición preliminar para su existencia, la de comprometerse a entregar resultados destinados a enriquecer otras ciencias que se ocupan de otros objetos? Esto es negarle un objeto propio. Lo único que se puede pedir a las ciencias que aspiran a ser reconocidas es que tengan un objeto digno de atención seria, es decir, un objeto que desempeñe una función indiscutible en las cosas del universo, en el que se hallan comprendidas ante todo las cosas de la humanidad; y el rango que ocupe esa ciencia será proporcional a la importancia del objeto en el gran conjunto de las ideas. (2004: 129-130)

Sin embargo, el hecho de que Saussure abogara por la autonomía de la Lingüística y enfatizara la necesidad de tener un objeto de estudio propio no significa que ese objeto sea fácilmente asible. En una de los pasajes célebres del CLG se puede leer, a propósito las diferencias que hay entre la Lingüística y otras ciencias, que en Lingüística “Lejos de preceder el objeto al punto de vista, se diría que es el punto de vista el que crea el objeto, y, además, nada nos dice de antemano que una de esas maneras de considerar el hecho en cuestión sea anterior o superior a las otras” (Saussure 1945: 36). Es el mismo Saussure, esta vez de puño y letra, el que reafirma esto: “¿Hay un objeto primero e inmediato, un objeto dado ante el que se encuentra la lingüística, un conjunto de cosas que aparezcan ante los sentidos, como en el caso de la física, la química, la botánica, la astronomía, etcétera? De ningún modo y en ningún momento: se sitúa en el extremo opuesto de las ciencias que pueden partir de los datos de los sentidos” (Saussure, 2004: 25). Esta clase de afirmaciones son inconcebibles en la epistemología de Sechehaye, para quien el método garantiza el hallazgo de leyes que pueden ser abstractas, pero que son reales, tienen una existencia innegable que se apoya en la naturaleza psicofisiológica de la gramática y constituyen en último término el verdadero objeto que debe preocupar a la Lingüística.

Una última y muy reveladora divergencia entre Saussure y Sechehaye tiene que ver con la célebre dualidad *sincronía/diacronía*. Al revisar las tres conferencias que Saussure dictó en 1891 a su llegada a la Universidad de Ginebra, contenidas en Saussure (2004), se puede ver

cómo destaca el carácter histórico de las lenguas, cómo enfatiza la importancia de las transformaciones inherentes al uso, señalando la inutilidad de inquirir por un estado “original” y resaltando el sinsentido de hablar de génesis y extinción en Lingüística (de manera absolutamente paradójica, en estas conferencias Saussure defiende argumentos muy similares a algunos de los que emplearía luego Voloshinov, 2010 [1929], para atacar la postura de... Saussure). Todo esto en el marco de una discusión que apunta a refutar el postulado de que las lenguas “nacen” y “mueren” tal como ocurre con las especies del mundo natural. Su insistencia en la historicidad y el flujo se debe a su rechazo a la concepción biologicista y orgánica de las lenguas que caracterizó a los comparativistas. Dentro de esta lógica, su distinción entre lo diacrónico y lo sincrónico puede perfectamente ser considerada como una distinción operacional (e incluso metodológica, pero en un sentido práctico) que permite ordenar el estudio de un fenómeno naturalmente complejo, pero esencialmente indivisible que se caracteriza por avanzar necesariamente en el tiempo siguiendo el “...principio elemental y esencial de la *continuidad* o de la *ininterrupción* forzada, que es la primera característica o la primera ley de la transmisión del hablar humano” (2004: 136, énfasis en el original).

Sechehaye, en cambio, organizó en gran medida su obra para objetar el protagonismo que tenían los factores históricos en el estudio de las lenguas y el lenguaje. No escribió para refutar a los comparativistas, sino a los neogramáticos, y por todo lo expuesto anteriormente queda claro que privilegió siempre el estudio de lo atemporal por sobre lo contingente, de la ley general por sobre el hecho histórico particular. Su forma de concebir lo “estático” y “evolutivo” le permite delimitar ámbitos que si bien son solidarios deben ser estudiados por disciplinas diferentes y mantienen entre sí una relación de encajonamiento. En otras palabras, allí donde Saussure propone una separación operacional que ayuda a ordenar el estudio del lenguaje y las lenguas, Sechehaye plantea una separación ontológica basándose en principios racionalistas y positivistas. Para los lectores familiarizados con el CLG, resulta fácil ver que es esta segunda forma de entender la dualidad la que más aparece respaldada en el libro. Corresponde, además, a la interpretación más habitual del CLG y aquella que favorece la idea de un sistema o una “estructura” autónoma, atemporal y abstracta.

A casi cien años de la publicación del CLG, determinar el verdadero origen de algunas de las nociones centrales del libro no altera en nada su importancia. Ya sea pertenezcan a Saussure, a Sechehaye, a Durkheim o a Whitney, algunas de las nociones fundamentales del Cours tuvieron una repercusión enorme tanto en la Lingüística como en otras disciplinas. Sin embargo, la historia del CLG está plagada de malentendidos, confusiones y contradicciones, muchas de ellas probablemente generadas por una suerte de dualidad presente en la obra. Nada

ilustra mejor esto que la recepción del libro en Rusia, donde fue recibido calurosamente primero como un texto antipositivista para ser luego ser célebremente criticado por su “objetivismo abstracto” y su filiación racionalista (Voloshinov, 2010 [1929]). Si se lee con atención lo que Saussure efectivamente escribió y no lo que se le imputa, se puede ver cómo en el CLG se presenta un Saussure cuya voz se mezcla, coincidiendo a ratos y divergiendo en otros, con la voz del mismo Saussure. Por lo discutido aquí, esa primera voz puede perfectamente ser la de Sechehaye.

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