# Always look back: Eye movements as a reflection of anaphoric encapsulation in Spanish while reading the neuter pronoun *ello*

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## ARTICLE INFO

## ABSTRACT

Eye movements constitute an important cue to understanding how readers connect textual information, particularly when an encapsulator pronoun must be anaphorically resolved in order to construct a coherent mental representation of the text being read. While existing research into anaphoric reference has predominantly focused on the distance between pronouns and referents and on their morphosyntactic features, no previously published studies have addressed the effect in causal contexts of varying extensions of the referent being encapsulated by a neuter pronoun. In the present research, we help fill this gap by studying the effects of online processing of the anaphoric neuter Spanish pronoun *ello* ('this' in English) in causally-related texts using two varying referent extensions: short and long antecedent. A one factor repeated measures design was implemented. The results of three eye reading measures showed a fine-grained picture of encapsulation processes for seventy-two Chilean university students as they each read twelve texts. On the one hand, the reading times for processing the neuter pronoun *ello* AOI did not show statistically significant differences between the short and long conditions. On the other, the findings indicate that, in constructing referential and relational coherence in causally-related texts in Spanish, resolution of the neuter pronoun is in fact influenced by the extension of the referent.

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## 0. Introduction

Discourse comprehension, or the process of constructing a mental representation during reading based partially on textual information, requires, among many other abilities, that the reader be able to connect text-based information. This is not always clearly guided by linguistic resources or signals, which may encompass varying textual distances between, for example, the target word and its previous disambiguating antecedent (Carpenter and Just, 1977; Rayner and Ehrlich, 1983). At the same time, the reader also faces the challenge of not knowing exactly the amount of text information that must be retained in memory when moving forwards or backwards in order to elucidate the referential connection between, for

example, the neuter Spanish pronoun *ello* ('this' in English) and phrases or sentences that may act as its referent. Consider the following two examples, in which (1) is a short antecedent (one causal clause), and (2) is a long antecedent (two causal clauses):

(1) José y Andrés hacen poco ejercicio. Por ello están gordos.
   (José and Andrés don't take much exercise. As a result of this, they are fat.)
(2) José y Andrés hacen poco ejercicio. Comen muchos dulces. Por ello están gordos.
   (José and Andrés don't take much exercise. They eat a lot of sweets. As a result of this, they are fat.)

In contrast to the extensive literature on the processing or resolution of anaphoric or co-referential links (personal and demonstrative pronouns) (i.e., Brown-Schmidt et al., 2005; Byron and Allen, 1998; Carreiras and Clifton, 2013; De Cock and Kluge, 2016; Ehrlich, 1980; Fretheim et al., 2010; Grosz et al., 1995; Hogeweg and de Hoop, 2015; Mitkov, 2002, 2009; Van Gompel, 2013), neuter pronouns, such as *ello* in Spanish, have received almost no attention as encapsulator anaphors (Sinclair, 1994; Tadros, 1994) in psycholinguistics and computational linguistics studies. This is possibly due to the fact that *ello* is less common than personal pronouns in both written and spoken texts (Fernández, 1999; De Cock, 2011, 2013). It is also surprising that, even though anaphoric discourse relations have been among the most widespread research areas over the last five decades (i.e., Asher, 1993; Clark and Sengul, 1979; Clifton and Ferreira, 1987; Cornish, 1999; Ehrlich and Rayner, 1983; Garnham, 1999), empirical and experimental studies, particularly employing eye tracking techniques, focusing on the processing of neuter pronouns as encapsulators and with varying degrees of referent extension (i.e., number of words or clauses being encapsulated) are nonexistent. Interestingly, there is also limited research on the descriptive or analytical textual approach to the Spanish neuter pronouns *esto, eso, aquello* (this, that, those) (De Kock, 1997; Pérez, 2014; Pomino and Stark, 2009; Zulaica, 2007; Zulaica and Gutiérrez, 2009) and even fewer studies are devoted to *ello* (De Cock, 2011, 2013, 2016; Montolío, 2013; Moreno, 2004).

However, recent findings reported by Parodi and Burdiles (2016, 2017, 2018) in a number of large corpus-based studies on disciplinary written genres have found that these pronouns (*ello, esto, eso* and *aquello*) tend to occur in a much higher proportion in causal contexts and when encapsulating large previous text segments. These segments may include a clause, a clause complex, or even what they have named Clausal Group, which may comprise one or two paragraphs. Their findings indicate that — on descriptive grounds — these pronouns are used regularly across genres in systematic constructions of referential and relational coherence. Yet, it remains unclear whether a uniform dimension such as salience, activation, or expectancy (Ariel, 1988, 1999; Mitkov, 2002) may be independently sufficient to account for how different referring expressions are processed. Evidently, grammatical features associated with pronouns, such as gender and number agreement and selectional restrictions, among others, influence reference resolution (Ariel, 1990; Cornish, 1999; Mitkov, 2009; Rayner et al., 2012).

In this vein, the goal of the present study is to evaluate whether the extension of the referent affects the processing of causally-related texts in Spanish (texts composed of a cause discourse segment and a consequence discourse segment). In particular, our interest lies in exploring a neglected area of research by focusing on whether using a short or long antecedent leads to different reading patterns to do with neuter pronoun *ello* resolution in causally-related texts. In order to achieve this objective, we designed an experimental study with seventy-two Chilean university students employing eye tracking technology.

The article is organized as follows. In the first section, which presents the theoretical framework, we review some relevant issues concerning referential and relational coherence of the pronoun *ello*, and briefly discuss the encapsulation role of pronouns. In Section 2, we describe the methodology, focusing on the experimental design, participants, material, and procedures. Section 3 presents the results. Finally, in Section 4, we summarize the results and discuss the findings, highlighting avenues for further research.

## 1. Pronoun encapsulation with the neutral pronoun *ello*

Encapsulation is a text mechanism of cohesion and coherence through which the meaning of textual segments is condensed or labeled, establishing a process of reference and substitution by another textual element (Halliday and Hasan, 1976). Encapsulators contribute to textual thematic progression and to referential maintenance. They also guide comprehension by converting the encapsulated information into a shared knowledge available to the reader (Cornish, 1999; Prandi, 2004; Sinclair, 1994). Encapsulated text segments may be presented in preceding or subsequent textual units; consequently, an encapsulator may function cohesively as an anaphora or a cataphora (Halliday and Hasan, 1976).

In his seminal studies, Sinclair (1993, 1994) identifies the mechanism of encapsulation, names it thus, and establishes a distinction between 'encapsulation' and 'prospection', being equivalent to anaphoric and cataphoric relations respectively. Francis (1994) refers to encapsulating nouns in general as 'discourse labels', having previously called them 'anaphoric nouns' (Francis, 1986). In terms of 'prospection', Tadros (1994) puts forward an English language taxonomy of prospective rhetorical elements involved in what she terms 'prediction'.

The specialized literature contains much debate concerning the types of unit that can be grouped together into the category of encapsulators (Ariel, 1988, 1991; Borreguero, 2006; Cornish, 1999; Figueras, 2002; González-Ruiz, 2009; Halliday and Hasan, 1976; Llamas, 2010; López Samaniego, 2011; López Samaniego and Taranilla, 2014; Montolío, 2013, 2014; Prandi, 2004; Schmid, 2000; Sinclair, 1993, 1994). In Spanish, these units may be equal to or greater than a noun phrase or a clause.