Case study on the processing effort of neonyms, neologisms and non-neological units[1]

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Case study on the processing effort of neonyms, neologisms and non-neological units

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Abstract

This article presents evidence on the effort required to process neological units belonging to a specific domain of expertise by subjects who are specialists in other domains. In this pre-experimental design, reaction times (RTs) and accuracy rates were measured on a group of native Spanish speakers with expertise in fields other than political science, in line with the design of Suárez et al. *(in press). This study provides empirical evidence regarding the processing of neonyms by participants who are specialists in other domains, in relation to general language neologisms and non-neological units. In this respect, it allows us to contrast the results obtained with those reported in the study by* Suárez et al. *(in press), providing evidence confirming that the processing effort is related to the individuals' linguistic experience, allowing the use of different cognitive mechanisms according to the degree of proximity or distance with respect to the lexicon under study.*

KEYWORDS: *experimental neology; processing effort; neologisms; neonyms; political science*

Resum

Estudi del cas sobre l'esforç que comporta el processament de neònims, neologismes i unitats no neològiques

Aquest article presenta evidències sobre l'esforç de processament d'unitats neològiques que pertanyen a un domini d'expertesa per part de subjectes especialistes en altres dominis. En aquest disseny preexperimental, es van mesurar els temps de reacció (RT) i les taxes de precisió en un grup d'hispanoparlants nadius, amb experiència en camps diferents de la ciència política, d'acord amb el disseny de Suárez et al. *(en premsa). Aquest estudi aporta evidència empírica sobre el processament de neònims per part de participants especialistes en altres àmbits, en relació amb els neologismes lingüístics generals i les unitats no neològiques. En aquest sentit, permet contrastar els resultats obtinguts amb els proposats en l'estudi de* Suárez et al. *(en premsa), aportant evidències per afirmar que l'esforç de processament està relacionat amb l'experiència lingüística dels individus, la qual cosa permet l'ús de diferents mecanismes cognitius segons el grau de proximitat o distància amb el lèxic objecte d'estudi.*

PARAULES CLAU: *neologia experimental; esforç de processament; neologismes; neònims; ciències polítiques*

1 Introduction

Cabré (2002) defines neology as the phenomenon of lexical innovation that introduces units or other new linguistic resources into a language that can be created by taking advantage of the internal resources of the language itself or by borrowing from other languages.

However, in this lexical innovation, Guerrero Ramos (1995) infers that the main characteristic of neology and neologisms is the notion of novelty. This coincides with what was stated by Cabré (2015), who affirms that a neologism is a complex object given its instability and its character of novelty and that it should be analyzed from various perspectives: linguistic, morphological, semantic, and cognitive. Similarly, Freixa Aymerich (2010) affirms from an objective perspective that novelty refers to the real and documentable certainty of the first appearance of a lexical unit and that this is related to the subjective feelings of the speaker, that is to say, to the perception that the lexical unit is of recent appearance.

Addressing this particularity requires ongoing research, aiming to delve deeper into methodologies that enable us to gain a comprehensive understanding of how the processing of lexical units facilitates the accurate identification of novelty for neology and neonymy.

In recent years, authors such as Varo (2013) and Llopart-Saumell *et al.* (2014) have been interested in studying neologisms from an experimental approach, which is a significant factor in the characterization of neology. With this approach, an attempt is made to deepen our understanding of how the users of a language do or do not manage to recognize new words in certain contexts based on their *processing effort*, which forms part of the cognitive effort (Todd and Benbasat, 1991). In fact, a greater effort has been demonstrated in the processing of neologisms as compared to non-neological units in a Spanish-speaking sample (Peninsular variant) (Llopart-Saumell *et al.*, 2014). Likewise, Suárez, Suaza and Calvache (in press), in line with the design of Llopart-Saumell *et al.* (2014), explored the cognitive effort invested in processing Spanish neonyms, neologisms and non-neologisms from the domain of the negotiation and implementation of the peace agreement process in Colombia by specialists in the field of political science. They used a single measurement of reaction times (RTs) and error rates on a group of thirteen native Spanish speakers and concluded that specialists in the field of political science showed lower RTs when processing neonyms in contrast to neologisms and non-neological units, which presented higher RTs. The processing effort coincides with the results stated above, that is to say, the participants made less effort in the processing of neonyms, in contrast to the processing of neologisms and non-neological units. This study also concluded that the perception of the novelty of the lexical unit

is not directly correlated with the processing effort because it showed higher RTs and, therefore, the lexical decision was made more slowly; however, this slowdown did not influence the recognition of novelty.

Based on the authors' recommendations of precedent study, the present pilot case study involves three specialists from domains other than political science. The main objective is to account for the processing effort of lexical units by designing an experimental protocol with neonyms, neologisms and non-neologisms and by determining the reading level (*e.g.* Cassany, 2004) of participants, so that the data obtained can be correlated with intervening variables such as reading performance.

2 Theoretical framework

2.1 Neology and neonymy

Neology is a necessary dynamic phenomenon for the evolution of languages and their adaptation to new realities (Suárez de la Torre, Giraldo Ospina, and Calvache Dulce, 2019). Cabré (2002) defines it as the phenomenon of lexical innovation that introduces a unit or other new linguistic resource into a language, created by taking advantage of the internal resources of the language itself or by borrowing from a foreign language. The lexical units resulting from this creation process constitute a manifestation of enunciation from an individual or collective conscious or unconscious speech act (Boulanger, 2010).

In this respect, Varo, Díaz, and Paredes (2009) define neologisms as the product resulting from the process of linguistic innovation, which can be recent in signifier and signified, or only in its signifier or only in its meaning, or which can be taken from another language. In this regard, Cabré (2015: 71) affirms that neologisms are complex objects given their instability and relative novelty. Therefore, neologisms should be analyzed from various perspectives, e.g. linguistic, morphological, semantic and cognitive.

Indeed, as stated by Guerrero Ramos (1995), the main characteristic of neology and neologisms is the notion of novelty. On the one hand, from an objective perspective novelty refers to the real and documentable certainty of the first appearance of a lexical unit, and on the other hand novelty is related to the subjective feelings of the speaker, that is, the perception that the lexical unit is of recent appearance (Freixa Aymerich, 2010).

Accordingly, Vega Moreno and Llopart Saumell (2017) state that, although the notion of novelty has a degree of theoretical solidity, its identification by the speakers is not evident, which makes it difficult to determine which units are new in the language and, therefore, neological.

Traditionally, there is consensus on the detection of the character of novelty, but not on its scope (Estornell Pons, 2009). Novelty is usually established from the documentation of the lexical unit in a dictionary. In this respect, there are criteria allowing neological detection, namely: *tangible criteria* such as temporal, lexicographic (or textual) and instability criteria; and *cognitive criteria*, which include psychological detection and are based on the perception of novelty on the part of speakers (Cabré, 1993; Estornell Pons, 2009; Sablayrolles, 2009; Vega Moreno and Llopart Saumell, 2017). Studies carried out on the "neological feeling" (Gardin, 1974; Sablayrolles, 2009) have yielded hardly conclusive results and have shown that the perception of novelty varies according to the processes of neological formation. In addition, they point out that when the subjects fail to perceive novelty, the lexical units become predictable due, on the one hand, to the familiarity of the affixes established in the nominal or verbal bases and, on the other hand, to the fact that the previously established structures in language hinder such a sense of novelty, even when the lexical items are read or heard for the first time.

2.2 Neology and cognition: Elements for a neurocognitive approach to neological usage

Lamb's (1999) and Pulvermüller's (2005) studies on the organization of linguistic knowledge as interconnected neural networks give rise to a neurocognitive approach to neology. This perspective offers a more flexible understanding of words as elements with a dual formal and semantic structure, benefiting from a lexical reconstruction mechanism guided by linguistic analysis systems and influenced by contextual factors, particularly frequency. This approach explains the prevalence of neological procedures in languages and the uniqueness of their modalities.

The theoretical framework for this neurocognitive approach to neology is rooted in the Hebbian concept of cell assemblies (Hebb, 1949), which refers to extended neural networks repeatedly activated during specific mental processes. It represents a reconciling position between holistic views and localized perspectives on brain functions. Furthermore, it has inspired models of conceptual processing attractors, as proposed by Cree, McRae, and McNorgan (1999), and by Rabovsky and McRae (2014).

In the realm of language, the *associative network model*, initially advocated by Lamb (1999, 2004) as an abstract model of linguistic knowledge organization, is supported by its plausibility in terms of real-time language processing, language acquisition, and the mental and cerebral organization of linguistic knowledge. Lamb (1999) emphasizes the need for a realistic theory of language that not only accounts for the production and comprehension of linguistic systems, but also considers the additional requirements of real human beings and their relationship with language.

The relational or associative network approach challenges the conventional acceptance of encapsulated cognitive functions and focuses on the strength of neural connections. It is based on the notion of a minimal unit of information processing in the cognitive network, consisting of junction and branching nodes, with the activation of cortical areas attributed to their neural correlates (Mountcastle, 1998).

The *functional web model*, proposed by Pulvermüller (2005), among others, serves as a foundation for understanding brain plasticity and learning. These models highlight the existence of an associative memory distributed across specific sets of cortical areas, forming a functional unit that incorporates correlational learning principles based on the activation of global network properties.

Neurocomputational simulation models, such as those developed by Lansner, Fransén, and Sandberg (2003), and Brouwer *et al.* (2017), replicate certain aspects of cortical anatomy constituting neuronal representations of functional entities, such as words.

These approaches reintroduce a compositional interpretation of linguistic units, particularly one based on feature concurrence and frequency (Devlin, 2002), emphasizing the strength of connections. According to Varo (2020), this perspective moves away from the notion that lexical production or comprehension involves accessing or retrieving static content selected from a predetermined set of possibilities. Instead, the associative strength arises from the interaction between features in usage contexts and the experiential aspects of the referents involved, allowing for the flexible prominence of each feature and simultaneous categorizations.

However, challenges remain, such as the assumption of relevant features and their nature, the effect of feature distance as a predictor of spontaneous speech errors, and the explanation of the integration of multimodal conceptual information into abstract semantic representation (Vinson, Ponari, and Viglioco, 2014). As a consensus solution to these issues and the controversy surrounding compositional lexical retrieval models, alternative approaches, like the *distributional models* inspired by Firth (1957), have gained prominence. These models prioritize word relations and statistical distribution in the language. The meaning of a word ultimately depends on the most frequent usage contents.

Varo (2020) claims in her study that one prominent representative of this perspective is *latent semantic analysis* (LSA), which posits that semantically related words tend to co-occur in similar contextual environments (Landauer and Dumais, 1997). This approach aligns with current neurocomputational models of processing that demonstrate how correlation-based learning algorithms can identify frequently combined elements. The co-occurrence of participating elements in new formations, as a foundation of neurocognitive approaches to neology, explains the efficacy of lexical creation and recognition as integral mechanisms of linguistic abstraction, generalization, and symbolic combination.

However, issues such as formulating processes for configuring linguistic knowledge and the role of sensorimotor-derived features in these processes remain unresolved. As a possible solution, combining compositional and distributional perspectives becomes feasible, allowing the inference of the most relevant properties of each neological usage based on its semantic and conceptual associations and combinatorial relationships with other lexical units or formations possessing contextually accessible features.

Assuming that individuals do not work with prestored units during linguistic processing (Lamb, 1999: 375), the phenomenon of neology perfectly accounts for the flexibility and dynamism inherent in lexical innovation processes. As a neurocognitive support for the formal and semantic creativity processes that arise in our daily communication, some aspects are highlighted. Firstly, there is dynamic focalization, which plays a role in the construction and interpretation of discursive meaning and serves as a pillar for pragmatic enrichment. In fact, although it may originate unconsciously or automatically (alert neural circuits), once the novel element is detected and, as a result, sensory and information processing resources are activated (orientation neural circuits), it becomes a conscious or controlled process linked to executive capacities (executive attention neural networks) (*cf.* Posner, Rueda, and Kanske, 2007).

According to Varo (2020: 27), it is undeniable that meaning emanates from relationships with other mental representations derived from our interaction with the world, as evidenced in the phenomenon of neology. In neology, sensory, episodic and linguistic experiences contribute to the creation of new modes of interpretation that push the versatility of language to extremes, supported by mental imagery and linguistic changes and adjustments. This is reflected, for example, in the pronounced preference for certain compositional elements, especially learned ones, which have significantly increased in recent decades. These tendencies allow for the delineation of sociocognitive profiles related to prioritized experiential spheres such as health, well-being, technology, and socio-economic functioning.

Lastly, delving deeper into the phenomenon of neology prompts a reflection on the levels of meaning from the perspective of the neurocognitive dimension of the lexicon. As we have seen, neological usages are situated within the realm of speech and should be analyzed as acts of designation materializing in senses. The potential evolution of these senses into meaningful facts through processes that begin with perception, pass through categorization and culminate in semanticization.

2.3 Word recognition models: Lexicon-based models versus learning-based models

There are word recognition models which differ from each other. Some of them represent traditions from a morphological processing perspective (*lexicon-based models*); that is, the way in which morphological units are discriminated against in the recognition of whole words. Others come from a tradition based on learning (*learning-based models*), that is, lexical units are conceived as complete units in which form and meaning are combined (Milin, Feldman, and Smolka, 2018).

Historically, the most highly considered models have been those based on morphological processing, assuming the explicit representation of morphemes and the morphological structure of the word. However, the most distinctive alternative model is the one based on learning that seeks to describe morphological effects in terms of jointly processed patterns of form and meaning.

Within the framework of learning-based models, there are other connectionist models, namely: the *parallel distributed processing* (PDP) model (Gonnerman, Seidenberg, and Andersen, 2007; Rueckl and Raveh, 1999; Seidenberg and Gonnerman, 2000), which tends to present word-specific lexical events when words are presented in isolation and separately; and the *naive discriminative learning* (NDL) model (Baayen *et al.*, 2011, 2015), which seeks to understand and explain the dynamics of language through the discrimination of its contrastive properties instead of the "content" of the representations (Milin *et al.*, 2018). Both models make it possible to quantify the processing effort resulting from a systematic mapping between form and meaning.

However, as Coltheart *et al.* (2001), Coslett (2003), and Ellis and Young (1988) state, studies on the cognitive processes in the visual recognition of an isolated word have considered two processing mechanisms: a lexical pathway, and a sublexical or phonological pathway. Both the lexical and phonological pathways are set into operation during the presentation of a "written" visual stimulus. Nevertheless, it appears that both pathways contribute differently, depending on the type of stimulus. In this specific case, this depends on whether it is a new lexical unit or not; on whether there is a certain degree of familiarity to determine "novelty"; on whether the lexical unit is specialized or not and, lastly, on whether those who do the reading are considered "beginner" or "advanced" readers (Adelman *et al.*, 2014; Andrews, 2012).

To study these two types of mechanism and their interaction, the most analyzed effects in research related to the visual lexical decision paradigm are *lexicality* and *frequency*. In this study, these effects are represented as follows: lexicality (neonyms are recognized more quickly than neologisms and non-neological units), and familiarity or frequency (both closely related, since lexical items that are more familiar to the reader, and therefore more frequent, are recognized more quickly than units that are less familiar, and therefore less frequent). In addition to this, it may be considered for the purposes of this study that the character of "novelty" is not proportional to such an effect of familiarity and frequency, an aspect that will be discussed later.

These two mechanisms or processing pathways have given rise to two types of hypotheses to account for access to the meaning of lexical units during silent reading:

- Direct access hypothesis (Seidenberg, 1985), which postulates access to the lexicon first and, only after that, to phonology. In other words, the phonological component occurs in the silent reading of isolated lexical units once access to the meaning has been achieved.
- Phonological mediation hypothesis (Van Orden, 1987), which, contrary to the previous hypothesis, considers the phonological component *a sine qua non* condition to gain access to meaning. This implies an automatic activation of phonology (Berent and Perfetti, 1995), an activation that occurs before gaining access to the lexicon.

It should be noted that, although research highlights the central role of the phonological component during the processing of lexical units or in visual lexical decision tasks (Frisson *et al.*, 2014), the evidence is still inconclusive as to the existence of such activation in "advanced" or "expert" readers.

Regarding these models and within the framework of studies on neology, Varo (2013: 134) points out two positions related to what has been previously stated: a model known as the *exhaustive list hypothesis* or strategy (Butterworth, 1983; Dell and O'Seaghdha, 1992), and the *partial list hypothesis* (Taft and Forster, 1975). In the first, the complete word becomes the storage and access unit, while in the second this unit is not the word, but the morpheme. That is, morphemes have their own input representation during processing and, consequently, the word completely loses its leading role in lexical recognition (Varo *et al.*, 2009).

In this regard, Varo, Díaz, and Paredes (2009) show that both positions allow each individual to process derived units (in the case of formal neology). Before gaining access to the lexicon, morphological segmentation occurs, which leads to a greater processing effort. From this perspective, the aforementioned authors express their dissatisfaction with both positions since neither manages to define the morphological effects of the semantic and phonological complements.

An alternative which provides a solution to these conflicting models is the *dual access model* proposed by Burani and Caramazza (1987), in which lexical access does not begin with a morphological segmentation, but with the complete word which, in turn, activates the root entry; "activation that spreads to all access

units that share the root morpheme" (Varo, 2013: 135). In addition, the authors state that since formal neologisms do not have a previous lexical representation, this processing is only feasible if criteria such as familiarity in the morphological structure of the lexical unit and the possibility of semantic-conceptual association are presented. This is complemented by other dual models (Feldman, 1994) which suggest that these morphological aspects should be analyzed together with lexical aspects.

2.4 Reading comprehension

Reading comprehension is a fundamental aspect of information processing, encompassing skills such as analysis, imagination and deduction (Arándiga, 2005). It is a crucial tool for accessing knowledge and culture in academic settings, allowing individuals to search, locate, and analyze information in diverse texts and media. Strong reading comprehension skills are essential for problem-solving, data analysis, and overall enjoyment of reading. By establishing connections with prior knowledge, reading comprehension facilitates the consolidation and construction of meaningful learning based on preexisting cognitive frameworks (Ausubel, Novack, and Hanesian, 1983).

According to Bormuth, Manning, and Pearson (1970), reading comprehension is understood as the "set of cognitive skills that allow an individual to acquire and display information obtained from reading printed language". On the other hand, Solé (1996), Díaz Barriga and Hernández Rojas (2001), and Pérez (2005) expand the concept of reading comprehension by considering it as an interactive process between the reader and the text, in which the reader aims to fulfill the objectives that guide their reading, and the meaning of the text is constructed by the reader's active involvement.

Therefore, according to Arándiga (2005), reading comprehension can be approached from two perspectives: as a product and as a process. As a product, it is understood to be the result of the interaction between the reader and the text, stored in long-term memory (LTM) through knowledge schemas (*e.g.* Anderson and Pearson, 1984), and evoked when elucidating questions about the reading material. In this perspective, LTM and information access routines are important for successful comprehension. On the other hand, reading comprehension also involves a gradual and progressive non-linear process in which different moments of understanding are experienced. This dynamic process entails accessing information and acquiring new knowledge (Arándiga, 2005).

2.4.1 Reading comprehension models

In recent years, various explanatory models have been proposed regarding reading as a cognitive process. These include perceptual perspectives (Orton, 1937) as well as information processing-based approaches such as the so-called *bottom-up models* (*e.g.* Perfetti and Hart, 2002). These models focus on the processing of reading based on linguistic segments like letters, words, and phrases in an upward process that enables the reader to comprehend the text. They also require proficient decoding skills, where the reader has effectively consolidated *grapheme-phoneme correspondence* (GPC) rules and can allocate the resources of their working memory to the comprehension process.

On the other hand, in the *top-down reading models* (*e.g.* McClelland and Rumelhart, 1981), cognitive processing occurs in a downward manner, that is, relying on the reader's prior knowledge of reading and global word recognition. These models have given rise to others, such as the *interactive* or *mixed model* (*e.g.* Solé, 1996), which combines both theoretical approaches that contribute to reading comprehension. In this sense, both accurate reading (decoding – phonological access) and providing knowledge to understand and activate the meaning of words through the lexical route are equally important.

Other cognitive models of reading comprehension (routes to meaning and syntactic and semantic processing) have been proposed by Rumelhart (1980), Cuetos (1991), and Cuetos, Rodríguez, and Ruano (1996), among many others.

2.4.2 Levels of reading comprehension

Different authors (*e.g.* Kintsch, 1998; Arándiga, 2005) suggest that there are various factors that determine a person's level of reading comprehension. These factors include the reader's decoding skills, linguistic competence and domain knowledge. Other variables may include the level of prior knowledge about the reading topic, proficiency in reading comprehension strategies, interest in reading, and the psychophysical conditions of the reading situation, among others. Additionally, there are also modulating variables of reading comprehension such as age, education level, gender, and time spent on reading (Martín, 1999). All of these factors, albeit in different ways, play a relevant role in reading.

Research conducted by Cassany (2004), Castillo López (2015), Pérez (2003), and Tapia and Luna (2008) provides evidence of the existence of different levels of reading comprehension. Considering comprehension as a process of interaction between the text and the reader, various authors, such as Strang (1965), Jenkinson (1976), and Smith (1989), describe different levels of comprehension, namely: literal, inferential and critical comprehension.

In literal comprehension, readers identify phrases and keywords in the text, understanding its content without actively engaging their cognitive and intellectual abilities. This involves reconstructing the text while acknowledging its basic structure. At this level, there are two sub-levels: primary literal reading, which centers on explicitly stated ideas and information through fact recognition; and deep literal reading, where the reader engages in a more thorough understanding, recognizing unfolding ideas and the main theme.

On the other hand, at the inferential comprehension level, readers delve into and understand the network of relationships and associations of meanings that allow them to read between the lines, presuppose, and deduce the implicit. That is, they seek relationships that go beyond the text, explain it more extensively, incorporate previous information and experiences, and connect what is read with prior knowledge by formulating hypotheses and generating new ideas. The goal of the inferential level is to draw conclusions. It promotes the connection with other fields of knowledge and the integration of new knowledge as a whole.

Lastly, the critical comprehension level is the highest level of textual understanding. It requires a high degree of expertise to make value judgments about the text. At this level, one can even elucidate the thoughts and emotions of those who are the protagonists of the writing (Cubides, Rojas, and Cárdenas, 2017). In critical comprehension, readers engage in deep analysis and evaluation of the text, examining its underlying assumptions, biases and implications. They question the author's perspective, evaluate the evidence presented and consider alternative viewpoints.

The levels of reading comprehension are closely linked to the concept of critical reading as a *broad competency* introduced by the Colombian Institute for the Evaluation of Education (ICFES, in its Spanish acronym). This institute is responsible for creating the standardized Saber tests to assess reading abilities in Colombia. According to the Saber tests, critical reading is defined as a comprehensive set of interconnected knowledge, skills, attitudes, and cognitive, socio-affective and psychomotor abilities. Importantly, critical reading is not limited to specific academic or professional domains but can be applied across diverse contexts. It involves the ability to go beyond surface-level understanding, to question information, to evaluate it from multiple perspectives, and to interpret it critically.

2.4.3 Relationship between reading comprehension level and word recognition

The relationship between an individual's reading level (literal, inferential, or critical) (Kintsch and Van Dijk, 1978) and their performance in recognizing new words can be influenced by various cognitive and linguistic factors, as suggested by several authors such as Fajardo Hoyos, Hernández Jaramillo, and González Sierra (2012), and Balbi, Cuadro, and Trías (2009), among others.

For instance, readers with higher levels of comprehension tend to have greater prior knowledge and greater ability to contextualize information (Perfetti and Stafura, 2014). This can facilitate the recognition of new words, as they can use their knowledge and context to infer the meaning of unfamiliar words based on their experience or based on contextual cues provided in a text.

Furthermore, these readers often excel in making inferences (Cunningham and Stanovich, 1997; Nation and Snowling, 2004). This implies that they can use linguistic and conceptual cues to infer the meaning of unknown words. For instance, they can analyze the word structure, search for familiar roots or prefixes, or relate the new word to familiar concepts.

Lastly, when it comes to specialized topics such as technology, medicine, or political science, the recognition of new words can be closely related to the level of knowledge and familiarity with the specific vocabulary of the subject (Suárez, Suaza, and Calvache, in press; Anderson and Freebody, 1981; García and Cain, 2014). Readers with a critical level of reading comprehension often have greater exposure to and understanding of specialized terms, which gives them an advantage in recognizing and understanding new words within that context.

All in all, readers with a higher level of inferential or critical reading comprehension may have an advantage in recognizing new words, not only from general discourse, but also associated with specialized language, as is suggested by the insights provided by various researchers regarding reading levels and word recognition (*e.g.* Fajardo Hoyos, Hernández Jaramillo, and González Sierra, 2012; Balbi, Cuadro, and Trías, 2009; Perfetti and Stafura, 2014).

3 Methodology

This exploratory study involves a pre-experimental design (Campbell and Stanley, 1966) with a correlational scope. Relationships as well as causal incidences of independent and intervening variables (nature of the lexical unit and reading level) on dependent variables (reaction times [RTs], and accuracy rates) were determined. Consequently, a pilot case study was conducted with a single measurement that consisted of presenting a stimulus to a group of participants and, subsequently, measuring the variables to observe the group's performance against these variables.

In this regard, measurements were carried out based on three types of information: reaction times (RTs),

which refer to the milliseconds elapsed from the presentation of the stimulus to the participant's executed decision; accuracy rates, which refer to the percentage of accurate and inaccurate responses; and the level of reading comprehension, which reflects the subjects' reading performance in levels 1 to 4.

For this purpose, the following hypotheses were formulated:

1. Regarding reaction times (RTs), neonyms will have higher RTs than neologisms, and both neologisms and neonyms will have higher RTs than non-neological units. Cases of lower RTs will indicate less processing effort, while higher RTs will indicate greater processing effort.
2. Regarding accuracy rates, specialists from other domains (SOD) will have less accurate responses in perceiving novelty in neonyms than in neologisms, and, in turn, more accurate responses in perceiving novelty in non-neological units than in neologisms and neonyms.
3. Regarding reading comprehension level, specialists from other domains (SOD) with a higher reading level will have lower reaction times (RTs) and lower error rates in relation to the nature of the lexical unit (neonyms, neologisms, and non-neological units).

Internal validity was controlled by applying the same task, during the same time frame (from 8:00 am to 11:00 am), to SODs with the same educational level (postgraduate studies) under identical environmental conditions, using a single measurement and a stable and reliable measuring instrument (protocol with E-Prime 3.0 software). In addition, confidentiality regarding the procedure among participants (through informed consent forms) and objective behavior of the experimenters towards all participants were maintained (Mertens, 2010).

External validity was controlled through the selection of participants based on specific criteria; stimuli matched by grammatical category (nouns) and by the structure of the lexical unit (syllable length and number of tokens); similarity in the application of a methodological design used as a reference (Llopart-Saumell *et al.*, 2014); the possibility of replicating this design, and the potential for generalizing the results in similar environments. Ethical approval for this study was obtained from the Bioethics Committee at UAM.

3.1 Sociodemographic characterization of participants

In line with the design of Sablayrolles (2009), this case study was conducted with three participants, all of them university professors at the Universidad Autónoma de Manizales, Colombia, who were specialists in fields other than political science.

Participant 1 (SOD1) is an industrial designer with a master's degree in Education, and teaches the subjects of Hermeneutics and Semiotics, Design Workshop II, Design Methods, Research Processes II, and History of Objects. SOD1 is a full-time professor and has nine years of experience at the university.

Participant 2 (SOD2) is an architect with a master's degree in Creativity and Innovation in Organizations. SOD2 is a full-time professor and has seven years of experience at the university.

Lastly, participant 3 (SOD3) is a dentist with specialization in Health Administration, a master's degree in Public Health, and a doctorate in Health Sciences. SOD3 teaches the subject of Health Administration and is a full-time professor with six years of experience at the university.

None of the participants reported having any visual impairment that would affect the performance of the test. In addition, all of them signed an informed consent before starting the experimental protocol.

3.2 Materials

The 160 stimuli that made up the lexical units were divided into four categories: 40 neonyms specific to the field of political science; 40 neologisms belonging to general language; 40 non-neological lexical units; and 40 filler units. The neonyms and neologisms were selected from the BUSCANEO platform,[2] considering the period between 2012 and 2019, and only data recorded by ANECOL (the Spanish acronym for Antena Neológica Colombiana) were extracted. The data validation was obtained from the protocol followed in the Neological Antenas Project. In addition, the neonyms were also validated by experts in the field of political science.

All stimuli were selected on the basis of the number of syllables and tokens. The topic considered within the field of political science was the negotiation and implementation process of the peace agreement in Colombia. The criteria for the selection and organization of stimuli were grammatical category (nouns) and structure (similar number of syllables or tokens).

Given below are some examples of the categories formed and their respective pairing process.

Neonyms	Neologisms	Non-neological units	Fillers
agenda de negociación [negotiation agenda]	*teléfono celular inteligente* [smartphone]	*casa de cambio* [currency exchange office]	*punto de partida* [starting point]
fariano [fariano (member of FARC, a Colombian guerrilla group)]	*clonador* [cloner]	*estudiante* [student]	*positivismo* [positivism]
posconflicto [post-conflict]	*multipropósito* [multipurpose]	*trasfondo* [background]	*preestreno* [preview]
tribunal para la paz [court for peace]	*noche de las velitas* [candle night (a traditional Colombian celebration)]	*róbalo a la marinera* [seabass in marinara sauce]	*arma de doble filo* [double-edged sword]
victimizante [victimizing]	*tiquetera* [ticket book]	*obtención* [obtention]	*comunicación* [communication]

TABLE 1. Some examples from study materials (Original Spanish examples in each category)

3.3 Techniques and data collection instruments

The experimental protocol was conducted in the Neurophysiology Laboratory of the Universidad Autónoma de Manizales, which has the necessary resources and equipment for conducting neurophysiological, neuropsychological and psycholinguistic tests. The tasks and tests applied are listed below:

- **Visual lexical decision task:** The task consisted of presenting 160 stimuli (lexical units) divided into four categories: neologisms, neonyms, non-neological units, and filler units. Participants were to state whether they considered each stimulus to be novel in Spanish or not. Response times were recorded for each stimulus.
- **Reading comprehension test:** A 26-question test was adapted from the institutional standardized test designed by the Colombian Ministry of National Education, known as SaberPro.[3] The questions and answers for the adapted version of the test were compiled on the basis of the available resources published in official Ministry of National Education websites. The adapted version comprises 12 passages covering a range of topics (both general and specialized) and maintains the same structure and percentages of questions in the original test: 23% literal questions (six questions in the adapted version); 35% inferential (nine questions in the adapted version); and 42% critical (11 questions in the adapted version).
- **Sociodemographic questionnaire:** A questionnaire in Google Forms was used to collect information about the participants' level of education, their level of knowledge on the negotiation and implementation process of the peace agreement in Colombia following a Likert Scale (1: Not knowledgeable; 2: Little knowledgeable; 3: Moderately knowledgeable; 4: Knowledgeable; 5: Very knowledgeable), subjects taught in their specialized domain, and criteria for determining whether a word was novel or not.
- **E-Prime software:** E-Prime software was used to record the participants' response times in milliseconds (ms) and response accuracy (accurate and inaccurate responses rates) during the visual lexical decision task.

3.4 Tasks and procedures

Each participant signed an informed consent form before starting the test, and instructions for the experimentation were given afterward. The main task consisted of presenting a number of stimuli (lexical units) on screen that belonged to one of the lexical categories: neologisms, neonyms, non-neological units, or fillers. Forty lexical units of each category were presented to each of the participants, for a total of 160 stimuli. Participants did not know about the nature of the presented lexical unit. These stimuli were presented under the following parameters: white background screen, black 36-point font (lowercase), centered position. Random stimuli presentation followed by a fixation mark (+) during 1000 ms. In line with Llopart-Saumell *et al.* (2014), the participants were not under time pressure, so they carried out the visual lexical decision task at their own pace.

The lexical decision task started with instructions on screen, which explained to each participant how to proceed. For each presented lexical unit, participants had to answer the question: "Is this a novel Spanish word or expression?", to which they responded "yes" or "no" by pressing the S key (for 'sí'/'yes') or the N key (for 'no'), respectively.

Likewise, in order to achieve familiarity with the procedure, six trials were included before starting the measurement of RTs, with stimuli similar to those in the test. Both in the examples and in the actual test, the subject selected a response, and a fixation mark appeared in the same position as the stimulus. After the established time (1000 ms), the fixation disappeared and the next stimulus appeared on the screen. In this way, the presentation of the 160 stimuli for each participant was completed, while RTs and accuracy were recorded as evidence of the processing effort of each lexical unit.

After the lexical decision task, participants completed an online reading comprehension test in order to determine their reading performance level (level 1, 2, 3, or 4).[4] All questions were multiple-choice, requiring participants to select the most suitable option from A, B, C, or D.

After completing the reading test, the participants' answers were automatically saved. The time constraint for the test was one hour to answer the entire set of questions.

4 Analysis and results

4.1 Descriptive statistical procedures

In order to analyze the data collected to measure the dependent variables in this study (reaction times and accuracy rates), descriptive statistics, distribution tables and graphics were obtained from the statistical software JASP.[5] This software allowed the obtention of measures of central tendency such as the mean values, and measures of variability such as the standard deviation and minimum and maximum values. This was done, taking into account the nature of the present case study as well as the intended intrasubject and interstimulus analysis.

The following statistical procedures were applied:

1. For the homogenization of experimental units, data for each subject (SOD1, SOD2, SOD3) were taken, corresponding to the categories of neologisms (40 data per subject), neonyms (40 data per subject) and non-neological units (40 data per subject), for a total of 120 data per subject. Filler lexical units were not taken into account, as these stimuli did not constitute a variable of interest and were only incorporated in the lexical decision task to match conditions in the lexical decision.
2. Taking into account the methodological approach proposed by Falbén *et al.* (2019) in their study on lexical processing, responses shorter than 300 ms and longer than 3000 ms were excluded for each SOD and in each category of nature of the lexical unit. Thus, the following data were excluded in order to homogenize the experimental units:

Subject	Nature of lexical unit (40 lexical units per category)	Number of excluded data (values below 300 ms and above 3,000 ms)	Equivalent percentage of excluded data	Total percentage of data excluded per subject (average)
SOD1	Neologisms	3	7.5%	10%
	Neonyms	4	10%	
	Non-neological units	5	12.5%	
SOD2	Neologisms	13	32.5%	28.3%
	Neonyms	11	27.5%	
	Non-neological units	10	25%	
SOD3	Neologisms	0	0%	1.6%
	Neonyms	2	5%	
	Non-neological units	0	0%	

TABLE 2. Excluded data

3. From the resulting data per participant, RTs averages were obtained for each lexical unit category (neologisms, neonyms and non-neological units). Likewise, the accuracy rate (percentage of correct answers) for each category was calculated from the count of correct answers compared to the total number of answers.

Descriptive Statistics

	RT		
	ne.nimo	neologismo	noNeol.gica
Valid	36	37	35
Missing	0	0	0
Mean	1398.500	1347.108	1260.200
Std. Deviation	539.358	546.991	438.821
Shapiro-Wilk	0.952	0.910	0.940
P-value of Shapiro-Wilk	0.119	0.006	0.055
Minimum	636.000	612.000	499.000
Maximum	2588.000	2563.000	2325.000

Note: Excluded 7 rows from the analysis that correspond to the missing values of the split-by variable NATURALEZA

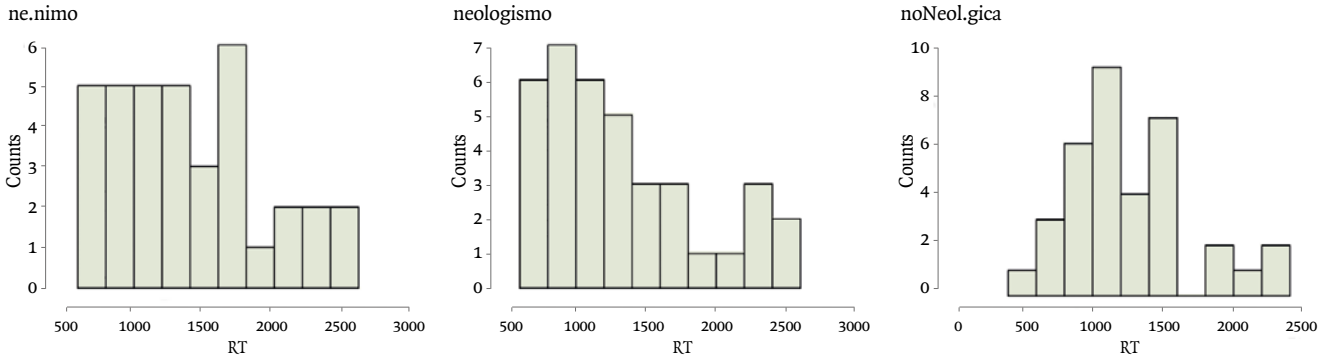

TABLE 3. Descriptive statistics and distribution plots for SOD1

Descriptive Statistics

	RT		
	ne.nimo	neologismo	noNeol.gica
Valid	29	27	30
Missing	0	0	0
Mean	1710.931	1483 111	1448.667
Std. Deviation	604.048	448.957	641.164
Shapiro-Wilk	0.927	0.912	0 807
P-value of Shapiro-Wilk	0.045	0.026	< 001
Minimum	915.000	942.000	837.000
Maximum	2972.000	2550.000	2930.000

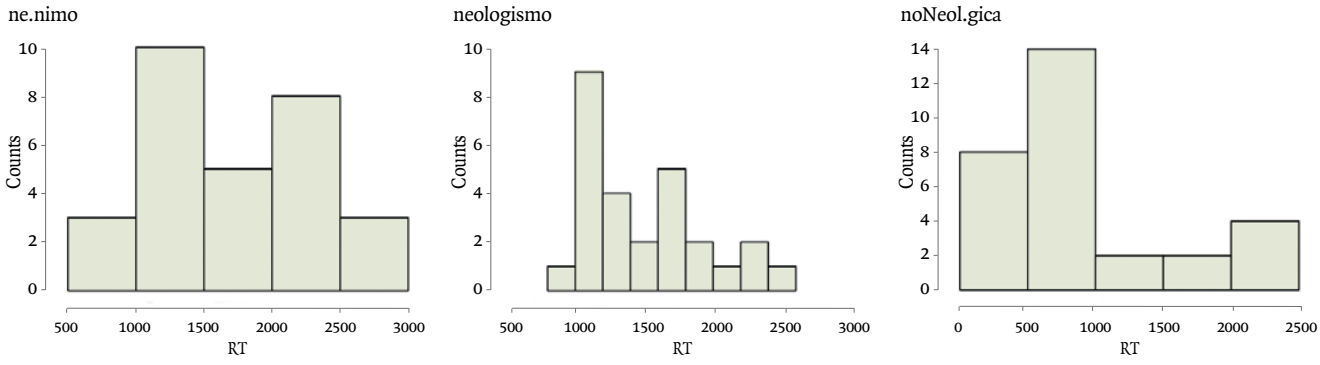

TABLE 4. Descriptive statistics and distribution plots for SOD2

Descriptive Statistics

	RT		
	ne.nimo	neologismo	noNeol.gica
Valid	38	40	40
Missing	0	0	0
Mean	1086.816	1202.200	1027.475
Std. Deviation	463.255	410.620	461.841
Shapiro-Wilk	0.909	0.914	0.920
P-value of Shapiro-Wilk	0.005	0.005	0.008
Minimum	435.000	597.000	461.000
Maximum	2360.000	2134.000	2441.000

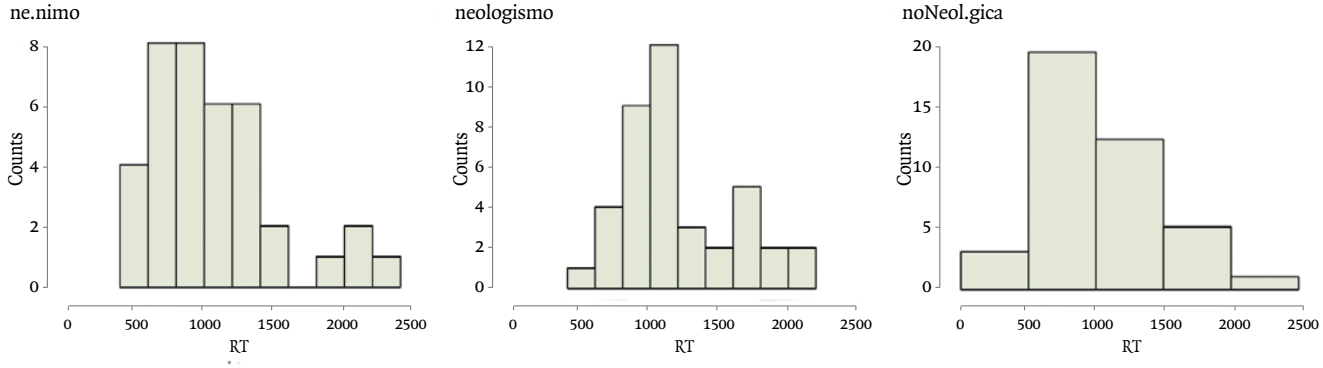

TABLE 5. Descriptive statistics and distribution plots for SOD3

Frequencies for TASA ERROR

NATURALEZA	TASA ERROR	Frequency	Percent	Valid Percent	Cumulative Percent
ne.nimo	ACIERTO	34	94.444	94.444	94.444
	DESACIERTO	2	5.556	5.556	100.000
	Missing	0	0.000		
	Total	36	100.000		
neologismo	ACIERTO	36	97.297	97.297	97.297
	DESACIERTO	1	2.703	2.703	100.000
	Missing	0	0.000		
	Total	37	100.000		
noNeol.gica	ACIERTO	2	5.714	5.714	5.714
	DESACIERTO	33	94.286	94 286	100.000
	Missing	0	0.000		
	Total	35	100.000		

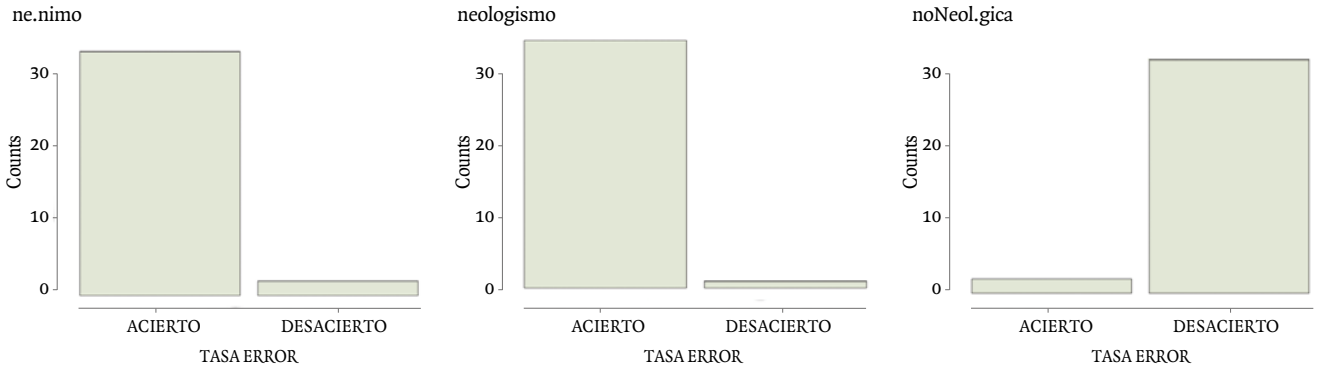

TABLE 6. Frequency tables and distribution plots for SOD1

Frequencies for TASA ERROR

NATURALEZA	TASA ERROR	Frequency	Percent	Valid Percent	Cumulative Percent
ne.nimo	ACIERTO	18	62.069	62.069	62.069
	DESACIERTO	11	37 931	37 931	100.000
	Missing	0	0.000		
	Total	29	100.000		
neologismo	ACIERTO	16	59.259	59 259	59.259
	DESACIERTO	11	40.741	40.741	100.000
	Missing	0	0.000		
	Total	27	100.000		
noNeol.gica	ACIERTO	24	80.000	80.000	80.000
	DESACIERTO	6	20.000	20.000	100 000
	Missing	0	0.000		
	Total	30	100.000		

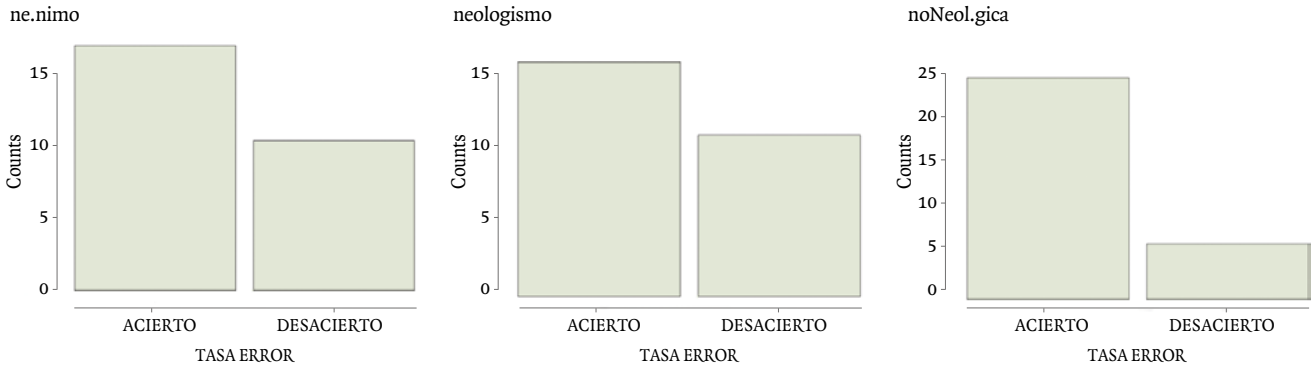

TABLE 7. Frequency tables and distribution plots for SOD2

Frequencies for TASA ERROR

NATURALEZA	TASA ERROR	Frequency	Percent	Valid Percent	Cumulative Percent
ne.nimo	ACIERTO	14	36.842	36.842	36.842
	DESACIERTO	24	63.158	63.158	100.000
	Missing	0	0.000		
	Total	38	100.000		
neologismo	ACIERTO	13	32.500	32.500	32.500
	DESACIERTO	27	67.500	67.500	100.000
	Missing	0	0.000		
	Total	40	100 000		
noNeol.gica	ACIERTO	38	95 000	95 000	95 000
	DESACIERTO	2	5.000	5.000	100.000
	Missing	0	0.000		
	Total	40	100.000		

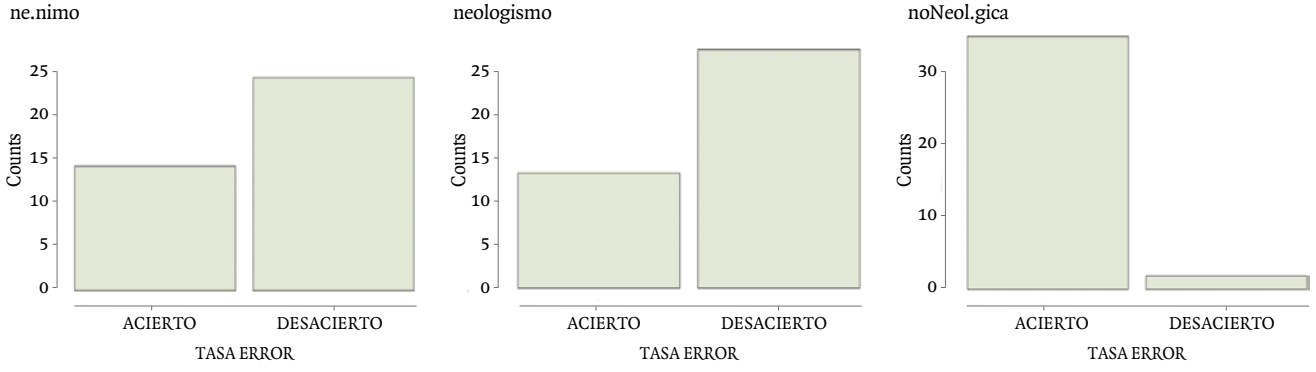

TABLE 8. Frequency tables and distribution plots for SOD3

4. Regarding the reading performance level, the answers given by each subject in the reading comprehension test were analyzed, taking into account the standardized parameters for its scoring. In order to determine the reading level of each subject, we took into account the outline of the critical reading module stipulated by SaberPRO. The data obtained in relation to the reading level of the participants are presented in table 9.

The critical reading test applied in this case study is based on the model of the three semantic units of a text (microstructure, macrostructure and superstructure) and, consequently, it recognizes three general levels of reading comprehension: 1) literal comprehension of the text, 2) construction and interpretation of the meaning of the text, and 3) critical approach to the meaning.

In the test, a numerical score from 0 to 300 was given to readers based on the number of correct answers. The score obtained matches a description that allows readers to be grouped into one out of four levels of reading performance: level 1, level 2, level 3 or level 4. Each performance level includes a qualitative description of the skills and knowledge that the subject is estimated to have shown on each level.

None of the participants in this case study showed the highest level of reading performance (level 4), according to SaberPRO. In fact, one of the participants (SOD1) obtained a level 1 in reading performance.[6] According to SaberPro, this means that: "The reading subject [...] could identify text elements such as thematic, structure, among others, if these appear explicitly. In this sense, [the reader] could recognize the author's communicative intention and respond to specific questions that inquire about data provided in the text. Likewise, [the reader] could identify some linguistic and discursive resources that allow understanding the local meaning of the statements.

On the other hand, the two other participants (SOD 2 and SOD 3) obtained a reading performance level 3,[7] which means that: "In addition to what is described in the previous level, the reading subject placed at this level goes beyond the explicit information of the text by mastering text comprehension strategies. The reading subject, in addition, can project writings from the information in the text".

4.2 Answers to the sociodemographic questionnaire

The answers obtained through the sociodemographic questionnaire are discussed below:

Participant 1 (SOD1) was considered to be little knowledgeable ("2" on the Likert Scale from 1 to 5) about the implementation of the peace process in Colombia. Regarding the criteria used to determine if the lexical unit presented was novel or not, SOD1 considered "previous analysis and reading of the press, newspapers, news, where [lexical units] are *recurrently* exposed". This indicates that the subject used a semantic-pragmatic criterion to decide whether the lexical unit was new or not, that is, an experiential criterion (which is an individual, subjective criterion). The use of the "recurrently" also indicates a criterion of frequency of use or appearance. With regard to reading habits, SOD1 devotes four to six hours a week to reading scientific articles and theses, as well as more than seven hours a week to reading literature.

Participant 2 (SOD2) was considered to be knowledgeable ("4" on the Likert Scale from 1 to 5) about the implementation of the peace process in Colombia. The criteria SOD2 used for determining whether the lexical unit presented was novel or not was: "if it was something recent, that is, an event or object developed a short time ago. However, I question myself, because I do not know how the time of something new is determined". This indicates that the subject used a chronological criterion. With regard to reading habits, SOD2 devotes four to six hours a week to reading scientific articles, theses and books, as well as more than seven hours a week to reading literature, newspapers and social media.

Participant 3 (SOD3) was considered to be little knowledgeable ("2" on the Likert Scale from 1 to 5) about the implementation of the peace process in Colombia. SOD3 determined whether the lexical unit presented was novel or not by considering how long the word had been used. This indicates that the subject used chronological and pragmatic criteria to decide whether the lexical unit was recent or not. Regarding reading habits, SOD3 devotes four to six hours a week to reading scientific articles, theses, books, and spe-

Subject	No. of correct answers (out of 26)	Percentage of correct answers	Test Score	Reading performance level
SOD1	10	38.46%	115	**1**
SOD2	17	65.38%	196	**3 (higher margin)**
SOD3	15	57.69%	173	**3 (lower margin)**

TABLE 9. Participant's number of correct answers and reading performance

cialized web pages, as well as four to six hours a week to reading literature.

Condensed results are presented below for each subject (SOD1, SOD2, SOD3) and each lexical unit category (neologism, neonym and non-neological unit). The table 10 shows the data obtained for the variables of interest in the present study (RTs, accuracy rate, nature of the lexical unit, reading level).

4.3 Data interpretation for RTs

The RT data for each participant were homogenized by considering only the relevant lexical categories (neologisms, neonyms, and non-neological units) and excluding filler lexical units. This allowed for a focused analysis of the processing effort specifically related to the target lexical categories.

The average RT was calculated for each lexical category for each participant. This provided insights into the relative processing effort required for the different types of lexical units in different subjects. For example, SOD2 had the highest average RT (1,710 ms, applied to neonyms) in contrast to SOD1 (1,398 ms for neonyms) and SOD3 (1,202 ms for neologisms), suggesting that processing these units required more effort compared to neologisms and non-neological units.

Based on this analysis, it can be observed that the highest reaction times varied across participants and different lexical unit categories. Participant SOD2 had the highest reaction times overall, particularly for neonyms. However, the specific pattern of reaction times differed among participants, highlighting individual differences in processing speed and effort.

4.4 Data interpretation for accuracy rates

Accuracy rates (percentage of correct responses) were calculated for each nature of word, allowing for a comparison of performance across the different lexical categories. This measure complemented the RT analysis by providing an overall marker of cognitive efficiency in relation to processing effort (Todd and Benbasat, 1991).

On analyzing the accuracy rates in the different lexical unit categories for each participant, the following observations can be made:

- For neologisms, SOD1 achieved an accuracy rate of 97.3%, indicating a high accuracy in identifying these lexical units. In the category of neonyms, SOD1 had an accuracy rate of 94.44%, demonstrating a similarly high level of accuracy. For non-neological units, SOD1 achieved an accuracy rate of 5.7%, indicating an inconsistent level of accuracy across the different lexical categories.
- SOD2 had a lower accuracy rate for neologisms, achieving 59.26% accuracy in identifying these lexical units. In the category of neonyms, SOD2's accuracy rate was slightly higher, at 62.07%, but still relatively low compared to other participants. SOD2 had an 80% accuracy in identifying non-neological units, which is the highest accuracy rate in the three categories.

	RT	Accuracy rate (%)	Reading performance level and score	Knowledge about the peace process	Criteria to determine novelty
SOD1	**1,398 ms** (neonyms)	**97.29%** (neologisms)	Level 1 (score 115)	2: little knowledgeable	*Based on previous analysis and reading of the press, newspapers, news, where [lexical units] recurrently appear* (**semantic-pragmatic criterion, criterion of frequency of use**)
	1,347 ms (neologisms)	94.4% (neonyms)			
	1,260 ms (non-neological)	5.7% (non-neological)			
SOD2	**1,710 ms** (neonyms)	**80%** (non-neological)	Level 3 (score 196)	4: knowledgeable	"if it was something recent, that is, an event or object arising a short time ago. However, I question myself, because I do not know how the time of something new is determined" **(chronological criterion).**
	1,483 ms (neologisms)	62% (neonyms)			
	1,448 ms (non-neological)	59% (neologisms)			
SOD3	**1,202 ms** (neologisms)	**95%** (non-neological)	Level 3 (score 173)	2: little knowledgeable	How long the word has been used. **(chronological-pragmatic criterion).**
	1,086 ms (neonyms)	36.8% (neonyms)			
	1,027 ms (non-neological)	32.5% (neologisms)			

TABLE 10. Summary of results

- For neologisms, SOD3 achieved an accuracy rate of 32.5%, indicating a relatively low accuracy in identifying these lexical units. In the category of neonyms, SOD3's accuracy rate was slightly higher, at 36.84%, but still relatively low compared to other participants. SOD3 had a high accuracy rate of 95% for non-neological units, demonstrating a strong ability to accurately identify these lexical units.

Overall, there is considerable variation in accuracy rates among participants. SOD1 demonstrated a high level of accuracy across all categories and across subjects (97.29% accurate responses in identifying neologisms), while SOD2 and SOD3 had lower hit rates (80% and 95%), particularly in identifying non-neological units. These variations may reflect differences in the participants' linguistic knowledge, cognitive abilities, or familiarity with the specific lexical units presented.

5 Discussion

The analysis of RTs and accuracy rates provided valuable information about the cognitive effort and processing demands associated with different lexical units. It helped to understand the relationship between reaction time and processing effort, supporting the statement that higher RTs imply higher processing effort (Todd and Benbasat, 1991), while lower RTs indicate less effort. This analysis supports the emerging interest in studying neologisms from an experimental approach (Llopart-Saumell and Freixa, 2014; Varo, 2013; Llopart-Saumell *et al.*, 2014; Suárez, Suaza, and Calvache, in press) and at the same time it demonstrates that novelty is related to other aspects complementary to the subjective feelings of the speaker (Freixa Aymerich, 2010).

The first hypothesis of this study, which regarded reaction times (RTs), was fully confirmed. Considering the average RTs between participants per lexical category, neonyms presented higher RTs than neologisms, and both neologisms and neonyms presented higher RTs than non-neological units, as opposed to previous studies (Suárez, Suaza, and Calvache, in press). This indicates that non-neological units, which had lower RTs, implied less processing effort, while neonyms, with higher RTs, implied greater processing effort.

This finding can be explained by the fact that the participants were not experts in the field of political science and they therefore had to invest greater processing effort in recognizing neonyms that were not familiar to them from their academic or professional background. This reflects that the associative strength arises, in fact, from the interaction between features in usage contexts and the experiential aspects of the referents involved (Varo, 2020; Devlin, 2002), so the processing of a word ultimately depends on the most frequent usage contents, in line with distributional models (Firth, 1957).

The second hypothesis regarding accuracy rates was partially validated. Contrary to what had been hypothesized, the participants had more accurate responses in perceiving novelty in neonyms than neologisms; that is, the error rate (percentage of inaccurate responses) was not as high for neonyms as previously thought. In fact, the average error rate for the neonyms category was the lowest among the three types of lexical units, *i.e.*, participants actually gave more accurate answers in the recognition of neonyms than in the recognition of neologisms or non-neological units.

In turn, two out of three participants (SOD2 and SOD3) had more accurate answers in the perception of novelty of non-neological units than in the perception of neologisms and neonyms. Interestingly, one of the participants (SOD1) proved to be an atypical case with the lowest accuracy rate in recognizing non-neological units. For this participant, most non-neological lexical units (94.29%) represented novel Spanish words; however, the reason for this remains unclear. One possibility could be that dynamic focalization issues did not play a role in the construction and interpretation of discursive meaning (Varo, 2020). In this respect, novelty was not detected and, as a result, sensory and information processing resources were not activated (orientation neural circuits), calling for attention to the role of executive capacities (executive attention neural networks) in word recognition processes (*cf.* Posner, Rueda, and Kanske, 2007). In short, part of the second hypothesis was validated only for two of the three participants.

With regard to accuracy rates based on reading level, the hypothesis was confirmed by an inversely proportional relationship between these aspects, specifically in terms of the recognition of *non-neological units*. In this respect, SOD1 exhibits a lower reading level (level 1, numerical score 115) and, at the same time, the highest number of errors in identifying non-neological units. The hypothesis also holds true for SOD2 and SOD3, as opposed to SOD1, since their reading level is higher (level 3, with numerical score 196 and 173, respectively), and, at the same time, their error rate (mistakes) is lower when it comes to non-neological units.

This leads us to believe that, when it comes to general discourse and established words in language, a higher reading level and reading habits could positively impact the recognition of non-neological units by decreasing the number of errors in recognizing and processing Spanish words in a lexical decision task. In fact, by establishing connections with prior knowledge, reading comprehension facilitates the consolidation and construction of meaningful learning based on preexisting cognitive frameworks (Ausubel, Novack, and Hanesian, 1983).

However, concerning accuracy rates based on reading level in the recognition of neologisms, it was observed that this was the lexical category with the

highest number of mistakes for SOD2 (40.75%) and SOD3 (67.5%), who had the highest reading levels, as previously mentioned. These results lead us to think that when it comes to lexical units from general discourse that are not established in language, such as neologisms, a higher reading level and reading habits do not necessarily impact the recognition of novelty. This is evident as the number of errors in recognizing and processing neologisms in a lexical decision task does not decrease but rather increases, as shown in two out of three participants.

It seems that inferential reading skills enabled participants to identify familiar words but did not necessarily facilitate the recognition of novelty; therefore, there is no apparent correlation between a high reading level and the ability to recognize novelty. Recognition of novelty involves separate cognitive and psycholinguistic processes independent of reading performance. In fact, different authors (*e.g.* Kintsch, 1998; Arándiga, 2005) suggest that the factors that determine a person's level of reading comprehension are varied and include the reader's decoding skills, linguistic competence, the level of prior knowledge about the reading topic, interest in reading, and the psychophysical conditions of the reading situation, among others. Other modulating variables that affect reading skills are age, education level, and time spent on reading (Martín, 1999).

These findings seem to contradict what some authors suggest (*e.g.* Fajardo Hoyos, Hernández Jaramillo, and González Sierra, 2012; Balbi, Cuadro, and Trías, 2009; Perfetti and Stafura, 2014) with regard to a subject's reading level and word recognition. In fact, readers with a higher level of inferential reading comprehension may not necessarily have an advantage in recognizing new words associated with specialized language, as the insights provided by our own research suggest.

Lastly, the criteria that subjects considered to determine whether a lexical item was novel or not differ among participants. Some of them used chronological criteria while others used semantic and pragmatic criteria to make the lexical decision. This might complement the psycholinguistic evidence for *dual access models* in word processing (Burani and Caramazza, 1987; Feldman,1994; Pinker, 1991). Our findings suggest that lexical access did not begin with morphological segmentation since the SODs did not focus on word structure in any case, but rather on the recognition of the complete word. In turn, this activated pragmatic criteria such as familiarity and semantic-conceptual association, as stated by Varo (2013).

Regarding self-reported knowledge of the peace process in Colombia, findings suggest that this does not seem to be a reliable criterion to recognize novelty. For instance, SOD1, who claimed to have little knowledge ("2" on the Likert Scale), devoted more effort to recognizing neonyms; SOD2, despite declaring some knowledge ("4" on the Likert Scale), still exerted considerable effort; while SOD3, who reported having less knowledge ("2" on the Likert Scale), did not excel in recognizing neonyms. Such knowledge or familiarity can come from expertise through professional experience or from simply forming part of the Colombian context; however, the RTs reflect that there is greater cognitive effort involved in recognizing neonyms. Therefore, self-reported knowledge in a specific domain does not seem to be necessarily correlated to the recognition of novelty.

6 Conclusions and recommendations

Briefly, the findings from this case study provide the following insights:

1. Novelty, whether neonymic or neological, involves a higher processing cost. It is more challenging for individuals to process and recognize novel lexical units compared to established ones.
2. A higher level of reading proficiency, particularly in general discourse, may enhance the recognition of non-neological units and specifically established words. Reading provides a broader contextual and lexical foundation from which individuals can better identify and process such units.
3. Inferential abilities enable individuals to identify familiar words but do not necessarily facilitate the recognition of novelty. There is no apparent correlation between reading level and the ability to recognize novelty. Recognition of novelty involves separate cognitive and psycholinguistic processes independent of reading performance.
4. Most participants find it easier to recognize established words due to their familiarity, prior knowledge and usage. However, SOD1 is an exception to this trend, probably given the subject's reading performance level, which calls attention to the influence of subject-specific cognitive aspects in word recognition and processing studies.
5. Subjects who lack expertise in a specific domain, *i.e.* political science, struggle to recognize neonyms related to that field. Familiarity with the subject matter plays a crucial role in identifying novel terms within specialized domains.
6. Reading on specialized topics in different media or sources, *i.e.* political science, could potentially reduce the processing effort required for recognizing neonyms, given that political science as a specialized domain can be present in various informal sources, such as Twitter, Facebook, etc., and this accessibility to the domain can facilitate the recognition of neonyms.
7. Self-reported knowledge of a given topic does not necessarily have a significant impact on the recognition of neonyms related to that specific domain.

These conclusions emphasize the complexities surrounding the recognition of novelty, the influence of reading proficiency, and the role of domain-specific knowledge in neological and neonymical processing. Further research is warranted to expand upon these findings and to delve deeper into these relationships. For example, further analysis and interpretation of these results would require considering the context of the study (university context, Colombian context, level of education, etc.), the specific tasks involved (reading tasks, lexical decision task with context), the instruments used (behavioral measures complemented with neurophysiological measures, *e.g.* EEG or ERPs) and potential factors influencing the participants' performance.

Another aspect that should be considered in future research is the possibility of including other tests to measure different cognitive abilities or executive functions such as working memory (WM), attention, and inhibitory control, among others. These results could not only have an incidence on word recognition but could also help to refine the selection of participants so that they are grouped according to their particular abilities.

In a similar way, it is important to mention that the application of a reading test should not only be considered as an instrument to obtain information about an intervening variable such as reading performance, but as an instrument for including or excluding participants. The reading level can become a criterion for sample selection in order to achieve greater homogeneity in participants.

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Notes

1. This study contributes to the recent interest in experimental aspects of the CITERM research group of the Universidad Autónoma de Manizales (UAM) and its line of research about experimental neology to provide findings from a process perspective. This study was approved by the UAM Research Committee, according to Minute No. 115 of May 11, 2021, and by the UAM Bioethics Committee, according to Minute No. 129 of March 23, 2022. Project code: 753-115.
2. BUSCANEO is an online formal neology extractor that works with texts from the Internet. It uses a dictionary browser that allows working with texts from several languages for different purposes. The program is integrated into the OBNEO platform.
3. The critical reading test is governed by specifications that include three general reading competencies – corresponding to different levels of comprehension and analysis – and involve different types of texts. In particular, the tests seek evidence of the activation of transversal reading strategies (which involve the macrorules), which pursue the adequacy between the text, the discursive context and the readers (with their previous knowledge and goals) (*e.g.* Kintsch and Van Dijk, 1978; Kintsch, 1998; Van Dijk, 1995; Martínez *et al.*, 2004).
4. According to SaberPro, reading performance level 1 corresponds to literal reading; reading performance levels 2 and 3 correspond to inferential reading; and reading performance level 4 corresponds to critical reading.
5. JASP is a free and open-source program for statistical analysis supported by the University of Amsterdam.
6. Performance level 1 (score 0 to 124).
7. Performance level 3 (score 157 to 198).