Universitat de València
Facultat de Filologia, Traducció i Comunicació
Departament de Filologia Espanyola

Reformulación y categorías vecinas: un tratamiento teórico y experimental a través del marcador discursivo *o sea* en español / Reformulation and Neighboring Categories: A Theoretical-Experimental Approach through the *Sp.* discourse marker *o sea*.

Tesis doctoral presentada por:

Shima Salameh Jiménez

Dirigida por:

Dr. Salvador Pons Bordería

Dr. Óscar Loureda Lamas

Doctorado en Estudios Hispánicos Avanzados

Valencia, mayo 2019

The dissertation has been developed thanks to a predoctoral grant provided by the *Promotionskolleg “Diskurspartikeln, informationsstruktur und Kognition* —*Iberoamerica Zentrum*, Heidelberg Universität— and the economic support of the research project Udemadis (FFI 2016-77841-P), funded by the Spanish *Ministerio de Economía y Competitividad* —MINECO—.

Esta tesis ha sido posible gracias a una beca de investigación predoctoral en el marco del *Promotionskolleg “Diskurspartikeln, informationsstruktur und Kognition* —*Iberoamerica Zentrum*, Heidelberg Universität—, y con el apoyo económico del proyecto de investigación FFI 2016-77841-P, Unidades discursivas para una descripción sistemática de los marcadores del discurso en español (UDEMADIS), financiado por el MINECO, la AEI y los fondos FEDER.

A mi familia, por ser mis pies y mis manos.

A la vida, por sus grandes regalos.

"Tot és ara i és possible".

Agradecimientos

Hace ya unos años me adentré en el mundo de la investigación con la intensidad que solo aquellos que forman parte de él comprenden. Esa intensidad ha permanecido intacta incluso tras acabar una tesis (*no pain, no gain*, dicen los americanos), algo que, en gran parte, se ha debido a la calidad humana de los que me han acompañado durante su elaboración. Los próximos párrafos (acortados, por cierto) recogen los nombres de esas personas que, directa o indirectamente, han contribuido a que estas páginas adquieran forma y función. Prometo hacer llegar la versión extensa a todos los que, al leer esta, sepan que yo les diría algo más.

En primer lugar, si hay dos personas que merecen mi más sincero agradecimiento son Salvador Pons y Óscar Loureda: Salvador, gracias por despertar a la lingüista que llevaba dentro en las clases de Semántica, con los trabajos optativos de gramaticalización, o con aquellas lecturas de verano sospechosamente pragmáticas recomendadas cuando ni siquiera había empezado tercero. Repetiría ese rito iniciático, llevado a cabo allá por 2011, tantas veces como fuera necesario: aquel día, en el despacho 16, pude ponerle voz y rostro a la persona que alimentaría mi ilusión y ganas de investigar para siempre. Por tu humanidad, tan necesaria, tu apoyo, tu disponibilidad, por el inglés y por los chistes, y por todo lo que no cabe aquí: gracias. Óscar, gracias por recibirme en Heidelberg como si me conocieras desde siempre cuando todavía estaba metiéndome diez artículos diarios de pragmática experimental entre pecho y espalda. También por los cafés matutinos en Fatma hablando de lingüística teórica para que no nos encasillaran en lo experimental y, con permiso de Rayner, por enseñarme que *los ojos son el espejo del cerebro* (y no del alma). A los dos, gracias por las oportunidades y, sobre todo, por demostrarme que una tesis a caballo entre dos universidades de países distintos sí era posible.

Al Iberoamerika Zentrum (IAZ), por haberme permitido desarrollar esta tesis con una beca de investigación predoctoral: Katrin, Frank, Adriana, Inés, Laura, Iria, Martha, Héctor, Hans y, en los dos últimos años, Lourdes, Elisa y Carlos Cuello. A Araceli López, por pasar tres meses juntas en Alemania en plena temporada del espárrago y no cansarnos de pedirlos para cenar. También a Ricardo Maldonado, por el tiempo y la orientación antes incluso de ponerme "ojos a la obra" con esta investigación. A Pepe Portolés, por su cercanía académica y por todos los consejos en los congresos. Gracias también a MªJesús Pons y Javier Castro por las explicaciones estadísticas en pleno verano.

A Val.Es.Co., por las ideas, las cenas, y la humanidad. A Antonio Briz, por cuidarnos siempre profesional y personalmente. A Marta Albelda, la prueba de que brillantez y bondad van de la mano. A Leonor Ruiz, por el apoyo y los gestos cálidos y sinceros. A Antonio Hidalgo, por sus amapolas. A María Estellés, a la que admiro profundamente como investigadora y como persona. A Adrián Cabedo, por ampararme con cuestiones estadísticas cuando ni siquiera sabía qué era el ajuste de una recta (sobre todo en estos últimos meses). Y al resto de miembros del grupo: Julia Sanmartín, Marta Pilar Montañez, Ana Llopis, Jorge Martí, Xose Padilla, Elena López-Navarro, y Montserrat Pérez. También a Mila, David, Jorge R. y Carles. Especialmente a Virginia, amiga fiel e inseparable: desde las visitas a Xàtiva cuando más lo necesité hasta la convivencia cuando, también, más lo necesité.

A Mercedes Quilis y Rafael Beltrán, por cerrar gestiones a tiempo (a pesar de mi caótica organización). Mercedes, gracias por pavimentar el camino hacia la cotutela en

Valencia a base de palabras y paciencia. A Miriam Izquierdo, Elena Plano, Pilar Almor, Paloma Sáez e Inma Zaragozá por soportar, siempre con una sonrisa, aluviones de preguntas burocráticas y robos de caramelos en la secretaría.

A los doctorandos, amigos dentro y fuera de la facultad, y artistas y/o cocineros cuando no hablan sobre lengua (o incluso mientras lo hacen). A Elena, por ser mi persona (con todo lo que eso implica): por apoyarme desde el primer día, por permanecer cerca cuando estuve lejos de mí y de todos, por esa noche en Mogambo, y por ser más que una compañera de trabajo; por el placer de poder acabar esta aventura juntas. A Adrià, por alegrarse por mis buenas noticias y cabrearse más que yo por las malas; por ser siempre persona de confianza y por su humor negro y desternillante. A Tomás, por su buen corazón y buenas palabras (aunque le robemos el turno cada dos por tres); por las batallas compartidas. Ellos tres fueron la primera IPrA en Amberes, en la que tantas cosas se forjaron con un abrazo grupal y nocturno. A Cris, Dayane y Dorota, por ser ejemplo y dar cariño a partes iguales (con permisos poéticos). A Sara y Amparo, hermanas pequeñas académicas y comienzo de nuevo ciclo. A Guada y su pasión *studioghibliana*. A Alejandra y su protección. A Pau, el karaoke en el O'Reilleys, y el apoyo mutuo. A Víctor y las escapadas alemanas. A Giulio, por parecer que está desde siempre. A Amparo Soler y su hambre viajera. A Amparo García y su rock-step-triple-step. A Gloria y sus deseos de verme nadar en el Moldava. A Andrea y sus fotografías del cielo valenciano acordándose de mí. A Lucía y sus conversaciones sobre diacronía para no olvidarme de ella.

Más allá de los muros de la facultad están mis amigos que, a pesar de todo y todos, quisieron descubrirme como persona: Jenifer y Sergio, Vicent, Rafa y Laura, Emilio y Sarai, Alfredo, Juan, Maria Belda, Armando, Vicent B. y Sara, Ismael y Ramón. Dolors Sampió y Álex Espí pusieron la primera piedra en mi camino filológico. Mélani Revert fue mi compañera de historias en el José Segrelles. Y Anna Lluch siguió cantando conmigo el Cadillac Solitario durante años. También a mi gran amiga Nieves, por demostrar que la distancia no es una excusa para dejar de querer cuando se quiere de verdad. Sandra y Xavi fueron mis dos destellos lumínicos en el invierno alemán. Pilar Salinas siempre quiso verme crecer. Y a mi prima Sheila: gracias por tu talento para crear y captar momentos. No me olvido del deporte y de la música, que me han fortalecido en esta última etapa.

Reservo las últimas líneas de estos agradecimientos a mi familia, que hace honor a la palabra. A Dolores, por ser mi modelo de persona, por tanto amor incondicional, y por no ser una mamá convencional. A Marian, por ser tía y amiga, por sacarme sonrisas y, también, por enderezarme. A Toni, por haber evitado que me sintiera emocionalmente vacía cuando había una razón demasiado grande para que ocurriera. A José Damián, por el cariño incondicional que nos hace parecer tío y sobrina de sangre (por culpa —o gracias a— nuestras torpezas). A mi *iaio* Antonio, por ayudarme más de lo que piensa en mi último año de tesis (y por sus reflexiones metaligüísticas); por despertarse a ponerme la estufa para no enfriarme en las madrugadas de invierno y redacción.

Y, finalmente, a mi *iaia* Dolores, por haberme enseñado a no tirar la toalla, aunque esta ya estuviera desgastada, y haberlo hecho justo a tiempo. Por seguir escribiendo páginas juntas a pesar de la distancia insalvable que nos separa.

Capítulos enteros de esta tesis se escribieron al ritmo de *Hamilton*. Gracias, Lin-Manuel Miranda, por alimentar intelectos y espíritus artísticos. *Rise up!* * * *

Table of contents

List of Figures

List of Tables

List of Abbreviations

AOI	Area of Interest
DM	Discourse marker
DPDE	Diccionario de Partículas Discursivas del Español
DT	Decision trees
EM	Eye-movements
FC	Fixation Count
FPRT	First Pass Reading Time
GDLE	Gramática Descriptiva de la Lengua Española
M1	Member 1
M2	Member 2
MM	Mixed-Models
NGLE	Nueva Gramática de la Lengua Española
PF	Progressive Fixations
RF	Regressive Fixations
R into AOI	Regressions into AOI
R out of AOI	Regressions out of AOI
TRT	Total Reading Time
SPRT	Second Pass Reading Time
Y	Yes
N	No

Resumen

Recientemente, los estudios sobre reformulación han generado un debate teórico en torno a esta función y su tratamiento semasiológico-onomasiológico: algunos autores abogan por una distinción clara de esta función frente a otras, como la conclusión o la corrección (Pons 2013, 2017). Otros autores defienden que la reformulación presenta subtipos basados en esas otras funciones, expresadas por los mismos marcadores discursivos: los reformuladores (Murillo 2016). La primera postura va de lo onomasiológico a lo semasiológico: la reformulación, la paráfrasis, la conclusión y la corrección son cuatro relaciones discursivas diferenciables (Pons 2013) que pueden expresarse a través de los mismos marcadores discursivos. Esto, no obstante, no significa que todas ellas sean subtipos supeditados a la función predominante (en el caso de los marcadores de reformulación, la reformulación discursiva): se trata, más bien, de una muestra de la polifuncionalidad de los marcadores (Pons 2017). La segunda postura va de lo semasiológico a lo onomasiológico: la conclusión o la corrección son subtipos de la reformulación porque la mayoría de los marcadores de reformulación las expresan en varias lenguas (Murillo 2016). Este hecho es un indicador de la relación existente entre ellas, que va más allá de la polisemia de los marcadores discursivos.

Ambas posturas son lícitas: se oponen entre ellas por los argumentos y las bases teóricas que las sustentan; sin embargo, ninguna puede anular a la otra. Los investigadores las seguirán en función de su aplicabilidad en sus trabajos. Esto ha llevado a que el debate alcance un punto muerto que aceptará más estudios de caso e ideas pero que, desde una visión teórica, no conducirá hacia una resolución definitiva. Como resultado, el estado de la reformulación es el de una función que, aparentemente, ha perdido sus límites definitorios: ¿son reformulación, conclusión y corrección tan parecidas, como sus marcadores parecen mostrar, o es posible detectar rasgos que las distingan? Frente a este problema teórico, el presente trabajo ofrece una propuesta experimental para solventarlo. Dicha propuesta tratará la reformulación con el método eye-tracking (Just, Adam y Carpenter 1980; Loureda et al. 2013, 2016): este método se basa en la *hipótesis ojo-mente*, que asume que todo contenido observado está siendo cognitivamente procesado.

A partir de un conjunto de movimientos (fijaciones y regresiones) y su duración en varias etapas de lectura (first, second y total reading time), se obtendrán patrones de procesamiento para contextos de paráfrasis, reformulación, conclusión y corrección expresados con y sin marcador discursivo. Los datos obtenidos reflejarán: (1) si la reformulación se parece o no a sus otras funciones vecinas, y (2) si los marcadores de reformulación se procesan igual en contextos de reformulación, conclusión o corrección o si, realmente, son un ejemplo de polisemia. Para medir la polisemia, se ha seleccionado el marcador de reformulación *o sea* en español: es la muestra más clara del problema expuesto, ya que es el marcador reformulador prototípico pero, además, codifica otras funciones, como la paráfrasis, la conclusión y la corrección, junto con algunos valores modales y de formulación. Los resultados permitirán al investigador decantarse hacia una postura u otra.

Abstract

A recent debate on reformulation and its semasiological-onomasiological treatment has become the focus of different studies published in the field. Some researchers argue for a clear distinction between reformulation and other functions such as conclusión or correction (Pons 2013, 2017); others defend the existence of different subtypes of reformulation based on such other functions which, in turn, are expressed by the same group of discourse markers in different languages (Murillo 2016). The former approach goes from onomasiology to semasiology: reformulation, paraphrase, conclusión and correction are four distinguishable functions which can be expressed by the same discourse markers; however, this does not mean that all them are subtypes of their predominant function (reformulation in reformulation markers) (Pons 2013). Rather, this shows the polyfunctionality behind these markers (Pons 2017). The latter is a semasiological-onomasiological approach: conclusión or correction are reformulation subtypes because most of the reformulation markers express them in varios languages (Murillo 2016). This fact suggests the relationship they share, which goes beyond discourse markers polysemy.

Both approaches are valid despite their arguments and theoretical basis are opposed. Researchers follow one or another depending on the type of study developed. This situation however, should be clarified: theoretically, no answers can be proposed as definitive. As a result, reformulation has lost its defining boundaries: are reformulation, conclusión and correction as similar as their discourse markers seem to demonstrate? It is posible to find distinguishing features? This dissertation presents an eye-tracking experimental proposal to solve these problems (Just, Adam y Carpenter 1980; Loureda et al. 2013, 2016): this method is based on the eye-mind hypothesis, which assumes that all things observed are cognitively processed.

A set of processing patterns will be obtained by considering a series of eye-movements (fixations and regressions) and their corresponding duration in different reading stages (First, second and total reading time). Such patterns will define experimentally paraphrase, reformulation, conclusión and correction expressed with and without a discourse marker. Results will show: (1) if reformulation is or not similar to other neighboring functions, and (2) if reformulation markers are processed in the same way in reformulative, conclusive or corrective contexts or if they are polysemic. Polysemy will be addressed by analyzing the Sp. discourse marker o sea. This marker is the most adequate ítem to account for this problem: it is the most prototypical reformulation marker which, in turn, expresses other functions such as paraphrase, conclusión or correction. Results will allow to assume one or other theoretical approach.

[…] “But in reality, there are still innumerable modes of saying a thing, and many roads leading to the same point […]” (Quintilian, *De Institutio Oratoria, X, Ch. V.* Translation in Murphy 1987).

[…] “The eye, which is termed the window of the soul, is the chief organ whereby the *senso comune* can have the most complete and magnificent view of the infinite works of nature” (Pevsner 2002, *Leonardo da Vinci’s contributions to neuroscience*).

[…] “Jakobson’s point suggests not only that a single marker might have multiple functions, but that a marker might have a predominant function: perhaps some markers are specialized for interactional functions, others for ideational functions” (Schiffrin 1987, *Discourse Markers*).

Capítulo 1

Introducción

1.1. Punto de partida

El presente trabajo trata de establecer límites entre la reformulación y otras categorías funcionales vecinas. Tal como indica su título, oscila entre dos enfoques principales: el onomasiológico y el semasiológico. Por un lado, se describe la reformulación frente a otras categorías cercanas, como la paráfrasis, la conclusión y la corrección, siendo todas parte de un continuum gradual motivado por la necesidad de modificar un discurso ─oral o escrito─ y hacerlo comprensible para el interlocutor (Antos 1982; Roulet 1987); por otro, se delimitan las propiedades del marcador discursivo de reformulación en español que prototípicamente expresa dichas funciones: o sea (Briz 2008; Garcés 2010).

Semasiología y onomasiología se han distinguido claramente en los próximos capítulos: definir la reformulación ─onomasiología─ es un proceso distinto al de describir las diferentes manifestaciones formales que permiten reformular ─semasiología─. Esto no quiere decir que ambos objetos de estudio sean excluyentes: es habitual explicar la reformulación a través de sus marcadores y, asimismo, relacionar los marcadores con sus respectivas funciones ─de hecho, es necesario hacerlo─. No obstante, es importante mantener una distinción entre ambos enfoques para evitar problemas teóricos: los estudios sobre reformulación no pueden basarse solo en descripciones de las propiedades de los marcadores de reformulación. De lo contrario, dichas propiedades acaban generalizándose erróneamente como rasgos definitorios de la reformulación, y ambos niveles ─forma y función─ se entremezclan (Pons 2013).

Este problema ha recibido el nombre de *trampa forma-función* (Pons 2017), y supone el punto de partida de esta tesis: se la llama trampa porque los rasgos de la función se confunden con los rasgos de las formas analizadas. De esta trampa se derivan dos micro-problemas directos:

(i) Los límites de la reformulación frente a otras funciones similares y cercanas ─pero no iguales─ se tornan borrosos.

(ii) Esas otras funciones acaban supeditándose a la reformulación y, por tanto, se crean nuevas subcategorías de reformulación.

Tanto (i) como (ii) dificultan el tratamiento y definición de esta función, y reflejan una intrusión semasiológica en la onomasiología. Ello conduce a un panorama difuso, distinto al de los trabajos fundacionales (Gülich y Kotschi 1983; Roulet 1987), que presentaban definiciones basadas en una noción de reformulación clara, distinguiendo entre el propio proceso ─reformulación parafrástica y no parafrástica[1]─ y los mecanismos para llevarlo a cabo.

1.2. Novedad y aceptación del enfoque: una justificación necesaria

Con el fin de arrojar luz sobre la trampa forma-función y poner límites entre funciones, esta tesis ha recurrido a un método experimental. La aplicación de un método experimental para abordar este problema teórico supone una novedad en el campo de la reformulación ─al menos, así lo revela una revisión exhaustiva de la bibliografía en el campo (§2.3.). Hasta ahora, todos los acercamientos han sido teóricos (Martín Zorraquino y Portolés 1999), basados en estudios de corpus (Gülich y Kotschi 1995) o de carácter contrastivo (Nolke 1994; Cuenca y Bach 2007). Con respecto a la trampa, ninguna de las dos propuestas actualmente seguidas (Pons 2013, 2017 y Murillo 2016) prevalece sobre la otra: una aboga por un tratamiento exclusivo que distinga paráfrasis, reformulación, conclusión y corrección; la otra, por uno inclusivo que considere conclusión y corrección subtipos de la reformulación (§2.3.3.). Llegados a este punto, se hace indispensable la triangulación con un método experimental que, mediante resultados cualitativos y cuantitativos, permita decantarse por una u otra solución para tratar la reformulación.

El método experimental utilizado parte de la tecnología *eye-tracking* (Rayner 1977; Just, Carpenter y Wolley 1982; Rayner y Sereno 1994), que analiza las reacciones del ojo humano al recibir inputs de diferente naturaleza ─videos, textos, enunciados, palabras, imágenes, etc.─ en diferentes procesos comunicativos ─lectura o interacción─. Para ello, sigue la hipótesis *ojo-mente* (Rayner 1998), que relaciona los movimientos oculares ─cantidad, dirección y duración─ con la dificultad en el procesamiento de la información.

[1] Debido a la extensión de las etiquetas *reformulación parafrástica* y *reformulación no parafrástica*, hemos optado por las siglas RP y RNP para referirnos a ambos tipos respectivamente. Estas etiquetas cambiarán a lo largo de la redacción de esta tesis: en capítulos posteriores (ver 2.3.3.) se optará por las nomenclaturas paráfrasis y reformulación, refiriéndose a RP y RNP.

En el ámbito de la pragmática, es cada vez más frecuente aplicar métodos de lectura controlada para testar hipótesis y solucionar problemas lingüísticos teóricos (Duchowski 2007). El estudio de una función a través de la asimilación de textos tomando los movimientos oculares producidos parece ciertamente complejo (ver Underwood y Everatt 1992 sobre la aceptabilidad de la hipótesis). No obstante, este método no difiere de la lingüística funcional y los estudios de corpus publicados en las últimas décadas. Parte de un planteamiento distinto, pero con un mismo objetivo de base: apoyar una descripción lingüística teórica sobre unos datos específicos ─en este caso, datos de lectura─. En este sentido, los estudios de *eye-tracking* también tienden puentes entre la descripción de una función discursiva o un fenómeno concreto ─*cómo se dice o escribe* o, en términos *coserianos*, una *norma* recogida en un *sistema* (Coseriu 1973 [1952]: 97-98)─ y la producción concreta de dicha función por parte de los individuos de una comunidad lingüística ─estudio de lo oral y/o lo escrito, como muestra del *habla* que se nutre de los dos niveles anteriores (Coseriu 1973 [1952]: 102)─ (ver §2.4.). Para ello, analizan cómo se procesan textos que expresan una función concreta; este procesamiento se relaciona directamente con las propiedades de dicha función y, por tanto, con cómo los hablantes asimilan sus características generales. La lectura, como sugiere Goodman (1996), y como indican Nelson et al. (2008):

> (…) is described as the process of constructing meaning from print. From this perspective reading is a transactional interaction between the individual reader and texts for the purpose of making meaning. (Nelson et al. 2008: 294).

En otras palabras, el uso de textos como vehículo para analizar la comprensión de la información y, por extensión, de las propiedades de una función concreta suele aceptarse porque esos textos también buscan transmitir un significado, al igual que sucede en la comunicación inmediata ─conversaciones, entrevistas, llamadas telefónicas─. Dicho esto, los datos experimentales obtenidos con *eye-tracking* en esta tesis serán útiles para:

(1) Complementar los resultados de análisis de materiales orales;
(2) Complementar, en un nivel más general, las descripciones teóricas asignadas a la función lingüística seleccionada ─formulación, digresión, focalización, causa-consecuencia, etc.─.

Por otro lado, dados los problemas de los que parte esta tesis, y la imposibilidad de resolverlos —al menos, por el momento— con las herramientas proporcionadas por diferentes corrientes teóricas en pragmática, el uso de un método experimental auxiliar como el *eye-tracking* se hace necesario. En este caso:

- Se analizará el procesamiento de enunciados que expresen paráfrasis, reformulación, conclusión y corrección para extraer patrones de procesamiento y comprobar hasta qué punto es posible excluir o incluir estas funciones en la clasificación de la reformulación (ver §2.3.).
- Se hará lo mismo con los marcadores discursivos: se medirá cuán importante es la presencia (o no) de un marcador en el establecimiento de cada función (ver §2.2.) a partir de esos patrones de procesamiento.

Se espera que estos datos aclaren el estatus de cada función con respecto a sus límites. Su lugar en esta investigación, nuevamente, está justificado por los distintos niveles de la lengua como sistema —Fig. 1—:

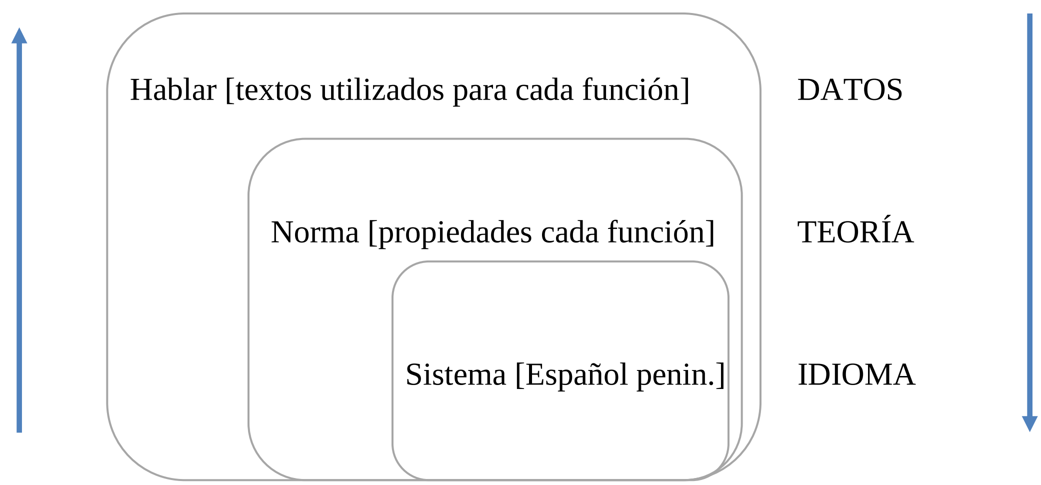


Fig. 1. Relación entre los datos obtenidos en los experimentos, la teoría y la descripción del idioma como sistema. Adaptado de Coseriu (1973 [1952]).

Los datos obtenidos de cada hablante —lectores participantes— son muestras individuales que reflejan la asimilación de un conjunto de propiedades —teóricas— de cada función, aceptados por todos como comunidad de habla —norma—; estas propiedades, a su vez, están determinadas por las imposiciones del sistema del español peninsular. Los textos leídos, también considerados muestras de habla, se han basado en dichas propiedades teóricas: de ahí que el movimiento en el esquema de la Fig. 1 sea hacia arriba y hacia abajo.

1.3. Objetivos de la investigación

1.3.1. Objetivos principales

Como se ha dicho en §1.1., el principal objetivo de este trabajo es delimitar el funcionamiento de la reformulación frente a otras funciones discursivas cercanas ─paráfrasis, conclusión y corrección─ desde una perspectiva experimental, basada en experimentos de lectura controlada con la tecnología *eye-tracking*. La aplicación de este método experimental complementa las diferentes posturas teóricas relacionadas con el problema de la reformulación y sus límites, en punto muerto según demuestran las últimas publicaciones (Pons 2013, 2017; Murillo 2016). Los resultados obtenidos, por tanto, no pretenden sustituir las ideas teóricas que constituyen la base de la reformulación, sino enriquecerlas y ser una herramienta para poder decantar la explicación hacia una dirección u otra. El cruce de perspectivas teórica y experimental beneficia a ambas: por un lado, consolida un proceso empírico de validación teórica utilizado hasta el momento con partículas focales (Loureda et al. 2013; Loureda et al. 2017; Cruz Rubio ─en proceso─) y conectores argumentativos (Nadal ─en prensa─; Sanders y Spooren 2015; Canestrelli et al. 2016; Zufferey et al. 2017), pero no con marcadores de reformulación; por otro, abre el campo de la reformulación a nuevos tratamientos, algo que refleja su interés como objeto de estudio no solo para la semántica y pragmática teóricas, sino también para el campo experimental.

Un segundo objetivo consiste en describir el rol de los marcadores discursivos en los procesos de reformulación. Este es otro punto de interés presente en la bibliografía: la revisión de trabajos refleja que algunos autores (Rossari 1990, 1994; Gülich y Kotschi 1995) describen los marcadores de reformulación como indispensables para que una reformulación pueda ejecutarse (§2.2.3 y §2.3.2); otros defienden su utilidad como marca formal para resaltar una relación de reformulación entre contenidos que, sin embargo, ya existe desde que el mismo hablante desea modificar su discurso mientras lo produce (Roulet 1987; Noren 1999). Los datos experimentales obtenidos arrojan luz sobre este aspecto en dos sentidos: uno concreto, por el que se comprueba hasta qué punto la presencia o ausencia de marcador discursivo afecta al procesamiento de la función analizada; y uno general, midiendo cuál es el significado procedimental de un marcador discursivo, un rasgo aceptado en la bibliografía sobre marcadores (Schiffrin 1987; Blakemore 2002) (§2.2) pero todavía no probado mediante parámetros cuantificables.

1.3.2. Objetivos adicionales

Estos objetivos generales se consiguen mediante la realización de los siguientes cinco objetivos adicionales:

1. Establecer exactamente desde cuándo surge este problema de límites entre categorías. Esto se hará mediante la revisión crítica de algunos de los trabajos más importantes dentro del campo de la reformulación (Gülich & Kotschi 1983; Charolles & Coltier 1986; Roulet 1987; Adam & Revaz 1989; Blakemore 1993; Fuchs 1994; Flottum 1994; Gülich & Kotschi 1995; Blakemore 1999; Noren 1999; Apotheloz 1999; Cuenca 2001; Ciapuscio 2003; Bach Martorell 2009, entre otros). Se han extraído los fragmentos informativamente más relevantes para hacer exégesis de sus contenidos y trazar la ruta de cambios en las definiciones según cada autor.

2. Delimitar los rasgos de los marcadores de reformulación en general, y los de *o sea* en particular, poniendo especial atención en su polifuncionalidad. Esto se ha hecho revisando los principales trabajos sobre marcadores discursivos en el ámbito nacional e internacional (Zwicky 1985; Schourup 1999; Bazzanella 1986, 1995; Schiffrin 1987; Blakemore 1987, 1996, 2002; Fraser 1990, 1999, 2009; Schwenter 1996, 2000; Fischer 2006; Fuentes 1987, 2009, 2012; Cortés Rodríguez 1991, Casado 1991, 1993; Briz Gómez 1993; Portolés 1993, 1998, 2010; Hansen 1998; Haselow 2011; Pons Bordería 1994, 1998, 2006, 2008; Martín Zorraquino 1999; Martín Zorraquino y Montolío Durán 1998; Briz et *al.* 2003; Cuenca 2006; Briz, Pons y Portolés 2008; Loureda y Acín 2010; Cuenca 2013; Llopis Cardona 2014; Tanghe 2016; Lopes Macário 2016).

3. Delimitar correctamente todas las propiedades de un experimento con *eye-tracking*. Para ello, se ha llevado a cabo una revisión exhaustiva de las referencias básicas en este campo (Kennedy 1987; O'Regan 1990; Duffy 1992; Clifton 1992; Ferreira, Apel & Henderson 2008; Pollatsek 1993; Rayner 1984, 1995; Reingold 2003; Reichle, Rayner y Pollatsek 2003). Se han presentado los principales conceptos relacionados con los movimientos oculares y su duración para facilitar su tratamiento en el capítulo de metodología.
4. Diseñar material experimental y programar un experimento sobre paráfrasis, reformulación, conclusión y corrección que refleje, del modo más fidedigno posible, el funcionamiento de estas categorías funcionales, de sus respectivas estructuras y, también, de sus marcadores discursivos. Para conseguirlo, se han elaborado enunciados con el marcador discursivo *o sea* y sin este. Considerar enunciados con y sin marcador discursivo permite llegar a resultados que expliquen las cuatro funciones onomasiológica y semasiológicamente, separando con claridad ambos enfoques y evitando generalizaciones problemáticas.
5. Plantear las hipótesis de investigación que esta tesis pretende resolver. Estas hipótesis parten de una base teórica relacionada con el problema de límites entre reformulación, conclusión y corrección, y tienen un reflejo directo en el análisis de los datos obtenidos: estos intentan dar respuesta a cada una de las hipótesis estipuladas. Cada hipótesis requiere una justificación y explicación precisas, y debe resolverse en los diferentes apartados del análisis.

Estos objetivos principales y adicionales se alcanzan en diferentes capítulos de esta tesis: mientras los dos principales son transversales para todos los capítulos y se desarrollan principalmente a través del análisis, los adicionales se cubren en capítulos concretos. Estos se organizan como sigue.

1.4. Organización de los capítulos

El capítulo 2 cubre los objetivos adicionales (1) y (2). Presenta una revisión bibliográfica que acota teóricamente la trampa forma-función: por un lado, caracteriza los marcadores discursivos y su polifuncionalidad para así delimitar la naturaleza de los marcadores de reformulación; por otro, se centra en las referencias básicas en el campo de la reformulación para detectar ─a través de una interpretación de sus definiciones de la función y sus marcadores─ cómo y bajo qué circunstancias esta función comienza a confundirse con otras. Por último, el capítulo presenta una descripción del marcador de reformulación español *o sea* y justifica la necesidad de un tratamiento experimental dado un problema teórico como este.

El capítulo 3 engloba el objetivo adicional (3). Muestra una doble vertiente: teórica, por la que se proponen los fundamentos básicos de la pragmática experimental, en general, y de los experimentos de control de movimiento ocular, en particular; y metodológica, por la que se definen todos los conceptos que se tendrán en cuenta en el diseño del experimento y su ejecución posterior.

El capítulo 4 cumple con los objetivos adicionales (4) y (5). Recopila todas las decisiones tomadas para el diseño de los experimentos sobre reformulación y categorías vecinas: debido al carácter novedoso de nuestra propuesta, todos los componentes experimentales deben justificarse minuciosamente. También explica cómo se han creado los enunciados ─tanto críticos como distractores─ y los contextos utilizados en el análisis, teniendo en cuenta diferentes parámetros de diseño morfológicos, sintácticos y semántico-pragmáticos ya testados en el campo de la pragmática experimental. Junto con esta información, el capítulo ofrece el protocolo adoptado para ejecutar los experimentos y, por último, precisa cuál es el tratamiento estadístico que se ha aplicado a los datos experimentales obtenidos.

El capítulo 5 cubre los dos objetivos principales. Presenta los resultados obtenidos en los experimentos con *eye-tracking*. Se divide en cuatro bloques informativos, uno para cada función testada. A su vez, cada bloque se subdividirá en tres tipos de resultados, organizados en dos subsecciones: la cualitativa, que se centra en los patrones visuales de cada experimento de una forma intuitiva; la cualitativa-cuantitativa, que explica la relación entre las funciones y los movimientos que su lectura, con y sin *o sea*, ha generado; y la cuantitativa, que detalla la duración de cada movimiento lector. La triangulación de los tres grupos de datos ha dado lugar a cuatro configuraciones experimentales detalladas en este capítulo. Los datos cualitativos y cuantitativos, tratados estadísticamente con métodos diferentes ─árbol de decisiones (Breiman y Friedman 1984) y modelos mixtos (Baayen 2008; Wood 2011)—, manifiestan cómo se han asimilado paráfrasis, reformulación, conclusión y corrección y, por tanto, se correlacionan directamente con los fundamentos de la reformulación (§2.3), y responden a las hipótesis y preguntas de investigación subyacentes a esta (§4.2.1. y §4.2.2).

En el capítulo 6, finalmente, se presentan las conclusiones generales y particulares de la investigación. Algunas líneas de investigación futuras se dejarán abiertas.

Chapter 1

Introduction

1.1. Point of departure

This dissertation aims to establish limits between reformulation and other neighboring functional categories. As the title reports, the research follows two main approaches: onomasiological and semasiological. On the one hand, it describes reformulation in faces of other similar categories, such as paraphrase, conclusion and correction, which are all part of a functional continuum. Such functions are triggered by a change of discourse orientation ─spoken or written─ in order to facilitate the interlocutors its assimilation (Antos 1982; Roulet 1987). On the other hand, it characterizes the discourse marker *o sea*: this discourse marker is the prototypical reformulation marker expressing such four functions in Iberian Spanish (Briz 2008; Garcés 2010).

Semasiology and onomasiology will be clearly distinguished in the chapters composing this research: defining reformulation ─onomasiology─ is different than describing formal items expressing reformulation ─semasiology─. Still, it does not mean that both onomasiology and semasiology are mutually exclusive: explaining reformulation by analyzing reformulation discourse markers and relating discourse markers with their corresponding function(s) is very common in Linguistics. Notwithstanding, it is important to keep a clear distinction between both approaches to avoid theoretical problems. The characterization of reformulation cannot just depend on descriptions of reformulation markers and their features. In such a case, discourse markers features are generalized as reformulation defining features and, consequently, the level of the form and the function get blended (Pons 2013).

This problem is the so-called *form-function trap* (Pons 2017) and constitutes the point of departure of this dissertation: it is a trap because the features behind the function are confused with those defining the forms addressed. The *form-function trap* is subdivided into two problems:

(i) The limits between reformulation and other similar ─but not equivalent─ functions get blurred;

(ii) Such other neighboring functions are finally subordinated to reformulation and, therefore, new subtypes of reformulation are created.

Both (i) and (ii) difficult the treatment and definition of reformulation: they reflect a semasiological intrusion into the onomasiology. Such current outlook differs from that in original works (Gülich & Kotschi 1983; Roulet 1987), which present clear definitions of reformulation and distinguish the process ─paraphrastic and non-paraphrastic reformulation─ from the set of devices expressing it ─discourse markers, among others─.

1.2. Novelty of the method: a necessary justification

This dissertation adopts an experimental method to solve the form-function trap and put limits between the functions addressed. Experimental methods are a novelty in the research field of reformulation ─or, at least, an exhaustive review of the literature shows that (see §2.3.)─. All the studies on reformulation published up to now are theoretical (Martín Zorraquino & Portolés 1999), corpus-based (Gülich & Kotschi 1995) and contrastive (Nolke 1994; Cuenca & Bach 2007). Concerning the form-function trap, any of the two current theoretical proposals prevails (Pons 2013, 2017; Murillo 2016): Pons's proposal argues for an exclusive treatment distinguishing paraphrase, reformulation, conclusion, and correction; Murillo's proposal aims an inclusive treatment which includes conclusion and correction as subtypes of reformulation (see §2.3.3.). Once to this point, it is necessary to incorporate a triangulation with a method that leads to one or another solution to address reformulation with qualitative and quantitative results is necessary.

The experimental method employed is based on the eye-tracking technology (Rayner 1977; Just, Carpenter & Wolley 1982; Rayner & Sereno 1994). This technology allows to analyze the eye-reactions at receiving different ocular inputs ─video, texts, sentences, words, pictures, and so on─ in various communicative contexts ─reading or interaction─. To do so, it follows the eye-mind assumption (Rayner 1998), which relates the ocular movements ─number, direction and, especially, their duration─ to the difficulty behind processing information. Pragmatics has included such experimental methods to test hypotheses and problems which cannot be solved completely from a theoretical perspective (Duchowski 2007). Studying functions by addressing the assimilation of texts based on the ocular movements produced would seem a complex task (see Underwood 1992 about the acceptability ─or not─ of the eye-mind assumption). This method, however, does not differ from functional linguistics and corpus studies published throughout the last decades. They share in the end the same aim: support theoretical linguistic descriptions with specific data ─in this case, experimental reading data─. In this sense, eye-tracking studies also establish bridges between descriptions of functions ─in Coseriu's terms, how things are said or written with basis in norms within a system (Coseriu 1973 [1952]: 97-98)─ and individuals' production of such functions ─studies on oral and written texts (Coseriu 1973 [1952]: 102)─ (see §2.4.). To do so, eye-tracking studies address how texts expressing concrete functions are processed by readers; their processing is related to the defining features behind such functions and, therefore, to how individuals assimilate the functions. As Godman (1996) and Nelson et al. (2008) suggest that reading:

> (…) is described as the process of constructing meaning from print. From this perspective reading is a transactional interaction between the individual reader and texts for the purpose of making meaning. (Nelson et al. 2008: 294).

In other words, texts are employed to analyze how information and, by extension, properties behind functions expressed in such texts because they also aim at showing some communicative meaning, such as conversations, interviews, or phone-calls. This said, the eye-tracking experimental data employed in this dissertation allow:

(a) Complementing oral-based results;
(b) From a global perspective, complementing theoretical descriptions of such functions ─formulation, digression, focalization, cause-consequence, and so forth.─.

Furthermore, given the theoretical problems underlying this research, and the difficulties in solving them from pragmatic theoretical approaches, an experimental auxiliary approach such as the eye-tracking is thus necessary. In this case:

- Paraphrase, reformulation, conclusion, and correction critical sentences and contexts will be addressed. The reading experiments will focus on their processing to extract a set of cognitive patterns and prove to which extent they should be included or excluded within the category of reformulation (see §2.3.);
- Discourse markers will also be experimentally measured through the effects derived from their presence or absence in establishing each function (see §2.2.).

The data obtained are expected to clarify each function and their status regarding theoretical boundaries. The relevance of experimental data in this research is again justified by the different levels behind language as a system:

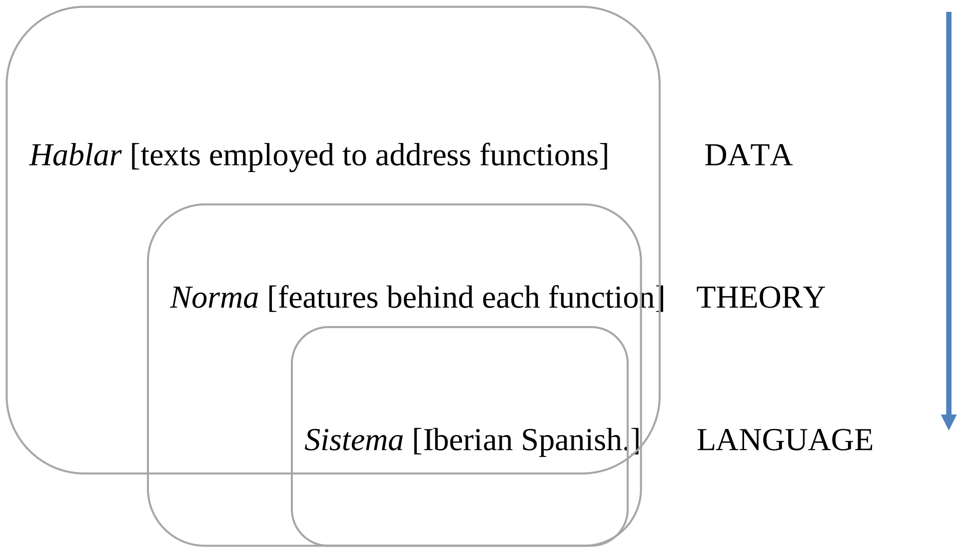


Fig. 2. Relationship between experimental data, theory and language description as a system. Adopted from Coseriu (1973 [1952]).

Fig. 2. shows a bottom-up movement. Speaker's data ─participants in the experiment─ represent individual samples showing the assimilation of a set of ─theoretical─ features for each function which, in turn, are accepted by all members in a linguistic community ─norm─. These features are determined by the system behind Iberian Spanish and its restrictions.

1.3. Objectives of the research

1.3.1. Main objectives

As noted in §1.1., the main aim of this research is to delimit reformulation and other similar discursive neighboring functions ─paraphrase, reformulation, conclusion, and correction─ from an experimental approach based on reading experiments with eye-tracking. Such an experimental method complements the different theoretical perspectives related to reformulation, which are currently deadlock as demonstrated by the studies published recently (Pons 2013, 2017; Murillo 2016). The results obtained will thus not substitute the theoretical ideas underlying reformulation but improve them. The combination of theoretical and experimental approaches benefits both of them: on the one hand, it consolidates an empirical validation process for theory employed before only with focal particles (Loureda et al. 2013; Loureda et al. 2017; Cruz Rubio ─in progress─) and counter-argumentative connectives (Sanders & Spooren 2015; Canestrelli et al. 2016; Zufferey et al. 2017; Nadal 2019) but not with reformulation markers; on the other, it opens reformulation to new treatments. That highlights its potential as object of study not only for Semantics and Pragmatics but also for experimental studies.

A second general objective is to describe the role of discourse markers in establishing reformulation processes. It constitutes another focus of interest explored in the literature: the review of some works shows that several researchers (Rossari 1990, 1994; Gülich & Kotschi 1995) argue that reformulation markers are key in establishing reformulations (§2.2.3 and §2.3.2); others defend they are useful formal marks highlighting reformulation relationships that, however, exist since the speaker aims modifying his discourse while produces it (Roulet 1987; Noren 1999). The experimental data address such an issue in two ways: on the one hand, they will test how the presence or absence of the discourse marker affect the processing of the function analyzed; on the other, they will measure the procedural meaning behind discourse markers, a commonly accepted but not quantitative tested feature (Schiffrin 1987; Blakemore 2002) (§2.2).

1.3.2. Additional objectives

The following five additional objectives allow reaching the two general ones:

I. To find out the form-function trap trigger in the literature ─in other words, to detect when researchers define reformulation by including features from other functions─. To do so, a critical review of some main works in the field of reformulation is made (Gülich & Kotschi 1983; Charolles & Coltier 1986; Roulet 1987; Adam & Revaz 1989; Blakemore 1993; Fuchs 1994; Flottum 1994; Gülich & Kotschi 1995; Blakemore 1999; Norén 1999; Apotheloz 1999; Cuenca 2001; Ciapuscio 2003; Bach Martorell 2009, among others). Relevant informative excerpts have been extracted and interpreted to detect changes by authors.

II. To delimit reformulation markers features in general and of *o sea* in particular, with a special focus on their polyfunctionality. To do so, some main studies on discourse markers have also been reviewed (Zwicky 1985; Schourup 1999; Bazzanella 1986, 1995; Schiffrin 1987; Blakemore 1987, 1996, 2002; Fraser 1990, 1999, 2009; Schwenter 1996, 2000; Fischer 2006; Fuentes 1987, 2009, 2012; Cortés Rodríguez 1991, Casado 1991, 1993; Briz Gómez 1993; Portolés 1993, 1998, 2010; Hansen 1998; Haselow 2011; Pons Bordería 1994, 1998, 2006, 2008; Martín Zorraquino 1999; Martín Zorraquino y Montolío Durán 1998; Briz et *al.* 2003; Cuenca 2006; Briz, Pons y Portolés 2008; Loureda y Acín 2010; Cuenca 2013; Llopis Cardona 2014; Tanghe 2016; Lopes Macário 2016).

III. To delimit all properties of an eye-tracking experiment. To do so, basic references in the field have been addressed (Kennedy 1987; O'Regan 1990; Clifton 1992; Ferreira, Apple & Henderson 2008; Pollatsek 1993; Rayner 1984, 1995; Juhasz y Rayner 2003; Reingold 2003; Reichle, Rayner & Pollatsek 2003). Main ocular-movements and temporal notions are detailed to facilitate their treatment in the Chapter 4 (methods).

IV. To design experimental materials and programming an experiment about paraphrase, reformulation, conclusion, and correction. Such experiments should reflect how these functions work ─structure, meanings, discourse markers, etc.─. To do so, critical sentences with and without a discourse marker are prepared. It will allow to distinguish onomasiological and semasiological results, avoiding possible theoretical problems.

V. To propose research hypotheses to be solved in this dissertation. Such hypotheses should be based on the theoretical framework in Chapter 2 and the different related problems. Each hypothesis requires precise justifications and explanations.

These general and additional objectives are attained in different chapters: the two general objectives transverse all chapters ─namely in Chapter 5─; additional objectives are addressed in specific chapters. They are organized as follows.

1.4. Organization of chapters

Chapter 2 addresses additional objectives (1) and (2). It focuses on the form-function trap by reviewing several basic references: on the one hand, discourse markers and their polyfunctionality are described to delimit reformulation markers appropriately. On the other, some main studies on reformulation are reviewed to detect how and when this function starts to be confused with others; to do so, definitions of reformulation and reformulation markers are interpreted. Finally, the chapter establishes a bridge between reformulation and experimental pragmatics; after explaining benefits of its application, the defining features behind *o sea*.

Chapter 3 covers the additional objective (3). It shows a theoretical-methodological approach: theoretical since the main ideas on experimental pragmatics are established; methodological since it defines all the notions required for the experimental design and the data interpretation.

Chapter 4 accomplishes additional objectives (4) and (5). This chapter gathers all the decisions adopted to design the experiments. Because of the novelty of this research, all experimental parameters should be justified in detail. It also focuses on the design of critical sentences and contexts; together with this information, the chapter proposes the protocol adopted in the experiments and focuses on the statistical treatment (decision trees, linear regression mixed models) applied to the raw experimental data obtained.

Chapter 5 addresses the two general objectives of this thesis. It presents the eye-tracking experimental results obtained. The chapter is subdivided into four main blocks ─one per function─ which, in turn, are divided into three subsections depending on the results offered: qualitative, focusing on eye-movements; qualitative-quantitative, based on decision trees testing such eye-movements; and quantitative-qualitative, based on the temporal reading time values retrieved. The triangulation of such three types of result allows to answer the research questions and hypotheses proposed in Chapter 4.

Chapter 6 finally presents general and particular conclusions derived from the analysis; some future research guidelines are also suggested.

Chapter 2

Reformulation and reformulation discourse markers: defining the form-function trap

2.1. Introduction

As noted in 1.1. studies on reformulation have usually described this function by analyzing reformulation discourse markers (Fløttum 1994; Gülich & Kotschi 1995). However, given that discourse markers are polyfunctional (Fischer 2006), studying reformulation by addressing reformulation markers results in definitions based on the functions they express ─reformulation markers do not only express reformulation but also conclusion, correction or explanation (Garcés 2008)─. Such kind of characterization leads to what has been called form-function trap (Pons 2017) and reflects a semasiological intrusion into the onomasiological level: features retrieved from forms ─reformulation markers─ are generalized to the level of function ─reformulation─. As a result, the other functions of reformulation markers can be improperly classified as subtypes of reformulation, and this blurs the limits of reformulation as function (see §1.1.1. and §1.1.2.).

This chapter focuses on the form-function trap in reformulation to (i) explain what is, (ii) to show how it works, and (iii) to solve it. These three aims will be attained in four sections (§2.2. to §2.4.) based on the following research questions concerning reformulation markers and reformulation:

a) Why the polyfunctionality of discourse markers influences the loss of theoretical boundaries of reformulation (§2.2.);
b) When research on reformulation first changed definitions of reformulation to introduce definitions based on reformulation markers (§2.3.);
c) Which theoretical issues are derived from a lack of boundaries to distinguish reformulation from other functions (§2.3.)
d) How to solve the form-function trap with a new approach complementing the theoretical groundwork on reformulation (§2.4.)

Questions a) to d) will allow to explain and solve systematically the form-function trap. Section 2.2. will summarize the basic features of discourse markers found in the literature (§2.2.1.), with special attention to their polyfunctional character (§2.2.2.) as a trigger of the form-function trap ─especially in reformulation discourse markers (§2.2.3.)─.

Section 2.3. will focus on reformulation markers and their role in studies on reformulation. It will meta-analyze some representative works on reformulation published since the mid-80s. These works will show all changes in definitions of reformulation due to the use of polyfunctional reformulation markers. Such review will be subdivided into three subsections: §2.3.1. focuses on first works based on clear definitions for reformulation; §2.3.2. addresses subsequent works offering definitions of reformulation more determined by reformulation markers; §2.3.3. closes the section by gathering all the issues derived from the form-function trap. To do so, it reviews the Pons-Murillo's polemic (2013-2016-2017) as the most recent proposals related to this problem.

Finally, section 2.4. will present the benefits of applying an eye-tracking experimental approach to solve the form-function trap (Rayner 1980; Holmqvist *et al*. 2011). Experimental approaches become necessary when the theory cannot be decisive in solving theoretical issues (§2.4.1.) [2]. Concerning reformulation, some researchers argue for characterizations of this function based on its reformulation markers[3]; others, however, disagree[4]. Both researchers in favor or against these characterizations offer a series of legitimate arguments: their proposals can be accepted or refused, but none of them can cancel other. Experimental pragmatics create a bridge between theory and cognition to solve the form-function trap by introducing quantitative and qualitative data triangulation (§2.4.2.). To do so, an eye-tracking experiment based on the presence-absence of *Sp. o sea* will be designed: this reformulation marker is the most appropriate to accomplish these purposes (§2.4.3.).

[2] The use of eye-tracking methods to solve reformulation issues is innovative: there are no references in the literature accounting for reformulation or any of the issues mentioned here, except for Loureda & López Serena (2013): both authors propose an experimental pilot study focused on how 16 Spanish naïve speakers process utterances with and *without o sea* in a reading eye-tracking experiment─. Eye-tracking methods allow to complement the theoretical groundwork published in the last thirty years and help researchers in deciding on the best approach to reformulation. Schröck (2018) also proposes an experimental approach to the reformulation marker *es decir* in her Master dissertation: in her work, proposed after this dissertation, only PR and NPR are addressed; conclusion and correction does not.

[3] (Gülich & Kotschi 1995; Charolles & Coltier 1986; Murat & Carter-Bresson 1987; Roulet 1987; Rossari 1994; Schwenter 1999; Del Saz 2003; Murillo 2007; Bach 2009).

[4] (Pons 2013; 2017; Briz & Pons 2010; Borreguero & López Serena 2010)

To sum up, §2.2. aids to understand polyfunctionality in discourse markers and their role in the form-function trap; §2.3. explains the form-function trap and its development in reformulation studies; and §2.4. jumps from theory to the experiments to triangulate them and decide for the best approach to reformulation and reformulation markers. exemplifies the form-function trap by describing the prototypical reformulation marker in Spanish. Together, all five sections form the basis for the methodology (§4.1. to §4.4.) and the analysis (§5.1. to §5.4.) of this dissertation.

2.2. Definition and features of discourse markers

Discourse markers have been described by multiple seminal references[5] since their consolidation as object of study in Linguistics (Halliday and Hasan 1976; Zwicky ─1985─; Schourup ─1999─, Bazzanella ─1986─, Schiffrin ─1985, 1987─, Blakemore ─1987, 2002─; Fraser ─1990, 1999, 2009─; Schwenter ─1996, 2000─; Fischer ─2006─; Fuentes Rodríguez ─1987, 2009, 2012─; Cortés Rodríguez ─1991─; Casado ─1991, 1993─; Briz Gómez ─1993, 1998─; Portolés ─1993, 1998, 2010─; Hansen ─1998─; Haselow ─2011─; Pons Bordería ─1994, 1998, 2006, 2008─; Martín Zorraquino & Portolés ─1999─; Cuenca ─2006─; Briz, Pons & Portolés ─2008─; Loureda and Acín ─2010─; Tanghe ─2016─; Crible ─2018─). Researchers show little consensus on proposing a systematic set of definitions, features, classifications and labels[6] (Fischer 2006) for discourse markers.

There is, however, a common feature all works provide: discourse markers are polyfunctional, that is, they are forms related to several different interpretations ─or meanings─ (Hansen 2008: 34). Such polyfunctionality has been also addressed from different approaches: homonymic (Jucker 1993), monosemic (Fretheim 2000) and

[5] Descriptions of discourse markers have also been made from many different research domains: Diachrony (Traugott 1995; Jucker 1997; Pons 2010); oral vs. written (Adam 1987; Briz 1993a, 199b; López Serena and Borreguero 2010); types of discourse (García Domínguez 2010; Fuentes 2010); contrast between languages (Aijmer and Simon-Vandenbergen 2003); second language acquisition (Andorno and Rosi 2016; Recio -in progress-); language processing (Loureda et al. 2013; Loureda and Nadal 2016; Godfroid 2012); language disorders (Gallardo & Marín 2005); discourse positions (Briz and Pons 2010; Montañez Mesas 2015; Tanghe 2016; Salameh, Estellés and Pons 2018); prosody (Cabedo 2009; Hidalgo 2010; Beliao 2013), among others.

[6] Other labels besides Discourse marker are Pragmatic marker (Fraser 1999; Cuenca 2008), Discourse particle (Schourup 1985; Fischer 2006; Briz, Pons & Portolés 2008), Operator (Portolés 1998; Fuentes 2003; Brinton 2008), Connective (Roulet 1987; Briz 1993; Ducrot 1993), Modal particle (Diewald 2006; Haselow 2011), or Discourse relational device (Crible 2018), to name but a few.

polysemic (Travis 2006). All three approaches argue for a concrete explanation on how the functions expressed by discourse markers are acquired and interrelated (Hummel 2012). The following subsections (§2.2.1. and §2.2.2.) review the main ideas published in the seminal discourse markers references above-named. This information ─specifically that concerning polyfunctionality─ will be useful to explain in §2.3. the semasiological intrusion into onomasiology in reformulation and understand why functions and discourse markers are confused in the literature.

2.2.1. Definition and features

Generally, discourse markers are defined as “nonpropositional and metadiscursive linguistic items providing instructions to speakers and hearers” (Hansen 2006: 25) without affecting “the truth-conditional meaning of the utterance” (Lewis 2006: 44)[7]. Some of the instructions they codify are:

(i) Orienting speakers in retrieving inferences (Portolés 2004: 288) for the production and comprehension of extended discourses (Schourup 1999: 228);

(ii) Facilitating the establishment of textual cohesion and coherence by aiding inferences serving to relate parts of texts and integrating the information given (Van Dijk and Kintsch 1983: 91);

(iii) Highlighting strategic signals in social interaction, modal processes (Pons 2006: 86-87), and the structuration and progression of conversations (Briz & Hidalgo 1998: 123).

Instructions (i) to (iii) contribute to assimilate contents, stances, attitudes and interaction during communication, and to relate different kind of contents within the discourse structure[8]. These instructions, in turn, are related to various communicative functions:

---

[7] First works described discourse markers as residual categories of the usual ‘miscellaneous’ type (Halliday and Hasan 1976: 267).

[8] Discourse markers are directly related to discourse production. Schiffrin (2006: 4-5) distinguishes three main parts of discourses where discourse markers work:

a) Within sentences: discourse markers can mark “how parts of core grammar and marginal grammar are related to the larger textual units in which they occur and their respective contexts”.

formulation, digression, mitigation, evidentiality, epistemics, approximation, argumentation or reformulation (Martín Zorraquino & Portolés 1999). These functions allow speakers to display their evaluation of contents and the way they are put together (Traugott 1995: 1). Observe instructions (i) to (iii) in examples (1) to (3):

(1) Creo que mañana seguiré enfermo. **Por tanto**, no acudiré al trabajo.

(2) El ministro quedó muy conforme con la solución que le dimos y en la que tú colaboraste, muy eficazmente por cierto, y ello por dos razones: **en primer lugar**, porque rápidamente quedó resuelto el caso de forma oficial y definitiva. **En segundo lugar**, porque evitaba la politización del asunto.

(3) **Oye** ↓ ¿te ha gustado la cena que he preparado?

In example (1), *por tanto* expresses a basic instruction: the second utterance is a conclusion derived from the first one. In this case, the discourse marker orientates in extracting the conclusion, based on a contextual inference. In example (2), *en primer lugar* and *en segundo lugar* express another instruction: distribute the attention on the contents in the order forced by such markers and assimilate both arguments as relevant. They provide the text with cohesion and coherence and organize contents so as to communicate a clear message. Finally, in example (3) *oye* expresses a double instruction: put your attention on me and put your attention on my message. Such discourse marker highlights the interpersonal relationship between speakers.

Examples (1) to (3) show how instructions (i) to (iii) work. Items such as *por tanto*, *en primer/segundo lugar* or *oye* "are not susceptible to be analyzed as any other traditional grammatical category such as sentences, nouns or propositions" (Fraser 1990: 388). Discourse markers, thus, "must be understood and described in their own right" (Heine 2013: 1207): their communicative specialization requires functional descriptions (Waltereit

---

b) Texts: discourse markers mark how "sequences of sentences are linearly and hierarchically structured".

c) Contexts: discourse markers highlight that "language is part of larger systems of meaning and practice. They serve to face-to-face interaction, social gatherings, societies, cultures, identities, and so on".

2006: 64) complemented by a set of formal features which also go beyond grammatical boundaries. Such features are the following:

Prosodic features[9]

a) Discourse markers have their own prosodic contour; that is, they are preceded and followed by pauses (acoustic pauses in conversations; graphic pauses in texts) (Zwicky 1985: 303; Schiffrin 1987: 328; Danon-Boileau et al. 1991: 113; Schourup 1999: 236; Briz & Hidalgo 1998: 129; Cabedo 2013: 203).

b) Functions of discourse markers and their prosodic features are interrelated: their pitch, tone, F0, or intonation distinguish different meanings in discourse markers (Komar 2007: 48; Hidalgo 2010: 71-72; Tanghe 2016: 265-266; Estellés 2017: 242-249).

Morphological features

c) Discourse markers are a functional category composed by expressions from other traditional categories, such as verbs, nouns, adjectives, adverbs, conjunctions, prepositions, and so on[10] (Fraser 1990: 383; Briz 1993: 40-44; López Serena & Borreguero 2010: 436).

---

[9] The prosody of discourse markers has not been addressed during decades in the literature: initially, discourse markers were morphosyntactically and semantically described; only a few intuitive assessments for the prosody of discourse markers were noted (Hidalgo 1997; Morel 1998). Such works described discourse markers as isolated terms whose prosody reflects various procedural/communicative meanings. Current works, however, are not intuitive but experimental-based: specialized software tools help at confirming or refusing hypotheses regarding the relationship between functions and the prosodic features of discourse markers (Martín Butragueño 2006; Cabedo 2009, 2014, among others).

[10] There are different categories included or excluded within the group of discourse markers depending on the approach adopted to describe them. Schiffrin (1987: 327) includes a wide range of items under discourse markers, such as particles ─oh, well─, conjunctions ─and, but, or, so, because─, time deictics ─now, then─, and lexicalized clauses ─y'know, I mean─. Traugott (1995) includes discourse deictics ─there, here─, literal used phrases ─to repeat, what I mean to say, similarly, overall─, idiomatic phrases ─while I have you, still and all─ verbs ─look, see─, interjections ─well─, or adverbials ─now, then, still─ when they work discursively. Fraser (1990: 390-393) excludes interjections ─oh, ahem─, vocatives ─You, Sweetie, Doctor─, commentary adverbs ─certainly, frankly, amazingly─, and other such as because or y'know due to their 'traditional' character (Fraser 1999: 942).

d) Discourse markers have an inflected morphology: unlike grammatical words, they have no grammatical number[11] ─singular or plural─ or gender ─masculine, feminine or neutral─ (Zwicky 1985: 289; Schourup 1999: 241; Martín Zorraquino & Portolés 1999: 4059; Martín Zorraquino 2010: 99).

e) Discourse markers cannot be the focus of negations (e1), pronominal substitutions (e2) or interrogations (e3) (Schourup 1999: 235; Martín Zorraquino 1998: 37;):

(e1) No pues es divertido*

(e2) El examen fue fácil; así, tenía preguntas que me sabía muy bien*

(e3) ¿Pues? Es divertido*

Syntactic features[12]

f) Discourse markers relate "utterances or other discourse units". The contents discourse markers connect determine the perspective adopted by researchers: utterances (Fraser 1990, 1999; Traugott 1995; Hansen 1998; Schwenter 1996; Schourup 1999); units of talk (Schiffrin 1987); discourse units (Jucker 1993); discourse segments (Redeker 1990); speech acts or prosodic cues (Erickson 1979) to name but a few.

g) Discourse markers highlight coherence (Schiffrin 1987; Fraser 1990, 1996; Schourup 1999) or discursive processes (Briz 1998; Pons 2001; Loureda & Acín 2010; Briz & Pons 2010; Salameh, Estellés & Pons 2018). Coherence-based discourse markers show relationships between the basic message and the foregoing discourse (Fraser 1990: 389); discourse-based markers show a broader

[11] Discourse markers based on verbs can vary on the person or number in Spanish. Such variation, however, is also restricted: as Tanghe (2016) or Marin (2005) note, such discourse markers alternate between the second person in singular (mira, oye) and the second formal person (mire, oiga).

[12] The non-propositional status of discourse markers is directly related to other main feature: their nonsentential syntax (Martín Zorraquino 1998: 19). Discourse markers "are independent of the sentential structure" (Schiffrin 1987: 32). As discursive items (Briz 2006), their scope cannot be grammatical: they connect different contents and the notion of *position* is also discursive (see Montañez Mesas 2015 for further details).

scope encompassing modal and interpersonal functions besides textual coherence; given that discourse is not constituted by language only ─the context must also be considered─ connectivity can also pertain to relations between the host utterance and its context (Hansen 2006; Fischer 2006).

h) Discourse markers occupy various positions [13] within the discourse: they typically are placed at utterance-initial position (h1), but also at utterance-internal (h2) or utterance-final (h3) (Schiffrin 1987: 328; Fraser 1990: 389; Briz 1993: 158; Briz & Estellés 2009)[14].

(h1) **oye**/ soy mayor! Y también me gusta pasármelo bien

(h2) pues sí señor **oye**/ de verdad

(h3) síi [aah! ((también me gusta)) **oye**=

i) Discourse markers can be combined with other discourse markers (Vicher & Sankoff 1989; Pons 2008; Cuenca 2008; Fraser 2015; Lohmann & Koops 2016; Pons 2018). Combinations are more than adjacent or lexicalized discourse markers; they lead not only to a formal, but a functional integration of the items related:

(i1) **Yo qué sé pues** no sé cómo saldrá el examen

(i2) Tío pero qué TE PASA // ¿Estás bien?

Semantic features

j) Discourse markers present a reduced or void lexical meaning (Hansen 2006: 83; Weydt 2006: 206) after losing their original meaning due to language change

[13] The positional variation of discourse markers is interrelated with the loss of semantic meaning throughout their evolution (Traugott 1997; Traugott & Dasher 2002).

[14] Fraser notes that "defining what constitutes an utterance and hence what is utterance-initial/internal/final is problematic". Such problem has been addressed from the research field of Discourse Analysis. There are various discourse segmentation models focused on the importance of dividing discourses into units and subunits to detect structural relationships they share: Roulet *et al.* (1985); Roulet (1991, 2001); Cresti (2003); Ferrari *et al.* (2008); Briz and Val.Es.Co. Group (2003; 2014). When discourses are divided the notion of position in discourse markers become clearer. See Pons Bordería (2014) for a complete review of such models of segmentation.

processes (Traugott & Trousdale 2013: 22). They rather express a set of instructions on how the contents introduced must be interpreted[15]. The less lexical-based, the more relational meanings discourse markers will acquire (Yang 2006: 268) ─e.g. *oh* in English derives its meaning from the context and prosody (Schiffrin 1987: 328; Heritage 2018: 158-162)─.

k) Discourse markers are optional: because of their nonpropositional meaning (Hansen 2008), discourse markers can be removed without altering the grammaticality of its host sentence (Fraser 1988; Murillo 2010). However, their presence in discourse avoids possible misleads and reinforces the interpretation intended by the speaker (Schourup 1999: 232)

This set of prosodic, morphologic, syntactic, semantic, textual and distributional features (Pons 1998: 57) prompts participants to infer further information besides what has been explicitly said in a discursive procedure. They complement any basic definition of discourse markers and are key in understanding how they work.

However, not all the features presented above are indispensable to keep the status of discourse marker: some of these features are prototypical and others peripheral depending on the nature of the discourse markers addressed (Pons 2001; Cuenca 2013; Tanghe 2016). The only defining feature shown by all the discourse markers is their polyfunctionality ─or multifunctionality─ (Lewis 2006). The next subsection (§2.2.2.) explains the different approaches to the polyfunctionality of discourse markers found in the literature and raises its relationship with reformulation markers.

2.2.2. The polyfunctionality of discourse markers

Discourse markers are polyfunctional: they operate on several levels simultaneously; in other words, they express different meanings depending on the semantic-pragmatic context

[15] Some discourse markers keep part of their original propositional meaning (e.g. I mean, you know); others do not (e.g. oh) (Schiffrin 2006: 14). In any case, discourse markers will never be full lexical items given that they are discourse-oriented.

(Schiffrin 2015: 62; Bazzanella et al. 2007: 10)[16]. The following examples ─extracted from Estellés (2008)─ show how polyfunctionality works in the Sp. discourse marker *bien*:

(4) Pero, por ejemplo, lo del tema de la convocatoria de diciembre era curioso, ¿no?, para que veas también el otro lado, el pasotismo también que hay por el colectivo universitario, ¿no? **Bien**, una la convocatoria de diciembre nos afecta a todos, es un tema que nada más decimos ¡oye, que nos la quitan!, que saltamos, y en la manifestación frente al Rectorado éramos doscientos, si llegábamos, ¿sabes? (M.R. Alonso Ibáñez, "Accesibilidad en los espacios públicos").

(5) Sí, Gonzalo tuvo suerte. Suerte de ser cómo era. Suerte de tener apoyos firmes y estimados a su alrededor. Suerte de que los Estréchez probablemente no fueran tan mala gente. Sobre todo, suerte de apoyar su fortuna. **Bien**, hasta aquí hemos presentado las piezas del puzle que conforman el proceso del estrés. Nuestro próximo objetivo será encontrar el lugar de cada una (Á. Enríquez Soriano, Estrés. Cómo aprender en la encrucijada).

(6) (Tras la presentación de un ponente en un congreso, el ponente inicia su discurso) **Bien**. Pues… Muchas gracias a todos. Vamos a tener ocasión a lo largo de la jornada de poder seguir debatiendo. No se preocupen todos aquellos que quisieran formular preguntas, va a haber ocasión, insisto, a lo largo de la jornada. (M.R. Alonso Ibáñez, "Accesibilidad en los espacios públicos").

(7) ─ ¿Es posible la libertad a prueba aplicarla, empezar a aplicar la libertad a prueba en España? ¿Resolvería algo el hacinamiento en las cárceles?
─ **Bien**, es que esa pregunta así formulada, así ya, es imposible, porque la libertad a prueba necesita unos instrumentos, necesita unos esquemas de funcionamiento. (Oral, España, CREA, 1999).

[16] Polyfunctionality (Pons 2006: 79) can also be read at two levels: "first, at the type level, discourse markers are polyfunctional if they convey different meanings ─*but* expresses contrast and disagreement─; second, at the token level, discourse markers display different functions at different discourse levels ─in a given context, a token of English *but* can express contrast at the sentence level and, at the same time, disagreement at the interactional level".

Examples (4) to (7) show different functions for this discourse marker in different contexts and positions[17]: in example (4), *bien* serves to mark how the speaker comes back to a previous idea after a digression; in example (5), it closes the discourse after a series of comments; in example (6) the speaker starts the discourse with *bien* after being presented by other person; and in example (7) *bien* marks a refusal of what has been said by another speaker (7).

There are three general approaches to such polyfunctionality in the literature: homonymy, monosemy and polysemy (see Hansen 1998, 2006, and 2008 for a fully review)[18]:

- Homonymy argues for a number of readings ─meanings─ that are identifiable and listed as distinct in different defining entries (Jucker 1993: 437): these meaning lists are sometimes associated with their conditions of usage. In such cases, no relationship between readings is assumed (Fischer 2006: 13)[19].
- Monosemy defends that discourse markers cover a complete procedural meaning ─core meaning (Fretheim 1990)─ based on one basic instruction ─e.g. argumentative, formulative, and so on─. This basic instruction is contextually enriched: as a result, various particular discursive uses are developed (Portolés 2001). These uses, however, are secondary (Portolés 1998: 85; Pons 2004: 54)[20].
- Polysemy assumes that "words may indeed have different senses which are not merely a matter of pragmatics" but that "are related" (Hansen 1998: 241; Lewis 2006: 52). Polysemic approaches account better for the rise of the various functions

[17] See all the function expressed by bien in Spanish in Bien1, Bien 2 and Bien 3 ─DPDE (Estellés 2008)─.

[18] All three approaches are valid in the literature, but the choice of one or another must be constant so as to present coherent results in the research (Murillo 2010: 264).

[19] Hansen (2006) finds homonymy an unsatisfying explanation of polyfunctionality: "For one thing, it seems particularly prone to conflate the coded meaning of a given marker with the situated interpretations of the utterances in which that marker appears. Secondly, it is inherently unable to explain the frequently quite robust intuition (often supported by diachronic data) that the so-called homonyms are nevertheless somehow semantically related" (Hansen 2006: 24).

[20] In monosemic approaches semantics has very little work to do (Hansen 1998): "monosemic descriptions are too abstract and general to be significant practical value, especially, if a unitary analysis of cross-categorial items is attempted. Moreover, the minimalist approach is unable to explain the diachronic fact that the meanings of linguistic elements frequently evolve over time, such that new uses may be added, while certain others may fall into obsolescence (…)" (Hansen 1998: 240).

that discourse markers historically develop because it considers the possible relationships the functions share (Waltereit 2006: 71).

Regardless the approach adopted, it is assumed that all discourse markers are always polyfunctional in both oral (Montañez Mesas 2015: 26) and written discourses (Schourup 1999: 234). One of the most polyfunctional group is that of reformulation markers[21] (Portolés 1998; Martín Zorraquino & Portolés 1999; Domínguez García 2007; Briz, Pons & Portolés 2008; Pons 2008; Loureda & Acín 2010; Borreguero & López Serena 2010; Borreguero 2015, among others). Reformulation markers express further functions expressed by discourse markers included in other categories[22] ─cause-consequence, conversational modality, formulation─: their polyfunctionality makes them most suitable items to study different functions in a general way; this, however, involves descriptive issues (see 2.3.3.). The polyfunctionality, features and some descriptive problems behind reformulation markers are next reviewed (2.2.3.).

2.2.3. Reformulation markers

Reformulation markers are commonly employed to reformulate across languages (Rossari 2000: 110; Gülich & Kotschi 1983: 315)[23]. Several seminal references (Gülich & Kotschi 1983, 1987, 1995; Charolles & Coltier 1986; Murat/ Carter-Bresson 1987; Roulet 1987; Adam & Revaz 1989; Blakemore 1993; Vázquez Veiga 1994; Schwenter 1999; Del Saz 2003; Murillo 2007; Bach 2009) define reformulation markers[24] as items indicating that the

[21] Discourse markers are classified into different categories systematizing their defining properties and the wide number of semantic-contextual functions they cover. Most of classifications generally include five general categories: (i) informative markers, (ii) connectives, (iii) argumentative operators, (iv) reformulation markers and (iv) conversational markers categories (Martín Zorraquino & Portolés 1999: 4083). Reformulation marker is commonly accepted in the literature.

[22] Discourse markers are included within one of these categories depending on their predominant functions, but they can express further functions covered by other categories ─e.g. Spanish *bueno* is classified as a conversational marker, but it can also reformulate in several contexts─. Categories, thus, are not discrete, and their discourse markers can fit into various

[23] The interactive relationship underlying reformulation, however, can be addressed as an argumentative procedure and, therefore, reformulation markers can be argumentatively analyzed ─e.g. Ducrot (1980), Schelling (1982), López Alonso (1990) or Briz (2002)─ (Flores Acuña 2003: 165).

[24] There are further formal marks besides discourse markers employed to highlight reformulations in oral and written discourses (Gülich & Kotschi 1995: 42): syntactic equivalences, lexical items, repetitions (Gülich & Kotschi 1983: 308), punctuation marks, parentheses or quotation marks (Adam & Revaz 1989: 88-89; Bach

new utterance ─henceforth, M2─ is the best option to express again the idea(s) previously formulated ─henceforth, M1─ (Rossari 1994). They are guides reflecting how discourses are being construed and how formulation obstacles are solved (Gülich & Kotschi 1995).

Such seminal references also classify reformulation markers in various subgroups based on their semantic instructions. There are four general subtypes of reformulation markers in Spanish ─see Table 1 based on Martín Zorraquino & Portolés (1999: 4122-4139)─:

REFORMULATION MARKERS	**Explanation markers**: M2 is presented as an explanation of M1.	o sea, es decir, esto es, a saber, en otras palabras, etc.
	Rectification markers: M2 is presented as a correction of M1.	mejor dicho, mejor aún, más bien, digo, etc.
	Detachment markers: M2 is presented as a more accurate expression of M1.	en cualquier caso, o sea, en todo caso, de todos modos, etc.
	Recapitulation markers: M2 is presented as a conclusion of a series of contents expressed in M1.	en suma, en conclusión, en definitiva, en fin, al fin y al cabo, después de todo, en resumidas cuentas, total, después de todo, etc.

Table 1. Reformulation markers in Spanish (Martín Zorraquino & Portolés 1999).

These four subtypes of reformulation markers are related to the following formulation processes: (i) explanation markers introduce explanations for non-clear ideas ─especially in technical discourses, but also in informal discourses─ (Bach 1996; Murillo 2007); (ii) rectification markers present new information to change previous ideas wrongly expressed (Fuentes 1993; Del Saz 2003; Garcés 2008); (iii) detachment markers highlight differences between non-accurate and new accurate contents (Briz 2001; Pons 2013); and (iv) recapitulation markers contribute to summarize all the ideas previously said (Vázquez 1994; Murillo 2016). Examples (8) to (11) show some instances of such subtypes of reformulation markers[25] ─extracted from Portolés (1998) and DPDE (2008)─:

Martorell 2009: 38; Charolles & Coltier 1986: 54). These marks, however, are less frequent than reformulation markers because they do not codify an explicit procedural meaning.

[25] See in Zorraquino & Portolés (1999: 4122 -) examples for all the reformulation markers included in each subgroup.

(8) La palabra griega *skholé*, que significó primero ocio, después la ocupación del hombre ocioso, **es decir**, el estudio y, en fin, “escuela” filosófica. [Explanation]

(9) Hombre, volviendo al pasado: entonces en las cafeterías, o, **mejor dicho**, en las tabernas, de dinero no se hablaba, se hablaba de necesidades, y siempre había algún cándido que se consolaba diciendo que por lo menos había orden. [Rectification]

(10) ─ Este ─decía uno de los sonrientes soldados a Gudrum─, está casado seis veces y no puede alimentar a todas sus esposas; **de todos modos** no le importaría cargar con una séptima… [Distance]

(11) Y se habían reído la tira, con Rafa, que decía que por la noche nos iba a atacar una panda de navajeros que iban a violar a los chicos y a degollar a las chicas, y Jose, tronchándose, que en todo caso sería al revés, y Rafa que no; **total**, que se lo habían pasado genial charlando y diciendo idioteces hasta que Laura se dio cuenta de lo tarde que era. [Recapitulation]

There are further subtypes of reformulation markers related to these four subgroups in the literature ─e.g. denomination, reconsideration, invalidation, correction, particularization, exemplification, separation, conclusion, definition, and so on─ (see 2.3. for further details). Nevertheless, most of these subtypes are derived from the polyfunctionality of reformulation markers and not from their reformulation meaning. Observe the following example:

(12) Podríamos ir ahorrando tiempo y avanzando. **Quiero decir**, mientras tú haces cola en este pabellón, yo me acerco a comprar las entradas para el teatro[26].

Example (12) presents a context of exemplification where M1 and M2 are related by the reformulation marker *quiero decir*. In this context, *quiero decir* introduces a concrete information complimenting a general idea previously expressed. This concrete information is added because the speaker feels that the M1 is not enough clear and that it should be exemplified:

[26] This example has been extracted from Fuentes (1993: 177). The original example introduced *por ejemplo* instead of *es decir*: the reformulation marker has substituted the original one.

M1─first discourse member─	Podríamos ir ahorrando tiempo y avanzando
Exemplificative addition	**quiero decir**
M2 ─ complimenting M1─	mientras tú haces cola en este pabellón (…)

Table 2. Discourse connection established by *Sp. quiero decir* in exemplification contexts.

The fact that *quiero decir* ─or other reformulation markers such as *esto es* and *o sea*─ introduce examples in some contexts does not mean that exemplification markers ─*por ejemplo*, *digamos*─ are a subtype of reformulation markers and that, by extension, exemplification is a type of reformulation at the function level[27].

Cases such as (12) are very frequent in studies on reformulation: several categories of reformulation markers have been created because reformulation markers across languages are polyfunctional, and such other functions are finally considered as part of reformulation uses. This leads to a methodological problem (Pons 2013) triggered by various factors. Given that:

- Reformulation markers are addressed because explaining reformulation by focusing on them is easier; and
- Reformulation markers are polyfunctional ─ what means that they express further functions besides formulation;

Then

- New subcategories of reformulation markers are created ─explicative reformulation markers, exemplificative reformulation markers, reformulation conclusive markers, and so on─;

And, as a corollary

[27] Fuentes (1993: 177) argues that exemplification is a subtype of reformulation because the M2 ─ mientras tú haces cola en este pabellón, yo me acerco a comprar las entradas para el teatro─ introduces the most informative part in the message and, consequently, fits better the speaker's communicative aim or the hearer's expectative. In such cases, exemplification could be taken as a sort of paraphrase because it introduces another way to express previous contents. This generalization is inaccurate.

- The features of such new subcategories are improperly related to reformulation at the function level

This methodological problem becomes theoretical when the defining features of reformulation are mingled with other functions expressed by reformulation markers ─e.g. conclusion, correction, recapitulation, summary, rectification, invalidation─. This problem has been addressed under the term form-function trap (Pons 2017) (see 1.1.2.): features and meanings of forms ─discourse markers─ are identified as defining features of a concrete function ─in this case, reformulation─ (see fig. 3):

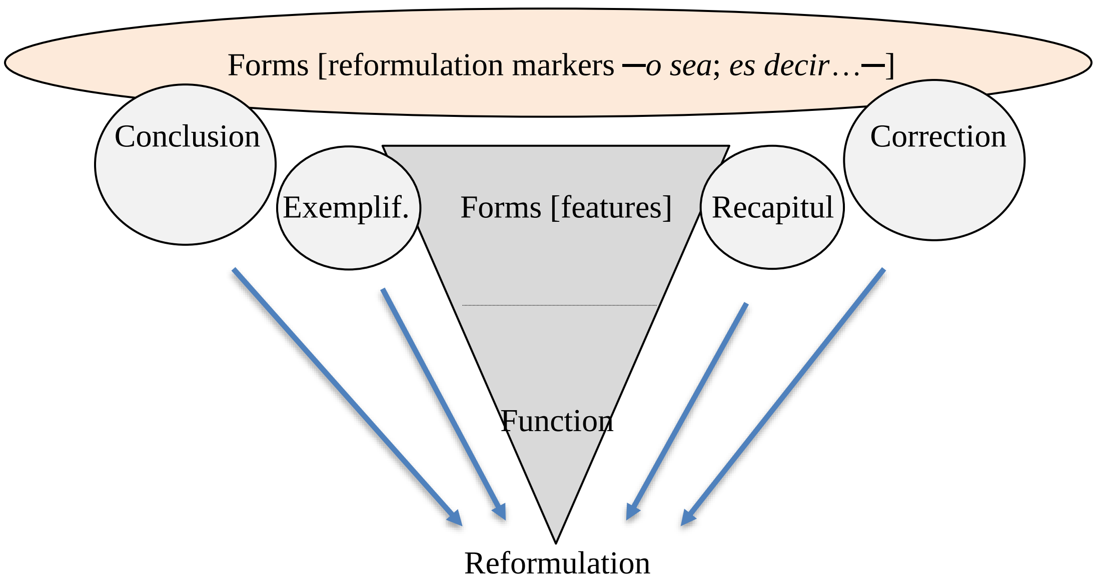


Fig. 3. Form-function trap (Pons 2017). Top-down visual representation. Circles represent the polyfunctionality of reformulation markers; blue arrows represent the influence of such functions on reformulation.

In order to detail this form-function trap, the following section (§2.3.) presents a review of some main works on reformulation and reformulation markers. Such works will show when and how the development of the form-function trap started.

2.3. Reformulation and reformulation markers

Reformulation has been widely addressed in the literature (Gülich & Kotschi 1983, 1987, 1995; Charolles & Coltier 1986; Murat/ Carter-Bresson 1987; De Gaulymn 1987; Roulet 1987; Adam & Revaz 1989; Blakemore 1993; Vázquez Veiga 1994; Schwenter 1999; Apothéloz & Zay 1999; Briz 2001; Del Saz 2003; Flores Acuña 2003; Murillo 2007; Bach

2009; Garcés 2011; Pons 2013; Murillo 2016; Pons 2017)[28]. These studies present two main aims: on the one hand, defining reformulation theoretically; on the other, describing reformulation markers. Such aims, however, converge in one point: some descriptions initially oriented towards defining reformulation become characterizations of reformulation markers. There is where the form-function trap occurs. For instance, Gülich & Kotschi (1995) focus on discourse production activities and, concretely, on reformulation processes. Their study starts with a clear general perspective (1995: 30; 40):

> In the approach to the analysis of oral communication to be presented in this article, we will concentrate on the activities speakers carry out during the process of discourse production. In particular, we will deal with so called formulating activities (…) To **resolve the [expression] problems** thus indicated, **the speaker has procedures** (or "methods" in the ethnomethodological sense of the word) at his/her disposal; **they allow him/her to modify, to state more precisely, to explicate, or to correct the segment of talk** (…). Such treatment procedures are called *reformulations*.

However, after presenting the theoretical basis of their study, they focus on reformulation by describing reformulation markers (1995: 40; 44):

> It is possible to distinguish between paraphrastic and non-paraphrastic reformulations. This suggestion offers an interesting way of subdividing the class of reformulating treatment procedures. **The distinction is based on the assumption that markers** like de toute façon, en somme, en un mot, tout compte fait, somme toute, après tout, en tout cas, en fait, de fait, au fond **have a particular feature in common**: they **indicate** something which would not be expressed by the discourse structure alone, namely **the "change in utterance perspective"**, which at the same time indicates a certain degree of distance to the perspective contained in the reference expression.

---

[28] Reformulation is differently described depending on the tradition of studies followed (Cuenca 2003): Romance studies focused on the discursivity underlying reformulation, while English studies detailed reformulation from the grammatical notion of *apposition* (Murillo 2007: 28; Pons 2013: 152).

Describing reformulation markers contributes to better treatments of reformulation: such markers are formal items expressing reformulation and clarifying the relationship shared between contents. Detecting reformulation markers leads thus to faster and easier definitions of reformulation. Notwithstanding this, such kind of approaches trigger the form-function trap for reformulation (Pons 2017; Pons 2013: 154):

> Sin embargo, al tomar este camino, se cae en el riesgo de **identificar la variación del marcador**, que puede cubrir diferentes funciones, **con la caracterización de la relación funcional específica que se pretende estudiar** (…). Por ejemplo, un procedimiento para describir la (…) reformulación en español puede consistir en la descripción del marcador *o sea*[29], que cubre frecuentemente dicha función. Sin embargo, dicha decisión transforma el objeto inicial "descripción de la reformulación en español a través de la marca formal o sea" en "descripción de las funciones del marcador del discurso o sea en español".

In such cases, reformulation is finally addressed by describing the features of reformulation markers and their multiple functions. The following subsections will review some main studies on reformulation to detect the influence of reformulation markers in defining reformulation and the development of the form-function trap in the literature.

The works chosen for the review are the following: Gülich & Kotschi (1983); Roulet (1987); Murat & Cartier-Bresson 1987; Fuentes (1993); Rossari (1994); Gülich & Kotschi (1995); Martín Zorraquino & Portolés (1999); Noren (1999); Bach (2000); Del Saz (2003); Murillo (2007); Garcés (2008); Pons (2013); Murillo (2016); Pons (2017), and other studies. Such works have been chosen for two reasons: (i) because all they have been mentioned or addressed in Murillo (2016) and Pons (2013, 2017) ─see their reformulation polemic in §2.3.3.─; and (ii) they are the most representative in the literature in Spanish, French, and English. They will be classified into two main groups: first studies ─or preserving works─ (§2.3.1.) and subsequent studies ─or amplified works─ (§2.3.2.). Preserving works keep clear definitions for reformulation without being influenced by

[29] See 2.4.3. for a detailed description of *o sea* as reformulation marker and the viability of an experimental treatment by using it.

descriptions of reformulation markers and their features ─that is why they preserve─; amplified works focus more on reformulation markers and thus they introduce further subcategories of reformulation based on the functions such markers express ─that is why they amplify─.

2.3.1. First studies ─preserving works─

First studies[30] on reformulation constitute a starting point within the field[31] because they:

a) established the two basic categories of reformulation ─paraphrastic reformulation (Gülich & Kotschi 1983, 1987) and non-paraphrastic reformulation (Roulet 1987)─ adopted in studies published later;

b) addressed reformulation from different theoretical groundworks within Pragmatics and Discourse Analysis ─especially textual analysis and conversation, and others such as argumentation, relevance, or polyphony─;

c) focused on different structural features to determine under which parameters are paraphrastic and non-paraphrastic reformulations produced in written and oral discourses;

d) described the discourse markers ─reformulation markers─ usually employed by the speakers in reformulation contexts.

Gülich & Kotschi (1983a, b) and Roulet (1987) are the first seminal works published in the field of reformulation. A short review of both works shows the two different expositive directions they follow: they define reformulation as a function ─paraphrastic and non-

[30] As Murillo notes (2007: 47), such first works are highly influenced by the theory of formulation (Antos 1982), by the notion of repair developed in American conversation analysis (Schegloff, Jefferson and Sacks 1987), and by the studies on dialogue and discourse analysis in the Geneva school (Roulet 1981; Moeschler 1985; Roulet et al. 1985).

[31] Before such studies, reformulation received a different theoretical treatment before the consolidation of such discursive studies (Gülich & Kotschi 1983b: 250): traditional approaches (Rhetoric and Logic) described reformulation as the device with which writers could reformulate an initial text to clarify non-clear contents uttered in. Rhetoric focused on pedagogical activities where such reformulated texts could be employed, such as biblical exegesis or learning (Fuchs 1994: 4; 17); Logic defined reformulation as a propositional process of change by which old propositions become new, equivalent propositions (Fuchs 1994: 20). Such *equivalence* is based on the notion of identity (Fuchs 1982: 13): P and Q behind the propositions involved must be both true or false. Otherwise, they are not paraphrases.

paraphrastic— and describe the reformulation markers employed to express this function. Such preserving works define reformulation onomasiologically and set solid foundations for this theoretical groundwork.

Gülich & Kotschi (1983a, b) present a pioneer account[32] for reformulation based on the notions of *paraphrase* —coined as *paraphrastic reformulation*— and *predication of identity* (Mortureux 1982). Paraphrastic reformulation (henceforth, PR) is produced as a communicative strategy (Gülich & Kotschi 1983a: 341) when some idea has not been clearly uttered (Gülich & Kotschi 1983a: 305-308):

> La reformulation paraphrastique tient une place particulièrement importante : l'emploi d'une paraphrase **permet au locuteur de résoudre un certain nombre de problèmes communicatifs** : problèmes de compréhension, problèmes concernant la prise en compte de l'interlocuteur, problèmes de menaces potentielles pour les faces des interlocuteurs, etc. […] Ceci implique que l'accent est mis **sur l'activité du locuteur** ; car c'est ce dernier qui établit une relation paraphrastique pour réaliser une stratégie communicative. […] Deux énoncés sont produits et enchaînes de telle manière **qu'ils doivent et peuvent être compris comme « identiques »** […] est une « **duplication discursive** »

To do so, speakers or writers introduce a M2[33] —new content— semantically similar to M1 —older content—. Both M1 and M2 do not require to be totally identical: it is enough that speakers predicate some shared degree of semantic-contextual identity between M1 and M2 to reformulate them (Gülich & Kotschi 1983a: 307-308). This is, so to speak, a discursive reduplication. Table 3 represents the structure of PRs:

---

[32] Their study is pioneer because it first introduces a new orientation towards pragmatics and discourse analysis. Descriptions of paraphrase in the 1960-1970s were directly influenced by logical approaches: contents were related by their truth-conditional meaning. Some linguists (Harris 1957; Smaby 1971) followed the formal treatment applied in Logics that argues for a *total identity* between A and B —the reformulated contents— (MelCuk 1992; Milicevic 2007): A is paraphrased by another utterance B only if they mean the same (Smaby 1971: 2). Such paraphrases are obtained by means of *transformations* (Gross 1977: 72; Harris 1973: 78).

[33] The initials M1 —first discourse member— and M2 —second discourse member— are employed in this thesis because of the variety of contents that can be restated in reformulation procedures: words, parts of words, parts of utterances, paragraphs, sequential relations (Blakemore 1993, 1996), and so on.

M1─first discourse member─	Initial utterance ─énoncé-source─
M2 ─reinterpreting M1─	Duplicated utterance ─énoncé-doublon─
PRM ─connecting M1 and M2─	Marker ─Paraphrastic reformulation marker─

Table 3. Representation of PR based on Gülich & Kotschi (1983a: 308).

The definition above is not determined by reformulation markers (Gülich & Kotschi 1983a: 324), which are defined apart:

> Rappelons que, en étudiant la paraphrase et ses marqueurs structurels, notre intérêt est centré essentiellement sur l'organisation discursive. Sous cette perspective, nous nous occupons moins du problème de savoir si les MRP peuvent être considérés comme marqueurs de fonction illocutoire ; ce qui nous importe c'est le fait que les **MRP indiquent comment le locuteur organise ses activités verbales** : comment, per exemple, il reprend d'une certaine manière ses propres paroles ou comment il coordonne ses activités verbales avec celles de l'interlocuteur. **Nous allons étudier ces fonctions en discutant séparément** a) la fonction générale des MRP et b) différentes fonctions spécifiques que peuvent avoir certains MRP.

Reformulation markers ─PRM in Gülich & Kotschi's terms─ are key in PR: their presence is optional, but it helps to establish semantic similarities shared by M1 and M2 even though when there no exists a complete semantic correspondence between contents. The choice of reformulation markers in PR depends on the semantic relationship between M1 and M2: contents can be related by a maximum ─*équivalence maximale*─ or a minimum semantic equivalence ─*équivalence minimale*─. Maximum equivalences ─e.g structural repetitions, synonyms─ are semantically strong: M1 and M2 do not need reformulation markers to be paraphrased since their relationship can be deduced from the meaning of the linguistic content expressed. Minimum equivalences ─e.g. contextual equivalences─ are semantically weak: PRs are in such cases established with the help of reformulation markers, which make explicit that the speaker intends to express M1 in a clearer way ─through M2─ (Gülich & Kotschi 1983a: 325-326)[34].

Besides their general function, reformulation markers cover other three specific functions: expansion, reduction, and variation[35]. Such functions ways to establish similarities between M1 and M2. In expansion the M2 shows semantic-contextual features not explicitly expressed in M1; in reduction the M2 is simpler than the M1 since it condensates all the previous contents; variations are not expansions neither reductions (Gülich & Kotschi 1983a: 328-330; Gülich & Kotschi 1983b: 256-258). Examples (13) to (15) show such specific uses of PRM:

(13) Mary is a linguist; that is, a person who analyzes how language is produced and used [Expansion]

(14) Mary works hard and passes all her exams; that is, she is a good student [Reduction]

(15) Mary is an ecologist; that is, she has adopted a way of life. [Variation]

This information suggests that Gülich & Kotschi understand reformulation and reformulation markers as two separate objects of study in their first works: the form-function trap thus should not occur.

Similarly, Roulet (1987) proposed the notion of *non-paraphrastic reformulation* (henceforth, NPR) in order to distinguish this procedure from PR. This work also focuses on the different reformulation markers expressing non-paraphrastic reformulation but, again, treatments for both reformulation and reformulation markers are distinguished.

NPR is different from paraphrase because M1 and M2 are not placed at the same hierarchical formulation level: while PR intend to introduce clarifications or explanations to

---

[34] In conversational contexts, the use of reformulation markers indicates that the discourse is being restated due to formulation obstacles and that the speaker is seeking a more adequate expression (Gülich & Kotschi 1983b: 254).

[35] Reformulation markers can be structurally placed at different positions within the discourse ─integrated, precedent and postposed─ in monological ─the speaker/writer himself─ or dialogical ─to other speaker/writer─ discourses (Gülich & Kotschi 1983a: 319-320).

make M1 more understandable, NPR reflect a change in the discourse orientation to modify the illocutionary force expressed in M1 (Roulet 1987: 115). This change of discourse orientation is determined by the notion of discourse as *negotiation*[36] (Roulet 1985, 1986): discourses are negotiated so as to achieve a complete communication in conversations (Roulet 1986, 1987). If contents are not well expressed, the other participants may not understand them and, consequently, the discourse will not progress (Roulet 1987: 115):

> […] Reformulation occupe une place particulière, qui n'a guère attire l'attention des chercheurs jusqu'ici, parmi les processus contribuant à la réalisation de la complétude interactive du discours monologique […] [C'est] reformulation, car l'énonciateur tente de mieux satisfaire à la **complétude interactive** en présentant **l'intervention principale comme une nouvelle formulation**, liée à un **changement de perspective énonciative** indiqué par le **connecteur**, d'un premier **mouvement discursif (ou d'un implicite)** ; c'est un processus rétroactif ; non-paraphrastique pour la distinguer de la reformulation paraphrastique décrite par Gülich et Kotschi (1983).

For this reason, speakers/writers decide to exchange M1 by a different M2 expressing what was not said before: such modification is not based on the notion of identity but on that of distance. Example (16) shows the resulting non-paraphrastic structure ─see also table 4─:

(16) Tom works in a bank; that is, where the people lose their money.

In this case, the M1 ─bank─ and the M2 ─where the people lose their money─ do not share a relationship of equivalence: *bank* is an understandable word that could be explained by a similar expression such as *that place where people make money transactions*. The writer, however, has decided to reinterpret the M1 ─a less accurate content─ with a new M2 fitting better his communicative aim: given that he intends to attack banks, the best way to do so is

[36] Negotiations in discourses imply three basic stages: an initial stage, made by the speaker; a reaction stage, made by the hearer; and an evaluation stage, made again by the speaker (Roulet 1986: 189). Speakers produce an intervention with a concrete illocutionary force; hearers may accept or not this intervention and react with another intervention. Finally, speakers evaluate reactions made by hearers. When reactions or evaluations are positive (and, thus, there exists agreement between speakers), an interactional completeness is achieved (Roulet 1986:190); when reactions are negative (that is, there no exists agreement between speakers), the negotiation and, therefore, the exchange, must continue until the achievement of this completeness.

by reformulating the meaning of bank with negative connotations. The M2 expresses the contextual features related to bank, but it does not show the prototypical semantic defining features of that place. This fact establishes a distance ─based on semantic-contextual differences─ between the M2 and the M1.

M1─first discourse member─	Less accurate content ─original─
M2 ─reorienting M1─	More accurate content ─distance─
RM ─connecting M1 and M2─	Marker ─Rreformulation marker─

Table 4. Representation of non-paraphrastic reformulations based on Roulet (1987: 120).

Non-paraphrastic reformulation is usually expressed by reformulation markers ─*connectives* in Roulet's terms─ (Roulet 1987: 117):

> Compte tenu de la rareté des descriptions existantes, qui contraste avec la fréquence élevée des reformulatifs en français contemporain et avec le rôle déterminant qu'ils jouent dans la réalisation de la complétude interactive du discours monologique, il nous parait nécessaire de reprendre l'étude d'ensemble de ces connecteurs en formulant de nouvelles hypothèses. Aussi tenterons-nous : de proposer une **définition globale des connecteurs reformulatifs** ; de distinguer **différentes sous-classes de connecteurs reformulatifs** selon le changement de perspective énonciative (…) et décrire le **fonctionnement des connecteurs reformulatifs** dans leurs trois positions les plus courantes dans le discours (…).

Reformulation markers ─*en tout cas, de toute manière, de toute façon; en fait, de fait, en réalité; au fond, en somme; somme toute, tout compte fait, tout bien considéré; finalement, en définitive; en fin de compte* or *après tout*─ work different than argumentative, counter-argumentative or consecutive markers (Roulet 1987 : 119): they highlight the change of perspective behind non-paraphrastic reformulation at the monological level ─where M1 and M2 are retroactively subordinated─ and at the interactive level ─where the change of discursive perspective is marked[37]— (Roulet 1987: 135), and facilitate the achievement of complete interaction between speakers. The use of such reformulation markers is related to different ways to change the discourse orientation and thus reformulate it (Roulet 1987: 120-121; Murillo 2007):

- by invalidating the enunciative perspective offered in M1;
- by highlighting the new perspective adopted by the speaker in M2;
- by focusing on the type of change executed from M1 to M2

Such three processes, however, do not constitute any subcategory of reformulation marker neither of reformulation as a function: they are only ways to reformulate, and it is possible to distinguish them from Roulet's first general definition.

In sum, paraphrastic and non-paraphrastic reformulation are clearly characterized in these first works. Paraphrastic reformulation presents M2 as an expression clarifying the meaning of M1; non-paraphrastic reformulation is a retroactive process which allows to come back to previous ideas and change them it by introducing a new enunciative perspective. reformulation markers present such new perspective and facilitate the whole process. Reformulation markers are great marks to establish reformulation processes, but their use is not indispensable: that is why Gülich & Kotschi and Roulet do not define reformulation

[37] Concerning the interactivity of reformulation markers, they can relate explicit —something that the speaker has verbally expressed— and implicit contents —something that the speaker has not said previously thought—. Roulet offers the following examples of interactive uses of reformulation markers (1987: 135):

Initiative interventions —that is, those expressed by the speaker—:

> - Vous avez **somme toute** une vue très sereine de la mort.
> - Ii* approche apparaît quand même comme une série de privations.
>
> (S. de Beauvoir, Entretiens avec J.-P. Sartre, Paris, Gallimard, 1981, 542)

and reactive interventions —those produced as a response to what another speaker says—:

> - Depuis quelque temps, tu t'interroges sur l'espoir et la désespérance. Ce sont des thèmes que tu n'abordais guère dans tes écrits.
> - **En tout cas**, pas de la même manière.

exclusively by analyzing its discourse markers and use them as an additional explicative device.

Other studies ─Charolles & Coltier (1986); Murat & Cartier-Bresson (1987); Gülich & Kotschi (1987)─ are in line with such first works. These studies, however, begin to open reformulation towards further functions. They are a kind of bridging works: they were published before Roulet's study (1987) ─they thus do not address non-paraphrastic contexts─ and introduce definitions of reformulation based on some reformulation markers; such works, in addition, incorporate new subcategories closer or related to reformulation. These subcategories are not definitive but, in the end, trigger the form-function trap and blur the limits of reformulation as a function.

For instance, Charolles & Coltier (1986) sit amidst first works and amplified works. They define paraphrastic reformulation in texts[38] (Charolles & Coltier 1986: 51):

> [La reformulation est] « une opération de composition textuelle assez spécifique », un indice « d'un contrôle que le sujet écrivant exerce sur l'interprétation (l'interprétable) de son propos ».

Their approach to reformulation is very contextual: paraphrastic reformulations occur because writers aim to make their discourses easily understandable for their readers (Charolles & Coltier 1986: 56) and provide them with coherence[39]. This definition shares features with Gülich & Kotschi's proposal and their reformulation as communicative strategy. However, this study introduces further categories closer to reformulation that could be interpreted as subcategories of reformulation: denomination, conclusion and correction. Such categories are related to the polyfunctionality of the reformulation markers they address ─*c'est-à-dire* and *autrement dit* in French─. Examples (17) to (19) show how these markers work:

(17) Je veux un cadeau pour noël ; c'est-à-dire une encyclopédie [denomination]

[38] Charolles & Coltier do not include non-paraphrastic reformulation in their study: their proposal precedes Roulet (1987). They develop Gülich & Kotschi's categories ─see Murillo (2007) and Flores Acuña (2003) for further details─.

[39] See also Charolles (1986) and Charolles & Ehrlich (1991).

(18) Il étude beaucoup et fait ses devoirs chaque jour ; c'est-à-dire, il est un garçon appliqué [conclusion]

(19) J'aime la douce ; or autrement dit, j'aime le fruit sucré [correction]

The fact that *c'est-à-dire* or *autrement dit* can denominate ─or exemplify─, conclude and correct does not involve that exemplification, conclusion and correction are subcategories of reformulation: such functions are related because they are expressed by reformulation markers at the formulation level, but each function can be analyzed separately ─they are not interdependent─. Charolles & Coltier note that such functions are closer to reformulation ─and not subtypes of─, but such proximity could propitiate wrong associations between the main function analyzed ─reformulation─ and the other functions.

It is the same for Murat & Cartier-Bresson (1987): they also address *c'est-à-dire* and the different functions it expresses so as to account for reformulation ─which is described as the result of the (re)interpretation of the contents involved (Murat & Cartier-Bresson 1987: 6). As a result, they distinguish between *paraphrase*, *correction*, *argumentation values* and *interpretative retakes*. Their study notes that such functions should not be confused (Murat & Cartier-Bresson 1987: 6; 10):

> Paraphrase et reprise interprétative ne doivent pourtant pas être confondues, bien que dans certains cas elles parviennent au même résultat ; la notion d'équivalence n'y joue pas le même rôle.
>
> La reprise interprétative présente des différences profondes avec la reformulation, que ces expressions servent à marquer. La reformulation n'est en aucun cas une rectification : 1) elle postule la conservation d'un invariant de sens ; 2) elle n'impose pas de hiérarchie entre les termes, qui sont placés sur le même plan, comme deux formulations également possibles.

However, after distinguishing such four functions, various subcategories of interpretation are introduced: interpretation in intension ─the meaning of the word─ and in extension ─the identity of what is being referred─. Intension is subdivided into *réprise definitionelle* and extension into *coreference*, *quantification*, or *spécification* (Murat & Cartier-Bresson 1987: 11). Such subcategories are again closer to paraphrase and could be identified with this function because they are all expressed by the same reformulation marker, but such kind of associations between similar functions contribute to the development of the form-function trap. There is a generalization of the features and uses of *c'est-à-dire* (Murat & Cartier-Bresson 1987: 15):

> **C'est-à-dire est le mot de l'interprétation** dans la langue. Il montre comment la relation dialogique se constitue par rapport à une loi du sens, que le locuteur en un même mouvement reconnaît et promulgue. C'est selon cette loi que le discours s'ajuste à la réalité qui le fonde, soit en y référant directement, soit per l'intermédiaire d'un renvoi au code. **L'opération s'accomplit dans un moment réflexif**. Elle consiste com on l'a vu, en une reprise sélective, assortie d'un décentrement qui évalue les croyances de l'interlocuteur, et conduisant à une rectification (…).

This reformulation marker introduce reformulation meanings but also non-reformulation meanings closer to reformulation. Since non-reformulation meanings are also addressed in a study on reformulation, their identification as reformulation uses is plausible: several subcategories not established before ─see Gülich & Kotschi 1983 or Roulet 1987─ are created in relation with reformulation, which becomes a more complex function.

This is true for Gülich & Kotschi's (1987) subsequent work: they update their first classification of reformulation (1983). Two new categories are added ─*repetition* and *correction*─ (Gülich & Kotschi 1987: 30):

> Paraphraser, c'est avant tout produire un énoncé de la forme xRy, où x et y sont deux segments de la structure propositionnelle du texte et où R est une relation sémantique. Cette structure rapproche la paraphrase de deux autres types d'actes de composition textuelle : le « rephrasage » et la correction (…) Dans ce qui suit, nous étudierons donc une sous-catégorie des actes de composition textuelle, qui comprend le rephrasage, la paraphrase et la correction. Nous désignons ces actes par le terme general d'actes de reformulation (ou simplement reformulations).

Gülich & Kotschi classify repetition and correction as reformulation acts. Expansion and reduction ─the old categories established in Gülich & Kotschi (1983)─ are subdivided into defining explanation, exemplification, denomination and summary (Gülich & Kotschi 1987: 40):

> En considérant les occurrences de paraphrases relevées dans des textes oraux, on constate que la relation d'équivalence – indépendamment de son degré de force – peut se présenter sous la forme a) d'une expansion, d'une réduction, ou d'une variation. Si nous tentons compte de la présence ou de l'absence, dans une paraphrase, d'un trait définitoire, nous distinguons cinq sous-catégories de paraphrases : explication définitoire, exemplification, dénomination, résumé, variation.

According to this, reformulation seems to be amplified to further subcategories. It is noted that such subcategories are not determined only by the semantic relationship between the contents involved but also by the discourse markers employed to highlight such relationship ─*c'est-à-dire*, c'est ce qu'on *appelle*, en d'autres *termes*, *cela veut dire*, *je m'explique*, to name but a few─ (Gülich & Kotschi 1987: 45). These reformulation markers are related to further functions besides reformulation, such as conclusion, correction or repetition. Examples (20) to (22) ─extracted from Gülich & Kotschi (1987)─ show that:

(20) Je tiens cette somme, à v= à votre disposition **alors** éventuellement' vous tenez une somme' à la disposition si i= vient l=chercher,

(21) CONS. Quand y pas d=bail, c'est les us et coutumes'
C'est les us et coutumes qui font : qui font la
Législation' hein la : la réglementation
C'est c=qu'on appelle les

DAM. Ouais

CONS. Us et coutumes'

(22) Les différents types de reformulation ne se distinguent pas seulment par la relation sémantique existant entre énoncé-sourcé et énoncé reformulateur, mais aussi par le type de marqueur employé pour indiquer cette relation. **En d'autres termes**, c'est

souvent à l'aide du marqueur que le locuteur crée une relation de reformulation entre deux énoncés différents.

Given that *c'est-à-dire* or *en d'autres termes* are prototypical reformulation markers, and that they can exemplify or summarize, it is automatically assumed that exemplification and summary are subtypes of reformulation ─the same for defining explanation, denomination or correction─. Even though Gülich & Kotschi's examples are not always based on discourse markers ─for this reason, their study also sits amidst preserving works and amplified works─, most of them are determined by their presence. As a result, the polyfunctionality of reformulation markers can be interpreted as a wide variety of categories for reformulation[40].

To sum up, the works meta-linguistically analyzed above show the following picture ─see table 5─: Gülich & Kotschi (1983) and Roulet (1987) define reformulation and reformulation markers without blending both objects of study. The other categories they introduce ─expansion, reduction, variation, invalidation of the enunciative perspective, highlighting of the new perspective, or focus on the type of change─ are only ways to paraphrase or reformulate contents. In tandem with Roulet's publication (1987), some studies ─Charolles & Coltier (1986); Murat & Cartier-Bresson (1987); Gülich & Kotschi (1987)─ begin to focus on the reformulation markers expressing reformulation: definitions of reformulation and reformulation markers first get together. Such studies alter the initial definitions where paraphrastic reformulation was clearly determined. They overgeneralize the functions and properties of reformulation markers to reformulation: that is why conclusion or correction ─among others─ are identified as similar to reformulation or even as subtypes of reformulation.

As a result, reformulation grows in subcategories but increases its complexity. Further subsequent studies go in the same vein: amplification works impose on classical definitions of reformulation. The form-function trap can be detected thus since the decade of 1980s.

[40] Together with reformulation markers, they refer to other formal devices to highlight the semantic relationship between contents: adverbs, conjunctions or interjections ─*alors, non, ah, hein*─ and other markers such as *eh bien, ah ben, bon, enfin, disons, donc*, etc. All such markers, however, can assume other functions within conversational discourses (Gülich & Kotschi 1987: 45).

<table>
<tr><th>Gülich & Kotschi 1983</th><th>Roulet 1987</th><th>Charolles & Coltier 1986</th><th colspan="2">Murat & Cartier-Bresson 1987</th><th colspan="4">Gülich & Kotschi 1987</th></tr>
<tr><td>PR</td><td>NPR</td><td>PR</td><td colspan="2">PR</td><td colspan="4">PR</td></tr>
<tr><td rowspan="5">Expansion</td><td rowspan="5">Invalidation of the previous perspective</td><td rowspan="5">Conclusion</td><td colspan="2">Identification</td><td colspan="2">Expansion</td><td colspan="2">Reduction</td></tr>
<tr><td>Intension</td><td>Extension</td><td rowspan="4">Defining explanation</td><td rowspan="4">Exemplification</td><td rowspan="4">Denomination</td><td rowspan="4">Summary</td></tr>
<tr><td rowspan="3">Réprise Definitionelle</td><td>Coréference</td></tr>
<tr><td>Quantification</td></tr>
<tr><td>Spécification</td></tr>
<tr><td>Reduction</td><td>Highlighting the perspecti</td><td>Denomination</td><td colspan="2">Correction</td><td colspan="4">Conclusion</td></tr>
<tr><td>Variation</td><td>Focus on the type of perspecti</td><td>Correction</td><td colspan="2">Argumentation</td><td colspan="4">Correction</td></tr>
<tr><td></td><td></td><td></td><td colspan="2">Modal & Rethoric</td><td colspan="4">Repetition</td></tr>
</table>

Table 5. First works on reformulation. PR represents paraphrastic reformulation; NPR represents non-paraphrastic reformulation. Shaded cells are addressed as subtypes of reformulation. See also Murillo (2007) and Pons (2013).

2.3.2. Subsequent studies ─amplification works─

There are a series of studies amplifying first definitions of reformulation proposed by Gülich & Kotschi (1983) or Roulet (1987): Fuentes (1993); Blakemore (1993); Rossari (1994); Gülich & Kotschi (1995); Martín Zorraquino & Portolés (1999); Noren (1999); Bach (2000); Del Saz (2003); Murillo (2007); and Garcés (2008). Such subsequent studies focus on reformulation markers and explain every reformulation process by analyzing them: they show thus an intrusion of semasiology into onomasiology.

For example, Fuentes (1993) follows the distinction between paraphrastic and non-paraphrastic reformulation. Such distinction presents further subdivisions into new subcategories based on other discursive or grammatical functions ─e.g. explanation, correction, conclusion, recapitulation, and so on─. However, such subcategories of reformulation are directly related to the reformulation markers addressed in her study; in other words, descriptions of the form are expanded to the function level (Fuentes 1993: 171-172):

> Abordamos aquí la descripción de una serie de unidades que tienen como misión establecer el final de un discurso, o la conclusión del mismo, valores que están en relación directa con la operación que algunos llaman "reformulación discursiva" (…) Dentro de estos elementos que hemos llamado conclusivos hay varios grupos: los que tienen un valor léxico temporal y señalan terminación ─*finalmente*, *en fin*, *por fin*…─ y otros [que] tienen unos valores añadidos, de conclusión nocional y textual ─*en resumen*, *en suma*, *en conclusión*, *total*…─ y de final pero con valor explicativo. [Estos] equivalen a "termino diciéndolo más claro" ─*brevemente*, *en una palabra*, *en pocas palabras*, *total*─. Estos elementos tienen una doble función: son explicativos y marcas de resumen y conclusión (…). De ahí que J.M. Adam & F. Revaz (1989) trataran conclusivos y reformulativos juntos. Son dos operaciones que están muy cercanas la una a la otra.

Fuentes follows a discursive-enunciative approach in line with Roulet (1987), Rossari (1990) or Adam & Revaz (1989)[41]. The study, however, includes a recategorization of paraphrastic and non-paraphrastic reformulation and all the subtypes related with (Fuentes 1993: 176-177). To do so, several new labels are employed: paraphrastic reformulation is subdivided into explication, denomination and correction ─examples (23) to (25)─; non-paraphrastic reformulation ─examples (26) to (30)─ covers generalization ─label, conclusion and recapitulation─ and expansion ─enumeration and particularization/exemplification─. Such categories present a different distribution in comparison with previous studies: correction and conclusion had not been yet explicitly subordinated to reformulation, and exemplification was always related to paraphrastic reformulation ─and not non-paraphrastic reformulations─. However, Fuentes's classification is again based on reformulation markers and their polyfunctionality. Despite the general character of the classification, all the categories include various examples with discourse markers (Fuentes 1993: 177-193):

> Nos vamos a centrar, pues, en el análisis de aquellos elementos que explican o reformulan con algo que es el resumen o el final, la conclusión de una serie. Para ello las formas específicas son en una palabra, brevemente, en pocas palabras, en fin, por fin, finalmente, al fin, a fin de cuentas, al fin y al cabo, al fin y a la postre, en definitiva, bueno, bien, pues bien, y total.

Limits between reformulation, conclusion and correction are thus blurred in Fuentes's study: for instance, it is said that something previously said can be reformulated with a summary or a conclusion. This is said because the discourse markers analyzed in such study are not employed only to reformulate but also to conclude, correct, exemplify, denominate, and so on. The study of reformulation becomes a detailed description of discourse markers, and the results obtained are considered general features of reformulation as a function. This fact leads to statements as the following (Fuentes 1993: 177):

[41] Adam & Revaz (1989) is not addressed here because it clearly focus on reformulation markers from a textual approach. Their definition of reformulation is thus also textual, but it does not affect the general status of reformulation as a function. The main points in Adam & Revaz's study are: 1) reformulation is directly related to the coherence and cohesion of texts; 2) connectives and punctuation are key at providing texts with coherence and cohesion, and reformulation is highly related to connectives (1989: 62).

> En todos estos procesos [conclusión, recapitulación, enumeración, ejemplificación] se da una característica común. El segundo enunciado se considera la parte informativamente más importante, porque es la que se adecua a la intención del locutor o a las condiciones expectativas del receptor (…)

At this point, several functional subcategories have been created and subordinated to reformulation. Rossari (1990/1994) intends to come back to the simplicity of the paraphrastic and non-paraphrastic division. Her works aim to distinguish both types of reformulation established in Gülich & Kotschi (1983) and Roulet (1987) but, again, by focusing on reformulation markers and their meanings. Paraphrastic reformulation does not require reformulation markers to be produced or highlighted: the equivalence between contents is enough to detect this operation (Gülich & Kotschi 1983). Non-paraphrastic reformulation, however, needs the use of reformulation markers to be established (Rossari 1990: 348)[42]. Rossari states explicitly that reformulation should be defined by analyzing the discourse markers expressing it (Rossari 1990: 349):

> (…) la **description des marqueurs permet de mieux saisir en quoi consiste une opération de reformulation**. Pour cette raison, j'ai commencé par élaborer un classement sommaire des **diverses opérations de reformulation suivant la fonction et les marqueurs qui les caractérisant**, et la description détaillée des connecteurs susceptibles de déclencher ces opérations me permettra, par la suite, de **revenir sur ce classement afin de l'affiner**

On the one hand, reformulation markers establish easily the change of perspective behind the process; on the other, they highlight different strengths of non-paraphrastic reformulation (Rossari 1990: 349). Such strengths of reformulation ─operations of reformulation in Rossari's terms─ are: *recapitulation* ─the speaker puts in M2 the essential information expressed in M1─, *invalidation* ─the speaker introduces an M2 retroactively deleting M1─, *detachment* ─the speaker gets distanced from M1 in M2 but without

[42] La suppression du marqueur entraîne inévitablement la suppression de l'opération (…) Comme déjà vu, la reformulation non paraphrastique permet au locuteur d'opérer un changement de perspective énonciative.

invalidating all what was said in— and *reconsideration* —the speaker reviews the content expressed in M1 and formulates it again in M2 with some subtle changes— (Rossari 1990: 349-352). Such operations are first classified as subtypes of non-paraphrastic reformulation at the function level (Rossari 1990: 353) —table 6—:

<table>
<tr><td colspan="5">Reformulation operations</td></tr>
<tr><td>Paraphrastic</td><td colspan="4">Non-paraphrastic</td></tr>
<tr><td rowspan="5">C'est-à-dire

En d'autres termes

autrement dit</td><td>Recapitulation</td><td>Reconsideration</td><td>Detachment</td><td>Invalidation</td></tr>
<tr><td rowspan="4">En somme
En un mot
Bref</td><td rowspan="2">Tout bien considéré
Tout compte fait</td><td>En tout cas</td><td rowspan="4">Enfin</td></tr>
<tr><td>De tout façon
De toute manière</td></tr>
<tr><td rowspan="2">En fin de compte
Finalement</td><td>En fait
De fait</td></tr>
<tr><td>Au fond</td></tr>
</table>

Table 6. Classification of reformulation operations based on Rossari (1990: 353).

And as subgroups of reformulation markers in subsequent works (1994; 2000) —table 7—:

Marqueurs du récapitulation —recapitulation—	They express weak dissociation: *en somme, en un mot, bref.*
Marqueurs du réexamen —reconsideration—	They express moderate dissociation: *tout bien considéré, tout compte fait, somme toute…*
Marqueurs du distanciation —detachment—	They express strong dissociation : *en tout cas, de toute façon…*
Marqueurs du renunciation —renunciation—	They express invalidation: *enfin*

Table 7. Classification of reformulation markers based on Rossari (1994: 24; 2000).

That said, it is difficult to state if such types of non-paraphrastic reformulation are associated with the polyfunctionality of reformulation markers —semasiology— or if they are intrinsic in the function —onomasiology— (Rossari 1990: 358). According to Rossari, given that non-paraphrastic reformulation is usually expressed with reformulation markers, definitions based on such markers should contribute to better describe this function: operations of reformulation are thus determined by reformulation markers (1990: 348; 1994). Consequently, they may reflect their polyfunctionality instead of reformulation properties in an onomasiological way:

> Ce changement donne lieu à une prise de distance plus ou moins forte de la part **du locuteur par rapport à sa première formulation selon le connecteur utilisé** : **un marqueur peut indiquer, par exemple, que le locuteur condense sa première formulation**, ou, à l'inverse, **qu'il la remet en question**. Dans le premier cas, la reformulation sera en général introduite par des connecteurs tels que *en somme*, *en un mot*, *bref*, et la prise de distance sera modéré ; dans le second, elle sera introduite par *en tout cas*, *de toute manière*, *enfin* et la prise de distance sera fortement marquée.

And such polyfunctionality is generalized to reformulation as function. This leads to the following metalinguistic cycle ─see fig. 4─:

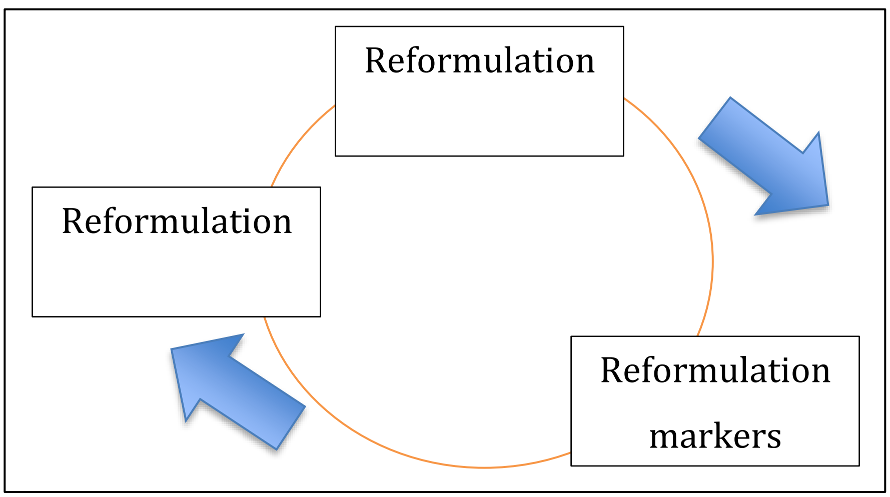


Fig. 4. Descriptive cycle for non-paraphrastic reformulation. Reformulation is addressed by describing reformulation markers and the results obtained are employed to define reformulation with more accuracy.

Furthermore, such four operations are defined as subtypes of reformulation because, in the end, they share some similarities in the function level: recapitulation ─summary, condensation─ could involve reformulation since the M2 expresses the same as M1 but by introducing other formulation with other words; invalidation also appears a reformulation because comes from a change of discourse perspective so as to correct the preceding M1; reconsideration and detachment express types of distance between M1 and M2. This idea reinforces that of reformulation markers and contributes to the consolidation of such subcategories of reformulation.

The paradigmatic work in establishing new subcategories for reformulation is Gülich & Kotschi (1995). After their study published in 1987, Gülich & Kotschi adopt the division of reformulation in paraphrastic and non-paraphrastic and introduce changes regarding previous classifications. Reformulation is one of the so-called *discourse production activities* (Gülich & Kotschi 1995: 34):

> A speaker's work of discourse production leaves traces in his/her linguistic utterances, which are then accessible to linguistic analysis (…) We will analyze how the work of discourse production is done under the conditions of spontaneous oral communication.

Which are, in turn, classified into three main types of traces of discourse production: (i) *verbalization procedures*, (ii) *treatment procedures* and (iii) *metadiscursive evaluation and commenting procedures* (Gülich & Kotschi 1995: 34). Reformulation is a treatment procedure (Gülich & Kotschi 1995: 40):

> [It] allow[s] him/her to modify, to state more precisely, to explicate, or to correct the segment of talk which is thereby specified as a "reference expression". Such treatment procedures are called reformulations. The typical structure of reformulations contains one or more expression functioning specifically as a marker or markers.

This definition shows Gülich & Kotschi's opening towards a broader approach to reformulation: first, they focus on reformulation markers and their importance as part of prototypical reformulation structures; second, they address explanations, corrections, or subtle modifications as reformulations. Table 8 groups paraphrastic and non-paraphrastic reformulation in Gülich & Kotschi (1995):

<table>
<tr><td colspan="7">Paraphrastic reformulation</td><td colspan="6">Non-paraphrastic reformulation</td></tr>
<tr><td colspan="2">Repetitions</td><td colspan="5">Paraphrases</td><td colspan="3">Dissociations</td><td colspan="3">Corrections</td></tr>
<tr><td rowspan="2">Literal</td><td rowspan="2">No literal</td><td colspan="2">Expansion</td><td colspan="2">Reduction</td><td rowspan="2">Variation</td><td rowspan="2">Recapitulation</td><td rowspan="2">Reconsideration</td><td rowspan="2">Detachment</td><td rowspan="2">Form</td><td rowspan="2">Formulation</td><td rowspan="2">Content</td></tr>
<tr><td>Specification</td><td>Explanation</td><td>Summary</td><td>Denomination</td></tr>
</table>

Table 8. Paraphrastic and non-paraphrastic distinction in Gülich & Kotschi 1995.

The main difference between their initial studies and their proposal in 1995 is their subdivision of reformulation in further complex processes determined by reformulation markers: paraphrastic reformulation was not subdivided into subcategories but only into different ways to do it —expansion, reduction, variation (Gülich & Kotschi 1983)—. After focusing on reformulation markers, such ways to paraphrase become subtypes of paraphrastic reformulation; repetition and correction were also incorporated as neighboring functions (Gülich & Kotschi 1987). Such last subdivision is kept in 1995's work, but with further specifications: paraphrastic reformulations can be repetitions —retakes, réphrasages— or paraphrases —equivalence between contents (1983, 1987)—; non-paraphrastic reformulation are dissociations —highlighting some distance between contents with recapitulations, reconsiderations and detachment (see also Rossari 1990, 1994)— and corrections —concerning the form, the formulation procedure itself, or the content (in Holker's 1981 terms)— (Gülich & Kotschi 1995: 46-51). The three types of dissociation distinguished are directly explained with their corresponding reformulation markers (Gülich & Kotschi 1995: 48):

> Markers of recapitulations (i.e. "weak" dissociations) are *en somme, en un mot* and *bref*. Reconsiderations ("medium" dissociations) are indicated by *tout compte fait, somme toute, après tout, en fin de compte, finalement*, *en définitive* and instances of detachment ("strong" dissociations) are indicated by *en tout cas*, *de toute façon*/ *manière, en fait, de fait, en réalité, au fond* (…) A speaker realizing "dissociation" procedures cannot omit the markers mentioned above without any loss; these

> procedures can only be realized (and recognized) if the corresponding markers are present (…) For some of those connectors the reference expression need not correspond to an actually realized discourse constituent; it can remain implicit, i.e. as a piece of information to be retrieved from discourse memory (…).

The same is true for correction (Gülich & Kotschi 1995: 49-50):

> We take up Hölker's suggestion (1988) and distinguish between corrections of form, corrections of formulation and corrections of content (..) The intended object of reference remains the same in non-genuine corrections of content, in spite of the change from reference expression to treating expression, whereas genuine corrections of content always contain a change in the intended object of reference. Example (16) (…) illustrates this point:
>
> (16a) Maintenant tu tournes à droite, enfin à gauche, quoi
>
> (16b) Maintenant tu tournes à droite, enfin non, à gauche.

Both dissociation and correction are explained with lists of reformulation markers and examples based on reformulation markers. Such prototypical reformulation markers, express further functions besides this one: that is why they are employed in reconsiderations and recapitulations ─close to summary or conclusion─, and correction ─close to invalidation─ which, in the end, are considered subtypes of reformulation.

Again, all this confirms that studies on reformulation suffered a change of perspective during the decade of 1990s: first definitions focused on the function and the discourse markers separately; subsequent approaches established subtypes of reformulation by addressing reformulation markers. Martín Zorraquino & Portolés (1999) work in this regard: their study focuses only on reformulation markers in Spanish. Previous studies (Gülich & Kotschi 1987; Roulet 1987; Rossari 1990, 1994; Gülich & Kotschi 1995) influenced theirs, as the four subcategories of markers proposed show: *explication markers*, *recapitulation markers*, *detachment markers*, and *rectification markers*. Reformulation markers introduce an M2 formulating again the preceding M1 (Martín Zorraquino & Portolés 1999: 4121-4122):

> (…) en todos los casos, se mantiene que, en lugar de lo anteriormente dicho, la nueva formulación es **el miembro que se ha de tener presente en la prosecución del discurso**. (…) Los reformuladores se pueden situar en **cuatro grupos según su significado**. Los *reformuladores explicativos* presentan el segundo miembro del discurso como una explicación del anterior; con los *reformuladores rectificativos,* este mismo miembro discursivo corrige otro anterior; los *reformuladores de distanciamiento* privan de pertinencia al miembro discursivo anterior al suyo; y, por último, los *reformuladores recapitulativos* introducen un miembro del discurso como una recapitulación o una conclusión a otro ─u otros─ miembros precedentes.

Martín Zorraquino & Portolés note that such four subgroups of reformulation markers are determined by the meanings they express ─in other words, that they are polyfunctional─. Explanations are related to paraphrastic reformulation because they establish certain equivalence ─semantic or pragmatic─ between M1 and M2; rectifications are associated with non-paraphrastic reformulation because they also involve a change of discourse perspective ─such change, however, is extreme since M1 is cancelled and substituted by M2─; detachments reflect initial canonical definitions of reformulation (Roulet 1987); recapitulations are related to non-paraphrastic reformulation because the conclusion introduced is somewhat different to the previous discourse members ─M1, M2, M3…─. However, they are different uses of discourse markers which are generalized to reformulation because reformulation markers express them prototypically. Martín Zorraquino & Portolés do not propose a general definition of reformulation by analyzing reformulation markers, but their view of reformulation can be deduced from their descriptions (Martín Zorraquino & Portolés 1999: 4121). Their approach to reformulation avoids the paraphrastic and non-paraphrastic distinction:

> La reformulación va desde la explicitación de un primer miembro que pudiera ser mal comprendido (238) hasta la rectificación (239):
>
> (238) a) El albañil es de aquí, o sea, del barrio de las Fuentes.
>
> b) El albañil es de aquí, o sea, zaragozano.
>
> c) El albañil es de aquí, o sea, español.

(239) a) Parece ser que Justo Redondo, el panadero del Castrillo, o sea, el hijo, se los baja con la furgoneta antes de que amanezca.

b) Sobreviví así, reconstruyéndome yo sola, es decir, con mi hijo, los dos en esta ciudad que no era la nuestra.

And addresses it in a gradual way comprising explanations to rectifications; such gradualness, however, is related to the multiple meanings of reformulation markers explained above.

Noren (1999) does not follow the distinction between paraphrastic and non-paraphrastic reformulation (Noren 1999: 58) because it can affect the characterization of reformulation markers:

> La dichotomie entre paraphrastique/non paraphrastique **laisse entendre que chaque CR[43] appartient exclusivement à l'une des deux catégories**, et que leur fonction première reste la même, plus ou moins indépendamment de la nature de X et d'Y. Procédant en sens inverse, nous examinerons quelques CR à partir des segments qu'ils relient pour voir comment et dans quelle mesure ces connecteurs sont employés dans la reformulation telle que nous l'avons définie.

She clearly differentiates reformulation markers from reformulation as a function: such discourse markers prototypically employed to express equivalence or distance between contents do not reformulate always ─e.g. *c'est-à-dire*, *bref* or *finalement*─. Noren addresses reformulation from an argumentative-polyphonic approach (Noren 1999: 49-57; 96-119) and proposes a definition based on the notion of similarity between contents[44] ─*ressemblance semantique*─ (Noren 1999: 49-53):

> Nous avons vu qu'un topos comporte deux FT converses qui mènent à une même conclusion en passant par deux trajets graduels différents. Les membres X et Y

[43] CR in Noren refers to *connecteur reformulatif*.

[44] Concerning differences between M1 and M2, Noren notes that: "Il serait impossible de rendre compte de toutes les différences qui peuvent exister entre les deux énoncés d'une reformulation. Quelques cas typiques de ce qui, pour nous, est admis comme variation sémantique entre X et Y d'une reformulation (Noren 1999 : 52).

> d’une reformulation doivent prendre appui sur le même topos, ce qui veut dire qu’ils doivent exploiter, sinon la même FT, du moins des FT converses. **La reformulation est la double actualisation d’un topos** ou d’un champ topique dans le discours (…) Le degré de ressemblance sémantique entre X et Y peut varier. Il faut alors trouver un critère qui élimine les cas où la ressemblance sémantique est si faible que l’on peut plus parler de reformulation. Ce critère se formule ainsi : pour qu’il y ait reformulation, il faut que X et Y soient interchangeables dans les enchaînements discursifs effectifs où ils sont réalisés.

Noren’s approach to reformulation is based on the actualization of topoi ─that is, conversational topics─ determining the semantics of the discourse. This leads to three subtypes of reformulation: repetition, repetition with strong semantic similarity, and repetition with weak semantic similarity (Noren 1999: 52). Strong semantic similarity is closer to what has been defined as paraphrastic reformulation; weak semantic similarity refers to subtle variations in the M2. This definition of reformulation does not contemplate cases such as recapitulation or summary, addressed as subcategories of reformulation in previous studies (Noren 1999: 36):

> La contrainte du même ordre de grandeur doit être prise dans un sens relatif et non pas absolu. Elle dépend d’une part de la condition de ressemblance sémantico-pragmatique et de l’autre de la condition séquentielle (voir infra), toutes les deux limitant sa portée. Corollairement, nous ne traiterons **ni de l’expansion, de l’explication, ou de la justification, ni du résumé**, quoique nous acceptions un certain déséquilibre structural tant que celui-ci reste à l’intérieur de l’énoncé.

In summary, Noren (1999) proposes a clearer model for reformulation concerning the terminology employed: there are no subcategories of reformulation, based on strong or weak similarity. It is complicated, however, to distinguish semantic weak similarity cases from distance cases such as those characterized as non-paraphrastic reformulation.

Bach (2000, 2009) continues with the classifications previously established. She defines reformulation as a general macro-function comprising further discourse functions (Bach 2000: 71):

> La reformulació és un procés de reinterpretació textual en què un locutor determinat reprèn algun element discursiu anterior per presentar-lo d'una manera diferent i amb unes funcions discursives determinades. En realitat, la reformulació esdevé d'una operació d'autoreflexió sobre la llengua i una mostra clara de la funció metacomunicativa del llenguatge (Calsamiglia i Tusón 1999, 310). La reformulació garanteix la cohesió textual i, alhora, facilita la progressió discursiva, perquè permet pal·liar els possibles defectes comunicatius d'un text (Antos 1982).

Reformulation results from the existence of communicative problems that should be fixed while discourse is being produced.[45] This general process can trigger other secondary functions ─explanations, amplifications, and so on─ and is subdivided into paraphrastic and non-paraphrastic. Paraphrastic reformulation, in turn, comprises expansion, reduction and variation ─in Gülich & Kotschi's sense (1983, 1987, 1995); non-paraphrastic reformulation adds permutation to the other categories (Bach 2000: 244). Such categories are generalized at the function level and, as Murillo states, Bach "considers conclusion, argumentation, and correction values in both expansion and reduction relations" (Murillo 2007: 89), all paraphrastic subtypes:

> En altres ocasions, la vehiculació de l'argumentació coorientada o antiorientada apareix unida inescindiblement a l'activació d'instruccions correctives, a voltes potenciades pel valor semàntic dels components de la peça lèxica reformulativa, com succeeix en l'ocurrència MBD09, on el connector *més ben dit* **corregeix les conclusions que s'extreuen del primer enunciat** tot mantenint la trajectòria argumentativa apuntada (Bach 2000: 228).

[45] Bach considers that reformulation covers two main textual processes: "D'una banda, parlem de reformulació quan designem la producció d'un text nou que parteix d'un altre que anomenem text base : un resum, un comentari, una traducció o un text de divulgació científica són productes de la reformulació textual (vegeu Casamiglia i López, en prensa; Cassany i Martí, en prensa; Ciapuscio 1992, 1993, 1997; Loffer-Laurian, 1984; Mortureux 1982 o Yriart, 1990). D'una altra, entenem també com a reformulació la represa dins d'un mateix text d'algun aspecte que es formula de nou (vegeu Gülich i Kotschi 1983, 1987a, 1995; Flottum 1994a …) (Bach 2000: 72).

> Finalment, en altres ocasions, l'argumentació, la denominació i altres instruccions **es combinen amb instruccions conclusives** que faciliten el tancament d'un tema textual iniciat amb anterioritat (...) (Bach 2000: 229).
>
> En l'exposició de les principals similituds entre els dos grups de connectors, sobretot en el que fa referència a les instruccions de segon nivell, **s'insinua implícitament la relació entre la reformulació i altres categories discursives com ara l'argumentació, l'exemplificació o la conclusió**. (Bach 2000: 230).

This shows how reformulation changed after publishing various works proposing several functional subcategories, most of them derived from the reformulation markers addressed and not from reformulation as a function. Reformulation, conclusion, correction, and other similar functions ─condensation, recapitulation, invalidation, summary, reconsideration─ converge, and the defining limits between functions blur.

Del Saz (2003) proposes another model blending the characterization of reformulation and reformulation markers in English. Reformulation is first defined as follows (Del Saz 2003: 211-212):

> A reformulation takes place between a source discourse segment S1 (cf Gülich and Kotschi 1983) or any of its constituents, and a reformulated segment, or S2, along with the presence of a marker or reformulator, which displays the type of relationship accomplished between the two linked discourse segments and indicates that a recharacterization of the previous discourse segment (S1) has been carried out, so that a new formulation or reformulation is "on the way".

Contrary to Noren (1999), Del Saz argues for the importance of markers in displaying reformulation processes and even establishing them. She bases her description of reformulation on Fraser's (2002) typology of elaborative discourse markers covering reformulation markers (Del Saz 2003: 231):

> I strongly support the claim that reformulators, as they are envisaged in this study, could be considered as a naturally occurring sub-class within Fraser's Elaborative DMs.

Del Saz classifies reformulation markers into four main groups (Del Saz 2003: 233): *explanation* ─the whole previous discourse segment S1, or one of its constituents, takes the form of an explanation in the reformulated S2 (2003: 234)─, *rectification* ─S1, or one of its constituents, is a rectification in the newly reformulated S2 (2003: 237)─, *conclusion* ─S1, or one of its constituents, is a concluding restatement drawn from the S1 (2003: 238)─ and *summary* ─S1, or one of its constituents, is a shorter version of it (Del Saz 2003: 239)─. Apparently her proposal distinguishes between the semasiological level of discourse markers and the onomasiological level of reformulation. However, some extracts of the explanations addressing such reformulation markers show how their features are generalized to reformulation as a function, especially concerning subgroups within the four categories ─see table 9 for all Del Saz's categories and subcategories─ (Del Saz 2003: 233-239):

> Clarification: A reformulator from this group carries out a recharacterization of the message conveyed by the whole previous discourse segment S1, or one of its constituents, the rendition of which is a newly reformulated S2 that clarifies some aspect of S1 (…)
>
> Identification: (…) the rendition of which is a newly reformulated S2 that **identifies or assigns reference to it**.
>
> Illustration: (…) the rendition of which is a newly reformulated S2 that **illustrates some aspect of S1**.
>
> Rectification: (…) as shown above, *or rather* and *on second thought* would mark the cases of Neutral Rectification. Then a first sub-group of **Rectification and Improvement** (…) is distinguished (…) The **specific meanings that these reformulators** convey entail a rectification of the message.
>
> Summary: (…) under the general label of Summary, I have opted to differentiate two main sub-groups, DMs of **Recapitulation**, namely, *to recap*, and its longer version *to recapitulate*, along with DMs of **Summary**, with varied units such as *in sum*, *to summarize*, the shorter form *to sum up*, *in short*, and its synonymous

counterpart *in brief*, and the most informal *in a nutshell*, along with *in a word*, and *in a few words* (…)

Explanation			Rectification			Conclusion	Summary	
Clarification	Identification	Illustration	Natural rectification	Rectification and Improvement	Rectification and fine tuning	In conclusion, to conclude, to top it off	Recapitulation	Summary
That is to say, that is	Namely, viz.	For example, for instance	Or rather, or on second thought	Better still, or better said	Or more precisely, more accurately		To recap, to recapitulate	In a word, in a few words

Table 9. Del Saz's classification of reformulation markers (Del Saz 2003: 242).

Such subgroups of reformulation markers are the same as the subtypes of reformulation proposed in previous studies on the field. They express different functions intrinsic in their meaning and are directly extrapolated to reformulation, which becomes a function used not only to change the discourse perspective but also to summarize contents, to identify ideas, or to exemplify. Del Saz's proposal thus keeps the trend of broad approaches to reformulation distorting first clear definitions for this function ─see 2.3.1.─.

As Del Saz, Murillo (2007) identifies several discourse process instructions instead of distinguishing between paraphrastic and non-paraphrastic reformulation. She describes eleven types of procedure expressed by *es decir* ─*that is*─: (i) identification, (ii) specification, (iii) orientation, (iv) explanation, (v) introduction of restrictions, (vi) correction, (vii) definition, (viii) denomination, (ix) conclusion, (x) mathematical operation, and (xi) consequence. Such labels are based on all the previous studies published in the field[46] (Murillo 2007: 98) and, in turn, are related to different theoretical notions within the

[46] Murillo (2007) offers an exhaustive review of seminal references in the field of reformulation published for various languages ─French, Spanish, English, Catalan, and other languages─ and from different theoretical

Relevance Theory. *Identification*, *specification* and *orientation* are associated with the recovery of the logical form of utterances (Murillo 2007: 212); in some contexts:

> (…) identification can be performed by operations that resemble those of *conclusion* or *mathematical operation* (Murillo 2007: 213) ─in other words, such functions are blended─.

Explanation, *introduction of restrictions* and *correction* are related to the recovery of explicatures; sometimes explanation can be interpreted as an illustration ─again, limits between functions are blurred─:

> (…) an explanation can also be an *illustration* when an example is provided to explain something. These examples reflect the proximity of reformulation and exemplification markers (Murillo 2007: 218).

Corrections and *repairs* are also equalized:

> Finally, the function correction is far more frequent in oral language (…) These type of examples, which are also repairs (i.e., they are related to unplanned discourse, see 4.3.6.2.), were found in the Spanish sub-corpus as well (Murillo 2007: 220).

Definition and *denomination* are related to the recovery of implicated premises (Murillo 2007: 223); again, such processes are identified with others:

> Examples in definition processes have a similar structure to that of lexicographical definition. The main patterns used are paraphrases and synonyms (cf. Alvar 1982, Werner 1982) (Murillo 2007: 223).

Last, *conclusion*, *mathematical operation* and *consequence* are the basis of the recovery of implicated conclusions (Murillo 2007: 227). Such operations behave like the previous ones:

> Like the other discourse processes (specification and explanation), a conclusion may be supported by an illustration (…) Recapitulation is a particular case of conclusion (cf. Galán 1998: 87) (…) The other main type of conclusion is label (cf. Fuentes

---

groundworks ─Theory of Argumentation, Theory of Polyphony, Relevance Theory, Analysis of Conversation, and so on─.

> 1993): sometimes a conclusion takes the form of a term that condenses and at the same time qualifies the previous concepts (Murillo 2007: 228).
>
> In the same way, mathematical operations are related to the process of recovery of implicated conclusions (…) A second level of this discourse process includes those in which a result is provided in the second member of a reformulation but is not possible to make a calculation with the information provided (Murillo 2007: 230).
>
> Finally, when the reformulation introduces a fact or event that follows or is the result of another fact or event, in other words, when it is factual, the corresponding discourse process is *consequence* in this research (Murillo 2007: 230).

Each excerpt shows the relationships between reformulation and other neighboring functions: all such processes are defined as subtypes of reformulation since the prototypical reformulation markers express them.

Garcés also differentiates various operations of reformulation beyond paraphrastic and non-paraphrastic (Garcés 2008: 71):

> En los procesos de reformulación, se han distinguido dos tipos de relaciones fundamentales: parafrástica y no-parafrástica; sin embargo, hay que matizar esa clasificación, dado que la reformulación se configura como una categoría compleja en la que se incluyen valores diversos como la **identificación, la especificación, la aclaración, la corrección, la conclusión o la consecuencia, la recapitulación, la reconsideración o la pérdida parcial o total de pertinencia de lo expresado previamente**.

In various works she considers that the presence of discourse markers is not compulsory to reformulate; however, their use shows the type of discourse operation established between M1 and M2 (Garcés 2008: 75). Once again, reformulation and reformulation markers are confused in their definition:

> El concepto de reformulación se define como un proceso retroactivo, de vuelta a un segmento previo (…) Ello supone una reinterpretación de lo anterior, que queda explicado, corregido, recapitulado, reconsiderado o ve restringida su pertinencia en

> todo o en parte (…) A partir de esta caracterización, se puede establecer una tipología de los **marcadores de reformulación, distinguiendo cinco grupos fundamentales, según las funciones discursivas que desempeñan: explicación, rectificación, recapitulación, reconsideración o separación**.

It seems that both objects of study are addressed separately, but all the operations of reformulation distinguished are exemplified with discourse markers. This suggests that perhaps all the operations proposed are based on the meanings codified by reformulation markers and not on reformulation as a function. For instance, Garcés defines explanation ─as a subtype of reformulation─ and address two prototypical reformulation markers in Spanish ─*o sea* and *es decir*─ (Garcés 2008: 87):

> (…) Los marcadores discursivos que desarrollan los dos tipos de operaciones son *es decir* y *o sea* (…) con o sea se presenta una explicación alternativa (…) entre varias opciones, el hablante elige aquella que ha de inferirse necesariamente. El marcador esto es señala una identificación o especificación de algún elemento del segmento de referencia o una aclaración del significado o del sentido expresado antes y, en determinados contextos, muestra la conclusión derivada de lo anterior.

Such definition, however, is cyclic: (1) explanation is a subtype of reformulation expressing identification, specification and consequence-conclusions; (2) *o sea* and *es decir* work in that way; (3) if *o sea* and *es decir* are prototypical reformulation markers and express such meanings in explanation contexts, explanation can be defined by describing their meanings ─see fig. 2─. The same is true for rectification, recapitulation, consideration, separation and their sub-functions ─see Garcés (2008: 104- 112; 115-125; 126-141; 142-154) respectively─. It is not clear if Garcés describes reformulation markers or the subtype of reformulation they express (Garcés 2008: 126):

> El grupo de marcadores de reconsideración se caracteriza, en contraste con los de recapitulación, porque la vuelta a la primera formulación no se hace para extraer lo esencial, sino para presentarlo desde una nueva perspectiva, que apoya o se opone a una propuesta anterior, parcial o totalmente. Por ello, la utilización de un marcador

de este tipo supone que ha habido un proceso previo de consideración de otras perspectivas, explícitas o implícitas (…).

The definition varies between the operation ─reconsideration─ and its discourse markers, what facilitates a generalization of such operations ─which actually reflect the meanings of the reformulation markers analyzed─ at the function level ─that is, onomasiology─ (Garcés 2008: 156):

Dado el papel fundamental que desempeñan los marcadores en este proceso [reformulación], hemos establecido una sistematización de las operaciones de reformulación a través de estas unidades que relacionan el miembro de referencia y el miembro reformulado (…) En esta sistematización de los marcadores, se han distinguido cinco grupos en función de las relaciones establecidas entre los miembros vinculados (…)

Reformulation was initially described in a simplest way, and reformulation markers were addressed as a concrete manifestation of how this function works ─in both paraphrastic and non-paraphrastic contexts (Gülich & Kotschi 1983; Roulet 1987)─. After that, new studies (Gülich & Kotschi 1987; Rossari 1990, 1994; Gülich & Kotschi 1995; Martín Zorraquino & Portolés 1999; Bach 2000; Murillo 2007) focused on reformulation markers rather than on reformulation per se: as a result, several sub-functions expressed by such reformulation markers were in the end considered as part of reformulation.

As has shown in this section, literature on reformulation changed the idea of this function assumed in the field: what initially was defined as a relationship of equivalence between M1 and M2, or as a retroactive change of discourse perspective became a more complex function encompassing subtypes based on other neighboring categories usually expressed by reformulation markers ─see Table 10─.

Fuentes 1993	
PR	NPR
Explanation	Expansion
	Defiition
Denomination	Generalization
Correction	Label

		Rossari 1994		Gülich & Kotschi 1995		Martín Zorraquino & Portolés 1999	Noren 1999	Bach 2000	Del Saz 2003	Murillo 2007	Garcés 2008
		PR	NPR	PR	NPR	Explanation	Repetition	PR	Explanation	Identif	Explanation
			Recapitulation	Repetition	Dissociation	Recapitulation		Expansion Reduction Variation	Summary	Explanation	Recapitulation
					Recap Recons Separation		Repetition based on high-similarity			Orientation	
Enumeration	Particular		Reconsideration	Paraphrase (expansion, redution, variation)	Correction	Detachment		NPR	Conclusion	Correction	Consiederation
			Distance		Form Formul Content		Repetition based on weak similarity	Expansion Reduction Variation Permutation		Definition	Separation
						Rectification			Rectification	Denomination/Math	
Conclusion	Recap		Invalidation							Consequence	Rectification

Table 10. Creation of new subcategories of reformulation in the literature. See also Pons (2013).

As a result, the theoretical limits of reformulation disappear: it is complicated to distinguish this function from others. All this reflects the so-called form-function trap (see §2.2.3): the function is defined by the meanings of the forms expressing it instead of its own intrinsic features. The form-function trap has been the focus of a series of studies published by Pons and Murillo for Spanish and English: the following subsection ─§2.3.3.─ deals with it.

2.3.3. The issues derived from the form-function trap: Pons and Murillo (2013, 2016, 2017)

A series of works published between 2013 and 2017 (Pons 2013; Murillo 2016; Pons 2017) focuses on the form-function trap[47] detected in most studies on reformulation. Pons and Murillo establish two different perspectives to define reformulation and its relationship with other neighboring functions:

- Pons's work (2013) is the first highlighting that reformulation is not paraphrase neither correction or conclusion; this work is onomasiological and does not follow the paraphrastic/ non-paraphrastic distinction ─like some previous studies (Noren 1999, Martín Zorraquino & Portolés 1999, Del Saz 2003 or Murillo 2007)─. One of his main ideas is that conclusion or correction are not subtypes of reformulation despite all the classifications proposed in the literature (Pons 2013: 155)
- Contrary to Pons's proposal, Murillo (2016) considers conclusion and correction types of reformulation as shown by several reformulation markers expressing such functions ─*o sea*, *es decir*, *esto es*─. She neither follows the paraphrastic/ non-paraphrastic distinction and addresses reformulation from a semasiological perspective. Murillo differentiates between conclusion in reformulations and conclusion (Murillo 2016: 245); the same is true for correction markers.
- Pons's response to Murillo was published in 2017: this work summarizes the main ideas of both studies and meta-analyzes Murillo's proposal to prove how blurred limits of reformulation are when describing it as a macro-function encompassing other functions.

[47] The label *form-function trap* is first coined in Pons (2017).

Pons and Murillo agree that the PR-NPR distinction should be abandoned[48] (Pons 2017: 156). Their arguments justifying such abandoning are, however, different:

> (…) al superponer el componente pragmático sobre la noción de igualdad, el hecho mismo de que un hablante sienta la necesidad de duplicar la definición intensional de una extensión cualquiera implica una cierta distancia con la primera formulación (…) Por otro lado, la expansión analítica de la noción de igualdad crea una zona gris cuando se confronta con otras relaciones vecinas, como las de hiponimia-hiperonimia, meronimia, expansión y reducción. **Así, la aparente seguridad que se alcanzaba con las nociones de igualdad y distancia se pierde cuando se analiza la casuística presente en las principales tipologías de RR.PP. y RR.NN.PP**[49] (Pons 2013: 155).

> (…) Sí que parece coherente, siguiendo a Pons (2013), abandonar la noción de reformulación parafrástica como paraguas general, **puesto que estos casos de corrección y conclusión, entre otros, quedarían claramente fuera de esta noción**. De la misma forma, cabría desechar la etiqueta de reformulación no parafrástica, pues en realidad ambas parten de criterios semánticos más que pragmáticos. Además, al no mantener la categoría de reformulación parafrástica, carece de sentido mantener la de reformulación no parafrástica (Murillo 2016: 240-241).

While Pons (2013) argues that PR and NPR are not as solid as they seem after reviewing all the examples and classifications proposed in the literature[50], Murillo (2016) notes that PR and NPR do not allow to include further functions expressed by reformulation markers, such as conclusion and correction. Such arguments reflect two different approaches to reformulation: Pons's approach is exclusive and distinguishes reformulation from other

---

[48] Given that both Pons and Murillo abandon the PR-NPR distinction, and that this work focus on their polemic, we will adopt the labels paraphrase and reformulation to address them.

[49] Pons refers to paraphrastic reformulation (RR.PP) and non-paraphrastic reformulation (RR.NN.PP.).

[50] The notion of *equivalence* (or *identity*) triggers interpretation issues in several contexts: if the speaker/writer needs to formulate again some technical content whose meaning is not easy to be assimilated, it could be said that there exists a difference between the new M2 and the old M1, even though the M2 refers to the same idea or content expressed in M1.

functions; Murillo's is inclusive, and classifies other functions as subtypes of reformulation – see figs. 5 and 6 –:

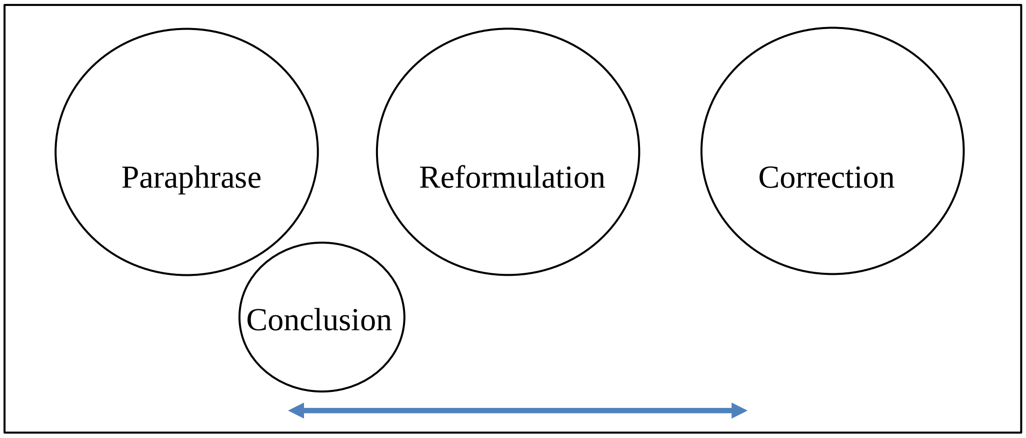


Fig. 5 Visual representation of Pons's exclusive approach to reformulation.

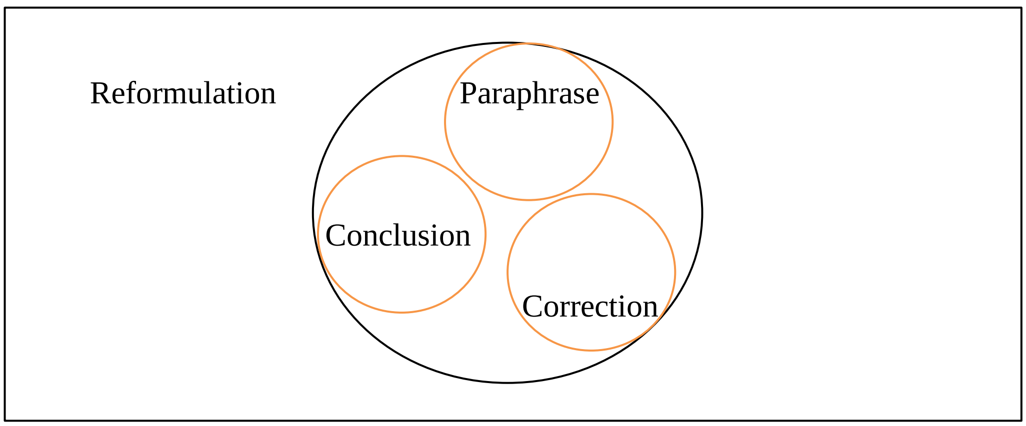


Fig. 6Visual representation of Murillo's inclusive approach to reformulation.

Pons (2016) proposes a model focused on defining reformulation onomasiologically and on the importance of separate semasiology from onomasiology. His model is characterized by three features:

a) Is exclusive: paraphrase and correction are different from reformulation, as shown by first studies published in the field. They can be distinguished by describing them structurally, semantically and pragmatically;

b) Conclusion is not a subtype of reformulation despite the fact that reformulation markers express it;

c) Reformulation markers are not determinant in detecting the presence of reformulation or any of the other functions, especially in pragmatic contexts.

Pons[51] distinguishes *reformulation* from *paraphrase*, *conclusion*, and *correction*. They are part of a functional continuum where paraphrase is placed at the left – related to identity ($\alpha = \beta$[52]) – and correction at the right – related to negation ($\sim\alpha, \beta$) – (see fig. 9 and Pons 2013: 157). He returns to first definitions of paraphrase and reformulation[53] – see Gülich & Kotschi (1983) and Roulet (1987) in 2.3.1. –, clearly separated because both functions are motivated by different communicative aims: paraphrase expresses the same idea in two identifiable ways (Cuenca 2003); reformulation results from highlighting differences between contents to change discourse orientation (Flores Acuña 2003).

Paraphrase and reformulation are contextual: the presence of formal items – such as discourse markers – does not guarantee the existence of paraphrase or reformulation. For instance, the same discourse marker introducing paraphrases can be employed to reformulate (extracted from Pons 2013: 158):

(23) Los presentes asintieron como buenos banqueros, es decir, como buenos tiburones.

This statement is essential in Pons's argumentation. Discourse markers contribute to interpret paraphrase or reformulation, but they are not determinant for their production neither to distinguish both functions:

> Lo que realmente importa en estos casos es que, en un contexto dado, el **autor/hablante** tenga la **voluntad de acercar o de alejar** los términos objeto de la

---

[51] In previous studies, Pons follows the PR-NPR distinction in a well-established tradition (2006: 90): "I will call this process reformulation and I will distinguish paraphrastic reformulation if the content of B merely rephrases A and nonparaphrastic reformulation if the speaker takes the content of B as the only valid source for the continuation of discourse". However, he notes that formulation and reformulation do not refer to the same phenomenon: formulation comprises hesitations, false starts, or interruptions, and is a frequent function in colloquial language, either in its spoken or written form. Reformulation, for its part, refers to "the argumentative structure of a message and has to do with the rephrasal of arguments – and not with planning problems and changes of project – (Pons 2006: 91).

[52] In Pons's terms, α and β are M1 and M2 respectively.

[53] La paráfrasis implica, por un lado, igualdad semántica y, por otro, igualdad cognitiva, textual o comunicativa. La reformulación, por el contrario, implica distancia. Desde un punto de vista discursivo, **el hablante que parafrasea desea establecer un nexo de identidad entre dos formulaciones**; el hablante que **reformula, por el contrario, desea poner de manifiesto las diferencias entre ambas formulaciones** (Pons 2013: 157).

> equiparación discursiva (Pons 2013: 158). Y esa es (…) la principal diferencia entre igualdad [paraphrase] y reformulación (…) que **una vez enunciado β** [M2], **se pueda / no se pueda continuar el discurso** a partir de la **información** semántica y pragmática presente **en α** [M1] (Pons 2013: 160).

Paraphrase and reformulation exist when the speaker/writer wants to do it, not because of the presence of reformulation markers. Paraphrases allow to use both M1 and M2 to continue the discourse; reformulation only needs the accuracy of the M2 to continue the discourse.

Concerning correction, it shares some common features with reformulation, but it should not be considered a subtype of the latter:

> En las relaciones correctivas se produce un abandono de (todo o parte de) el primer miembro, que el hablante considera no pertinente para el desarrollo de su intervención, en favor de (un elemento de) un segundo miembro (…) **α (…) no se retoma para el establecimiento de implicaturas, presuposiciones o redes léxicas, ya que es reemplazado por las (…) del segundo** (Pons 2013: 160).

Correction is produced because the speaker/writer needs to invalidate something previously said in M1[54]. Correcting is like deleting words in real time, so to speak: the only valid information is that uttered in M2 and, thus, the M1 is not necessary once M2 is expressed. Therefore, correction is different from reformulation, which establishes a difference between M1 and M2 but not a total substitution. Like paraphrase and reformulation, correction does not require the presence of discourse markers to be established. Their presence contributes to its interpretation, but it is not enough to detect which operation is produced:

[54] The notion of *correction* is close to *repair*, developed in the field of the American Conversation Analysis (CA) – Antos (1982), in turn, develops his proposal by considering this notion – . Repairs are related to formulation processes – see Schegloff, Jefferson & Sacks (1977) –: they are the result of immediate changes in forms and contents, especially in colloquial language (Gülich & Kotschi 1995). In its origins, thus, *repair* is not a subtype of reformulation, which results from the need of expressing some content with more accuracy and certain degree of distance.

> La diferencia entre distancia (reformulación) y abandono (corrección) es sutil y contextual; por ello (…) **no se puede establecer a priori a partir de la presencia de** una marca formal como, por ejemplo, **un conector determinado** (Pons 2013: 161).

The fact that reformulation markers express correction is not enough to classify this function as a subtype of reformulation. Concerning conclusion, Pons notes that is different from reformulation despite they share the same discourse markers (Pons 2013: 162):

> Desde el punto de vista discursivo, existe una estrecha relación entre reformular y concluir que ha llevado, desde el punto de vista descriptivo, a la **equiparación entre los marcadores de ambas clases** (Fuentes 1993) o a su **inclusión como subclase dentro de la reformulación** (Charolles, Coltier 1986; Del Saz 2003) (Pons 2013: 162).

The difference they present is subtle: it is assumed that reformulation implies a distance regarding the M1, and that this distance is produced because the speaker/writer aims to explicit in M2 some uncomplete idea in M1. Specifying uncomplete or implicit ideas is the basis of conclusion processes such as those expressed by most of reformulation markers analyzed in the literature (Pons 2013: 162)[55]. However, such descriptive proximity does not imply that reformulation and conclusion are the same type of discourse process:

> Desde el punto de vista **comunicativo** la **conclusión** tiene que ver con el grupo de las relaciones **causa-consecuencia** (y, de modo más **tangencial**, con el **resumen**); la **reformulación**, con las **actividades del decir**. Por eso, **conclusiones y consecuencias**, que hablan de relaciones **entre estados de cosas**, están codificadas **lingüísticamente en el marco oracional**, mientras que la **reformulación**, que describe la **actividad discursiva** del hablar, **no** (Pons 2013: 163).

---

[55] Pons introduces two examples taken from Charolles & Coltier (1986) and Fuentes (1993):

- Il est Arcadie, et l'Arcadie, c'est en Louisiane. Autrement dit, dans les Amériques.
- Estuvimos andando de un sitio para otro, fuimos al cine, charlamos, total, nada interesante.

In both cases, the M2 (dans les Amériques; nada interesante) explicits an implicit idea in M1 : that Louisiana is in America, and that walking, going to the cinema or speaking are not extraordinary activities.

Conclusion and reformulation are two different communicative processes: conclusion is related to the expression of the state of affairs of something described; reformulation to discourse production activities (Gülich & Kotschi 1995).

This review leads to the following onomasiological definition of reformulation (Pons 2013: 163-164) based on 6 corollaries:

(i) Reformulation is a two-placed discourse operation encompassing a first formulation α and a second formulation β. α is considered as discursively incomplete; β is partially similar to α;

(ii) Structurally, reformulation is based on a discourse subordination: this subordination is discursive because the relevant content is that expressed in β – that is, the second formulation –; α, thus, becomes secondary but not unnecessary;

(iii) Despite such subordination, the relationship α (reformulation marker) β is kept in the memory of speakers and writers;

(iv) Like in grammar, the relationship between α and β can be highlighted with a reformulation marker. The use of reformulation markers is frequent in reformulations because it facilitates its interpretation, but the correlation reformulation – reformulation marker is not systematic.

(v) Semantically, reformulation implies partial identity and partial difference between α and β. Therefore, relationships based on a total equivalence – such as paraphrase – or on the complete substitution of α by β – such as correction – are not the same as reformulation.

(vi) Communicatively, β overwhelms α since β is the most reliable representation of the speaker/writer's thoughts. The content expressed in α is kept in mind. This relationship is semantic and pragmatic; thus, formal marks such as discourse markers do not allow to distinguish reformulation vs. non-reformulation in an automatic way.

Two main conclusions are retrieved from this study: (a) reformulation must be defined in a functional way – onomasiological – so as to delimitate it adequately; (b) reformulation – as a function – and reformulation markers – as formal items expressing reformulation – must be distinguished. Regarding (a), reformulation is distinguished from paraphrase and correction, and all three are associated with formulation activities (Antos 1982); conclusion does not. Regarding (b), reformulation markers express further functions besides reformulation – conclusion, correction, summary, and others reviewed in 2.3.2 –[56], but reformulation cannot be completely defined by describing the meanings of such markers.

Murillo (2016) proposes a semasiological model focused on the relationship between reformulation, conclusion and correction, and on the importance of reformulation markers. Her model, based on Relevance Theory and polyphony, is characterized by two features:

a) Is inclusive: paraphrase, conclusion and correction are subtypes of reformulation, as shown by reformulation markers expressing all them in various contexts.

b) It leads to two subgroups of discourse markers: (i) conclusion markers and reformulative conclusion markers; and (ii) correction markers and reformulative correction markers (Murillo 2016: 251). Therefore, reformulation can conclude and correct besides reformulating, what is different from conclusion and correction in a traditional way.

Reformulation markers are referred to in the definition and all the explanations proposed:

> Los **marcadores de reformulación** (MR) **presentan el miembro del discurso** que los sigue como la **nueva perspectiva** desde la que se debe **reinterpretar** un primer miembro. Así, **permiten** volver al elemento anterior y **asignarle** una **nueva interpretación**, por suponerse que, a partir de este primer miembro, no se han debido de conseguir las inferencias deseadas (Murillo 2016: 238).

[56] Historically, prototypical reformulation markers – such as *o sea* in Spanish (see Pons 2013: 164-167) – develop conclusion meanings. However, this concerns the development of polysemy in discourse markers (Pons 2013: 162) and not the definition of reformulation as a function.

According to this definition, reformulation markers introduce the new perspective adopted to reinterpret previous contents and allow to assign that new interpretation for the whole message. Depending on the discourse markers employed, reformulation varies: it concludes, correct – Charolles & Coltier (1986)[57] –, defines, specifies or introduces mathematical operations – Murat & Cartier-Bresson (1987), Flottum (1994) –. Murillo thus assumes that reformulation involves other micro-processes contributing to the change of perspective required for M1. This statement disagrees with Pons's (2013) proposal:

> **Pons** aboga por un concepto unitario de reformulación, separándolo de las nociones de paráfrasis y de corrección, y **argumenta que los valores de conclusión de marcadores de reformulación como *o sea* no deberían incluirse dentro de la reformulación**. Esta afirmación **llama la atención**, pues los **valores conclusivos constituyen un alto porcentaje** de los usos de los **marcadores** de reformulación explicativa (MRE: *es decir*, *o sea*, *esto es*, *a saber*, etc.), al menos en la **lengua escrita** en español (…) (Murillo 2016: 239)

Concerning conclusion, it should be kept in mind when defining reformulation that reformulation markers express conclusion in several contexts and that, consequently, both functions are related. Examples interpreted as conclusion and reformulation in Pons (2013) are reinterpreted in Murillo (2016: 239):

> A: El gobierno no cederá a las presiones
>
> B: **Por tanto** ustedes no van a desbloquear el conflicto
>
> B: **Es decir**, ustedes no van a desbloquear el conflicto

The conclusion with *por tanto* introduces a cause-consequence relationship; the reformulation with *es decir* shows a conclusion on the formulation level. Both examples are a conclusion, but such conclusions are different: the former is a relationship between contents; the latter is a conclusion on what is said. As a result, two processes can be

---

[57] However, as shown in 2.3.1., Charolles & Coltier (1986) are a kind of bridging work: they define reformulation as in traditional studies but also take into consideration other functions related – but not subordinated – to reformulation. They also highlight that their relationship could result from the reformulation markers –such as *c'est-à-dire* or *autrement dit* – addressed.

distinguished at the function level: conclusion – in the traditional sense – and conclusive reformulation – a subtype of reformulation – (Murillo 2016: 239)[58].

Reformulation markers expressing conclusion and correction contribute to the establishment of explicatures in terms of Relevance Theory (RT): they correspond with the different stages of interpretation in RT. According to this idea (Murillo 2016: 242):

> La mayor parte de sus valores se pueden **integrar en una relación de reformulación**. De esta forma, los **procesos discursivos que se dan con estos marcadores**, y que han sido progresivamente puestos de manifiesto en estudios sobre diversas lenguas, pueden **agruparse** en torno a estas etapas (Murillo 2004, 2007, 2009, 2010, 2012).

Murillo's model encompasses two main categories – or macro-processes –: functions related to the interpretation of the explicit meaning, and functions related to the interpretation of the implicit meaning. Discourse markers operate in such two categories (Murillo 2016: 243-244):

- Los marcadores usados en procesos de identificación, especificación y orientación actúan en el **nivel del desarrollo de la forma lógica** y contribuyen directamente a las **explicaturas** del enunciado (…)
- En el nivel de las **explicaturas** tenemos **los procesos de explicación y corrección**, ya que se reformula el contenido explícito del enunciado, acercándolo a lo que se quiere comunicar. Los **casos de corrección son más una reorientación** que una rectificación (…)
- En el nivel de las **premisas implicadas** encontramos la **definición y la denominación**, que proporcionan la información enciclopédica o contextual necesaria (…)

[58] Pons (2013) argues that *por tanto* introduces an interpretation based on what is understood by the speaker B – A could say "such conclusions are yours, not mine" –; *es decir* introduces a reformulation of what A says – "this is not an adequate reinterpretation of my words" – (2013: 162). Both answers are motivated by different communicative aims: (i) concluding some idea; and (ii) reinterpreting some content.

- Por último, en el nivel de las **conclusiones implicadas**, tenemos los procesos de **conclusión**, **operación matemática** y **consecuencia**, en los que el hablante explicita una conclusión que previamente estaba implícita.

Contrary to reformulation markers, consecutive markers – usually employed to introduce conclusions – contribute to the establishment of implicatures (Murillo 2016: 245), what fits with that idea of conclusion as a relationship between contents (also defended in Pons 2013). This idea is supported by a second argument in Murillo's proposal: reformulation markers expressing conclusion are employed in polyphonic contexts (Murillo 2007, 2010, 2012), while conclusion markers are frequent in contexts without polyphony (Murillo 2016: 247):

> Todos estos marcadores son polifónicos, pues introducen **otro punto de vista sobre lo que se ha planteado previamente**. Siguiendo a Ducrot (1984), los MRE revelan al menos la existencia de dos voces, la de un primer enunciador – fuente del punto de vista – y la de un segundo enunciador, con el que se identifica el locutor, esto es, el responsable del enunciado (…).

Concerning correction, it is noted that reformulation markers expressing correction are marginal in written contexts – at least only a 1.5% of the cases in Murillo's journalistic corpus (2007) –. The type of correction introduced by reformulation markers is more reduced than canonical corrections introduced by other discourse markers, such as *bueno* in Spanish (Murillo 2016: 251). Murillo argues for this idea by commenting another two examples addressed in Pons (2013):

(24) Dame tres filetes de magro; **bueno**, cuatro, que, como somos tres, tocamos a más de uno / #tocamos a uno;

(25) Estuvimos enfermos; **bueno**, algo pachuchos; estuvimos decaídos todo el día[59].

---

[59] This idea is justified by the following example, extracted from Fuentes's (1993) study on reformulation markers:

- Estuvimos algo enfermos, bueno, pachuchos.

Fuentes describes such example as an instance of correction. However, Pons notes (Pons 2013: 161) that both *enfermos* and *pachuchos* can be employed in several discourse continuations:

Correction is the only possible interpretation for (24) because four persons cannot have more than one steak if there are only three steaks in total. However, Pons does not analyze (25) as a correction but as a reformulation: *bueno* introduces a precision because *enfermos* is an adjective with more connotations than *pachuchos*. Murillo states that (Murillo 2016: 251):

> En efecto, con los MRE se dan correcciones o precisiones, pero estas **no se alejan tanto de la primera formulación**, puesto que pueden extraerse implicaturas del miembro reformulador que son también compatibles con el primer miembro. **Son como reorientaciones**[60].

Reformulation markers expressing correction are employed in oral – *bueno*, *mejor dicho*, *vamos*, *al menos* – and written contexts – *mejor dicho*, *mejor aún*, *más bien* – and are related to explicatures; other correction markers – explicative corrective markers – function at the level of implicatures (Murillo 2016: 252)[61].

To sum up, this work has three main points (Murillo 2016: 254): (a) reformulation markers can also express conclusion and correction, and they contribute to interpret the explicit meaning of what is said through both explicatures or high-level explicatures; (b) conclusive reformulation expressed by reformulation markers is not equivalent to the traditional conclusion of conclusion markers – por tanto, así que –, as shown by their polyphonic

---

- Estuvimos algo enfermos, bueno, pachuchos; estuvimos decaídos todo el día.
- Estuvimos algo enfermos, bueno, pachuchos; aunque no quiero darle importancia a lo que nos pasó.
- Estuvimos algo enfermos, bueno, pachuchos; como se decía antes, “indispuestos”.

[60] Murillo shows it with two examples:

- Conviene hacer esta aclaración porque quienes conocen al ministro, hombre muy dado a la socarronería, pueden creer que se trata de una burla. Rajoy dice que va en serio. **O sea**, no dice nada pero asiente, que para el caso es lo mismo.
- Le comentó que no había leído las cartas, **es decir**, que solo había leído unos pocos fragmentos de alguna de ellas.

[61] However, we believe that Murillo’s interpretation is influenced by her semasiological approach to reformulation: in (23) *bueno* expresses correction, in (24) a reformulation. This shows the polyfunctionality of discourse markers: they can express different functions in different contexts. It does not mean that *bueno*, as the prototypical correction marker in Spanish, codifies another type of correction expressing detachment and not invalidation. Such an interpretation generates an excess of categories and subcategories complicating the definition of functions.

nature; that is why conclusive reformulation should be integrated into reformulation; (c) correction in reformulation markers is closer to the function expressed by rectification markers rather than those expressing invalidation. Corrective uses in reformulation markers are not very frequent – at least in written contexts –.

Pons (2017) summarizes all the ideas exposed in Pons (2013) and Murillo (2016) and focuses on two main questions (Pons 2017: 156):

a) To prove if conclusion and reformulative conclusion are two different categories or if they refer to two different relationships;

b) To prove if correction and reformulative correction are two different categories or if they refer to two different relationships

Before addressing both questions, Pons notes that it is necessary to establish a clear distinction between semasiology and onomasiology. Onomasiology will clarify if the category *reformulation* is different from the categories *conclusion* and *correction*; semasiology will state that conclusion and correction are two subfunctions of reformulation because most of reformulation markers express such functions (Pons 2017: 156). Reformulation markers can be addressed in reformulation studies, but it should be clear that functions and their discourse markers are different objects of study:

> En realidad, lo que defiendo es que los **valores conclusivos de *o sea* no deberían contarse como casos de reformulación, sino como ejemplos de conclusión**. Una cosa muy distinta sería afirmar que, en la descripción de dicho marcador, no hubiera que tener en cuenta el número, frecuencia y contextos de sus usos conclusivos – dicha postura sería equivocada y, por ello, no ha sido ese mi proceder en mi estudio diacrónico de *o sea* (Pons 2016) – (Pons 2017: 157).

Semasiological approaches trigger the form-function trap: descriptions of reformulation markers are generalized to the function level; this results in a problem. As Pons suggests, two – or more – functions must be distinguished by considering their specific features rather than the common discourse markers expressing them (Pons 2017: 156): this last method blurs limits between functions because similarities are highlighted and thus all become the same. Reformulation and conclusion are different because they work at different levels – reformulation is related to formulation purposes; conclusion is related to cause-consequence relationships –. Given that both functions are employed to accomplish different communicative aims, they should not be considered functional subtypes.

Pons’s response to Murillo focuses on the relevantist treatment for reformulation offered in her work. Such treatment raises some difficulties: RT defines discourse markers as items restricting high-level explicatures in the utterances where they are placed (Blakemore 1996, 2002). As a result, reformulation markers are seen as operators – conectivos de un lugar – (Pons 2008), what is opposed to the general idea of reformulation markers in the literature:

> Esta caracterización contrasta con el resto de la ingente bibliografía sobre reformulación y reformuladores, que coincide en **considerarlos como conectores**, es decir, como **elementos que vinculan dos miembros discursivos**; por tanto, como **conectivos de dos lugares**. Dicho de otro modo, para los **relevantistas**, marcadores como *esto es*, *es decir*, u *o sea* se comportarían, en sus usos **reformulativos**, como un **adverbio de frase**, mientras que, **para el resto** de los pragmatistas, funcionarían de **modo similar a *y*** (Pons 2017: 159).

Reformulation is addressed in the RT by considering the similarity between the function and the different interpretation stages in communication. Murillo’s proposal seems a systematic way to explain reformulation and reformulation markers, but it leads to two main problems: (i) reformulation becomes a more complex function based, again, on several categories; (ii) such functions are confused.

Seven different micro-processes defining reformulation are offered in such proposal: *specification*, *identification/ specification*, *orientation*, *explanation*/ *correction*, *definition*/ *denomination*, *conclusion*/ *mathematical operation*, and *consequence* (Pons 2017: 160). Such micro-processes are identified with each RT interpretation stage – see Table 9 extracted from Pons (2017) –. However:

> El hecho de **que los subtipos de reformulación se ajusten a las fases previstas por una teoría**, *per se*, **no es explicativo** ni prueba la superioridad explicativa de dicha teoría sobre otra (s).

This explanation abandons the PR-NPR dual distinction so as to create several micro-processes related to reformulation, what results in a problem and triggers the form-function trap. To prove the applicability of this RT proposal, Pons reanalyzes some examples presented in Murillo (2016). For instance[62]:

(26) Necesito creer que [quien gobierna] lo hace por juzgarse más capaz que otro de conducir al pueblo que gobierna – *o sea*, en cuyo nombre gobierna – hacia un mejor derecho y una más alta calidad de vida.

In example (26) the notion GOBIERNA is substituted by an ad-hoc notion GOBIERNA*, which is different – that is, is based on weaker implicatures –[63]. Nevertheless, this example is not a discourse sequence but part of the logical form of the proposition expressed, which is reformulated to better communicate the meaning intended by the speaker (Pons 2017: 161). As a result, correction is blended with other reformulation operations, such as specification, identification and orientation, which are related to explicatures: this RT classification shows thus a lack of coherence because, in the end, it does not allow to distinguish functions.

The same is true for conclusion: Murillo notes that conclusions introduced with reformulation markers are different from conclusions expressed in conclusion markers[64] (Pons 2017: 164):

> Estos datos **no apoyan** (…) la idea de que el tipo de **conclusión** que expresan **dichos marcadores** sea **onomasiológicamente distinto** al expresado por la **clase** de la **conclusión**, y **menos aún** que esta última sea un **subtipo de la reformulación**. Cuando es decir que u o sea que expresan funciones conclusivas (y lo mismo vale para otros reformuladores) se mantienen las restricciones vinculadas al decir que

[62] This chapter only focuses on correction because is one of the functions addressed here.

[63] The interpretation proposed in Pons (2017) is the following: "quien gobierna por delegación no posee los mismos atributos de mando que quien gobierna de forma absoluta". This discourse modification leads thus to a weaker statement about government.

[64] This idea is supported by the presence of formal marks after the reformulation marker (*o sea* / *o sea que*), their evidential meaning, or their formulative behavior – not expressed by conclusion markers –, all features shown in their diachronic evolution (Pons 2016) (Pons 2017: 164).

> están en su significado léxico, así como las discursivas vinculadas a la presencia de dos voces que contrastan; pero tales restricciones **no crean una clase distinta**, **subtipo de la reformulación, con un comportamiento diferenciado**.

Pons maintains such arguments by reinterpreting the data offered in Murillo's study: polyphony results a defining feature of reformulation ─see also Pons 2016 for its diachronic development in *o sea*─. Such data, however, are not significant when crossing polyphony with conclusion/ consequence and evidential polyphony. There are non-reformulative consecutive markers – conque, así que or de manera que – which also develop polyphonic uses (Pons 2017: 166). This suggests that polyphony is a transversal category rather than a defining feature for reformulation:

> En lugar de considerar la polifonía como una prueba a favor de la reformulación, cabría verla más como una **categoría transversal**, **común** –de forma más o menos constitutiva– a **muchas formas de relación discursiva** y vinculada al **carácter evidencial de *que*** (Rodríguez Ramalle 2014).

Concerning correction, it is noted that there is not exist two types of correction depending on the discourse markers expressing it. Murillo's proposal distinguishes reformulation from correction by describing *bueno* and *o sea*: while *bueno* is a prototypical corrective marker, *o sea* is the most reformulative marker of the paradigm in Spanish. Differences are supported by quantitative data: *bueno* is more frequent in further corrective contexts than other reformulation markers, which developed corrective uses in a smaller proportion (Pons 2017: 168). This idea is true but, again, is not connected to Murillo's main reasoning on the existence of two different corrections: an independent and another subfunction of reformulation (Pons 2017: 168).

Finally, Pons adds the following five conclusions summarizing the relationship between reformulation, conclusion and correction (Pons 2017: 168-169):

(i) The distinction between explicatures-implicatures and their role in reformulation does not seem to be a determinant criterion in characterizing different reformulation operations;

(ii) The fact that conclusions expressed by reformulation markers are polyphonic is not enough to confirm that such conclusion is onomasiologically different to the conclusion expressed by *por tanto* or *en consecuencia*;

(iii) Correction is not subdivided into correction and reformulative correction: the frequency or functional specialization of reformulation markers do not influence the function at the onomasiological level;

(iv) The three-part relationship between polyphony, evidentiality, and conclusion uses is not proved through the data provided by Murillo (2016a, b);

(v) Distinguishing reformulation from paraphrase and correction – which are two grammar-based operations – allows to address reformulation markers within a solid groundwork. This distinction is very useful for diachronic studies in which functions should be clearly delimited so as to detect functional changes within forms.

There are six key points in such works related to the form-function trap in reformulation. These six key points will be resumed in the analysis and the discussion (§5.1 to 5.4 and §6.1 to 6.4):

1. Reformulation requires onomasiological treatments so as to define it better (Pons 2013, 2017);
2. The distinction between RP and RNP becomes unclear when reformulation is subdivided into further sub-categories ─or subfunctions─; likewise, the notions of equivalence and distance make sense only when addressing them semantically and contextually (Pons 2013, 2017). All this blur the theoretical limits defining such function;
3. Semasiological descriptions of reformulation ─that is, those based on reformulation markers and their different uses─ also blur the theoretical limits defining reformulation. The different functions expressed by such markers are considered as part of sub-operations of reformulation or even generalized at the function level (Pons 2013);

4. Reformulation is also related to conclusion which, in turn, is similar to summary. Their limits are also blended. It is argued that conclusion is a subtype of reformulation – conclusive reformulation, different from traditional conclusion – because prototypical reformulation markers express this function across languages – synchronically and diachronically –. Polyphony and RT support the existence of such two types of conclusion (Murillo 2016);
5. Reformulation and correction should also be considered functional subtypes. Correction involves a change of discourse orientation, and reformulation markers expressing correction are closer to reformulation – rectification – than to correction in invalidation terms (Murillo 2016);
6. Distinguishing reformulation from other functions benefits this object of study in two ways: on the one hand, the function presents a clean organization based on structural, semantic, and pragmatic features admitting different functional degrees depending on the context; on the other, reformulation markers are better addressed if each function is clearly delimited. This also improves diachronic studies and the results obtained (Pons 2017).

After the Pons-Murillo's polemic, there are no further works addressing the form-function trap in reformulation[65]. Both exclusive and inclusive approaches are accepted: in general, most of the studies on reformulation are inclusive ─they include further functions as subtypes of reformulation─ (see §2.3.1. and §2.3.2.), but exclusive descriptions of reformulation are valid as well. We insist on defending the need for semasiology and onomasiology to be clearly distinguished: this is the focus of the form-function trap, and the main problem related to reformulation. Pons and Murillo's proposals focus on different objects of study: on the one hand, defining reformulation and differentiating it from other closer relationships ─conclusion, correction─; on the other, the development of reformulative and corrective uses in prototypical reformulation markers to define

[65] The last study on reformulation addressing the form-function trap is indeed Pons (2017); see also Salameh (forthcoming), which focuses on the notions of *equivalence* and *distance*, commonly adopted to distinguish PR and NPR.

reformulation. The former is onomasiological; the latter, semasiological. Both objects of study should not be confused: onomasiological arguments do not affect the development of functions in discourse markers; semasiological arguments, however, tend to be generalized to reformulation as a function[66] and modify definitions of functions. This happens because semasiology and onomasiology intersect in a grey area where the form-function trap is triggered:

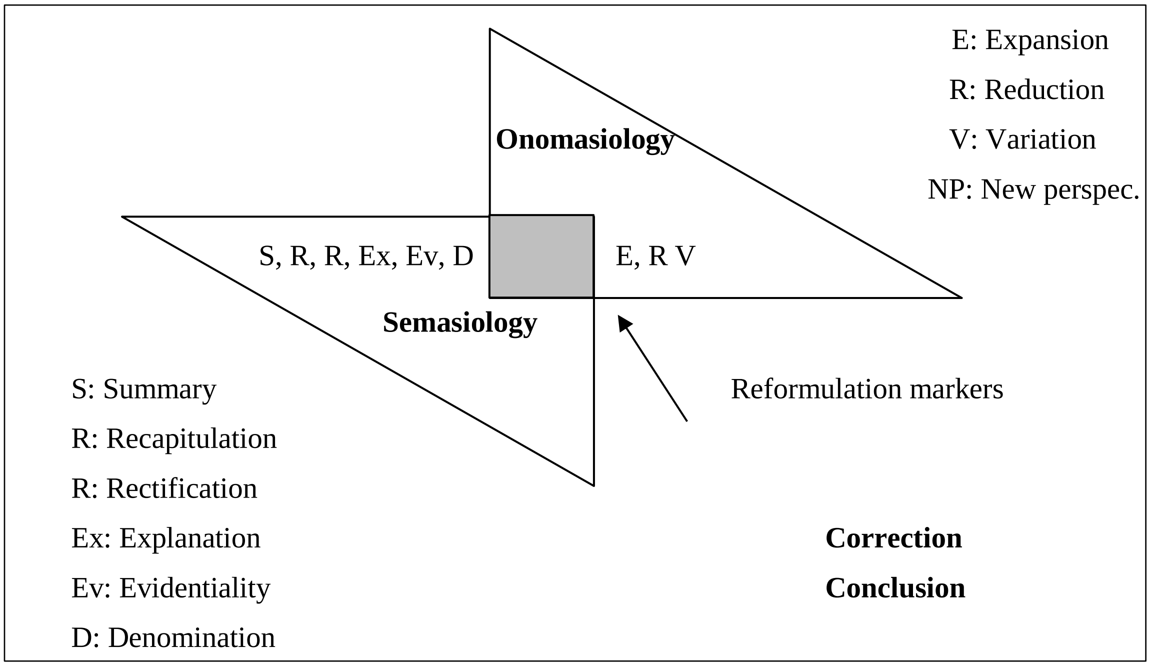


Fig. 7. Visual representation. Grey area between semasiology and onomasiology. Reformulation markers and reformulation basic operations converge.

For instance, some basic reformulation operations in the function level ─expansion, reduction, variation, new perspective (Gülich & Kotschi 1983; Roulet 1987)─ are confused with other functions expressed by the reformulation markers addressed ─recapitulation, summary, repair, and so on─. As a result, reformulation, paraphrase or correction are

[66] This can be problematic for diachronic studies on discourse markers: the study of the changes experimented by discourse markers requires a set of clear features defining the functions they cover. If such functions are onomasiologically defined in a non-clear way, the different functions expressed by the discourse marker addressed will not be adequately described (e.g. if digression is not well defined, and features from other functions –mitigation, intensification, reformulation– are included in the definition, digressive discourse markers will be inaccurately defined). This is thus a circular process: if functions are not onomasiologically described, discourse markers will be described with less accuracy; if such discourse markers are addressed to define one function, such function will be described with less accuracy as well.

blended, even with functions such as conclusion, motivated by a different communicative aim (see §2.2.3 and this section).

Pons and Murillo's models for reformulation coexist, but none of them prevails: their approaches are theoretically valid since they focus on corpus examples (spoken and written) across languages (English, Spanish) in synchrony and diachrony. Both approaches are true in a sense: reformulation must be defined onomasiologically, but reformulation markers must also be described because they show how reformulation is produced in communicative processes. At this point, theory requires to be complemented with further methods, such as those employed in Experimental pragmatics. Experimental pragmatics will allow to prove, with empirical results, some research questions derived from the form-function trap (§see 1.4.):

a) To prove whether paraphrase, reformulation, conclusion and correction lead to different experimental results;

b) To prove whether the presence or the absence of reformulation markers involves differences within paraphrase, reformulation, conclusion and correction;

c) To prove whether polyfunctionality of discourse markers is experimentally mensurable;

d) To prove whether conclusion shows a discursive experimental behavior like reformulation, as the inclusive approach defends (see Murillo 2016 above reviewed);

e) To prove whether conclusion shows a grammatical experimental behavior, unlike reformulation, paraphrase or conclusion (see Pons 2017 above reviewed);

f) If conclusion and correction are subtypes of reformulation because reformulation markers express them, a reformulation marker should present the same experimental behavior for such three functions.

All such research questions will be resumed in the methodology (§4.3) and the analysis (§5.1. to 5.4.). The following section (§2.4.) justifies the need for addressing reformulation with experimental methods and the benefits they provide.

2.4. When reformulation meets experimental linguistics: a new approach

2.4.1. Experimental linguistics: an overview

Experimental linguistics has played this complementing role over the past 40 years. Experimental methods have become an important tool in Linguistics to test theories which, in turn, generate new experimental hypotheses, even despite skepticism in some research fields (Gibbs 2004: 50):

> Yet there remains in psychology a persistent skepticism about experimental studies in linguistic-pragmatics. Psycholinguists are typically less concerned with the pragmatics of language use than they are with the architecture of the language processor (or production system) where the emphasis is on a single person comprehending words, sentences or texts apart from real-life communicative situations. Psychologists too often feel that the complexities of realistic language use make the topics of linguistic-pragmatics too difficult to study scientifically.

Experimental linguistics is related to other disciplines such as neurolinguistics or psycholinguistics (Simpson 2011: 465), which are considered subtypes of the former (Bever 1968: 482):

> Psycholinguistics **combines methods and theories from psychology and linguistics**. It attempts to evaluate the psychological reality and underpinnings of linguistic rules and processes. It also seeks to link word and sentence processing to the deeper expressive **processes of message construction and interpretation** (MacWhinney 2001).
>
> Neurolinguistics is the relation **between language and the structure and function of the nervous system**, is a relatively new field in psychology, which may give the interviewer two additional advantages. Neurolinguistic factors explain the probable link between eye movement and the **brain's language processing mechanisms** (Gordon & Fleisher 2011).

Such three disciplines [67] address linguistic human realities (patterns, generalizations, constraints, parameters, etc.) that may have some relevance to the way people process language (Eddington 2004: 24) and test linguistic theories. Experimental linguistics have been developed in different linguistic levels:

Experimental linguistics	Experimental Phonetics
	Experimental Syntax
	Experimental Semantics
	Experimental Pragmatics

Table 11. Experimental linguistics field

Experimental phonetics (and phonologic) focuses on sounds in the articulation, production and composition of words and meanings in language (McDougall et al. 2007): sound production can be analyzed through different experimental systems. Experimental syntax (Schütze 1996; Cowart 1997; Featherson 2005) supposed a change regarding traditional syntactic approaches since they test grammatical hypotheses. To do so, studies work with naïve speakers, large sample sizes improving representativeness, counterbalanced lists and filler items (Myers 2009: 2). Experimental semantics (Stanfield 2000; Horton & Rapp 2003) addresses "how people understand and generate linguistic meaning in everyday communication. Researchers apply statistical methods to measure and quantify the way people produce and understand words, sentences and gestures in varied situations and under varied conditions, and they draw conclusions based on systematic patterns that emerge" (Matlock and Winter 2013: 3). Finally, experimental pragmatics provides descriptions and

[67] Other disciplines related to (or part of) experimental linguistics are: language acquisition, that focus on different mechanisms and processes through which language is acquired through technic analyses (Eubank 1993; Fernández 1995; Johnson & Newport 1989); neurolinguistics, that addresses neurological patterns through linguistic manifestations (Whitaker & Whitaker 1977; Hynd 1984; Gentner & Goldin-Meadow 2003); psycholinguistics, which focus on the processing procedures through which language is psychologically produced or comprehended (Gregory 1987; Caramazza & Hillis 1991; Fernández & Smith Cairns 2001); clinical linguistics, that addresses different pathologies through linguistic behaviors (Barr et al. 1989; Crystal & Varley 1998; Gallardo Paúls 2005); forensics linguistics, that uses linguistics as a tool to solve forensics issues (Smith 1983; MacLeod 2012; Briz 2005; Hidalgo 2017); computer science, in which language is a tool employed to prepare computers and programs (Booth 1967; Sparck, Gazdar & Needham 2000; Reiter 2007); and artificial intelligence, in which robots and cybernetic applications are linguistically programmed to be able to interact with humans (Weisser 2010).

intuitions[68] with empirical data supporting, refusing or questioning current pragmatic theories and proposing new models for interpreting pragmatic phenomena (Grisot and Moeschler 2004: 9).

A rich and extensive domain of research on experimental pragmatics deals with diverse themes ranging (Noveck & Sperber 2004; Coulson 2004; Meibauer & Steinbach 2011: 11): child's language acquisition (Naigles 1990; Valian & Casey 2003; Aguado 2004; Ambridge & Rowland 2013); speech planning, production and reception (Fuchs et al. 2013; Torreira, Bögels & Levinson 2015)[69]; the comprehension, perception and decoding of the acoustic (or visual) signal to interpreting discourses (Tanenhaus, Spivey-Knowlton, Eberhard & Sedivy 1995; Altmann & Kamide 2009: 56)[70]; the functioning of metaphors and metonymies (Pynte et al. 1996; Giora 2003; Schumacher 2011; Bambini & Resta 2012: 41)[71]; irony (Spotorno & Noveck 2014)[72]; scalar inferences (Huang and Snedeker 2009); presupposition (Abrusán and Szendröi 2013) and so on.

All these objects of study in experimental pragmatics are addressed under various experimental techniques developed in the 1990s (with a notable increase since the 2000s): response time measuring (probably the most widely used measure of behavioral response in time units, from presentation of a given task to its completion ─Baayen & Milin 2010: 13─), questionnaires (usually employed to complement other online methods ─Meibauer & Steinbach 2011: 12─), electroencephalographic recordings (EEG measures electrical activity of the brain over time using electrodes and reflecting thousands of simultaneously ongoing brain processes ─Grisot & Moeschler 2014: 8─), magnetoencephalography (MEG

[68] "For a long time, pragmatics remained exclusively theoretical, and theories were tested by using as evidence a mixture of intuitions about interpretation and observations of behaviors" (Bambini & Resta 2012: 39)

[69] Focusing on how time people need to react, take the turn conversation, and planning their discursive production (Levinson & Torreira 2015)

[70] Focusing on people's reactions when videos and dynamic images are viewed, as well as on the relation between discourse comprehension and interpersonal manifestations (De Groot, Huettig & Olivers 2017).

[71] Focusing on the differences between familiar and unfamiliar metaphorical and metonymic sentences depending on studies their more or less lexical structure (De Grauwe et al. 2010)

[72] Mainly focused on the "immediacy with which ironic interpretations are made when compared to literal readings" (Spotorno & Noveck 2014: 2).

also measures neural activity with high temporal resolution ─Ahles & Williams 2015: 855─), functional magnetic resonance imaging (fMRI), or eye-tracking technology (Bublitz 2018: 129). Considering the object of study and the aims of this research, eye-tracking technology is above the other methods (see §2.4.2.).

2.4.2. Eye-tracking and reformulation: benefits for the approach

Eye-tracking is one of the most developed *online* experimental methods in the study of language phenomena: from the largely perceptual aspects of word identification, to the largely perceptual aspects of metaphor understanding (Richardson, Dale & Spivey 2004: 329). This method, also characterized as a technique[73] and followed by a considerable number of researchers within experimental pragmatics (Kennedy & Murray 1987; O'Regan et al. 2000; Clifton & Rayner 2007; Ferreira & Clifton 1986; Pollatsek 1993; Rayner 1984, 1995; Juhasz et al. 2006; Reingold 2003; Reichle, Rayner & Pollatsek 2003), is based on the relationship between ocular movements, mind processing and information (Coulson & Matlock: 94):

> Eye movements during reading are typically used to index processing difficulty. (…) of different syntactic constructions and how supportive semantic and pragmatic context affects processing difficulty (Rayner & Liversedge 2004).

This relationship has been so-called *eye-mind hypothesis* (or assumption) (Just & Carpenter 1984; Rayner 1998). According to this hypothesis, there exists a relationship between how the eyes react at detecting different contents (*i.e.* eyes can move and jump between contents, remain still, or move back to focus again on previous contents) and how these contents are being processed Rayner and Morris 1991: 175): in other words, the movements of the human eye and their duration determine where the user is looking at and, thus, if the

[73] Possibly the most applied apparatus to measure such movements is the video-based corneal reflection eye-tracker (with infra-red-light source) (Duchowski 2007: 51-54)

information is (or not) being adequately assimilated (Rayner 1998: 374; Duchowski 2007: 3)[74].

Eye movements in relation with language processing have been addressed by focusing on various linguistic issues[75]: spoken narrative comprehension in adults and child[76] (Andreu et al. 2011), verbal facts and spatial indexing (Richardson & Spivey 2000)[77], speech production (Meyer & Dobel 2003) and listeners interpretation (Tanenhaus, Chambers & Hanna 2004)[78], among others. However, "the most apparent, and most studied, link between eye movements and language is in the process of reading" (Richardson & Spivey 2004: 329). The relationship between ocular movements, reading and linguistics been developed over the past 40 years through three different eras (Rayner 1978, 1998):

- The first era of eye-movement research comprises 1880s-1900s. Eye-tracking systems were quite different in comparison with the current ones: initial techniques of study were highly invasive for readers (Delabarre 1898; Huey 1898), but they changed a little in 1900 with the incorporation of "photographing the reflection of an external light source from the fovea" (Richardson, Dale and Spivey 2007: 333). During the first era, "many basic facts about eye movements were discovered such as saccadic suppressions, saccade latency or the size of the perceptual span" (Rayner 1998: 372).
- The second era lasts, approximately, until the 1950s: eye-tracking systems became a business by which "eye movement researchers built their own apparatus"

[74] See some critical approaches to the eye-mind hypothesis in Underwood & Everatt (1992), or Anderson, Bothell & Douglass (2004). Such works, however, are punctual references within the wide literature on eye-tracking and the eye-mind hypothesis. This hypothesis is commonly accepted by the researchers.

[75] Under different mechanisms and techniques, such as button pressing tasks (Just, Carpenter and Wolley 1982: 228) or moment-to-moment cognitive processes to infer information from eye recorded movements (Rayner 1998: 376).

[76] With the so-called visual world paradigm (Cooper 1974; Tanenhaus, Spiney-Knowlton, Eberhard, and Sedivy 1995) addressing the relationship between eye-movements, audio stimuli and visual representations.

[77] That is, the "behavior of associating events and information with a moving location, and re-fixating that location when the information is relevant" (Spivey & Richardson 2004: 327).

[78] "For example, in face-to-face conversation listeners have access to background knowledge about the current situation and experience with the person speaking, in addition to the actual words said and how they are uttered." (Griffin 2004: 214).

(Holmqvist *et al.* 2011: 10). In this era, "little attempts were made to infer mental processes from eye-movement data" and eye-tracking started to be related to moment-to-moment processes (Rayner et al. 2009).

- The third era since the 1970s was decisive for the development of this research field: companies of engineers built and commercialized eye-tracking systems and sell them to researchers (Holmqvist *et al.* 2011: 11). Eye-tracking systems lost their invasive character and improved their features: faster processors and better degree of accuracy, high-quality for their cameras, and new techniques to detect more precisely corneal reflex and pupils by new calibration procedures (Chennamma *et al.* 2013: 389; Hammoud 2008: 6). During the third era, "the development of general theories of language processing through texts analyses made possible to use eye-movement records for a critical examination of the cognitive processes underlying reading" (Rayner 1998: 372). "Text, after all, was language" (Wilson & Keil 1999: 705).

Some authors argue for a fourth era of eye-movements research (Noveck and Sperber 2004), where pragmatics (Cuetos and Mitchell 1998; Diderischen 2008; Zufferey 2010; Loureda and Nadal 2011; Cestrelli, Mak and Sanders 2012; Kaakinen, Olkoniemi, Kinnari and Hyönä 2014) and other disciplines incorporated experimental methods to their studies (see footnote 67)[79].

An eye-tracking experimental approach will complement all previous theoretical (Mortureux 1982; Fuchs 1982; Gülich & Kotschi 1983) and corpus-based (Del Saz 2003; Briz 1998, 2001; Cuenca 2001, 2003; Cuenca & Bach 2007; Pons 2016) studies on reformulation: this phenomenon has been widely theorized from different groundworks (Textual analysis ─Adam & Revaz 1989─, Enunciation theories ─Fuentes 1993; Fuchs 1994─, Conversation Analysis ─Schegloff, Jefferson and Sacks 1977─, Argumentation Theory ─Nolke 1994; Noren 1999─, Relevance Theory ─Blakemore 1993, 1996, 2002─,

[79] Current eye-tracking studies tend to be aligned with EEG data (Keren, Greenberg & Deouell 2009; Dimigen et al. 2011). "The benefits of a dynamic interplay between computational models and empirical research are clearly evident in several computational models of VWR [visual word recognition] based largely on behavioral measures (reaction time and accuracy) (Reilly 2014: 135).

or Polyphony ─Murillo 2010─, among others) across languages (English, Spanish, French, Catalan ─see Murillo 2007─) in spoken (De Gaulymn 1987; Apotheloz & Zay 1999) and written language (Charolles & Coltier 1986; Murat & Cartier-Bresson 1987). However, after reviewing the literature, no experimental study of reformulation has been found[80] ─at least in the references managed in this dissertation─. The study of reformulation and neighboring categories from an experimental approach would contribute to draw a global map of these functions ─as in Fig. 8─:

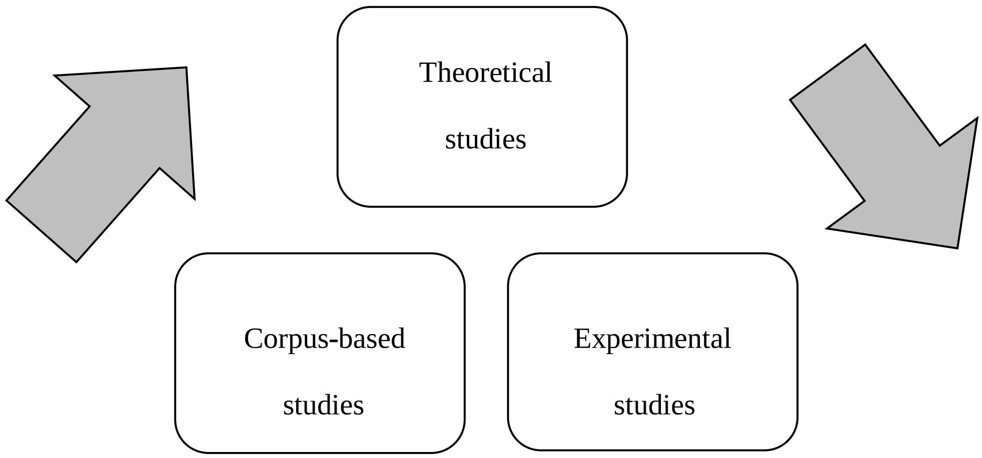


Fig. 8. Reformulation. Triangulation between theoretical studies, corpus-based studies and experimental-studies. The branch of experimental studies for reformulation has not been yet explored.

Reformulation is a discourse production activity (Antos 1982; Gülich & Kotschi 1995) triggered by how contents are being assimilated (or how they should). That is why an experimental analysis will determine how production and assimilation happens: this will improve theoretical ideas published up to now and, most importantly, will allow to solve the theoretical problems above-mentioned (see the form-function trap and other related issues in §2.3.1. and §2.3.2.). In sum, experimental pragmatics (and eye-tracking methods in particular) build a bridge between theory and cognition triangulating the analysis of reformulation and leading to possible solutions for problems.

Eye-tracking methods fit better the characteristics and objectives of this study[81]: despite an experimental method like eye-tracking involves certain degree of control and "artificiality",

[80] Except for Loureda & López Serena (2013).

[81] Further methods could be applied to this research. We consider, however, that eye-tracking is the most useful to accomplish the objectives of this research: EEG, fMRI or MEG could give an insight into internal

it will be more natural to address how reformulation contexts are processed during reading than expecting for participants to reformulate in “spontaneous” conversations in a laboratory while they are tracked with monitors, glasses or cams. Moreover, reformulation and the other functions are not only produced in spoken language: written texts (more formal such as scientific texts ─Ciapuscio 2003; Cuenca and Bach 2007─ or less formal, such as journalistic texts ─Murillo 2007, 2015─) also show such processes of discourse production, especially paraphrases or conclusions (see Blakemore 1993 for further details on reformulation ─apposition─ in texts and its influence in the final meaning communicated). The reading of contexts and utterances based on these functions will not be thus strange for participants, with or without the presence of reformulation markers (see §4.2 and §4.3).

The study of reformulation markers is another point in this research: eye-tracking methods will allow to prove if their presence or absence affects the processing results and, consequently, if the existence of reformulation is determined by them. The choice of the reformulation marker analyzed must be coherent with the objectives proposed (§1.4.):

A. The reformulation marker selected should be representative, covering uses in both spoken and written contexts (§2.3.2., §2.3.3.),

B. The reformulation marker selected should fit all the features attributed to discourse markers (in particular to reformulation markers) in previous sections (§2.2.1., §2.2.3. and §2.3.2); it cannot be another formal item ─e.g. an operator, a focal particle─ expressing reformulation;

C. This reformulation marker should be polyfunctional and express the four functions analyzed so as to avoid unexpected or unreal contexts (§2.2.2.);

brain processes, but this research does not aim to know which brain zone is activated after processing reformulations. The correspondence between eye-movements, their duration and the different components of paraphrases, reformulations, conclusions and corrections with and without discourse marker is enough explicative. Moreover, this is the first-time reformulation is experimentally addressed. The results obtained in this work may could be explored with such techniques in the future, but first is important to establish some theoretical-experimental basis to do so.

D. The reformulation marker selected should be the same for all the utterances addressed expressing paraphrase, reformulation, conclusion and correction;

E. The discourse marker employed should allow the use of the same contexts and utterances without discourse marker in order to distinguish semasiology from onomasiology (§2.3.3.).

Considering such five parameters, the reformulation marker employed in this research is *o sea*. The next sub-section (§2.4.3.) explains why this marker is the best option.

2.4.3. A case-study: why do we focus on o sea?

The reformulation marker *o sea* has been selected for this research because it covers the parameters above-mentioned one by one.

- As ratified by a vast body of references in the literature[82], *o sea* is the prototypical reformulation marker in Spanish[83] (Casado 1991: 91): this reformulation marker is very frequent in conversations (Santos Río 2003: 379; Briz 1994: 21) but also in specialized journalistic discourses (Briz 2002), what ensures the representativity of the data obtained and accomplishes the first requirement (see A).

- Some basic features for *o sea* are (§2.2.1):

[82] Pons Bordería 2016 includes some of basic references addressing o sea: Cortés Rodríguez (1991); Briz (2001); Santos (2003); Cuenca (2007); Briz, Pons and Portolés (2008); Murillo (2007); Fuentes (2010), Estellés (2017), among others.

[83] The paradigm of reformulation markers in Spanish covers different polyfunctional markers besides *o sea*: *esto es*, *es decir*, *a saber*, and *en otras palabras.* They are the most frequent reformulation markers employed in both oral and written discourses (Pons 2016: 292), and all share the same properties: they help speakers to substitute an initial M1 by a new M2, better expressed (Cuenca 2003: 1071); hearers/readers assimilate the change of contents easier if detect their presence (Rossari 1990). Reformulation relationships are better marked with discourse markers, namely in planned discourses: in such cases, the suppression of the discourse marker provokes a change or total alteration of the pragmatic meaning intended by the Speaker (Rossari 1990). In unplanned contexts the presence of reformulation markers is optional: the speaker can mark changes of discourse planning through different linguistic devices (prosodic marks, interjections, lexical items, etc.) (Flores Acuña 2003: 190).

- Phonologically, *o sea* is described as independent of the rest of the surrounding contents of the utterance (Schwenter 1999: 858)[84]. This independence is prosodically manifested through pauses. *O sea* shows different pronunciations and functions depending on the position occupied: in final positions pronunciations are longer and express modality; in medial positions pronunciations are not as long and express formulation (Schwenter 1999: 858).

- Morphologically, *o sea* comes from two different word categories: on the one hand, the conjunction *o* (or); on the other hand, the subjunctive verb *sea* (to be). Their combination derives from a grammaticalization procedure by which the original exclusive meaning related to disjunctions with o changes towards an inclusive meaning (Pons 2016). As a discourse marker, *o sea* is invariable: is not possible to say *o seas* or *o sean*.

- Structurally, *o sea* usually can be placed at initial, medial and final positions; in such last cases, it expresses modal values, especially in spoken discourses. Final positions in texts are stylistic uses (Garcés 2008; Briz 2008, in DPDE). This marker links different contents, from words to sentences (independent, subordinated or coordinated) in monological discourses; in dialogical discourses, it has scope over the whole content expressed by other speakers85.

Such features reflect the connectivity of *o sea*, as shown in most of the seminal references in the field (Pons 2017: 159): except for modal values, this marker always

---

[84] However, as Travis (2006) or Pons (2006) state, “discourse markers are not necessarily surrounded by pauses” (Travis 2006: 229), and further prosodic information would be helpful at delimiting the extra-propositional behavior of such expressions.

[85] Reformulation discourse markers establish a type of connectivity different from argumentative relationships. Since the contents underlying the new formulation are the most important (see any of the examples introduced above), it will be considered that the discourse marker focuses only on the content it introduces and not on the content preceding it. That is why Martín Zorraquino and Portolés (1999) classify reformulation discourse markers separated from connectives, which constitute another subcategory: while the meaning of connectives consider both the preceding content and the new content introduced, reformulation discourse markers appear to focus only on what comes next (1999: 4121).

links two contents in both monological and dialogical contexts. All this accomplishes the second requirement (see B)[86].

- *O sea* expresses different functions depending on the context (Casado 1991, 1998; Galán 1998; Martín Zorraquino and Portolés 1999; Murillo 2007): paraphrase (1); reformulation (2); conclusion (3); correction (4); mitigation (5); intensification (6); and formulation (7)[87]. Such functions reflect a layering procedure (Hopper 1991) outcoming from the historical evolution of the discourse marker (Pons 2014, 2016): if polysemy is the synchronic side of polyfunctionality (Tanghe 2016: 79), *o sea* can only be described as a highly polyfunctional discourse marker. This feature accomplishes the second and third requirements (see B and C)[88]: paraphrastic, reformulative, conclusive and corrective utterances using *o sea* will be plausible and assimilable because this polyfunctional reformulation marker expresses all them (§C). This avoids including

[86] As Pons (2017: 159) notes: "la ingente bibliografía sobre reformulación y reformuladores (…) coincide en considerarlos como conectores, es decir, como elementos que vinculan dos miembros discursivos; por tanto, como conectivos de dos lugares (…). Funcionarían de manera similar a *y*". Reformulation is a two-placed process: despite the M2 (new content) is the one considered to continue the discourse, the M1 should be kept in mind to be compared with, detached, or invalidated: that is why researchers have described reformulation markers as connectives (linking always two contents). *O sea* exemplifies the connective nature of reformulation markers and thus will facilitate the execution of the eye-tracking experiment.

[87] Examples (1) to (7) show each function mentioned:

(1) Mario es su cuñado; o sea, el marido de su hermana.
(2) Y ella es su cómplice; o sea, esa que le pone buena cara y no la soporta.
(3) Juana lleva toda la tarde estornudando; o sea, se ha resfriado.
(4) Ha gastado cuarenta euros esta semana/// o sea / setenta euros si incluimos las botas que se compró.
(5) Me parece que su comportamiento es demasiado infantil; o sea, no debería cabrearse por esas tonterías porque es peor para él.
(6) Lo tuyo ha sido un escándalo de manual, o sea…
(7) Yo no tengo nada en contra/ o sea por ejemplo él decía/ no sé/ me decía que estaba preocupado/ o sea sí/ que sufría/ y eso/ y yo no soy quién para meterme/ pero/ o sea/ no sé// es mi amigo y me importa

[88] Like other discourse markers, such functions are prototypical or peripheral. A corpus-based analysis of *o sea* (Val.Es.Co. 2002 ─Briz and Grupo Val.Es.Co.─ and Val.Es.Co. 2.0. ─Cabedo and Pons 2013─) returns a total of 315 occurrences of this reformulation discourse marker. Such occurrences shows a very balanced functional distribution: paraphrastic ref. (17%), reformulation uses (8%), conclusion (24%), correction (3%), formulation (36%) and modal (16%). This functional distribution shows how polyfunctional and active this discourse marker is, but that it expresses frequently paraphrases and conclusions (Salameh 2017 ─personal communication─).

another reformulation marker in order to cover unexpressed functions and provides the experiment with homogeneity (§D).

- Those contexts using *o sea* in Spanish can also be expressed without using this reformulation marker. This allows distinguishing semasiological and onomasiological descriptions of each function addressed and thus to focus on the form-function trap with generalizable results: such results will answer different research questions related to reformulation markers and reformulation (§1.4.3. and §4.2.2). This accomplishes the fifth requirement (see §E).

This case-study is, in sum, the most appropriate for this research: on the one hand, *o sea* is the most polyfunctional marker within the reformulation paradigm in Spanish, what it makes easier to address the form-function trap[89]; on the other, *o sea* is used in both spoken and written contexts, what guarantees the understanding[90] of the utterances tested and, consequently, the viability of the experiments presented.

2.5. Summary

This chapter has dealt with the main point of this research: the form-function trap (Pons 2017). The form-function trap suggests the following problem: functions defined by addressing their discourse markers ─or other formal devices─ become, in the end, definitions of such discourse markers. Reformulation is one of the functions triggering the form-function trap: for instance, it is very frequent in Spanish to address reformulation by accurately describing the reformulation marker *o sea* (§2.3.). Given that discourse markers are polyfunctional (§2.2.2.), and that *o sea* is one of the most polyfunctional within the paradigm of reformulation markers (§2.4.3.), it is expected for reformulation to be defined

[89] As said in §2.3.3., if reformulation ─as a function─ is defined by addressing its reformulation markers, the functions expressed by the marker can be described as defining features of reformulation; that is why conclusion or correction are considered subtypes of reformulation. After describing such reformulation markers, classifications of reformulation increase their categories and thus their complexity. The case of *o sea* exemplifies this situation: o sea introduces paraphrases, conclusions and some corrections. It is expected for such paraphrastic and conclusive uses to be considered reformulations.

[90] Reformulative, conclusive and corrective uses of *o sea* are not as different in spoken and written contexts. Correction is the only function which could lead to some problems because is highly oral but, surprisingly, it does not do so. Modal values of *o sea* have not been considered since they are not related to the form-function trap. Both Pons and Murillo agree that they are not reformulation values (2013, 2016).

as the combination of all the defining features and functions of *o sea*. Even such functions are not related to reformulation ─e.g. conclusion─, they will be described as a specific subtype of reformulation (§2.2.3.).

As a result, reformulation acquires more complexity in its definition and, most importantly, loses the theoretical boundaries which allow to distinguish it from other functions, such as correction, conclusion, and so on. A review of some seminal references in the field of reformulation shows that: first studies (Gülich & Kotschi 1983; Roulet 1987) present clear definitions reformulation and establish the PR-NPR distinction (§2.3.1). They propose some mechanisms to reformulate, but such mechanisms ─expansion, reduction, variation, introduction of new perspective─ are described as subtypes of reformulation. After that, some bridging works and, especially, other subsequent works (§2.3.2.) introduce new subcategories of reformulation highly determined by the reformulation markers they address in various languages. Functions such as correction and repetition are considered PR subtypes; others such as conclusion, exemplification or particularization are considered NPR subtypes (see §2.3.2. with special focus on Fuentes 1993, Gülich & Kotschi 1995 or Murillo 2007). Reformulation, thus, become a more complex function in comparison with first definitions.

This problem has been addressed in a recent theoretical polemic (§2.3.3.): Pons (2013, 2017) and Murillo (2016) show two clear opposed approaches to reformulation: exclusive (Pons 2013) and inclusive (Murillo 2016). Such works propose a series of arguments in favor or against addressing conclusion, correction and other micro-functions as subtypes of reformulation: however, there is no prevailing proposal. Both are based on different theoretical ideas and methods which offer valid but not definitive results:

Pons (2013, 2017)	Murillo (2016)
Onomasiology	Semasiology
Analysis of examples	Corpus analysis and data
Theoretical approach	Relevance Theory, polyphony
Reinterpretation of results in Murillo (2016)	Subtypes of reformulation based on

	reformulation markers (*esto es*, *that is*, *bueno*, etc.)

Table 12. Pons and Murillo form-function trap polemic (2013, 2016, 2017).

For this reason, this research offers a new approach to reformulation and the form-function trap based on experimental methods (§2.4.). Experimental linguistics has been employed in several works to complement and prove theoretical ideas (§2.4.1.): in this case, the eye-tracking method is an adequate tool to analyze how reformulation and the neighboring functions usually classified as subtypes ─conclusion, correction─ are processed. It is based on the eye-mind hypothesis (§2.4.2.): ocular movements are directly related to how information ─linguistic functions─ is being processed in the brain.

To do so, a series of reading experiments (§4.1.) have been created: they focus on paraphrastic, reformulative, conclusive and corrective contexts expressed with and without reformulation marker ─*Sp. o sea*─[91] (§2.4.3.). Such experiments prove a set of research questions and hypotheses (§1.4.2. and §4.3.1.) which will shed light on the form-function trap and, the defining features of reformulation and the polyfunctionality of reformulation markers.

Reformulation hypotheses will be tested by analyzing different eye-movements in different parts of the reading process. Before presenting the experimental design (§4) and the results obtained (§5), Chapter 3 details the eye-tracking method.

[91] The presence and absence of reformulation markers will allow to distinguish onomasiological and semasiological results in a clear way.

Chapter 3

Eye-tracking methods: theoretical and technical notions

3.1. Introduction

This chapter reviews some eye-tracking main references so as to define the relationship between eye-movements and read content in reformulation ─and neighboring─ processes (§2.4.2.). Such references can be divided into two big groups: theoretical works and technical works. Theoretical works focus on the *eye-mind hypothesis* (Just & Carpenter 1984) and the type of eye-movements involved ─e.g. fixations, regressions, saccades, and others such as smooth pursuits or nystagmus─; technical works address some methodological skills in eye-tracking processes ─e.g. calibration, accuracy, eye-parts and muscles, eye-tracking systems, hypotheses or experimental design─.

The following sections mix such two groups of works in order to (i) provide a global picture of eye-tracking studies and (ii) delimit adequately the reading parameters employed in the experiments. To do so:

- Section §3.2. focuses on eye-movements as processing parameters by addressing them in three subsections: §3.2.1. presents the parts and muscles composing the human eye and thus triggering all the movements analyzed here; §3.2.2. establishes the three main eye-movements for this research and reviews some others usually employed in experimental research. Section §3.2.3. classifies eye-movements according to their duration: total reading time (§3.2.3.1.), first pass reading time (§3.2.3.2.) and second pass reading time (§3.2.3.3.) are the most frequent. Duchowski (2007); Holmqvist *et al.* (2011) and several Rayner's works (1977, 1980, 1998, 2006, 2009, among others) are the main references on which the notions presented in this section will be built.
- Section §3.3. addresses some basic eye-tracking technical skills that should be understood before presenting the methodology of this research: after describing the main eye-tracking systems in the market (§3.3.1.), accuracy (§3.3.2.), calibration (§3.3.3.) and other eye-tracking components are detailed so as to determine how the experiments are executed.
- Section §3.4. suggests, very shortly, the basic steps necessary in any experimental design ─in particular, in eye-tracking studies─. This section establishes a bridge

between all the information presented in chapter 3 and the experimental design required for our eye-tracking study on reformulation and neighboring categories.

This chapter is key for this research: eye-tracking is presented as theoretical groundwork, method and tool for the analysis proposed; for this reason, all the notions behind it require an exhaustive treatment. All the parameters described will be employed as qualitative and quantitative variables for the analysis (§4.5.6.).

3.2. Eye-tracking parameters in reading

Visual attention has been studied for over a hundred years in several pioneer works (Brewster 1832; Boettner and Wolter 1962; Cambpbell and Green 1965): human vision relies on the perceptual integration of small regions to construct coherent representations of what is observed (Duchowski 2007: 3-4). In pragmatic studies, the content observed is linguistic and functional ─e.g. discourse markers, focus operators, adverbs, sentences, texts, and so on─ (§2.4.1.): in such cases, mental representations are construed from the meaning of what is read. These mental representations are only plausible thanks to the accuracy of vision ─by the iris and the retina─ and the different eye-movements produced ─executed by recti and oblique muscles─. The light received creates an optical image which is transformed into electrical impulses and, finally, information (Artal 2015).

Eye-movements seeking the best visual accuracy also facilitate light reception. Eye-movements indicate how difficult (or not) is to assimilate what is being observed: the longer and repeated eye-movements are, the harder processing in reading is (Wanat 1971; Rayner 1977: 443). These movements are besides produced during different stages of the reading process related to morphological, syntactic, or semantic-pragmatic information (Liversedge *et al.* 1998): eyes move back or forward several times. This idea is the basis of the eye-mind hypothesis applied to reading studies (§2.4.2.), which will be extrapolated to the study of paraphrase, reformulation, conclusion and correction with and without reformulation marker: different types of movement ─with shorter or longer duration, more or less repetitions─ are expected for each function, what will allow to distinguish different functional patterns (see §4.2. for further high and low-level hypotheses).

All this makes necessary to establish a detailed set of eye-movements which, in turn, will be analyzed as processing parameters. Before presenting the eye-movements (§3.2.2.) and reading stages (§3.2.3.) employed in this research, the following subsection (§3.2.1.) addresses the different parts and muscles of the eye to understand how and why eye-movements are produced. This subsection shows the importance of human vision components, which determine the whole processing procedure.

3.2.1. Anatomy of eyes: structure and muscles

The most common way to analyze visual attention in reading experiments is by capturing the eyes applying the pupil-corneal-reflection method (Holmqvist *et al.* 2011: 21): this method consists on illuminating the different components of the eyes with infra-red light so as to track them and the movements they produce. Eye parts ─structure and muscles─ are thus decisive in eye-tracking studies since they allow to reconstruct the reading and assimilation processes: optical images are possible under determinate external conditions and, especially, thanks to the complex anatomy of the human eye, which is generally compared with the accuracy of cameras (Duchowski 2007: 22).

The adult eyeball can be subdivided into two main subparts: structure[92] and muscles (Mann 1964). The structure comprises all the parts contributing to the reception and absorption of light allowing to create images to be processed by the brain (Ramamurthy & Lakshminarayanan 2015); the muscles move the eyes in various directions ─up and down, left and right─ so as to catch everything they focus on. Concerning the structure, the eye is basically divided into two segments (Addo *et al.* 2016: 11-12) ─see Fig. 9─[93]:

> The anterior segment that consists of the *cornea*, *iris*, *pupil*, *conjunctiva*, *ciliary body*, *anterior chamber*, *aqueous humor*, *trabecular meshwork*, and *lens*. The posterior segment consists of *vitreous humor*, *sclera*, *choroid*, *retina*, *macula* and *optic nerve*.

[92] We have employed the term *structure* to refer to all the parts which are not muscles within the eye.

[93] Together with the references quoted, the information about the anatomy of the eye has been obtained from: www.allaboutvision.com

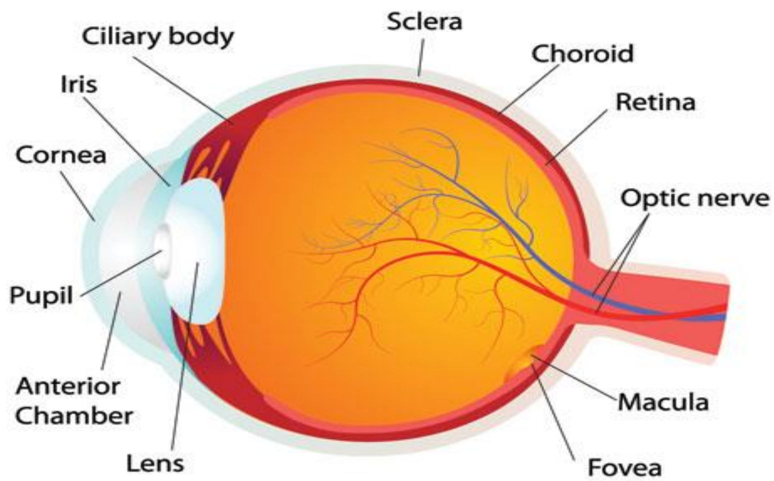


Fig. 9. Parts of the human eye based on Alvar Gullstrand's work (1862).

Such parts contribute to the transformation of light in optical images (see also Bron, Tripathi & Tripathi (1997); Meek & Fullwood (2001); and Dawson, Ubels & Edelhauser (2011) focusing on *cornea* and *sclera*; Iwasaki & Inomara (1986); and Abramoff, Garvin & Sonka (2010) addressing *retina* and *retinal imaging*; and Rogers (2011) offers a great treatment of each part above-mentioned). Light-transformation is a complex process, as most of optical studies summarize (Zhu, Zhang & Del Rio-Tsonis 2012: 1-7; see also Sires 1997; Smerdon 2000, among others):

> As light encounters the eye, it is slowed down, bent, absorbed and converted into electrochemical impulses to be processed by the brain. As light approaches the eye it **first comes into contact with the cornea**. The cornea refracts the light and allows it to converge inside the eye on its way to **the iris and the pupil** (…) Once through the gate of the pupil, the light is received by the **lens**, which is able to **change its shape** with the aid of **auxiliary muscles** and bring objects to various distances into focus through the process of accommodation (…) The **retina** (…) catches the light via its **photoreceptor and pigmented epithelial cells**. The photopigment molecules of these photoreceptors absorb the light, leading to a change in electrical (…) impulses, [which] travel through the neurons of the retina and **into the nerve optic**, leading to the brain. These signals are then received and processed by the brain as perceived images (Purves et al., 1997).

Light-transformation is a kind of light filtering process[94]: the photopigment molecules within the retina[95] are responsible of the main light-transformation into electrical impulses. Photopigment molecules are related to *cones* and *rods*, light-sensitive points which transform such light into electrical signals sent to the *optic nerve* to the visual cortex for further processing". Such light-sensitive points are "extremely over-represented in the *fovea region*" and more dispersed in the peripheral zone of the retina (Holmqvist *et al.* 2011: 21).

The fovea is a small depression in the retina providing the clearest vision of all: it receives light from the middle of the visual field, where [people] look directly (Pumphrey 1948: 299). The foveal region is crucial for the human vision: "high-resolution vision is only available for a small central region[96] around the fovea (the foveal zone); out of this region, which comprises 2 degrees of the vision (about the size of eight letters on a typical page of text ─Wilson & Keil 1999: 307─), visual resolution (acuity) deteriorates progressively" (Findlay 1992: 8). The zone where visual resolution deteriorates is the *parafovea*: "in the *parafoveal* zone, the 5 degrees zone of the vision, acuity is not nearly as good, and the periphery zone behind the parafovea conveys a poor acuity. Thus, eyes are moved to place the foveal zone on the part of the text to be clearly seen (Starr & Rayner 2001: 159); they are fixated to obtain light, transform it in electrical signals to project the content viewed in our cortex, and process the content detected.

Eye-movements are possible thanks to different muscles which rotate eyes towards different directions. Within the orbit, the eye is suspended by six extraocular muscles ─four rectus muscles and two oblique muscles─ (Wright 2006: 24) ─see Fig. 10─. On the one

---

[94] As Duchowski (2007) explains, the photoreceptors in the retina are composed by rods and cones. Rods are sensitive to dim and achromatic light (night vision), whereas cones respond to brighter chromatic light (daylight vision). In turn, the retina is composed by multiple layers of different cell types: the outermost layer, the inner plexiform layer, and the ganglion layer. The ganglion cells are subdivided into three main types contributing to the formation of visual images: X cells respond to sustained stimulus, location and fine detail; Y cells respond to transient stimulus, coarse features and motion; W cells respond to coarse features, motion, and project to the Superior Colliculus (which is placed in the cerebral cortex) (Duchowski 2007: 20-23).

[95] The photoreceptors in the retina lie at the very back; "light must pass through the entire retina before reaching pigment molecules to excite" (Kolb 2003: 28).

[96] The *central fovea* is populated exclusively by *cones*. The light levels where both are operational are called *mesopic*". Without them it is impossible to see colors and details from the contents we catch with our eyes.

hand, eyes move in horizontal with the *lateral rectus* and *medial rectus* (Singh & Singh 2012: 2): the lateral rectus "moves the eye so that is directed laterally (abducted)". The medial rectus "is slightly shorter than the other recti but is the strongest of the group"; it "moves the eye so that it is directed medially (adducted) (Standring 2008: 1194).

On the other hand, eyes move vertically with the help of other four muscles: the *superior* and *inferior rectus*, and *superior* and *inferior oblique*. The superior rectus is "slightly larger than the other rectus muscles"; this muscle moves "the eye so that the cornea is directed upwards (elevation) and medially (adduction), and it also causes intorsion of the eye"; the inferior rectus "inserts obliquely into the sclera below the cornea", and its principal activity is "to move the eye so that is directed downwards (depression); it also causes the eye to derive medially, and extorts the eye (i.e. produces lateral rotation)" (Standring 2008: 1194). The superior oblique "is attached to the sclera (…) between the superior and lateral recti"; "when it contracts, the back of the eye ball is elevated, and the front of the eye ball is depressed"; it also "moves the eye laterally". The inferior oblique "is inserted into the posterior part of the eyeball, when it contracts, the back of the eyeball is depressed, and the front of the eyeball is elevated"; it also moves the eye laterally (Standring 2008: 1195).

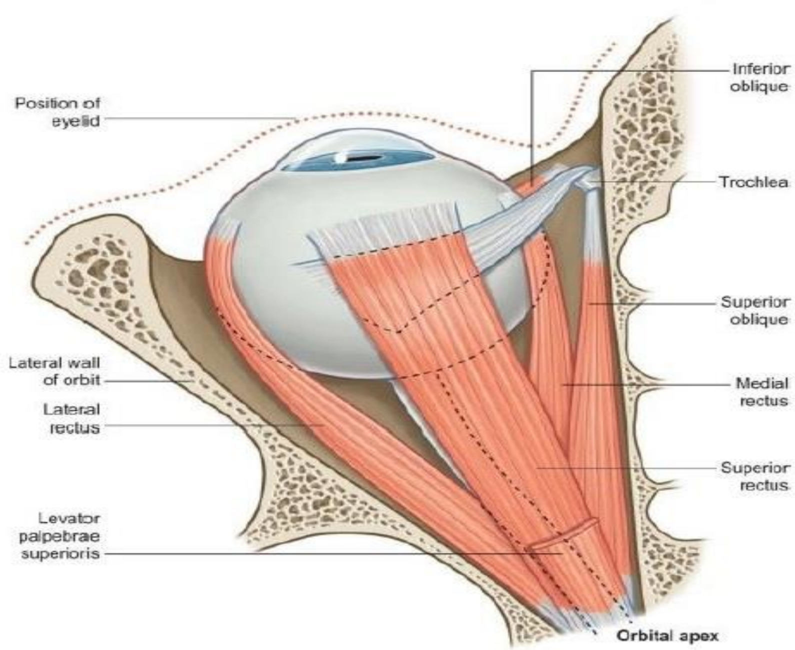


Fig. 10. Extraocular muscles viewed from above. Extracted from Gray's Anatomy [1858] (Standring 2008: 1193).

All the parts, nerves and cells of the eye function as a filter of light transforming it into electrical impulses to be processed by the brain. This results in the following chain: light > electrical impulses > optical image > information. The six extraocular muscles described are determinant in such chain: their combination allows to roll the eyes towards various directions ─see Fig. 11─. Their rotation allows to catch the light and put the fovea in the adequate position so as to produce optical images.

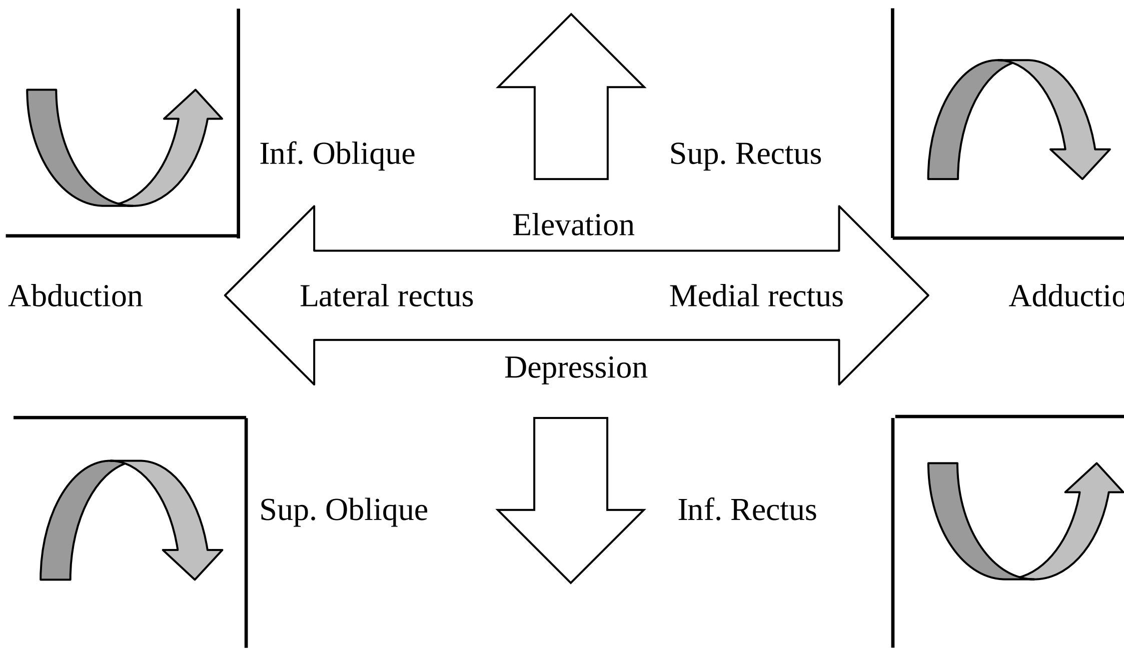


Fig. 11. Actions of the extraocular muscles. Adapted from Standring (2008).

As a result, a set of eye-movements can be established depending on the muscles involved. Such movements show a feedback circuit (Duchowski 2007: 42) directly related to how the information retrieved from the optical image created is being processed by the brain. The following subsection (§3.2.2.) classifies some of the main eye-movements in the research field of experimental pragmatics, with a special focus on those employed in this research.

3.2.2. Eye-movements: a typology

Eye-movements shift or stabilize gaze: it allows to bring the observed content onto the fovea and transform it into ocular images ─information─ within the brain. Their study thus determines how eyes are detecting the targets and retrieving information from the ocular representations created. Monitoring eye-movements during reading can provide valuable information about moment-to-moment comprehension processes (Rayner 2006: 241). Eye-movements became the focus of a vast number of reading studies during the last century (see some pioneer references in the field: Huey 1908; Butsch 1932; Buswell 1922, 1935; Tinker 1946; MackWorth & Hiebert 1967, among others): the three eras of eye-tracking research (see §2.4.2.) encompass, in turn, three eras for eye-movement research. During the first era (1879-1920) many basic facts about eye-movements were discovered ─saccadic suppression, i.e., the fact that eyes do not receive information while they are moving; saccade latency, i.e., the time that it takes to initiate eye-movements; and the size of the perceptual span, i.e., the zone of effective vision.─. The second era (1950-1970), however, was little focused on the study of eye-movements to infer cognitive processes. Finally, the third era (since 1970s) dealt with several methods to analyze eye-movement data, and some of the ideas proposed in the first era were developed with new technology, with special focus on the relationship between eye-movements and language (Rayner 1998: 372-373).

This third era thus consolidates the use of eye-movements as parameter for eye-tracking analyses also in (psycho)linguistics. As Irwin (2004: 106) notes:

> They seem to be an ideal dependent variable because eye movements are a natural and frequently occurring human behavior; people typically look at something when they want to acquire information from it.

Eye-movements can be involuntary and voluntary (see Yarbus 1967: 21-23 and other chapters in this work to see main initial descriptions of eyes and their movements). Involuntary movements ─vestibulo-ocular movements, nystagmus─ are reflex actions unconsciously produced so as to keep the retinal vision and retrieve information. Vestibulo-ocular movements (VOC) "stabilize the eyes relative to the external world, thus compensating for head movements; eyes automatically compensate for the head movement by moving the same distance but in the opposite direction, thus keeping the image of the object at more or less the same place on the retina" (Purves *et al.* 2004: 458). For its part, nystagmus are "conjugate eye movements characterized by a saw toothlike time course pattern (…) [they] compensate for the retinal movement of the target" (Duchowski 2007: 47).

Voluntary movements ─fixations, saccades, or regressions[97]─ are those made to bring and keep the observed content onto the foveal region (see §3.2.1.). These three eye-movements have been widely addressed in the literature (Rayner & McConkie 1976; O'Brien, Shank, Myers & Rayner 1988; Rayner & Well 1996; Rayner 1997; Rayner, Reichle & Pollatsek 1998), and various reading control models[98] focused on them.

Fixations are made when the eyes stop in a concrete part of the text, and their duration generally spans an average about 200-300 msec. (Rayner 1998: 373). Fixations directly depend on the foveal region ─see Fig. 12─. Is it assumed that during fixational pauses[99] reader's eyes extract information from the letters, words and images that compound the text, but not all the words in a sentence or text are fixated: sometimes, some words "are said to be skipped when they are not directly fixated on the first pass through a sentence" (Fitzsimmons and Drieghe 2012: 3). The duration of fixations varies depending on the type of content read and several factors: for instance, readers spend more time on longer and infrequent words, words introducing new topics, difficult syntactic constructions or words ending sentences (Just, Carpenter & Wolley 1982: 229)[100]. Long words (with 7-8 characters) tend to receive more and longer fixations than short words (3 or less characters,

[97] Smooth pursuits are other voluntary eye-movements (Lencer and Trillenberg 2008). This research, however, will not address them: smooth pursuits, usually coordinated with saccades are "involved when visually tracking a moving target; depending on the range of the target motion, the eyes are capable of matching the velocity of the moving target" (Duchovsky 2007: 45)..

[98] Such models can be classified into two general categories: 1) processing models (Morrison 1984; Sereno 1992; Kennison & Clifton 1995) assigning lexical processing or other ongoing processes a major role in influencing eye-movements; and 2) oculomotor models (O'Regan 1992; McConkie et al. 1989) arguing that eye-movements are mainly controlled by oculomotor factors and are only indirectly related to ongoing language processing (Rayner 1998: 388; Rayner, Sereno & Raney 1996: 1194). See such works for further details.

[99] Despite using the notion fixational pauses, eyes do not remain completely still during fixations: they produce *tremors*, *drifts* and *microsaccades* (Reingold 2014: 639). Tremors are "unprecise muscle control" movements whose "exact role is unprecise"; drifts are "slow movements taking the eye away from the center of fixation"; and microsaccades "bring quickly the eye back to its original position" (Holmqvist *et al.* 2011). *Microsaccades*, *Tremors*, or *Drifts* will not be employed in the experiments executed for this dissertation. Especially, *smooth pursuit movements* are analyzed in video-based dynamic viewing experiments where targets are in movement.

[100] Juola *et al.* show, some reading control models eliminate such variability ─for instance, the RSVP paradigm (1982)─.

usually identified in prior fixations[101]) (Rayner, Sereno and Raney 1996: 1189). Even the size of letters also affects the duration of fixations: fixation time increases when letters are smaller than in normal reading (Rayner 1998: 375). This happens because small letters are like texts further away from the eyes. Rayner & Duffy (1986: 191-193) or Rayner, Warren, Juhasz and Liversedge (2004) defend that ambiguous words are harder than unambiguous words since they include two or more meanings; is it also expected for complex meanings to present difficulties to be integrated with the sentence context once lexical access is completed (Cutler 1983). Likewise, a number of reading experiments have demonstrated that readers require more time when they look at low-frequency words than others well-known (Inhoff 1984; Rayner 1977); last, verb complexity ─especially, negative verbs─ is also difficult to be processed (Carpenter & Just 1975). Measuring fixations, thus, is not an easy task[102].

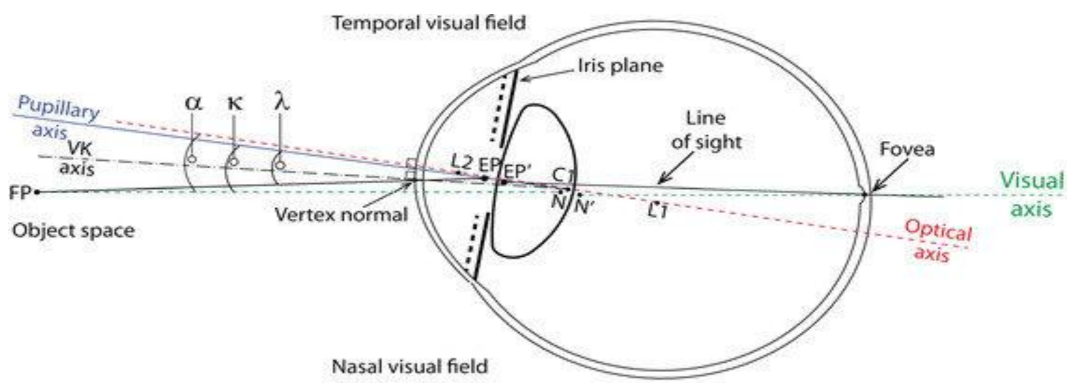


Fig. 12. Schematic sketch of reference angles in fixations. Adapted from Mosquera et al. (2015). The object space fixated through light is directly caught by the fovea (see Line of sight). All what is not adequately seen by the human eye is caught by the parafovea.

---

[101] This phenomenon is known as *parafoveal reading* (Rayner 1998; 2009), and it constitutes another controversial issue in reading processing/comprehension. Approximately "the 30% of time, readers do not directly fixate words and they are fixating words which are coming in the text"; but the nature of these parafoveal fixations are not very clear: "ortographic information about the next word can be acquired in parafoveal fixations; perhaps semantic information would also be acquired during this moment" (Schotter, Reichle and Rayner 2014: 2). Other works (McConkie et al. 1988) argue for the importance of of nonfoveal information in determining where to look next (Rayner, Balota & Pollatsek 1985: 474). This issue is related with the issue about whether there are cognitive effects during saccadic movements.

[102] All these parameters will determine the whole experimental design so as to avoid reading problems for participants (see §4.3.).

Between fixation and fixation, eyes move faster along the parts of the text: such fast movements are called **saccades**. The word *saccade* is originated from the French word saquer, which means to jerk the reins of a horse. This metaphor reflects the behavior of saccades, which are very quick and jerky movements of the eye from one target to another (Enderle 2010: 16). They have an “average 7-9 characters in size ─that is, they jump from one character to another, 7-9 characters downstream─” (Liversedge and Findlay 2000: 10) ─see Fig. 13─. Saccades are “also defined as ballistic and stereotyped measures: they are ballistic because there exists a presumption by which saccade destinations (to the next content in the text) are preprogrammed: once the movement to the next destination has been calculated –with a time average about 200 msec.─, saccades cannot be altered. This is a very short time to obtain any type of feedback guide” (Duchowski 2007: 43). They are stereotyped because particular movement patterns can be evoked repeatedly (see Bahill & Troost 1979 for an explanation and classification of saccades).

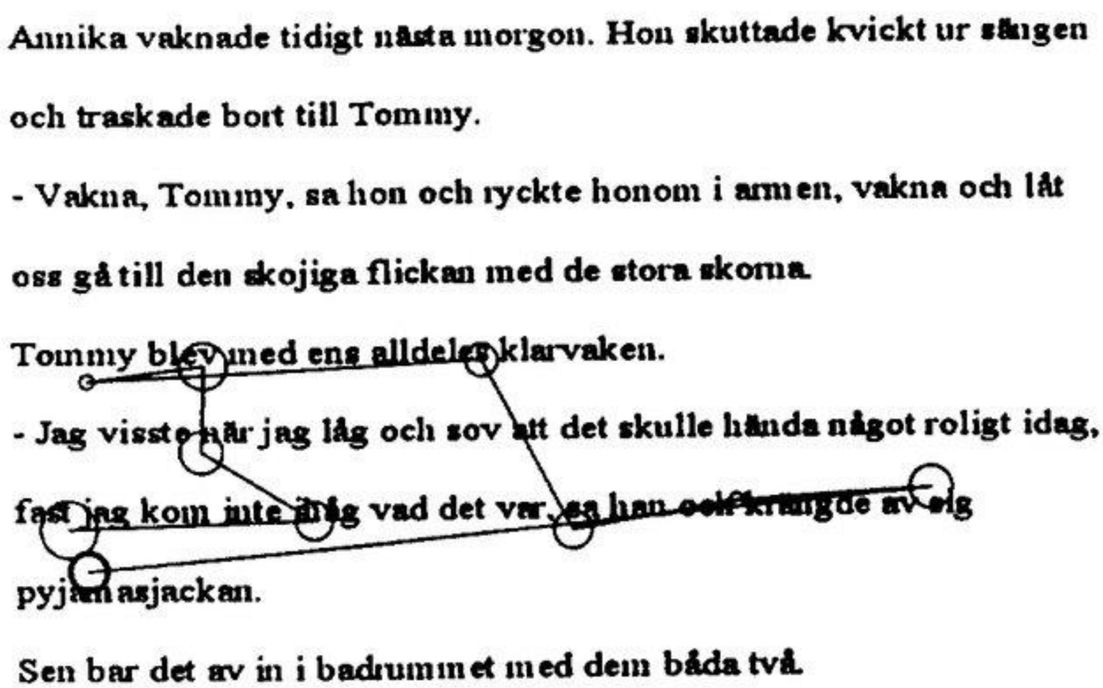


Fig. 13. Reading representation of fixations (circles) and saccades (lines). Adapted from Holmqvist, Holšánová, Johansson & Strömqvist (2005).

When saccades are being produced “no-information[103] from the text is obtained because the eyes are moving so quickly ─about 500º per second─ across the visual stable stimulus: in such cases, only blurs are perceived” (Rayner 1998: 373). There exists, however, a high variability “within each of these measures between and within subjects: a given subject may fixate for less than 100msec. to over 500msec. within the same text passage and make saccades of as little as 1-character space or as much as 15 or more spaces” (Rayner & Sereno 1994: 58)[104]. The number of saccades obtained during reading is related to the difficulty to process contents: the more difficult is the text, the longer fixations, shorter saccades and more regressions the subject will produce (Rayner & Sereno 1994: 58).

Regressions are similar to fixations (Rayner, Chace, Slattery & Ashby 2006: 243): they are backward movements to previously encountered sections of the text (Conklin, Pellicer & Carrol 2018: 1). Regressions are very useful in eye-tracking reading studies: it has been shown that models which allow for regressions are able to read more quickly and accurately than models that do not (Bicknell & Levy 2010; A. Sanders 2013: 3)[105]. They are produced “about 10-15% of the time” when contents seem to be non-clear and “the eyes move back in the text to read previous read material” (Rayner and Castelhano 2008) ─see Fig. 14─.

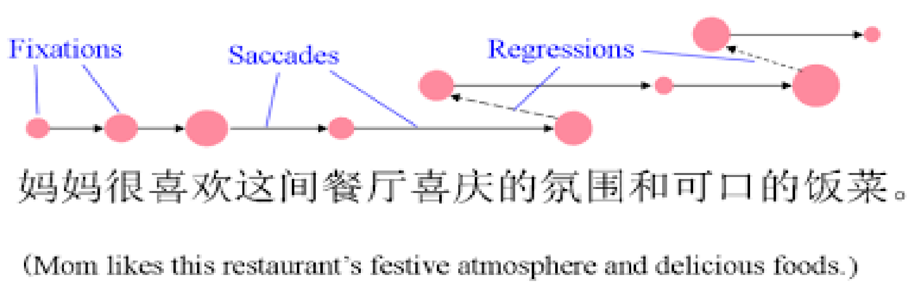


Fig. 14. Visual picture of fixations, saccades and regressions during an eye-tracking experiment. Adapted from Zhan, Zhang, Mei & Fong (2016). Regressions are represented by discontinuous lines.

[103] An account for cognitive processes during saccades is offered in Hansen & Sanders (1988), Sanders & Rath (1991) or Martin Shao and Boff (1993). There exists an open discussion about whether saccades imply cognitive processes (and which type) or not (Rayner 1998).

[104] Saccades are determined by the distance between the reader and the text-source (monitor, paper, document) (O’Regan 1980): “a 2º saccade typical of reading takes around 30 msec., whereas a 5º saccade, typical of scene perception, takes around 40-50 msec. (Rayner 1978: 443).

[105] There are concrete reading models addressing regressions, such as the SWIFT model (Engbert et al. 2002): this model allows to retrieve both short (local) and long-range (global) fixations (Perea & Carreiras 2003: 497).

It is generally assumed that regressions are related to near contents rather than to contents earlier employed in the text: "readers almost never regress to earlier lines; regressions, when they occur, are confined to the current line".[106] It is also suggested that regressions are motivated by the need of "access a word all over again" in case of an initial selection of wrong meaning or a wrong syntactic interpretation (Duffy 1992: 465). Regressions are not refixations: fixations produced again are refixations. Refixated words "refer specifically to a word that is fixated more than once prior to a saccade to another word; this excludes, for example, a word that is refixated via a regression from a later point in the text (Sereno 1992: 305)[107]. The combination of all such movements leads to a *scanpath* (Noton and Stark 1971): scanpaths are compilations of movement routines produced by the eyes at detecting a concrete type of content. This is, so to speak, the visual representation (or pattern) of all the movements produced. Such visual data-representations are very useful to relate the eye-movements obtained to theoretical linguistic hypotheses and draw tendencies in the information processing. For example, when text is difficult, readers tend to make longer fixations, shorter saccades, and more regressions (Rayner & Sereno 1994: 58); the same is expected for the analysis of discourse functions: when some function is complex, readers should fixate more, move forward slowly, and come back to what has read before.

For the purposes of this research, the following eye-movement measures have been employed (see §5.2. and subsequent sections):

- Fixation count ─FC─: it represents an approximate sum of the total number of fixations retrieved with the SMI automatic algorithm;
- Progressive fixation ─PF─: they represent forward movements in reading (Rayner 1998);
- Regressive fixation ─RF─: they result from backward movements in reading (Just & Carpenter 1980);

[106] However, it is also argued that a minority of fixations are longer-range regressions to an earlier segment of the text (Booth & Weger 2013).

[107] *First fixation* and *fixations* are the two notions allowing to distinguish refixations and regressions in experiments.

- Regression into AOI ─R into AOI─: they show eye-movements toward a specific AOI; they represent contents assimilation;
- Regression out of AOI ─R out of AOI─: they show AOI integration; they represent the cognitive construction of the syntactic structure behind contents.

Eye-movements are related to reading times: participants produce all fixations, saccades and regressions within a concrete time-lapse encompassing the whole reading process since it begins until ends (Magliano, Graesser Eymard, Haberlandt & Gholson 1993). As regards reading durations, "reading researchers typically distinguish between *early* and *late* measures" (Winke, Godfroid & Gass 2013: 206; see also Clifton, Staub & Rayner 2007; Rayner, Sereno, Morris, Schmauder & Clifton 1989); in other words, early measures correspond to first fixations and saccades, while late measures encompass all re-readings and backward movements during reading (Rayner & Pollatsek 1987). All early and late measures provide an approximate view on how the reading processing has been completed. Such three types of time measures have been so-called *first-pass*, *second-pass*, and *total reading time*.

3.2.3. Eye-movements: duration

Such time measures are a type of *position duration measures*: these measures concern how long participant gaze stays within a position ─i.e. a read concrete content─ (Holmqvist *et al*. 2011: 376). There exist several terms referring dwell measures, and sometimes are confused by researchers:

> A dwell is defined as one visit in an AOI, from entry to exit. Terminology for the dwell time measure varies. In some parts of human factors research, the measure is called glance duration, and Luftus and Mackworth (1978) used the term duration of the first fixation for the first dwell time in an AOI. Terms like 'observation' and 'visit' can also be found. In reading and some parts of scene perception research, dwell time is often called 'gaze duration', 'regional gaze duration', or even 'first-pass fixation time', and in psycholinguistics, Griffin and Spieler (2006) use the term 'gaze time', Krupinski and Jiang (2008) use the term 'cumulative decision dwell time' for dwell time on lesions in medical images. Dwell time is used in most other

eye-tracker based research fields, and dwell is a more precise term than the ambiguous gaze. (Holmqvist et al. 2011: 386).

It is important to separate pure fixation measures from pure dwell measures: for example, first fixation duration and single fixation duration only refer to the first ―or the only― fixation a target receives during forward reading movements (Winke, Godfroid & Gass 2013: 206); dwell times refer to the whole group of fixations and regressions in and out of concrete zones of the text. Their main difference is thus that dwell times involve enter and exit from reading zones, and fixation measures only involve fixations (Holmqvist et al. 2011: 387).

Holmqvist *et al.* (2011: 387-388) present a concise but detailed summary of dwell times and their processing implications; the duration of reading processes depends on the semantics of the read content, and the task of the participant. Some of the most important parameters offered in such summary are next reproduced (see also §3.2.2.). All the references are extracted from their work:

- **Interest and informativeness**. Dwell time shows two cognitive behaviors: interest in an object or higher informativeness on an object (Friedman & Liebelt 1981; Pieters, Rosbergen & Hartog 1996; Ryan & Cohen 2004). Contents with lower probability of occurrence or changed in the midst of a trial trigger more and longer fixations, what confirms a strong relationship between consecutive fixations on an item and how much is needed to mine information from it.

- **Difficulty in extracting general information**. Longer dwell time may indicate difficulties in extracting information from a display (Fitts et al. 1950; Goldber & Kotval 1999; Jacob & Karn 2003).

- **Difficulty in extracting word information**. Dwell time is a good index both of word frequency ―longer dwells are related to less frequent words― and of comprehension processes integrating several words.

According to this, the interest, informativeness and difficulty of what is being read lead participants to produce, in more or less time, fixations or regressions to certain parts of the text[108]. The "where" and the "when" of such eye-movements determines thus the type of dwell times found in the literature. Rayner insists on the need of distinguishing three different dwell times representing different cognitive processes in reading (Rayner 2009: 4)[109]: first-pass, second-pass and total reading time.

First-pass reading time ─henceforth, FPRT─ refers to all the fixations cumulated on a word or part of the text before leaving it ─saccade─ and fixate another forward content (Hÿona *et al.* 2003a: 340): it does not include any subsequent fixations on the region (Poynor & Morris 2003: 6). First-pass has been defined in several experimental studies (Henderson *et al.* 1999: 216; Duchowski 2002: 458; Juhasz & Rayner 2003: 1313; Godfroid, Boers & Housen 2013: 498; Wilkowski *et al.* 2014: 654) and has been often assumed to reflect lexical access, but also oculomotor processes and visual properties of the read content (Demberg & Keller 2008: 202).

Second-pass reading time ─henceforth, SPRT─ sumps up fixations that return to a text region after it has been fixated at least once (i.e., during the first-pass reading) (Hÿöna *et al.* 2003b: 316); it has been also defined as re-reading measure (Rayner 1998: 376) since comprises all regressions to previous read content. All definitions of second-pass (Sturt 2003: 548; Papadopoulou 2005: 101; Staub & Rayner 2007: 329; Dulgunsöz 2016: 66) focus on the reprocessing or verification behavior of such measure (Baccino 2011: 859).

Both first and second-pass are thus the temporal representation of the eye-movements above-named (see §3.2.2.): the total number of milliseconds individuals attend to a particular scene ─in this case, texts─, including all fixations ─fixations and refixations─, is the total reading time ─henceforth, TRT─ (Keller 2004). Researchers (Traxler & Pickering

---

108 Concerning the linguistic functions here analyzed, informativeness and difficulty can also be related to the more semantic or pragmatic nature of the contents presented. This idea will be resumed in Chapters 4 and 5.

109 First Rayner's Works (1977) did not distinguish between first, second-pass and total reading time. It can be deduced from some results preceding the discussion: "Analyses of variance on the total time spent in forward fixations and the total time spent in regressive fixations yielded results identical to the fixation duration data" (Rayner 1977: 446).

1996: 460; Rayner et al. 2007: 23; Rayner 2009: 1463) assume that total reading time subsumes the whole duration of a trial and should therefore be sensitive to slow and long-term cognitive processes (Holmqvist *et al.* 2011: 389).

FPRT, SPRT, and TRT are thus essential in describing reading processes with eye-tracking: in this thesis, eye-movements need to be complemented by their corresponding duration and the description of the concrete moment when they are produced to define each function addressed. Furthermore, studies on ocular movements have usually related such three dwell times to syntactic, semantic and pragmatic processing processes[110]: for example, lexical recognizing processing (Baccino & Manunta 2005: 204) is usually attributed to first-pass ─during the first 100-150 ms. (Sereno, Rayner & Posner 1998)─; reanalysis is associated with the second-pass since the eyes regress directly to the earlier region whose structural analysis must be revised (Meseguer, Carreiras & Clifton 2002: 552) [111]. All these linguistic-procedural features are expected to be detected also in the functions analyzed in this thesis (see §4.1. and §5.1. to §5.4.).

3.2.4. Summary

The eye-mind hypothesis assumes a direct correspondence between ocular movements, read content and information retrieved. Applied to Linguistics, such assumption allows to address several phenomena described only theoretically in different fields: anaphora resolution, morphological assimilation, syntactic parsing, semantic understanding, and even reanalysis. To analyze how eyes react in assimilating read contents, eye-tracking methods are usually employed: these methods record eye-movements under three main parameters; the "what, where and when" (Poole & Ball 2006). This permits to reconstruct the process experimented by people during observing different contents ─texts, pictures, videos, utterances, words, and so on─. To do so, eye-trackers detect the different parts of the eyes

[110] Some works, however, do not argue for a direct correlation between eye-movements, mind processing and information retrieving (Anderson, Bothell & Douglass 2004).

[111] Given that total reading time includes subsequent regressive fixations, it is not diagnostic of initial processing time (Starr & Rayner 2001: 158). Such kind of works, not as usual as eye-mind studies, state that "the use of eye-movements depends on one critical assumption, however, and that although participants need to look at the words to encode them to initiate retrieval, it is possible that the gaze durations are unrelated to retrieval".

with infra-red lights (§see 3.2.1.): parts and muscles are key in obtaining and processing light to convert it into optical representations for the brain. Parts and muscles trigger a series of eye-movements (§see 3.2.2.) identified with the cognitive assimilation of contents: fixations, saccades and regressions. Such movements can be described in two main ways: quantitatively ─i.e., by counting the total amount of movements regarding concrete reading zones─ and temporally ─i.e., by measuring how much time is needed to produce each movement regarding concrete reading zones─. Temporal position measures are so-called dwell times (§see 3.2.3.): first-pass covers all fixations produced in some read content before leaving it; second-pass encompasses the other fixations produced after leaving such read content; total reading time represents the whole reading process.

The eye-mind hypothesis can also be employed in studying linguistic functions ─i.e. counter-argumentation (Nada, forthcoming), cause-consequence (Canestrelli, Mak & Sanders 2016), focalization (Cruz in progress; Torres Santos in progress), or reformulation, such as this disertation─: detecting and identifying eye-movements, however, require high-accurate eye-tracking systems, an adequate experimental protocol and an experimental design adjusted to the characteristics of the research executed. The following sections deal with such requirements: section §3.3. focus on some eye-tracking technical skills ─apparatus, calibration, accuracy and so on─; section §3.4. presents an experimental design model considering the objectives, hypotheses and linguistic features of this work by reviewing some basic parameters adopted in eye-tracking experiments.

3.3. Eye-tracking systems: technical skills

A well-designed eye-tracking based experiment must be made with the adequate apparatus, methods and software retrieving data in the most accurate possible form so as to answer hypotheses and accomplish objectives[112]. Each task will need a different eye-tracking system: the features of the research conducted will determine which system is the best one. Eye-trackers are characterized by their structure ─fixed or portable─, the light they shed to the eyes ─visible or infrared─, their sampling frequency, and their accuracy in

[112] This thesis will only focus on the features manifested by the equipment employed. For a detailed review of the different eye-tracking systems see: Duchowski (2007); Holmqvist (2011).

calibration─. This section summarizes such general features of eye-tracking systems offered in Duchowski (2007) and Holmqvist *et al.* (2011).

There exists a big eye-tracking system offer in the market: *Tobii*, *SMI* (*SensoMotoric Instruments*), *EyeLink*, *ISCAN*, *LC Technologies*, *EyeTech*, *Smart Eye*, or *Gazepoint* are some of the most known manufacturers[113]. Eye-tracking systems are classified into three main types according to the data output they produce and how they analyze data: *Static systems* ─tower-mounted and remote─, *head mounted systems* ─helmets or glasses─ and *combined systems*. Static eye-trackers are called static because both illumination and cameras are placed in front of participants who, in turn, must also remain still to catch their eyes perfectly; head-mounted eye trackers put illumination and cameras in the head of participants with a helmet or a pair of glasses; finally, the last type adds a head-tracker to the head-mounted eye-tracker to calculate the position of the head in the space (Homlqvist *et al.* 2011: 51) ─see Fig.15─.

[113] This information has been retrieved from: https://imotions.com/blog/top-eye-tracking-hardware-companies/

Fig. 15. Static system ─above─; head-mounted system ─left─; and combined system ─right─.[114]

It is commonly argued that tower-mounted ─or table-mounted─ system provides high-quality data (Duchowsky 2007: 101). Despite being more restrictive, tower-mounted systems keep participant's heads still and their eyes near to the camera, directly connected to the monitor where images or texts are projected. Participants cannot move during reading, and this environment is not very natural, but this head restriction provides a correct data reading extraction. Remote systems are, perhaps, freer: participants must sit still in an optimal position and orientation" towards the monitor (Nierhoster *et al.* 2017), but such systems do not require foreheads and participants feel more comfortable during reading contents in the monitor (Richardson and Spivey 2004: 7); they "forget that they are being recorded" (Holmqvist *et al.* 2011: 53). For this reason, participants must be prevented so as to maintain the initial body and head position adopted and not to move: excessive movements could lead to a loss of their tracked eyes, and this would alter the amount of eye-movements and their duration ─see Fig. 16─.

Fig. 16. Remote eye-tracking systems.

Generally, video-based eye-tracking systems work under two "types of imaging approaches: *visible* and *infrared*. Both approaches differ "in the way they display the three more relevant parts of the eye: the *pupil*, the *iris* and the *sclera*" (Jacques 2010: 6) (see §3.2.1.). Meanwhile visible imaging employs "uncontrolled ambient light to illuminate the whole eye" (Li and Parkhust 2006: 1), infrared light "eliminates uncontrolled specular reflections by illuminating the eye with a uniform and controlled light not perceivable by

[114] Images taken from : Pubmed (2012) ; https://www.ergoneers.com/en/eye-tracking-remote-en/; and https://imotions.com/tobii-eye-tracking-glasses/.

the user" (Punde and Manza 2014: 600). This light illuminates the retina of participants, provokes reflections on "the pupil center and the cornea" (Khapre, Bhalerao and Mulajkar 2016: 11) and allows obtaining gaze estimations. Infrared light is more precise: in contrast with visible light, which contours the corneal limbus (the border of the cornea and the sclera, the white zone of the eye), infrared "contours the pupil zone and "both the sclera and the iris strongly reflect infrared light" (Kunka and Kostek 2009). This fact allows to detect the eye-movements with more precision and, thus, to obtain data output with good quality (Crossland and Rubin 2002). In this sense, despite visible light-based systems "do not require any special hardware and aim to solve the task making use of regular cameras" (Ferhat and Vilariño 2016: 2), they are not optimal devices whether researchers aim to obtain high-quality visual data, especially when their experiments focus on subtle procedures such as reading comprehension or clinical studies.

Eye-trackers differ in their sampling frequency, measured in hertz (Hz). Sampling frequency is the average number of samples compiled in one second of eye-recording experiments; a sample "is a single *photo* of the tracked eye, processed by gaze estimation" (Holmqvist et al. 2011: 31). Sampling frequency is a very important technical feature of eye-tracking systems: "the most modern eye-trackers have sampling frequencies ranging from 25 to 2500Hz" (Andersson, Nyström and Rayner 2010: 1). "Higher sampling rates produce better temporal accuracy with a lower average temporal error when measuring the duration of fixations and saccades" (Rayner, Campbell and Bovee 2014), but the sampling rate required depends on the type of experimental study executed: for example, "an eye-tracking device with a 60Hz sampling rate can records gaze points every 16.6 msec. (60 times per second), which is an adequate sampling rate for web studies" (Djamasbi 2004: 20); data sampled at 120Hz allows recovering information every 8.33 msec. (Helsen et al. 1998: 622).

Accuracy is determinant "in studies in which is necessary to know exactly where a participant is looking, especially by those where data from different areas of interest or gaze contingency" are retrieved (Holmqvist *et al.* 2011). Accuracy "refers to how well the calculated fixation location matches the actual -real- fixation location (Raney 2014: 2). Human eyes' maximum angles are "about 180º horizontally and 130º vertically; but the binocular field of vision covers only about 120º horizontally" (Szcecin, Kowalik and Michal 2011). This suggests that the degree accuracy of the eye-tracker should be lower than the binocular visual human degree in order to avoid force head movements (Kowalik 2011: 4)[115]. Such accuracy determines calibration in eye-tracking experiments. This "is a very necessary and critical part of the experiment: it establishes the relationship between the position of the eye in the camera view and a gaze point in space, the point-of-regard" (Komínková, Pedersen, Harderberg and Koplanová 2008: 2). Eye-tracking experiments thus cannot be executed without a calibration because this is the process by which the gaze is detected. Calibration tends to be "performed by asking participants to look at a number of predefined positions in the stimulus space" (Holmqvist, Nyström and Andersson 2011): when participants look at these target points their eyes automatically are recorded and directly related to the visualized contents in the screen. Eye-tracking systems have calibration software at their disposal: this software allows for recording and calculating "a function to estimate any given location on the stimulus" after retrieving corneal and pupil reflection positions (Holmqvist *et al.* 2011: 128) ─see Fig. 17─.

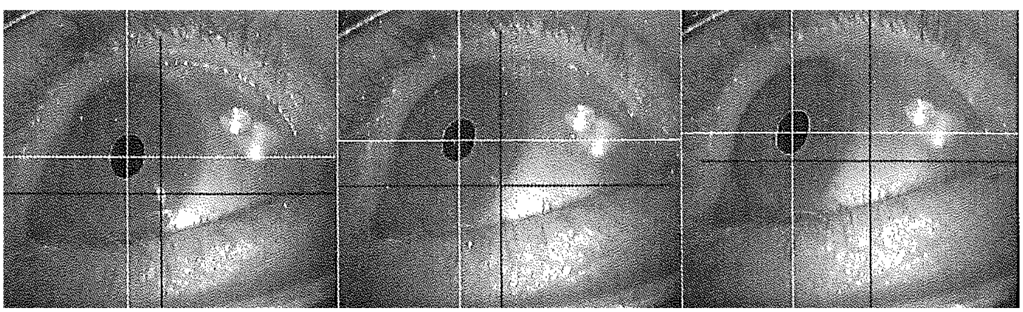


Fig. 17. Gaze during calibration towards the upper left corner (Holmqvist et al. 2011: 131).

During calibration, infrared lights thrown by the camera (one camera for each eye), placed in front of the participant, illuminate the retina of the eyes and provoke membrane

[115] *Accuracy* is also limited by the size of the fovea: the distance between the participant and the screen determines the degree of accuracy for the eyes during reading, together with the precise position of the eye during the calibration process. Accuracy tends to be bad at the corners of the monitor: due to this, it is better whether stimuli appear centered, in the middle of the screen. Some external factors could influence the accuracy: head-movements when participants are being recorded, the use of glasses, contact lenses, sunlight, tears, or even the eye colors.

reflections on "the pupil center and the cornea to obtain a *gaze estimation*" (Khapre, Bhalerao and Mulajkar 2016: 11): gaze estimations help at tracking the participant's eyes while the experiment is being executed and recorded.

This said, an adequate eye-tracker for the experiments considering the features of this research is (a) a remote system guaranteeing a partially natural context for the experiments but, in turn, assuring the correct visualization of contexts and trials without having tracking problems; (b) with an infrared system providing an accurate caption of the gaze; and (c) with a fast sampling frequency ─at least a 250 HZ sampling frequency─ providing several samples of the eyes while reading the functions addressed.

3.4. Experimental design: basic steps

As said in §1.3., Chapter 3 has a double purpose: theoretical ─because it introduces some main notions and resources in eye-movements studies─, and methodological ─since such theoretical notions are, in turn, tested parameters and variables in the experiments proposed in this thesis (see §4.2.)─. All the theoretical-experimental information exposed in previous sections becomes the basis for an adequate experimental design in eye-tracking studies[116] ─the most precise eye-movements according to our purposes; the dwell times related to such movements; or the best eye-tracking system to be used in a reading study─.

Eye-tracking is a type of research included within the empirical field. As Geeraerts (2006) highlights, eye-tracking research is data-driven and quantitative, and involves the formulation and operationalization of hypotheses (Geeraerts 2006: 23-25):

- **Data-driven**. You cannot easily draw conclusions from single cases and isolated observations: data is required. Observations could come from many sources: you could collect them as they exist, but you could also elicit them by doing experimental research;

[116] See Loureda *et al.* (2018) to see various examples on how experimental designs are prepared and applied to different linguistic issues in Spanish.

- **Quantitative**. You need techniques to come to terms with the amount of material involved. Specifically, you need statistical tests to determine whether your observations might be due to chance or not;
- **Formulation of hypotheses**. The only conclusions you will able to draw are the ones that relate to hypotheses you have formulated and tested. Empirical research necessarily combines inductive and deductive reasoning: on the one hand, you work in a bottom-up way from data to hypotheses, but, on the other hand, those hypotheses will also be derived top-down from the theoretical perspective you adopt in thinking about data;
- **Operationalization of hypotheses**. Hypotheses must be formulated in such a way that it can be put to the test. It is not just a question of finding the relevant data that allow you to measure something, but also of settling on a method of measurement.

As Chapter 4 shows next, an experimental design should incorporate these four parameters: data obtention (for an explanation of types of data in empirical research, see also Tummers *et al*. 2005; Guilqin & Gries 2009) is key ─in our case, data is retrieved by executing reading experiments─; the incorporation of one or more techniques for the statistical treatment will allow to describe and generalize the results obtained. Besides, these data do not make sense without establishing clearly the research hypotheses to test the theoretical ideas behind the experiments. Research hypotheses (see §4.2.1. and §4.2.2.) are operationalized in eye-tracking experiments by establishing experimental conditions and variables (see §4.2.3.) which, in turn, can be statistically tested: experimental conditions in eye-tracking are identified with an abstraction of the phenomena addressed ─e.g. linguistic functions, presence or absence of read contents, positional changes in trials, etc.─; variables are the materialization of such conditions ─e.g. focalization, reformulation, conclusion, correction─ and also the quantifiable and qualifiable information ─e.g. first fixation count, first-pass, second-pass, total reading time, etc.─ explaining such phenomenon. The combination of conditions and variables will answer to the hypotheses previously raised.

Concerning the data obtention, an adequate experimental design must adopt thorough decisions in the creation (or choice) of the contexts and utterances to be read by the participants (§4.3.1): word-length, frequency or meaning are controlled so as to avoid reading problems and, consequently, non-accurate eye-movements and reading times (see §4.3.2 and §4.3.3.). Furthermore, experiments must not be executed without establishing a previous reading protocol: this protocol should include all the instructions participants receive before starting to read (§ see 4.4.). After obtaining the reading data, a statistical technique will be applied: such technique can be classical or new (see §4.5.1.). Decision trees (§4.5.2.) and mixed linear regression models (§4.5.3.) are the two main techniques employed in this thesis, included in the so-called new statistics (see (§4.5.), frequently employed in Psycholinguistics (§4.5.4.) during the last decades.

Chapter 4

Materials and methods

4.1. Introduction

This chapter presents the methodological basis of the experimental design created for this research. As said in §3.4., an experimental design for an eye-tracking study requires several steps to be followed. Given that the study of reformulation and neighboring categories with eye-tracking is innovative in the field of experimental pragmatics, the explanation of the experimental design carried out in this thesis is even more important. For that reason, this chapter is key: it (i) formulates the hypotheses testing the theory previously presented (see §1.1. and §2.3.); (ii) establishes the conditions to operationalize such hypotheses; (iii) addresses the creation of materials to test hypotheses and research questions with real speakers; and (iv) presents the statistical treatment employed. Such four aims are addressed in four sections:

- Section §4.2. suggests two groups of hypotheses underlying this research: temporal hypotheses (§4.2.1.) and movement hypotheses (§4.2.2.). These hypotheses are based on two information sources: the duration of the reading movements ─first-pass, second-pass and total reading time─ (see §3.2.3.) and the type of eye-movements produced ─fixations, saccades, regressions, and their corresponding subcategories─ (see §3.2.2.).
- Section §4.3. focuses on the data obtention. To obtain data researchers compile corpus or create contents to be experimentally tested. In the latter case, contexts and utterances must be designed. However, such materials cannot be randomly created: they should represent natural language. To this regard, some decisions have been taken before creating the materials ─words-choice, extension, plausible situations for the contexts, pictures, and so on─ (§4.3.1.); after that, the contexts (§4.3.2.) and the utterances designed are presented and detailed (§4.3.3.).
- Section §4.4. introduces the experimental protocol followed in this research: this protocol is based on the basic requirements aimed at any eye-tracking experiment with remote-static systems.
- Finally, section §4.5. details the statistical procedures applied to the experimental raw data. After introducing multivariate statistics methods (§4.5.1.), decision trees

(§4.5.2.) and linear mixed regression models (§4.5.3.) are explained: decision trees allow to predict and reduce data for a better representation of the information, and filter experimental variables to see how they interact (Berlanga, Rubio & Vilà 2013); mixed linear regression models (Wood 2011) are a new statistic model ─usually employed in psycholinguistic and in eye-tracking studies─ applied to repeated measurements which can deal with missing values and contain both mixed and random effects (Milliken 1992; West, Welch & Galecki 2007). Given the number of values, conditions and variables analyzed, such statistical methods fit better the characteristics of the research.

Sections §4.2. to §4.5. encompass, in turn, the different natural steps followed to execute the experiments[117]. The achievement of these four aims in such four sections creates thus a bridge between theory (chapter 2) and cognition (chapter 5), which allows describing reformulation ─and neighboring categories─ experimentally and, in turn, solving its theoretical issues (see §2.4.).

4.2. Experimental hypotheses

The functions ─paraphrase, reformulation, conclusion and correction─ and conditions ─presence and absence of discourse marker─ addressed in this thesis (see §1.3.) have been operationalized as the time a participant spends fixating their contents. This information depends on two factors: (i) the type of movements the eyes produce and (ii) their corresponding duration. Human's eyes move towards different directions, what prolongs or reduces the duration of the whole reading process. The eyes reflect the assimilation processes related to each function and, consequently, the way they work (see the eye-mind assumption in §2.4.2.). In other words, depending on how eyes react, different cognitive-functional guidelines can be drawn for paraphrase, reformulation, conclusion and correction. For example, paraphrase and reformulation should share similar time patterns

[117] All the information offered in these four sections reflects the different experimental steps adopted in this thesis. First of all, main and additional hypotheses are established according to the nature of the object of study and the conditions behind the experiment(s) ─steps 1 to 4─. After that, some previous conditions should be specified for a correct experimental execution and data obtention ─steps 5 to 9─. All reading experiments require an adequate design ─steps 10 to 14─. The raw data derived from the experiments are finally treated with statistical methods ─steps 15 to 17─.

since they have the same discursive nature; conclusion should be easier due to its grammatical functioning; correction should be a functional outlier. Finally, there should exist differences between functions expressed with or without a discourse marker.

To test this relationship between eye-behavior and assimilation of information and, especially, to establish distinctive limits for each function, temporal and movement hypothesis are required: their acceptance or refusal will contribute to address and solve the theoretical problems presented in previous chapters (see §1.3.; §2.3.2, §2.3.3.)[118]. Temporal hypotheses are based on timing measures ─that is, the duration of the different reading stages (in ms.) produced during the whole reading experiment since it begins until ends─ (see all these measures detailed in §3.2.3.). Movement hypotheses depend on the ─number of─ eye-movements ─fixations and regressions namely─ retrieved in absolute numbers. Temporal and movement hypotheses depend on the following measures (or variables) which, in turn, are based on the different experimental notions addressed in previous chapters (see §3.2.2. and §3.2.3. for a detailed explanation of reading times and eye-movements in eye-tracking studies):

Temporal measures	Movement measures
First-pass reading time ─FPRT─	Fixation count ─FC─
Second-pass reading time ─SPRT─	Progressive fixations ─PF─
Total reading time ─TRT─	Regressive fixations ─RF─
	Regressions into AOI ─R into AOI─
	Regressions out of AOI ─R out of AOI─

Table 13. Temporal and movement parameters selected.

Temporal and *movement measures* are distinguished by their nature:

- TRT represents the total effort involved in assimilating a function or a content composing such function; FPRT is related to initial syntactic and lexical

[118] Both groups of hypotheses will be tested in terms of p-values, effect sizes (ESs) (Cumming 2005) and percentages quantifying how big or small the differences between compared groups of data are (see §4.5.2. and §4.5.3.).

disambiguation processes; SPRT reflects subsequent cognitive effects related to the semantic-pragmatic interpretation of contents (Rayner 2006)[119]. Their analysis thus will help to establish a temporal pattern for each function expressed with and without discourse marker: this temporal pattern supposes a window to the cognitive assimilation of the observed contents.

- FC shows the total number of fixations produced on the whole read content or only on determined parts; PF move the eyes forward through the read content ─i.e., after a forward saccade─, and RF are those following saccades that move the reader to prior points in a text ─i.e., after a regression─. R into and out of AOI are thought to show lexical activation processes ─i.e., assimilating the meaning of the word(s)─ and sentence integration processes ─i.e., understanding how words are related─ (Underwood 1998). Their analysis facilitates understanding an increasing or reduction of the reading times in the temporal measures, and completes the experimental pattern retrieved (Raney, Campbell & Bovee 2014).

Both groups of measures, and therefore their corresponding hypotheses, work differently. The type of eye-movements and their influence in the function analyzed are important, but the focus of this research is the duration derived from such movements: the more time readers fixate words, the more difficult to assimilate the information is. For this reason, hypotheses related to reading duration are detailed first (§4.2.1.), while those explaining eye-movements along the contents are additional and explained later (§4.2.2.).

4.2.1. Temporal hypotheses ─group 1─

Step 1. Establishing hypotheses

Paraphrase, reformulation, conclusion, and correction are four functions working differently from a theoretical point of view widely explored in Linguistics (see also §2.3.2. and §2.3.3.). Their main features can be summarized as follows:

---

[119] As Narvez & Torres note (2016: 5), "the distinction between the first and second reading correlates to the time required for the construction of an initial assumption derived from an utterance ostensively communicated and the processing effort needed for the reconstruction or confirmation of the initially constructed assumption. All types of linguistic information are processed according to a near-simultaneously processing model".

- Paraphrase ─commonly addressed as paraphrastic reformulation in the literature (Gülich & Kotschi 1995)─ is the process where "a first utterance, which carries the semantic content of the speaker's intervention, is reformulated ─or restated─ via a second, equivalent formulation[120]" (Pons Bordería & Lópes Macário 2013: 107). It guarantees textual cohesion and facilitates the progression of discourses since non-clear meanings are better "explained" (Cuenca & Bach 2007: 150). Equivalence between formulations is thus established by introducing semantic-pragmatic similarities (Polanco 2016: 17)[121]: some extra time is expected to understand the contents involved in both oral and written discourses. This happens because the recipient must make the effort of linking the less-clear content and the new formulation clarifying the former. The meaning of two different but related contents must also be disambiguated: after that, the second meaning collapses with the former. Their relationship is also possible thanks to the context, which must be considered to conclude the whole assimilation process.
- Reformulation ─addressed as non-paraphrastic reformulation in the literature (see Roulet 1987 and further readings)─ tends "to foreground the nuance(s) derived from presenting two contexts as alternative formulations" (Cuenca 2003: 1073) or, in other words, the distance[122]. Speakers change the discourse orientation to find a

[120] While classic approaches define paraphrase as a total propositional equivalence between α and β (Smaby 1971), current studies on address this function as a procedure by which α is expressed again under a new content β to clarify or precise it. This is the main difference between formal and semantic-pragmatic approaches: the first approach involves a total synonymy for α and β (e.g. tautologies, changes from active to passive voice, and so on); the second requires a certain identity between two utterances (Mortureux 1982). This identity depends, in the end, on the speaker's choices and the context where it takes place.

[121] Paraphrastic reformulations generally convey different degrees of equivalence between the contents related (Gülich & Kotschi 1983): the stronger the equivalence between contents is, the more semantic their relationship is, and vice versa. For example:

1. He seeds turmeric; that is, an Indian spice.
2. He is an alternative guy; that is, he loves specialty coffee.

Examples 1 and 2 are different: the former shows a more semantic-based equivalence; the latter is pragmatic-based: the eye-tracking experiments should thus reflect different results for such two types of paraphrase. This thesis employs semantic-based contexts to ensure the obtention of accurate reading data without outliers produced by the influence of the context.

[122] Such an explanation shows certain abstractness: distance between two or more ideas can only be captured by recognizing shared features. For example, if someone moves from one place to another, the total number

more accurate formulation expressing the meaning initially intended[123]. This change results from the speaker's perception concerning the adequacy of the message or the recipient's reaction to what is being said or read. In this sense, reformulation is a kind of meaning-negotiation (Roulet 1985, 1986) expanded until the speaker produces the best communicative option and the recipient accepts it: this moment is the so-called interactive completeness (*complétude interactive*; Roulet 1986: 190). Discourse changes in reformulation are produced linguistically: again, two contents are related; the new formulation, however, substitutes part of the former. It happens because there exists a semantic-pragmatic difference ─distance─ between both formulations (Roulet 1987: 120).

- Conclusion is a more grammatical function[124]: it depends on cause-consequence relationships (Sanders 2005)[125]. Two or more constituents ─called premises or

of kilometers crossed is measured once the traveler knows where both locations are. Then, this person will be able to explain that the destination place is near/far from the departure place. Reformulation shows a similar behavior: the speaker/writer shifts away from the first content α to follow the idea expressed in β; content β expresses the speaker's initial communicative aim better. However, to assimilate the accuracy behind β, content α should not be forgotten. In other words, the distance crossed from α to β is measured by comparing both contents: such a comparison distinguishes reformulation from paraphrase, whose contents are not compared but equated.

123 The notion of *distance* is vaguely defined in the literature (Pons 2013: 155): classical works focus on changes of discourse planning triggering distance (Gülich & Kotschi 1995: 44), but they do not offer a set of semantic-pragmatic features describing the nature of distance. As a result, several works consider that other functions also manifest distance and that, thus, they should be classified as subtypes of reformulation (Fuentes 1993; Gülich & Kotschi 1995; Murillo 2007; etc.). Furthermore, several works argue for this idea because reformulation markers can express such other functions (they conclude, they correct, and so on), which should suggest that they are subtypes of reformulation (Rossari 1994; Fuentes 1993; Murillo 2016). As a result, *conclusion*, *correction*, and their corresponding subclasses are included within the category of reformulation: they constitute a sort of reformulation since also present distance between contents. Experimental data will contribute to solve this problem (see §2.3.2 and §2.3.3.).

124 However, researchers define conclusion under a double-nature: on the one hand, it covers a cause-consequence relationship related to causality; that is why several theoretical approaches are grammar-based (see Cuenca 1991 or Galán 1995; specifically, Galán 1999 ─in Bosque & Demonte (eds.) 1999─). On the other, this cause-consequence relationship can function in discourses, providing them with coherence (Pander, Maat & Sandrs 2001); that happens when speakers relate causes and consequences semantically and ─especially─ contextually determined. For that reason, several works describe conclusion as a communicative relation (see, for instance, the influence of subjectivity on causal relations in Spooren, Sanders, Huskes & Degand 2010): its proximity to discursive functions has favored its treatment as a (re)formulation relation (see in §2.3.1. and §2.3.2. all classifications relating conclusion to reformulation, mainly through reformulation markers which also express conclusion values).

arguments─ are linked to a new content (Schelling 1983: 66) which can ─or not─ change the point of view previously adopted (Flores Acuña 2003: 177). Such new content is the conclusion, derived from the semantic and pragmatic information behind the arguments. Every argument is based on five main properties reflected in each word: polarity, force, order, linguistic marking and logical impairment" (Moeschler 2016: 3)[126]. Syntax influences conclusion relationships (Cuenca 1991; Galán 1995), but it also requires a semantic similarity between plausible arguments. That determines the interpretation of conclusion: it reflects the union of a set of arguments leading to one consequence, rather than an addition of information or syntactic coordination. Finally, two factors are key in conclusion: the lexical orientation of the contents involved, and the argumentative operations imposed by discourse markers and connectives (Moeschler 2016: 8)[127].

- Correction ─also called rectification, invalidation or repair in the literature (Crible 2016)[128]─ is defined as the way(s) in which speakers and hearers address recurrent problems in speaking, hearing and understanding (Keating 1991, Schegloff, Jefferson & Sacks 1977)[129]. It shows a double nature: on the one hand, this function

---

125 As notes Ridruejo (2002), causality has been widely addressed synchronically and diachronically: "hay aportaciones destacadas (…) en los trabajos de Lapesa (1978), Marcos Marín (1979), Blesa (1982), Santos Río (1982), García Santos (1989), Campo (1988), Galán (1999), o Gutiérrez Ordóñez (2002)" (…). Desde finales de los años ochenta del siglo pasado se han multiplicado los trabajos sobre la historia de las causales (…) Bartol Hernández (1988) y Mosteiro Louzao (2001)" (Ridruejo-Alonso 2002: 765).

126 Such properties have been proposed throughout the last forty years in different studies in argumentation (Anscombre & Ducrot 1983; Norén 1995; Portolés 1998; Negroni 2001).

127 To this respect, Moeschler points out that argumentation "is a way by which reasons are given to support a conclusion. Reasons are linguistically encoded in arguments. So argumentation is a relationship between an argument and a conclusion (...) Every argument is based on five main properties: polarity, force, order, linguistic marking and logical impairment" (Moeschler 2016: 3). These features should be assimilated by speakers or readers.

128 The term *correction* in romance languages does not refer only to formal mistakes in which some character has been misused or some word has been misspelled. It lies on a wide view of corrections in different discursive scenarios: formal, conceptual or formulative. This dissertation follows this idea of correction, but lays aside the notion of repair (Schegloff, Jefferson and Sacks 1977), which focuses more on formulative corrections like false-starts or hesitations (Gülich & Kotschi 1987).

129 As noted by Schegloff, Jefferson & Sacks 1977), sociologists take an interest in the distinction between self-correction and other-correction ─i.e. correction by the speaker of that which is being corrected vs. correction by some 'other'─ given that the terms 'self' and 'other' "have long understood as central to the

is related to negation[130], given that a first formulation ─or part of the formulation─ is invalidated by introducing a new formulation (Gülich & Kotschi 1995); on the other, it depends of the communicative aims and the context, which lead the speaker to change abruptly his discourse to provide the correct information. As a result, "content α (or part of the content uttered in α) and all the implicatures, presuppositions or lexical networks underlying it are replaced by those underlying content β" (Pons Bordería 2013: 160). In this case, semantics and pragmatics invalidate contents: antonym expressions ─e.g., black vs. white─ or numeric information ─e.g., three vs. two─ do not allow gradual interpretations. Once the second content is listened or read, the previous formulation is abandoned[131].

These main linguistic features determine the experimental design of context and critical sentences (see §4.3.), the temporal hypotheses suggested, and the results expected for each one. A total of five temporal hypotheses are formulated:

1. Discursive functions are related to long durations for the TRT; however, grammatical functions are related to shorter TRT;

---

study of social organization and social interaction" (Schegloff, Jefferson & Sacks 1977: 361). This dissertation does not focus on such a distinction; however, it would be interesting to test this idea from an experimental approach, specifically triangulating time-reaction responses and visual attention (Levinson & Torreira 2015): *repair* is an unexplored field in experimental pragmatics.

[130] In Horn's terms (1985), such a negation is not descriptive or metalinguistic ─i.e., it is not explicitly expressed by using negative formal marks (Ad Foolen 1991: 222)─ but meaning-based: correction depends on the propositional content behind the sentences involved ─semantic and pragmatic meaning─ and the speaker's aim of changing the discourse-orientation to introduce a correct expression.

[131] Reformulation and correction become closer functions: in both cases, speakers/writers (a) change their discourse because they detect inaccuracy ─reformulation─ or incorrectness ─correction─ and (b) provide recipients with a clear understanding of the message. Furthermore, reformulation also produces a partial (but not total) negation of the previous formulation (see Pons 2013: 160). Probably, that is why several researchers define correction as a subtype of reformulation ─since correction involves a different way to say something and, consequently, a new formulation─. Despite their proximity, correction differs from reformulation in the fact that the m1 (previous formulation) is completely abandoned (Gülich & Kotschi 1987: 247; Gúlich & Kotschi 1995: 48); reformulation involves comparisons between the m1 (non-accurate formulation) and the m2 (new accurate formulation, partially similar, partially different to the former); in short, speakers and readers do not abandon the m1 completely in reformulation (see in §2.3.3., §4.2.2., and §5.3. the notion of comparison between reformulations).

2. Discursive functions are related to long durations for the FPRT; however, grammatical functions are related to shorter FPRT;
3. Discursive functions are related to long durations for the SPRT; however, grammatical functions are related to shorter SPRT;
4. The presence of a discourse marker facilitates and even reduce costs in assimilating the function read;
5. The absence of a discourse marker does not influence the assimilation of the function read;

These five temporal hypotheses explain the four functions analyzed in this thesis from an experimental point of view. The results expected for each hypothesis vary:

- Paraphrase should provide medium-high temporal measures ─1 to 3─ since the equivalence between two contents forces readers to focus on the meaning of two expressions simultaneously. Both first and second-pass should be similar: that would represent the semantic similarity between contents in paraphrases, where a more technical ─or unknown─ content is clarified with a more accessible expression. Discourse markers should also facilitate the process ─4 and 5─ in the three reading times thanks to the instructions they codify.
- Reformulation also expects medium-high temporal measures ─1 to 3─ because distance between contents involves certain degree of difficulty in their assimilation. The first pass should be harder than the second-pass because two words with subtle semantic differences are related but without being considered equal ─in other words, they are put at the same discursive level but distinguished at the same time─. The second-pass should be big because the retroactive subordination behind any reformulation (Roulet 1987) requires more efforts than simpler relationships between linguistic contents. Discourse markers should also facilitate such a hard process ─4 and 5─ because their instruction would explicit the “break” between the old and the new formulation.
- Conclusion is a grammatical function and, therefore, lower temporal measures are expected ─1 to 3─. Both first and second-pass should be almost equal and relatively reduced since the arguments related in a conclusion share the same semantic-

pragmatic frame, what facilitates the deduction ─or derivation─ of the conclusion. The presence or the absence of the discourse marker perhaps does not affect the final output obtained: this grammatical function can be established with and without procedural instructions ─4 and 5─.

- Correction should generate extremely high temporal values ─1 to 3─ because the invalidation of contents ─especially of read contents─ is expected to be the hardest cognitive operation. The first pass could be similar to paraphrase or reformulation, but the second pass should be higher: speakers and readers must establish the abandon between two expressions they have listened or observed almost simultaneously. The semantic abrupt distance they share is very similar to cases of semantic incongruence (Godfroid & Schmidtke 2013). In this case, the presence or absence of discourse markers should lead to different results: given the difficulty of this operation, an instruction would help to mark the invalidation, which could not be easily detected when two contrary contents ─in semantic terms─ are contiguous ─4 and 5─.

Temporal hypotheses are better understood by considering the type of eye-movements produced. Movements should not constitute the only data presented in a research ─given that the eye-mind assumption is strongly based on the duration of reading processes─, but they are quite useful to address temporal measures because the latter are derived from the former: high second-pass reading time values result from a big number of fixations and regressions which, in turn, reflect assimilation difficulties. To accept or refuse temporal hypotheses ocular movement data and the positions where they are produced ─i.e., the concrete parts of the read content(s)─ are thus needed. Such hypotheses are next formulated.

4.2.2. Movement hypotheses ─group 2─

Movement hypotheses are also influenced by the features of the function addressed; the structure of the read contents, their meaning and their contexts lead to different types of ocular movements:

- Paraphrase is based on a semantic-pragmatic equivalence between contents in which their meanings are considered simultaneously —to understand the first formulation it is necessary a second formulation, and this second formulation makes sense only with the former—[132]. This function can thus be represented as a backward-forward movement: the recipient relates the meaning of two heard contents presented as equivalent and moves through one and the other mentally —see Fig. 18—.

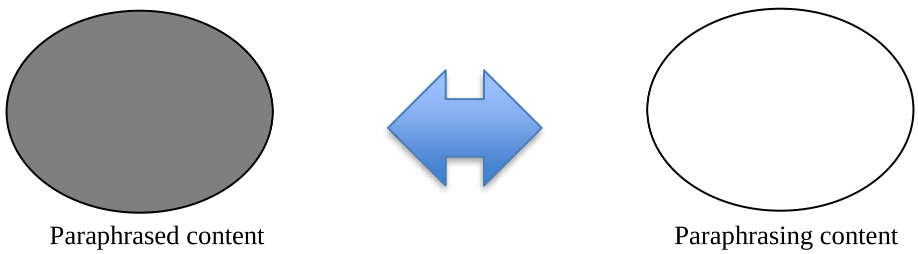


Fig. 18. Backward-forward movement behind paraphrases.

- Reformulation relies on a semantic-pragmatic distance between two formulations. Again, their meanings are considered simultaneously but, in this case, the second formulation is the only one valid to continuate the discourse. The relevant content is that introduced to express with more accuracy the communicative idea initially intended. After a backward movement, the attention is focused on what comes next —see Fig. 19—.

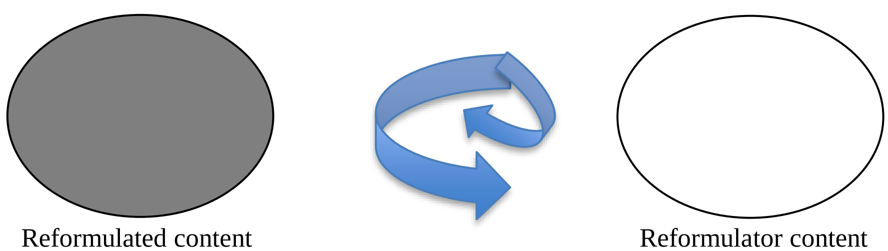


Fig. 19. Forward movement behind reformulations.

- Conclusion is linear since causes and consequences are placed at the same logical level. Arguments and conclusions should be thus linearly read —see Fig. 24—: this relationship is not about expressing some initial idea in a different way, but the

[132] This idea about paraphrase can be informally expressed as follows: "I can only well-understand the non-clear expression you said first by understanding the meaning of the second new formulation; since now, I will always define the first expression by using the second one".

result of combining actions within a set of contextual parameters. It can be represented as a bottleneck ─see Fig. 20─: different facts are related to express only one main information.

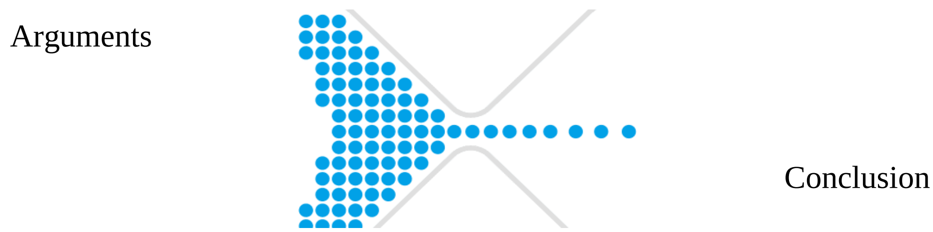


Fig. 20. Bottleneck behind conclusions.

- Correction is abrupt: this function does not only show differences between two formulations; rather, it involves a total interruption of the discourse plan so as to the adequate expression. It is not a matter of subtle differences ─reformulation─ or clarifications ─paraphrase─: correction excludes meanings. This function is also a backward-forward movement based, however, on several fixations ─see Fig. 21─.

Fig. 21. Invalidation behind correction. The little circle represents the invalidated content.

This said, the following four eye-movement hypotheses are suggested for the four functions analyzed:

6. Progressive and regressive fixations influence the establishment of paraphrases and reformulations with and without a discourse marker;
7. Several progressive fixations are expected for conclusions with and without a discourse marker because of the informativity of this function; progressive fixations represent forward readings;

8. Progressive and regressive fixations are relevant in establishing corrections with and without a discourse marker.
9. The presence or absence of a discourse marker changes the eye-movements retrieved.

Such hypotheses are tested by two methods: a qualitative analysis of fixation count and regressions ─e.g., 50 fixation counts distributed into 15 fixations and 35 regressions in corrections─ and a quantitative one based on decision trees testing the predictability of such movements behind the experimental results obtained (see §4.4. and §5.1.2.). Different results are expected for each function:

- Paraphrase should be based on progressive and regressive fixations given that equivalence. Regressions into and out of an AOI are expected to be similar. Progressive and regressive fixations will be thus determinant.

- Reformulation is expected to be based on progressive and regressive fixations, but the influence of progressive fixations should be bigger. Regressions into an AOI should focus on the new formulation. Progressive fixations and regressions into an AOI will be determinant.

- Conclusion should show an equilibrated pattern of eye-movements: fixations are expected to be distributed among the arguments and the conclusion; the conclusion perhaps would be more fixated (including regressions into an AOI). Progressive fixations will be also determinant.

- Correction is expected to be the more irregular function: fixations and regressions should be produced randomly ─with a high number for each one─. Progressive and regressive fixations will be determinant in a high-degree of significance. The same will be true for regressions into and out of an AOI.

Both groups of hypotheses are triangulated to (i) complement the information they provide and (ii) improve the whole explanation in the analysis: eye-movements cannot be understood without their global duration, and reading duration needs to be completed with the type of ocular movements triggering shorter or faster reads. Eye-movements hypotheses will be tested with regression decision trees (see §4.5.2.), while temporal hypotheses will require mixed linear regression models (see §4.5.3.). The first statistical model allows to predict which (groups of) data are the most determinant concerning the dependent and independent variables tested ─i.e., the relationship between the number and type of ocular movements and the reading times retrieved─; the second model proves the similarities or differences between groups of data so as to determine degrees of variance between the functions and conditions addressed ─i.e., the relationship between the different reading times obtained (in ms.) and the different parts of the critical sentences per function analyzed (see §4.3.2.).

4.2.3. Experimental variables

Step 2. Selection of variables

Temporal and eye-movement hypotheses require a set of variables to be tested. These variables are classified into two main types: independent ─the functions─ and dependent ─eye-movements and reading stages─. Dependent variables ─first pass, second pass, total reading time; fixations and regressions─ are the real measures obtained during the reading experiments; their analysis contributes to define the limits of the independent variables ─paraphrase, reformulation, conclusion and correction─.

Step 3. Read contents employed

Another important part of the experiment is the structure of the read contents; participants read sentences expressing paraphrase, reformulation, conclusion and correction under two basic conditions: (1) presence of reformulation marker and (2) absence of reformulation marker ─in this case, *o sea*─. Furthermore, these sentences are divided into different informative parts ─also called *Areas of Interest* (AOI)─: Ä ─complete sentence─; Ä-K ─all the sentence minus the discourse marker─; M1 ─segment 1─; M2 ─segment 2─; K ─the reformulation marker─. Reading information is retrieved from each AOI for each condition and function. These AOI have been selected due to the characteristics of the functions addressed ─see Table 14 for an overview of dependent and independent variables, conditions and AOI─:

- All four functions consist, on the one hand, of a first formulation or a set of arguments (operationalized as M1) and, on the other hand, a new formulation or conclusion (operationalized as M2).

- The whole sentence (Ä and Ä-K) represents a balance for each function. ─see their summary in Table 12─ determine the experimental design detailed in the following section.

- The discourse marker (K) can be employed in the four functions; that is why it needs a specific description.

	CONDITION: WITH OS TRT					CONDITION: WITH OS FPRT					CONDITION: WITH OS SPRT				
	Ä	Ä-K	M1	K	M2	Ä	Ä-K	M1	K	M2	Ä	Ä-K	M1	K	M2
Paraphrase															
Reformulatio															
Conclusion															
Correction															
	CONDITION: Ø OS TRT					CONDITION: Ø OS FPRT					CONDITION: Ø OS SPRT				
	Ä.	Ä-K	M1	K	M2	Ä	Ä-K	M1	K	M2	Ä	Ä-K	M1	K	M2
Paraphrase															
Reformulatio															
Conclusion															
Correction															

Table 14. Dependent, independent variables, and conditions.

Once hypotheses, variables, and condition are clear, the eye-tracking experimental design for this thesis can be proposed.

4.3. Data compilation: experimental design

Eye-tracking experimental designs are different depending on the research tradition followed: for example, studies on visual search or scene perception focus on how eyes react to distractors or how different factors affect the direction of the gaze in the experiments (see Treisman & Gelade 1980; Watson, Brennan, Kingstone & Enns 2010 for visual search, and Underwood 1998; Rayner *et al.* 2009 for scene perception). In such cases, targets are manipulated, and their spatial distribution and size are altered; luminescence, color, or contrast in monitors are also modified so as to obtain different results: all these factors determine the experiments and their results. Reading research differs a bit: this experimental branch addresses the relationship between text comprehension and lexical-syntactic factors on reading behavior. It requires thus presenting texts with a "clear design structure in order to pinpoint the exact mechanisms of oculomotor control during reading" (Holmqvist et al. 2011: 68-69). Parameters such as genre, education level, discourse structure, word frequency, word length or number of morphemes must be controlled in a reading experiment to avoid wrong results (Holmqvist et al. 2011: 68-69). Our study fits into the latter type of experimental design.

An adequate design of experiments is essential; if this is not the case, the results obtained can be descriptively and statistically false. The following are some factors favoring such bad design (see Coolican 1996; Duchowski 2007):

- The employment of poor designed materials ─images, contexts, texts and sentences, or non-formulated instructions─;
- The lack of correspondence between hypotheses, theory and the materials employed to test them;
- The absence of justification of the methodological steps followed or the hypotheses suggested ─e.g. the number of participants and experimental repetitions needed, the distribution of the contents to be read by participants, and so on─;
- Bad places ─labs, rooms─ with non-adequate conditions ─low illumination, noises disturbing participants, visual distractions, and so on─ to execute the experiments.

Such factors ─among others─ slow the data compilation down: if the room where the experiments are executed is badly illuminated, readers have problems to fixate their gaze on the contents; if the sentences employed contain complex words or present an uncommon syntactic structure, they also need more time to completely read such contents; if the number of participants for the experiment(s) is not enough, final results cannot be generalized. As a result, new descriptive problems related to the object of study addressed could appear: experimental data wrong conducted could confirm hypotheses which should be refused or refuse veridic hypotheses relating theory and cognition. Due to this, the issues suggested in previous chapters (see §2.3.2 and §2.3.3.) would neither be solved.

To avoid these problems, the experimental design proposed in the following sub-sections (§4.3.1. to §4.3.3.) considers the novelty of the object of study and the general technical requirements involved in any eye-tracking work. An eye-tracking reading study focused on reformulation and neighboring categories requires an exhaustive experimental design because this function has not been addressed in this field before: reformulation experiments should thus share some basic features with previous eye-tracking experiments applied to other discursive or grammatical functions ─previous experimental conditions, selection of participants, type of variables, the creation of contexts, hardware or apparatus selected (Rayner 1978, 1997, 1998)─, but they should also show some differences regarding them ─the hypotheses suggested (see §4.2.), the critical and filler items designed, the syntactical structure of the sentences, or the words selected, among others─. To do so, the contexts, texts and utterances[133] employed must thus be accurately created ─in terms of linguistic design[134]─, and the external features must be previously established: on the one hand, words fitting the recommended length, common syntactic structures, non-complex words or accessible contexts should be employed; on the other, the number of participants, their

[133] Reading eye-tracking experiments focusing on small textual excerpts or sentences need some specific designing skills different from those required for other eye-tracking experiments ─newspapers or bigger texts (Holsanova & Holmqvist 2006; Holmqvist & Wartenberg 2005; Mason, Pluchino, Tornatora & Ariasi 2013), internet (Josephson 2004; Huang & Kuo 2011), visual word paradigm (Magnuson, Tanenhaus, Aslin & Dahan 1999; Huettig & Altmann 2005), language acquisition or children (Traxler, Morris & Seely 2002), complex scene viewing (Henderson, Weeks & Hollingworth 1999)─.

[134] Given that the functions addressed are discursive-grammatical, they should be experimentally analyzed by focusing on syntactic, semantic and pragmatic features retrieved from designed texts: oculomotor control allows to retrieve such linguistic features from different specific zones in the utterances or texts designed with the experimental parameters previously selected by the researcher (see again §3.2.2. and §3.2.3.). Fixations, saccades, regressions, or first-pass, second-pass and total reading time are linguistically interpreted: fixations correspond to direct information retrieving, and this information is morpho-syntactic or semantic depending on the moment of the reading process; regressions reflect assimilation difficulties sometimes related to the semantic meaning of the contents read or the type of linguistic function behind such contents; first-pass tends to be associated with syntactic and even lexical disambiguation; second-pass is more pragmatic-discursive.

education level and age, or the environmental conditions should also be adequately selected and justified.

First of all, an experiment needs some basic information to be clarified (§4.3.1.): the number of participants determines the amount of utterances required to execute the reading experiment which. Participants, in turn, depend on the variables selected to be experimentally tested (see §4.2.3.): studying only one function involves less participants than studying four functions. Once such parameters established, the design of the linguistic content of the experiment starts: contexts (§4.3.2.) also should follow some instructions to be created ─the type of words included, the extension, pictures, and so on─; critical sentences (§4.3.3.) must consider all that has been said above.

4.3.1. Basic experimental conditions

Before designing contexts and utterances to be read by participants, some experimental considerations should be established (see Rayner 1998; Holmqvist *et al.* 2011; Keating & Jegerski 2015 for further general details on this issue). These considerations are commonly accepted in the research field of eye-tracking: any seminal reference relating oculomotor control and reading processes justifies the selection and number of participants required, the conditions analyzed, the amount of utterances and words included, or some technical skills ─screen-size, illumination, characters-size, and so on─ (see Just, Carpenter & Wolley 1982: 230; Rayner & Duffy 1986: 193-194; Altmann, Garnham & Dennis 1992: 688-690; Henderson & Hollingworth 1998: 284; Chaffin, Morris & Seely 2001: 226; Kaakinen & Hÿona 2007: 1325; Baldauf & Deubel 2008: 418; Ashby, Yang, Evans & Rayner 2012: 635, only to name but a few).

Step 4. Number of participants

A standard eye-tracking reading experiment is made with, at least, 20 participants (Loureda *et al.* 2013), but this number can change: some pilot studies offer results retrieved from 10 or 12 participants (Rayner 1977: 444-445), and others employ 30 or even more (see Zufferey *et al.* 2016: 394 with 87 participants subdivided into Dutch and advanced French-speaking learners and native English speakers). Such variation in the number of participants results from the different research objectives in each reading study: contrastive studies need several participants to test and compare two or various languages; studies focusing on various linguistic items also need several participants to obtain a representative population sample within a language (see Zufferey, Mak, Verbrugge & Sanders 2017: 22 for French *car* and *parce*). The amount of trial utterances or conditions to be tested also determine how many readers participate in an experiment[135]: for example, experiments testing two conditions ─e.g. adverb-verb congruence English-Romanian learners of Spanish (Nagarra & Ellis 2013), or longer and shorter target words assimilated by 2nd grade German speaking children (Tiffin-Richards & Schroeder 2015)─ could present a big number of participants due to other sub-conditions ─120 English and Romanian learners of Spanish, and 98 English, Romanian and Spanish monolinguals for the former case; 103 children and 24 adults for a basic data triangulation─. Other experiments addressing more conditions ─e.g. fifteen conditions fifteen times replied with fifteen themes to study focus particles under different positions and scopes in Spanish (Nadal, Cruz, Recio & Loureda 2017: 77; Cruz Rubio in preparation)─ could, however, lead to a redistribution of participants to obtain a homogeneous sample ─20 participants for each sub-experiment; 20x15= 225─. Both options are valid.

Step 5. Distribution of participants and sentence-replications (themes)

That said, given that this thesis addresses four functions ─paraphrase, reformulation, conclusion, and correction─ produced in two possible scenarios (conditions) ─in sentences with and without discourse markers─ without further sub-conditions ─e.g. different positions or scopes─, the following distribution of participants is the most adequate:

Function addressed	Th.1	Th.2	Total
Paraphrase (Exp. 1)	20	20	40

[135] Again, this is different for eye-tracking reading studies focusing on wider texts: a good example of well-designed experiment justifying all decisions adopted can be found in Godfroid, Ahn, Choi, Ballard, Cui, Johnston, Lee, Sarkar & Yoon (2017). They analyze how participants acquire new vocabulary during reading novels. To do so, participants read five chapters of an authentic English novel with foreign words in Farsi-Dari. A total of 54 participants, subdivided into native speakers (19) and non-native speakers (35), is employed. Native speakers were enrolled in language teaching courses and students at a large Midwestern university in US; non-native speakers came from a variety of language groundworks excluding L1 Dari, Farsi and cognates (Arabic, Hindi and Urdu) (2017: 10). Five chapters comprise a total of 9000 words approx.

Reformulation (Exp. 2)	20	20	40
Conclusion (Exp. 3)	20	20	40
Correction (Exp. 4)	20	20	40

Table 15. Participants distribution in the experiment. Th.1 and Th.2 correspond to each theme (replication) of the experiment.

Table 15 offers different key experimental information: four micro-experiments for each function have been created. That allows to obtain four different cognitive experimental patterns explaining how such functions work and how readers assimilate them; these cognitive patterns also consider the presence and absence of reformulation markers (in this case, *o sea*) in establishing syntactic, semantic and pragmatic relationships between the contents involved to measure their importance in each function (see §2.3.2 and §2.3.3. for further details on the importance of reformulation markers in reformulation and neighboring categories). These four micro-experiments require 20 persons to be tested; however, since each function is analyzed under two main conditions ─presence and absence of reformulation marker (see §4.2.3.)─, the experiments should be replied.

Step 6. Randomization

Experimental replications are produced to cover the principle behind the so-called Latin Square experimental designs (Wiener 1962): according to this principle, an experiment should be executed so many times as experimental conditions are tested. Latin Square designs prevent participants from reading the same content twice and, more importantly, from noticing the functions or discourse markers addressed: to do so, the target contents are randomized ─in this case, the critical sentences; see Fig. 22─. For that reason, this thesis reduplicates the four experiments: to do so, 8 contexts ─instead of 4─ and 16 critical utterances ─instead of 8─ are designed (§4.3.2. and §4.3.3.).

1	A	B	C	D	E
2	B	C	D	E	A
3	C	D	E	A	B
4	D	E	A	B	C
5	E	A	B	C	D

Fig. 22. Randomization of target contents in Latin Square designs. Adapted from Gao (2005).People making the experiment 1 will read different contents than those reading the experiment 2, and so on.

As a result, a total of 40 participants ─instead of 20─ read each experiment ─paraphrase, reformulation, conclusion and correction with and without *o sea*─: this number of participants is adequate because it exceeds the minimum number of subjects required to cover the Central Limit Theorem (CLT). This theorem argues that a non-normal population can be experimentally and statistically accepted if it contains a big sample ─composed by 30 or more subjects─: that guarantees a normal distribution for the data (Rustom 2012: 131)[136]. All four experiments fit the CLT: 40 x 4= 160.

Step 7. Selection of participants (features)

Such 160 participants must present a series of sociolinguistic features. Their education level is high: all participants are students in the Faculty of Philology, Translation and Communication ─University of Valencia─. This faculty encompasses various humanistic degrees ─Spanish, English, German, Modern Languages, Latin and Greek, Journalism, Translation and Interpretation, or Audiovisual Studies─ where students are constantly reading in different subjects: they are thus accustomed to work with various types of texts and, consequently, their reading speed is expected to be the adequate. All participants are Spanish native speakers comprising ages between 18 to 40 years old: people under or upper this range of age are not expected to make reading experiments with the same accuracy. Young readers produce further saccades and regressions; youngest children "have difficulty maintaining their gaze" (Tajik-Parvinichi, Lillakas, Irving & Steinbach 2003: 82). Older adults present eye-movement mechanisms different from those presented by young adults (Pratt et al. 1994: 325).

Step 8. Environmental experimental conditions

Last but not least, some environmental decisions should usually be taken before focusing on designing the linguistic contents of the experiment. Depending on the type of study conducted, experimental places are different: when pictures or landscapes are analyzed, head-mounted systems are very useful since they facilitate outdoor experiments ─e.g.

---

[136] According to the CLT, a big population sample facilitates obtaining a mean, median, or proportional distribution highly similar to a normal distribution. Alvarado states that: la media de tales parámetros (valor esperado) precisamente coincide con el valor del parámetro a estimar (…) Se pueden obtener distribuciones aproximadas de otras distribuciones como la binomial, Poisson, Chi cuadrado, etc. (Alvarado 2007: 13).

marketing studies in supermarkets, surfing internet research, and so on─. Oculomotor reading control studies, however, require attention and a high concentration: it would be impossible to obtain reading data with good quality if participants are exposed to noises and distractions. The most common scenario for such experiments is a closed place ─e.g. little rooms, classrooms with several tracking systems, or laboratories─: isolated rooms are not as natural as open spaces, but they guarantee that hidden variables do not affect final results (Duchowski 2007: 42). Data for this research was recorded in a reserved room in the University of Valencia functioning as a lab: this recording room was not a classroom where people could enter and leave freely; only researchers and people interested in participating in the experiments were allowed to be there. This lab was completely isolated: there were no further classrooms near the lab and thus participants did not get disturbed with noises; there were neither windows allowing natural sunlight entering and affecting participants during reading (Holmqvist et al. 2011).

To sum up, 160 readers were required for these four micro-experiments, executed in an isolated room in the same university from which participants came. The selection of such participants was filtered: only people with high-level education and age comprised between 18-40 years was accepted to do it. This number of participants results from the total critical items analyzed in this thesis: four functions ─paraphrase, reformulation, conclusion, correction─ under two main conditions ─presence/absence of reformulation marker─ involve 80 participants. Both participants and utterances for each function are duplicated according to the Latin Square design recommended in any eye-tracking research: its application avoids problems for the results and the detection of the object(s) of study addressed.

Step 9. Materials design: software

Once such previous indications completed, the experimental design begins. The four micro-experiments have been made with the software SMI Experiment Center™ (version 3.0.): this software is a powerful platform to record and analyze eye-tracking data[137]. It is

[137] This information has been retrieved from the Experiment Center Manual ─version 3.0.─ (SensoMotoric Instruments, June 2011).

complemented by SMI iView™ X for gaze tracking data acquisition and SMI BeGaze™ for gaze tracking data analysis. SMI Experiment Center™ is powerful because pictures, texts, video, full length web sites, or interactive programs can be inserted and displayed to each subject step by step; calibration and validation on demand are also possible; and, most importantly, it has a randomization function to present groups of stimuli in a non-determined order during the experiment.

Step 10. Experimental instructions

The experiment is thus designed entirely with the SMI Experiment Center™: before creating the contexts and utterances, some instructions to be used in the experiments are also designed. These instructions are structured into various slides indicating participants how to behave before, during and after reading:

- First the system welcomes the participant and explains him/her that a series of contents projected in the screen are going to be read.
- After that, a second slide explains what calibration is and how participants must seat in front of the monitor so as to obtain an accurate tracking of their gaze ─the adequate distance, their body position, and so on─. Calibration in the SMI RED 250 eye-tracker is simple: readers must look the red point within the little white ball. Such ball moves along the screen towards different directions and it must be followed with the eyes ─see Fig. 22─. Eyes must fixate the red point with accuracy. Calibration provides a set of coordinates based on X and Y axis. The maximum amount allowed is 0,7º. Bigger calibrations must be repeated: this last information can be explained by the researcher or also included in the slides.
- Another slide recommends participants to read contents slowly: several students think that such reading experiments are a kind of exam or that they should prove their ocular speed. This problem must be prevented to avoid bad results and outliers ─fast or slow readers; see §4.5.─.
- Finally, another important instruction is that of fix-crosses: fix-crosses are placed between critical items. Participants must look at them and do not push any button to see the next slide; then the system detects the eyes and projects the new content

automatically. This task confirms if participants are putting their attention into the experiment and allows the eye-tracker to keep participants' eyes calibrated and recorded.

- A last slide says goodbye to the participants so as to let them know that the experiment has finished.

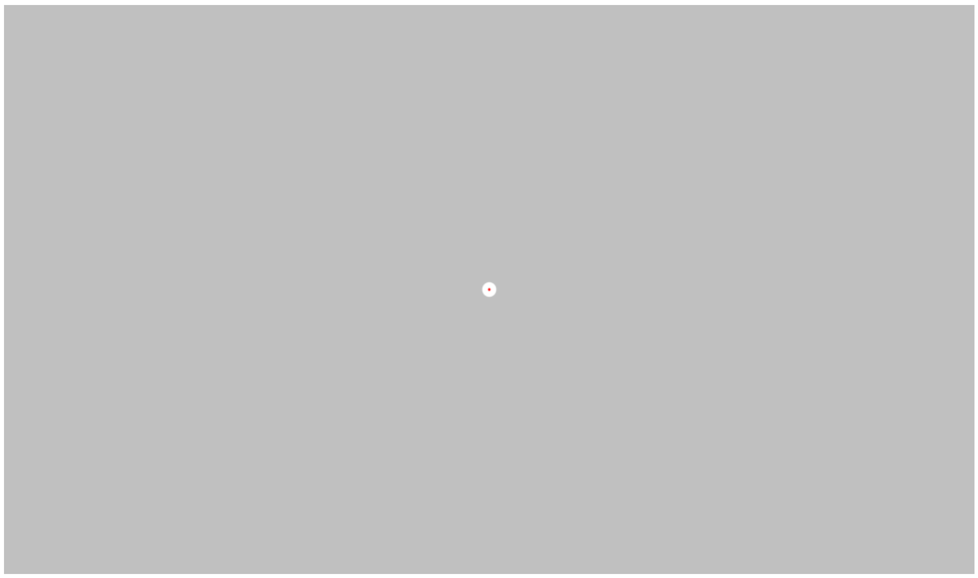


Fig. 23. Calibration point in the SMI Experiment Center™.

After designing such basic instructions, contexts are created (§4.3.2.). Contexts also require accuracy; three main restrictions are applied to all oculomotor control eye-tracking experiments: their extension is not random, adequate pictures must be included, and any linguistic critical information experimentally tested can be shown there.

4.3.2. Designing contexts

Step 11. Contexts

Benefits of well-designed contexts in eye-tracking studies are commonly assumed in different branches of this field ─see for instance Huck (2016) on the influence of frequency and contexts in aphasia reading; or Zhang (2014) on contexts in marketing studies based on food images─. Their presence in oculomotor reading experiments is not casual: contexts contribute to the establishment of inferences on the critical sentences addressed and lead to faster identification of targets and support restrictive interpretations of contents (Aparicio &

Xiang 2013: 413); they provide, in sum, word decoding cues (Huestegge, Radach, Corbic & Huestegge 2009: 2957). As Huestegge and Bocianski note (2010):

> Prolonged fixation durations were also demonstrated for words that are unpredictable, semantically implausible, or violate semantic expectances (e.g. Balota, Pollatsek & Rayner 1985; Ehrlich & Rayner 1981; Morris 1994; Rayner, Warren, Juhasz & Liversedge 2004). Even though in these examples the preceding context outside the current perceptual span may play a crucial role (…). (Huestegge & Bocianski 2010: 79).

It is thus useful to introduce some information related to the critical contents to reduce the extension of the sentences and thus extra-processing costs (Rayner & Raney 1996) (see §3.2.2. for further factors affecting the processing). Ambiguous referents, long structures and complex words can also be introduced in contexts in order to avoid their presence in the critical sentences (Wittek, Hsang Liu, Darányi, Gedeon & Soo Lim 2016). For example, the following critical sentence in an experiment:

> Sandra and Jaime drink specialty coffee; that is, the expensive one.

Should be complemented by further previous contextual information. If readers know who Sandra and Jaime are, their hobbies and their standard of living, reading that sentence will not be processed with difficulties ─or, at least, possible difficulties will be due to the intrinsic nature of the contents read─:

> Sandra and Jaime are two roommates living in Madrid. They love to go to the coolest places in the city. Every Friday they meet other friends in a hipster bar to talk about new films and other cultural staff.

Such a context helps to understand that both Sandra and Jaime are hipsters and that thus it is expected for them to drink that. It is also assumed that specialty coffee is more expensive than normal coffees in a common traditional bar. All this information constrains and complements the interpretation of the critical content and, consequently, facilitates its assimilation (Keating & Jegerski 2015).

The four functions addressed in this thesis could trigger extra processing efforts during their reading: paraphrase, reformulation and correction are discursive relationships introducing equivalence, invalidation, or plan changes; conclusions link various contents to another one condensing them semantically or pragmatically (see §2.3.3. and §6.2. for a theoretical-experimental definition of such functions). All these processes are thus more complex than coordination (α + β + …) or disjunctions (α or β), based on additions of information or choices between two options. For that reason, it is better to assure their assimilation with contexts clarifying part of the meaning of the critical read contents and enclosing their interpretation. However, it is recommended not to include explicit information presented later in the critical sentences read by participants: if concrete verbs, adverbs or discourse markers are studied, they should not appear in the previous context or their final interpretation will be determined ─if readers see some content repeated times, they will memorize it or, at least, will notice it is the target item─.

As the four micro-experiments must be duplicated (see §4.3.1.), each function analyzed presents two different contexts ─one for the Theme 1 and one for the Theme 2─. A total of 8 contexts is designed according to a set of visual characteristics encompassing font, color, size and paragraph spacing. Each context includes a descriptive picture to better construct the communicative situation (see §4.3.3.). Table 16 shows all 8 contexts:

Paraphrase	Estefanía y Miguel son profesores de la universidad. Son especialistas en flora. En clase han estudiado flores autóctonas y ahora quieren estudiar flores exóticas.	Lorenzo y Alejandro son fontaneros. Arreglan cañerías, canalones, grifos, retretes o bañeras.
Reformulation	Emilio y Javier son hermanos. Normalmente, nunca están enfermos. Hoy se han levantado con dolores de barriga.	Sonia y Mónica estudian medicina. Siempre preparan con antelación los exámenes de semestre. Las dos quieren sacar buenas notas.
Conclusion	Antonio y Juan están preparando los exámenes de fin de carrera. Normalmente estudian en la biblioteca. Sus compañeros se extrañaron porque	Marina y Jaime son empresarios. Esta semana se celebra un congreso para emprendedores. Normalmente todos practican su exposición un día antes de

	ayer no los vieron durante todo el día. El primer examen es mañana.	presentarla. Sus socios se extrañaron porque ayer no estuvieron en el ensayo.
Correction	Mar y Rafael son un matrimonio asturiano. Para la cena familiar de navidad quieren preparar pescado con salsa de vino. Seguirán la receta tradicional para elaborar la salsa.	Adrián y Elena son dos estudiantes de doctorado en la universidad. Durante los últimos meses han estado muy estresados con el trabajo y la investigación. Para desconectar un poco, anoche salieron a cenar fuera de casa.

Table 16. Contexts employed in each function and theme.

Contexts are written in Calibri 72, white color in a grey background, and 28 Calibri points of paragraph spacing: this text size helps participants to visualize contents at 70 cm. of distance from the screen. They share the same structure ─or, at least, as similar as possible─: two persons are described by addressing their origin, job, interests or current situation. The people described are protagonists in the critical sentences participants read in the experiment (see §4.3.3.): their presence in contexts disambiguate referents and avoids several difficulties during the first reading milliseconds[138]. The linguistic functions addressed in the critical sentences are expressed by examples based on these contextual stories: for instance, paraphrase is established by linking two contents related to exotic flowers or plumbing; correction is shown with some information about cooking receipts or dinner places ─see Table 13─. All the stories narrated are written in present tense, what facilitates their interpretation. The meaning of each context will be better understood with its corresponding critical sentence(s).

4.3.3. Designing sentences

Step 12. Sentences

[138] Readers need time to read texts with fluency at the beginning of the process; in other words, first words in sentences or texts may retrieve extra-processing time. That is why contexts clarify who are the people described in the critical sentences: it could reduce such extra-costs. All critical sentences show this structure ─S+V+Obj─ because it is preferred to spend more time in starting the read than in M1 and M2 (see §4.3.3.).

The set of sentences combined with such contexts are called critical items ─or critical sentences (Rayner 1989)─. They are critical because they encompass the major procedural information expected in oculomotor control eye-tracking experiments. Their correct design, thus, is crucial: the structure of critical sentences is highly controlled and accurately planned; they show several linguistic constraints. A total of 16 critical items have been designed for this thesis: 4 critical sentences with reformulation marker *o sea* ─condition 1─ and 4 critical sentences without reformulation marker ─condition 2─. Such 8 critical sentences are distributed among the 4 micro-experiments based on the four functions analyzed. Since these micro-experiments must be duplicated, each critical item must also be designed twice ─8 x 2 = 16─. Table 15 shows this distribution of critical sentences:

Function	Theme 1 + contexts	Theme 2 + contexts
Paraphrase	Sentence 1 with *o sea*	Sentence 1 with *o sea*
	Sentence 2 without *o sea*	Sentence 2 without *o sea*
Reformulation	Sentence 1 with *o sea*	Sentence 1 with *o sea*
	Sentence 2 without *o sea*	Sentence 2 without *o sea*
Conclusion	Sentence 1 with *o sea*	Sentence 1 with *o sea*
	Sentence 2 without *o sea*	Sentence 2 without *o sea*
Correction	Sentence 1 with *o sea*	Sentence 1 with *o sea*
	Sentence 2 without *o sea*	Sentence 2 without *o sea*

Table 17. Creation of critical sentences. Themes 1 and 2.

As stated in §4.3.1., the critical sentences and their corresponding contexts are redistributed according to a Latin Square design. Contexts and sentences from each theme are mixed ─that is why themes are created─ and, therefore, participants do not read the same sentences or contexts twice. Table 18 shows this:

Paraphrase [40 participants]		
1	A [Theme 1 with *o sea*]	B [Theme 2 without *o sea*]
2	B [Theme 2 with *o sea*]	A [Theme 1 without *o sea*]

Table 18. Randomization of critical sentences. Themes 1 and 2 mixed.

This randomization is applied to the following 16 critical sentences designed for the four micro-experiments ─thus 4 critical sentences per experiment─:

Paraphrase	1.Estefanía y Miguel quieren una rosa rugosa; o sea, japonesa. Los dos viajan a Tokio el próximo mes para conseguirla.	3.Lorenzo y Alejandro reparan sumideros; o sea, desagües. Están acostumbrados a soportar malos olores.
	2.Estefanía y Miguel quieren una rosa rugosa; japonesa. Los dos viajan a Tokio el próximo mes para conseguirla.	4.Lorenzo y Alejandro reparan sumideros; desagües. Están acostumbrados a soportar malos olores.
Reformulation	5.Emilio y Javier están enfermos; o sea, indispuestos. No es tan grave como parece.	7.Sonia y Mónica están angustiadas; o sea, nerviosas. Pronto sabrán la nota de sus exámenes.
	6.Emilio y Javier están enfermos; indispuestos. No es tan grave como parece.	8.Sonia y Mónica están angustiadas; nerviosas. Pronto sabrán la nota de sus exámenes.
Conclusion	9.Antonio y Juan tomaron unas cervezas y vieron una película; o sea, estudiaron poco para el examen. Ahora están nerviosos.	11.Marina y Jaime comieron unas pizzas y vieron una serie; o sea, practicaron poco su exposición. Ahora están nerviosos.
	10.Antonio y Juan tomaron unas cervezas y vieron una película; estudiaron poco para el examen. Ahora están nerviosos	12.Marina y Jaime comieron unas pizzas y vieron una serie; practicaron poco su exposición. Ahora están nerviosos.
Correction	13.Mar y Rafael añaden vino tinto; o sea blanco. De este modo la salsa queda más sabrosa.	15.Adrián y Elena cenaron en un restaurante italiano; o sea, mexicano. La comida estaba picante.
	14.Mar y Rafael añaden vino tinto; blanco. De este modo la salsa queda más sabrosa.	16.Adrián y Elena cenaron en un restaurante italiano; mexicano. La comida estaba picante.

Table 19. Critical sentences per function. Themes 1 and 2 mixed.

Such 16 critical sentences fit the linguistic features described for each (see §4.2.1. and §4.2.2.):

- Sentences (1) to (4) are paraphrases based on a relationship of equivalence between a complex expression ─M1─ and an easier term ─M2─; such paraphrases are usually produced in technical discourses (Cuenca & Bach 2007). In (1) and (2), the M1 shows a compound name, *rosa rugosa*: an oriental flower with rough leaves and thorny stem. This rose is typical from Japan; that is why it is reformulated as *japonesa*. The M2 only includes *japonesa* and not *rosa*: *rosa* has been deleted because this word is in the preceding M1 and its repetition in the same sentence could lead to unnecessary processing costs since the sentence could be understood as a literal lexical repetition (Gülich & Kotschi 1983). In (3) and (4) a clarification between the technical term sumidero and the less technical term desagüe is established: in this case, the meaning of the M2 is more accessible than the meanings shown by *rosa rugosa* and *japonesa*. That allows to explain two different degrees of paraphrase: hard and simple.
- Sentences (5) to (8) are reformulations based on a distance between an inaccurate content ─M1─ and a new precise content after introduced ─M2─. In (5) and (6), *enfermos* and *indispuestos* show semantic differences which, in turn, involve a discursive distance; the same is true for (7) and (8) with *angustiadas* and *nerviosas*. The design of these critical sentences follows the definition of non-paraphrastic reformulation proposed by Roulet (1987) and further subsequent works: the M2 introduced does not invalidate completely the previous M1; rather, it presents a new content expressing better the speaker's communicative aim ─the post-phrase works better with the M2 than with the M1─. In this case, *indispuestos* and *nerviosas* fit better their corresponding contexts than *enfermos* and *angustiadas*, which are semantically and pragmatically stronger.
- Sentences (9) to (12) show a different design pattern: they are conclusions, and their structure is longer than that of the other critical sentences because they do not express clarifications neither discourse reorientations. They show the union of different arguments ─premises─ leading to a concrete consequence pragmatically derived ─conclusion─: in (9) and (10) it is accepted that *tomar unas cervezas* ─drink some beers─ and *ver una película* ─watching a movie─ result in estudiar

poco para su examen ─have not studied the exam─. (11) and (12) function in the same vein: to spend time eating pizza and watching a soap opera are actions which do not allow students practicing their communication ─*comieron unas pizzas* y *vieron una serie*; *prepararon poco su exposición*─.

- Finally, sentences (13) to (16) are corrections based on a total invalidation of contents: the new M2 is absolutely contrary to the M1; using of one or another leads to a complete different interpretation. In (13) and (14), *vino tinto* is substituted by (vino) *blanco*, another kind of wine that will give different flavors and properties to the sauce; in (15) and (16) *restaurante italiano* is substituted by (*restaurante*) *mexicano*, a different place offering another type of food. It is generally assumed that white wine is used to cook fish dishes ─see the context in Table 13─ than red wine, frequently employed in meat dishes. Likewise, Mexican food is more spicy than Italian food. That is why the first option in M1 sounds stranger than the M2, which invalidates the former. After expressing these new contents in the critical sentences, participants forget what they read or listened before.

Step 13. Sentence design: main decisions

All these 16 critical sentences have followed some common designing features. They have a subject compound by two names ─e.g. *Marina y Jaime*─; a verb in present tense ─e.g. *estudian*─; a longer M1 ─e.g. *quieren una rosa rugosa*─; a shorter M2 ─e.g. *japonesa*─; a reformulation marker (or not) ─in this case, *o sea*─; and, finally, a post-phrase to close the sentence ─*viajan a Tokio el próximo mes para conseguirla*─. The inclusion of such structure and contents in the sentences depends on various theoretical and experimental factors:

- Subjects are long because participants usually present difficulties for reading the beginning of sentences (Rayner 1977): this is, in other words, like runners starting a race and obtaining speed progressively. Long subjects avoid such natural reading difficulties affecting the processing of the reformulation marker, the M1 or M2. All critical sentences use personal names instead of pronouns leading to further pragmatic disambiguation and, thus, more unnecessary processing costs.

- The use of present tense verbs is recommended because readers process them better than past or future tense verbs (Rayner & Duffy 1986: 192). Likewise, the verbs employed should convey clear semantic features to not confuse their meanings with other closer meanings since “lexical presuppositions are part of the definitions of the words, and they are stored as part of their mental representations (Cutler 1983). Accessing or integrating complex verbs might be expected to be more time consuming than easier forms (Rayner & Duffy: 192).

- The reformulation structure presents a longer reformulated segment ─so-called M1─ and a shorter reformulator segment ─so-called M2─ (see §2.3.2.); the M2 can be preceded by the reformulation marker *o sea*. Such extension of both segments has been applied to all the critical sentences: that avoids hidden variables such as length of words modifying the final results obtained. For example, if the M2 is longer, higher processing costs are expected during their assimilation and, consequently, such results could not be reliable. The critical words ─or targets─ must only depend on their semantic-pragmatic features and not on their structure or disposition.

- Semantically ambiguous words are also excluded: when a word covers different meanings the reader tends to access to all the meanings, despite the accuracy and concreteness of the context (Tanenhaus, Leiman & Seidenberg 1979). That is why polyfunctional words are not included ─except for the reformulation marker (see §2.2.).

- The M2 segment is separated from the rest of the utterance by a semicolon (;) in sentences with and without reformulation marker. Semicolons highlight orthographically and pragmatically a separation between discourse planes (Figueras 2001). Indefinite articles (un/una/unos/unas), pronouns (él, ella, me, te, se) and further referential marks are avoided because their disambiguation generates high processing costs (Cinkara & Cabaoglu 2015): their use ─only in concrete cases─ must be justified. If another alternative is possible, researchers should employ it.

- Finally, post-phrases are introduced to avoid the *wrap-up effect* of reading processes (Aaronson & Scarborough 1976; Just & Carpenter 1980; Rayner, Sereno, Morris, Schmauder & Clifton 1989): "readers tend to spend longer time reading sentence or clause-final words than sentence or clause-internal words. This phenomenon is referred to as sentence or clause wrap-up and has traditionally been thought to be due to integrative processing that occurs sentence or clause-finally, such as the processing involved in relating sentences or clauses" (Warren, White & Reichle 2009: 132). Without post-phrases readers unconsciously could spend more time in reading the M2 or even re-reading other target contents ─the reformulation marker─. Such re-readings would result from that wrap-up effect and, as a result, data could be skewed. In our experimental design, post-phrases are continuations of previous contents: the meaning of both the post-phrase and the M2 will thus always be compatible. The structure of the post-phrase is freer: it can introduce different verb tenses as well as more complex lexical items because their reading data will not be descriptively and statistically addressed.

Step 14. Critical and filler sentences

Such critical sentences must be combined with filler sentences: filler sentences avoid participants to detect linguistic the object of study addressed. The design of filler sentences is freer: they are not analyzed in the following chapters because the information they provide is not relevant. They should be introduced in a proportion 2:1 (Sanders & Spooren 2012; Loureda et al. 2013) ─or even in a bigger proportion─. This thesis employed critical sentences from other experiments as filler items: such experiments addressed other connectives (*Sp. Por tanto*; Narváez, in progress) or focus particles (*Sp. Hasta*; Torres Santos, in progress) with different semantic and pragmatic properties distracting participants during the experiment.

Once the instructions, contexts, critical and filler sentences are created and inserted in the system; the *SMI Experiment Center*™ organizes them and randomizes the sentences. Researchers must order the program to record only the critical sentences selected ─see Fig. 24─:

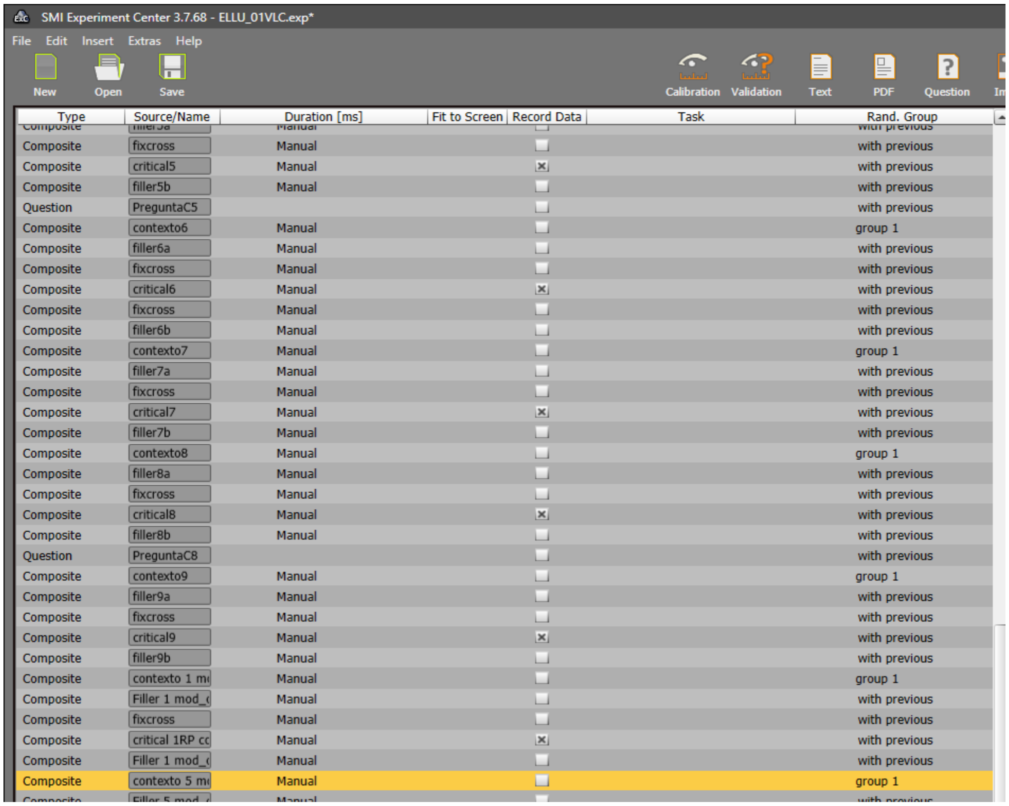


Fig. 24. SMI Experiment Center™. Randomization of sentences with the program.

After completing the experimental design, a few basic recommendations for the experiment must be operationalized: every experiment should be based on a protocol exhaustively prepared (§4.4.).

4.4. Experimental protocol

Step 15. Protocol design

As has been above-mentioned (see §4.3.1.), a total of 160 participants (Iberian Spanish naive speakers, between 18 and 40 years old) were required for these experiments. Participants were volunteer students from the University of Valencia ―in Valencia, Spain― that received the information about the experiments by email, informative flyers, wall-posters, and during classes in the faculty. All participants signed consent-agreements by which explicitly accepted that the data obtained from their readings could be employed for academic purposes. Signed consent-agreements also requested for some personal information: name and surnames, age, gender, mother tongue, other languages, professional career, doubts or issues regarding the experiment, and the date when experiments were run.

Each document was previously named under the label P_n, where n is the number of the participant (P01, P02, P03…) that identifies them. All the participants followed the same experimental protocol:

1) Before siting, participants listened an explanation about what an eye-tracker experiment is and what they must do in order to make the participants feel calm and comfortable. No linguistic explanations were previously made: participants did not know that they were going to read short reformulative texts with and without the *Sp.* discourse marker *o sea*. They only knew that a series of texts with images were going to be projected, that they must read silently these texts in a normal speed, and that it was not necessary to memorize the information provided.
2) Some technical skills about the eye-tracking system were also explained: where was the eye-tracking camera placed, how the ongoing reading procedure could be watched by the researchers through the auxiliary monitor, which were the approximate duration of the experiment, etc.
3) Participants sat in an adjustable chair. They were able to adjust the chair to sit adequately by maintaining the required distance to the laptop (about 70 cm.). Chin or forehead rests (Raney 2014) were not employed but participants were notified about keeping their heads still and the same position during the experiment to see their eyes in the auxiliary monitor all the time. The RED250 eye-tracker remote system (SMI) employed counts on a high-precision camera by which eyes are tracked even in longer distances than 70 cm. However, body or head movements could lead to a loss of data tracking, especially during the calibration procedure.
4) Once participants were sat, the RED250-camera detected their eyes. Through the visualization in the auxiliary monitor, researchers could see whether participants were maintaining an adequate position before starting the calibration. When the position is adequate, calibration started.
5) Participants received instructions about how eye-tracking calibration works. These instructions, projected in the screen, should be strictly followed to obtain a good degree of accuracy for the experiment.

6) After the calibration, participants saw some trial utterances in order to get familiarized with the experiment structure (size, font and color of the letters, length of utterances and paragraphs, images, contexts, etc.). Some last instructions were projected: participants could not press keyboard buttons to change to the next text; they were asked for look the *fixcross* and contents would change automatically. The *fixcross* guarantees that gaze movements are being tracked by the system all the time.

After receiving such instructions participants are able to start the real experiment. Once the experiments executed, participants could ask all about the reading procedure: which were the research aims, which were the items analyzed, etc. Offline devices (questionnaires) were not needed in our case.

Executing such four micro-experiments led to raw data. Before generalizing results, these raw data should be treated with statistical methods.

4.5. Statistical methods: Classical statistics vs. New statistics

4.5.1. Introduction: from raw data to statistical results

Step 16. Raw data treatment

Raw data are first-hand data gathered by the researcher himself (Oluwatosin 2017: 3) for a specific research goal (Hox and Boeije 2005: 593): in this research, raw data correspond to all the measures obtained from the 160 participants in the experiments once they read all the utterances under each function and condition (see §4.2.3. and §4.3.). These data are based on the reading times analyzed ─TRT, FPRT and SPRT[139]─ and the different eye-movements ─fixations, regressions and saccades─. The obtention and observation of such raw data are essential in this research (Lynn 2011: 154), but they first need to be filtered before their definitive analysis due to two reasons: on the one hand, it is impossible for the researchers to account for all the data one by one; that is why reducing the number of

[139] The raw data obtained are gathered in the Annex 2 of this thesis.

values addressed would be very useful[140]; on the other hand, comparisons between raw data are inadequate because they result from different experimental parameters. Statistics is a good tool to solve such problems ( ).

Given the nature of the object of study addressed (see §1.2., §4.2. and §4.3.), it is necessary to include statistical auxiliary inferential methods to manage the information provided by the data adequately (see §5.1.). The use of one or another statistical inferential method(s) depends on various factors (Liversedge, Gilchrist & Everling 2011: 998):

> Which statistical test to employ with eye movement data of these kinds depends on many different factors, including the nature of the dependent variable (and the assumptions that should be made about its underlying distribution), the experimental design, the theoretical hypotheses, the precedents for analyzing particular data in a particular way, and the limits of the individual researchers' (and their statistical advisors) knowledge (Liversedge, Gilchrist & Everling 2011: 998).

Considering all the variables and experimental conditions tested in this thesis (see §4.2.3.), multivariate statistical methods are the best option. As Echeverría notes (1982):

> En el campo de las Ciencias Humanas, difícilmente se puede explicar por qué los fenómenos se presentan de una determinada manera con el simple análisis de relación entre distribuciones bivariadas. Nuestras actuaciones se ven afectadas por muchas variables, lo que nos obliga a identificar y describir las interrelaciones entre aquellas que hipotéticamente explican un determinado proceder (…) Este es el motivo por el que las relaciones bivariadas (…) son solo un paso previo para trabajos más complejos, que se analizan mediante la técnica de análisis multivariante o multidimensional (Echeverría 1982: 149).

Multivariate statistics deals with analyses based on several interrelated variables to know to which extent they influence the results obtained. Multivariate methods can be applied by adopting two main approaches: classical or new. Classical approaches work with

[140] Individual analyses may become a vast and confusing task since the raw reading data obtained from the eye-tracking experiments encompass a total of 800 real reading time values in milliseconds from every participant, theme, condition, function, and reading time.

significance tests and p-values; new approaches employ different ways to test the validity of data ─for instance, the magnitude of effects (Cohen 1977), among others─. There exists a current polemic on how strong validations with classical and new approaches are (Bates, Mächler, Bolker & Walkr 2014: 34)[141]: on the one hand, significance tests based on p-values determine if the results addressed are arbitrary or not; however, p-values could lead to type I errors ─i.e. the null hypothesis is rejected whilst it is not false because the significance test is 0.059 and not 0.05─. Furthermore, if the experiment is repeated the results obtained could vary. On the other hand, statistical models without p-values can measure how big or small differences between groups of data are, but they could lead to type II errors ─i.e. the null hypothesis is not rejected despite being false─.

In order to test the applicability of these approaches ─with their advantages and disadvantages─, the results presented in chapter 5 adopt both of them: p-values will predict if (the type of) eye-movements determine the reading times obtained in the experiments; new approaches without p-value will measure how similar or different are the conditions analyzed by focusing on the duration of their readings. Both classical and new approaches validate or refuse the linguistic experimental hypotheses suggested (see §4.2.1. and 4.2.2.): the advantages of one method complement the disadvantages of the other, and vice versa. The two methods chosen are *decision regression trees* (classification model) and *mixed linear regression models*[142] (linear model). These methods share a common feature: they are regression models measuring relationships between dependent, independent and other hidden variables. Their use allows to test how ─and how much─ variables affect the final data outputs within a population ─or sample─ analyzed. The following subsections detail them (§4.5.2. and §4.5.3.).

---

[141] As the authors note, "one of the most controversial design decisions of lme4 (the mixed-models R-package) has been to omit the output of p values associated with sequential ANOVA decompositions of fixed effects. The absence of analytical results for null distributions of parameter estimates in complex situations (e.g., unbalanced or partially crossed designs) is a long-standing problem in mixed-model inference." (Bates, Mächler, Bolker & Walkr 2014: 34).

[142] Multivariate statistics include further methods besides classification and linear models: canonical correlation analysis, main components analysis, factorial analysis, canonical population analysis, multidimensional scales, analysis of correspondence, discriminating analysis, variance (ANOVA) and multivariate variance analysis (MANOVA), and so forth (see Cuadras 2008 for further details).

4.5.2. Decision regression trees

Decision trees ─also called classification trees─ (Crawford 1989; Esposito, Malerba & Semeraro 1997) are a predictive model which predicts categorical or continuous response variables (Breslow & Aha 1996). As defined by Tanghe (2016):

> Se trata de un análisis multivariante en el que se describe cierto comportamiento en el contexto de influencias múltiples. Es decir, el modelo examina la relación entre una variable dependiente (la variable objetivo) y otras variables predictoras. Estas relaciones se presentan en una estructura arbórea. (Tanghe 2016: 105).

Decision trees can be executed with SPSS and R software. In both cases, the visualization and interpretation is easy for readers (non)familiarized with statistics due to three reasons (Broodley 1995):

> Firstly, the methods find trees that generalize well to the unobserved instances, assuming that the instances are described in terms of features that are correlated with the target concept. Secondly, the methods are efficient, generally requiring a total amount of computation that is proportional to the number of observed training instances. Finally, the resulting decision tree provides a representation of the concept that humans find easy to interpret. (Broodley 1995: 1-2).

Dependent and independent variables are formalized into parts of the tree: nodes, leaves and branches. Nodes represent the strongest relationship with the dependent variable, and the independent variable placed at the highest part of the tree is considered as the most predictive one; branches show subdivisions within the tree. Last, several leaves are attached to such nodes: each leaf is assigned to one class representing the most appropriate target value (Rokach & Maimon 2014: 166; Tanghe 2016: 106).

In this research, decision trees will illustrate the relationship established between the reading times obtained and the eye-movements generated during the experiment for each function with and without reformulation marker. For example, a decision tree to test paraphrase with reformulation marker can address which are the more predictive eye-movements decisive for the obtention of various reading times in the experiment: the eye-movement placed in the nodes above is the most decisive. Branches relate the dependent variables (i.e., the eye-movements) ─see Fig. 25─. A total of 8 decision trees will be drawn ─4 with *o sea* and 4 without *o sea*─ (see the eye-movement hypotheses suggested in §4.2.1.).

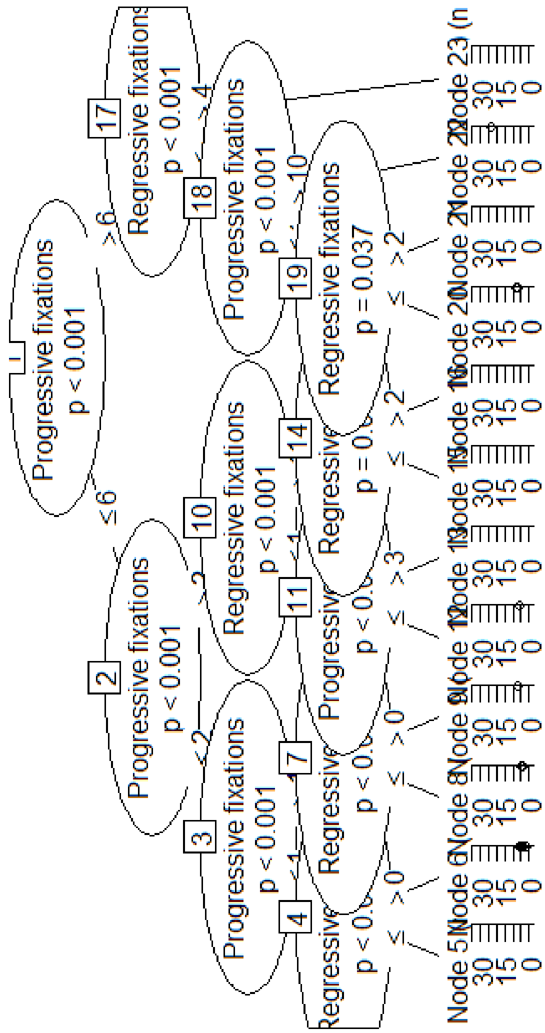


Fig. 25. Example of decision tree based on eye-tracking measures. Progressive fixations and regressive fixations are the most determinant measures in paraphrases with reformulation marker.

4.5.3. Mixed linear regression models

Mixed linear regression models ─henceforth, mixed models─ (Laird & Ware 1983; Davidian & Giltinan 1995; Verbeke & Molenberghs 2000; Demidenko 2004) are a generalization of classical regression models (Wood 2006; 2011): the main difference between mixed models and those based on regressions ─ANOVA, MANOVA (Parsad & Bahr 1987)─ is that mixed models cover correlated observations and heterogeneity in the data, and classical regression models do not. Heterogeneity and correlations in the data produce random effects (Verbeke 1996) ─besides fixed effects─ which cannot be easily predicted by a classic statistical model. Fixed effects are related to non-random results ─functions, conditions, reading measures─; random effects, however, are related to data which can be affected by randomness ─word length, variance between participants, reading speed, lexical meaning of the words selected, and so on─. Mixed models avoid such randomness. That is why they are mixed: they combine fixed and random statistical effects to refine the results obtained ─i.e., as if both types of effects could affect the final data output─. To do so, mixed models employ different mathematical algorithms neutralizing them, such as the Maximum Likelihood (ML) (Davies 1980)[143]. Contrary to fixed effects, random effects are assumed as the variance of data analyzed from different populations (Seoane 2014):

> Un ejemplo típico de variable de efecto fijo es el sexo, pues su conjunto de posibles valores está limitado (macho y hembra), estos son informativos (el sexo acarrea consecuencias fisiológicas y comportamentales) y la medida de la respuesta se asume independiente entre observaciones (p.e., entre los distintos machos). En contraste, el territorio de reproducción de un animal se suele considerar como una variable de efecto aleatorio, pues aquellos que se muestrearon son normalmente una submuestra aleatoria del conjunto de la población y la respuesta a analizar se espera que esté correlacionada con cada uno (p.e., la inversión parental que se mide en el mismo territorio en distintos momentos temporales). (Seoane 2014: 17).

Longitudinal and clustered data often include random effects (McCulloch & Neuhaus 2011: 271). Such variance should be controlled so as to avoid their generalization to a general population.

[143] "The Maximum Likelihood (ML) estimation includes both regression coefficients and the variance components, that is, both fixed-effects and random-effects terms in the likelihood function". This information has been retrieved from: https://es.mathworks.com/help/stats/estimating-parameters-in-linear-mixed-effects-models.html. See also Basu (1988) or Harris & Stocker (1998) for a detailed review of this concept and its mathematical treatment.

Mixed models are thus an optimal method to solve complex experimental designs (Schielzeth & Nakagawa 2013) such as that behind this thesis: at least 40 participants (20*2) are required for each function analyzed (see §4.3.1.), and such participants present different features as individuals ─e.g. reading speed, concentration, the moment when they make the experiment, and so forth─. Furthermore, the words employed in the critical sentences and their length are also random variables related to the fixed ones: the functions ─paraphrase, reformulation, conclusion and correction─, the conditions ─presence or absence of reformulation marker─, the eye-movements obtained ─fixations, regressions and saccades─ and the reading times ─FPRT, SPRT, and TRT─. All these variables are, in turn, hierarchized. Mixed models applied to the raw data focus on the influence of such random effects and, as a result, provide the analysis with new simpler and explicative values. Such values are so-called *estimate* and *predicted values*[144] and represent all the data for the four functions and two conditions. Observe the following table:

Area of Interest	Estimate	Std. Error	FPRT.pred	FPRT.pred Std. Err
Ä-K [intercept]	92.31	37.5	336.39	28.52
Ä_1	-20.2	35.15	316.19	28.56
Ä_2	6.84	34.93	343.23	28.23
M1_1	-56.11	35.17	280.28	28.61
M1_2	-155.32	34.96	181.08	28.32
M1 RF_1	38.18	35.28	374.57	28.59
M1 RF_2	91.92	35.06	428.31	28.28
M2_1	-102.77	36.51	233.62	29.9
M2_2	7.85	36.08	344.25	29.34
K	-7.91	35.62	328.48	29.31

Table 20. Data in mixed models. Estimates and predicted values with their corresponding Std. Errors.

[144] Further values can be tested in a mixed model: t-value, f values, mean sq, Chisq, confidence intervals (CI), or even p-values (despite the polemic concerning this value in new statistical approaches). This thesis will only employ estimates and predicted values: they allow to focus on comparisons within each function and (between) condition(s).

Estimates usually result from a maximum likelihood mixed model equation assuming a normal distribution for errors (Feddag & Mesbah 2006)[145]: they comprise both fixed and random parameters and allow to compare different groups of data (AOIs) to extract their corresponding effect magnitudes. However, estimates cannot be generalizable neither interpreted as absolute reading times in milliseconds (Obster & Bauer 2019: 1-2): predicted values complement estimates. Such values incorporate nonlinear effects for average word length and, therefore, reflect the absolute value in milliseconds for the AOI condition addressed ─see K, M2_2… in the Table 17─ assuming a fixed, average number of characters per word ─e.g. 6.84 nLetters.WD_fix.─. By doing so, all the parts within critical sentences are, so to speak, homogenized, and the values obtained for each one can be compared and generalized ─e.g. K (328.48) vs. M2_1 (233.62); M1_1 (280.28) vs. M2_1 (233.62)─. To sum up, estimates must be presented ─since the predicted values are obtained from them─, but predicted values are key for the analysis introduced in chapter 5: they measure the relationship between the reading time obtained, the part of the critical sentence addressed, and several fixed and random effects derived from the characteristics of the experimental design proposed.

- Predicted values are an abstraction of all the real primary values compiled (Schmettow 2018)[146] avoiding the generalization of inadequate results: they result from *point estimation*, the process "of using the data available to estimate the unknown value of a parameter when some representative statistical model has been proposed for the variation observed in some change phenomenon" (Daly et al. 2003: 225). The predicted value obtained is a single number which incorporates fixed and random statistical effects as possible variables determining the final data (e.g. the reading speed, the

[145] Estimates are generated by considering the following measures: AIC, BIC, log likelihood, and deviance.

[146] For example, a value of 315 msec. of the utterance *Estefanía y Miguel quieren una rosa rugosa; o sea, japonesa* obtained by the participant 05 cannot be directly compared with the 200 msec. of the utterance *Lorenzo y Alejandro reparan sumideros; o sea, desagües* read by the participant 09. The efforts involved in processing the first utterance may have been higher than the efforts involved to process the second one due to the variation of the themes, the number of words, or the fact that readers are different. As a result, conclusions could be altered and may not be suited to solve the research questions and hypotheses initially raised. Predicted values avoid that.

amount of characters per word, the meaning of the words, the themes, the participants and their differences, and so on). Predicted values assume a fixed average number of characters per word (Obster & Bauer 2019, personal report): this average allows for word and AOI comparisons within critical sentences and conditions; they are an abstraction of all raw data compiled[147].

All mixed-models statistical results will be presented in four models [Model 1, Model 2, Model 3, Model 4] gathering all data for the four functions addressed [Paraphrase, reformulation, conclusion, correction]; these results will be addressed in four different sections also including a qualitative analysis and decision trees results (see their organization in §5.1.2.)[148].

4.6. Summary

This chapter has emphasized the experimental character of this thesis and, therefore, has focused on the experimental design required to address the discursive functions studied. This experimental design has been proposed to solve the high- and low-level hypotheses to be tested (see §4.2.): after some previous considerations concerning the experimental conditions included (see §4.3.1.), the contexts (see §4.3.2.) and critical sentences created (see §4.3.3.) have been presented. Each decision adopted in designing contexts and critical sentences depends on the objectives of this research. As a result, 16 critical sentences ─8 per theme─ have been suggested: these sentences have intended to represent adequately paraphrase, reformulation, conclusion and correction and blended both written and spoken discourses as well. Any possible hidden variable (syntactic, semantic or pragmatic) has been solved to avoid wrong final results in the reading experiments. Together with contexts

---

[147] Predicted values in this research are not real milliseconds, but equilibrated values representing neutralized real reading times gathered and distributed among all the words of all the utterances under all the parameters mentioned.

[148] Mixed-models data are included in different informative tables. The following information is introduced in every table: "condition" represents sentences with ─condition 1─ and without *o sea* ─condition 2─; M1 and M2 correspond to the first and second member of the sentence respectively; whole utterance reflects the Ä values; conceptual meaning shows Ä-K values (see in §4.2.3. the explanation of variables and conditions).

and sentences, the experimental protocol followed before executing the experiments has also been included (see §4.4.), and the statistical methods (see §4.5.) have been detailed.

Given the novelty of the object of study in the field of experimental pragmatics, every step and proposal has been appropriately justified ─and explicitly mentioned (see Step 1 to 16)─. Once all this methodological information clarified, the results obtained in the experiments can be introduced in the following chapter.

Chapter 5

Analysis and results

5.1. Introduction

5.1.1. Relevance of the study and organization of contents

This chapter presents the results obtained from the experiments designed in §4 which, in turn, are based on the theoretical notions addressed in §2 and §3. Experimental methods complete theoretical explanations for different linguistic phenomena ─phonetics, syntax, semantics and pragmatics─: researchers have introduced them in their analyses as complementary tools and obtaining successful results. Given the unsolved problems derived from semantic and pragmatic approaches to reformulation and neighboring categories ─summary, amplification, reduction, variation, repetition, dissociation, and so forth─ (see §2.3.), an experimental approach combined with theory might benefit their description. As noted in §2.4., reformulation and eye-tracking methods work well together: theory on reformulation acquire a new way to validate its applicability ─reading controlled experiments─, whereas experimental pragmatics win a new object of study ─reformulation─ (see §1.3., §2.4.. §3.2., and §4.3.); the lack of experimental studies[149] focusing on reformulation and neighboring categories would also be filled.

In this sense, this study constitutes an innovative proposal: the data obtained prove empirically (a) how paraphrase, reformulation, conclusion, and correction are established and assimilated in different contexts and conditions ─with and without *o sea*─, and (b) how the processing behind each function differs depending on their nature. Such aims are achieved in five sections below:

- In section §5.2. paraphrase experimental results based on eye-movements (§5.2.1.) and their corresponding duration (§5.2.2.) are described. This section proves how equivalence between contents is cognitively assimilated; it also establishes limits complementing theoretical descriptions of paraphrase to distinguish it from other closer functions such as conclusion.

[149] Except for cause-consequence relationships ─see, for example, some works focusing on implicit causality in verbs (Featherstone & Sturt 2010; Koornneef & Sanders 2013, among others)─. Narvaez (forthcoming) addresses Sp. Por tanto and causality processing paths.

- Section §5.3. focuses on reformulation experimental results. This section proposes a cognitive description of *distance*, the main notion behind reformulation and vaguely defined in such theoretical framework (see §4.2.1.) by detailing how eyes move during reading this function (§5.3.1.) and the time they need to do so (§5.3.2.).
- Section §5.4. addresses conclusion experimental results. After detailing two discursive related functions such as paraphrase and reformulation, this section establishes a clear distinction between discourse and grammar reflected not only by ocular movements (§5.4.1.) but by reading times (§5.4.2.). Conclusion, based on causes and consequences, does not work like formulation functions involving changes of discourse plan.
- Section §5.5. discusses correction experimental results. The last of the four functions addressed is the most complex: eye-movements (5.5.1.) and their duration (5.5.2.) show differences regarding paraphrase, conclusion and reformulation ─despite the similarity shared with the last one argued from theory─. Again, eye-tracking results establish limits between these functions.
- Finally, section §5.6. summarizes all the results presented in sections §5.2. to §5.5. and relates them to the theoretical problems in §2: on the one hand, this section focuses on the 9 hypotheses underlying this study (see §4.2.1., §4.2.2. and the beginning of each subsection in the previous sections of this chapter); on the other, it addresses the three main research questions suggested in this dissertation (see §1.4.). Results and conclusions drawn in 5.6. will lead to further general conclusions presented in §6.

These sections are accumulative: each one compares results to the preceding one and adds further complementing information. Three factors contribute to the relevance of this chapter: it (i) tests the hypotheses behind the theoretical assumptions previously formulated (see §4.2.1. and §4.2.2.); (ii) confirms the adequacy of the materials created for such purpose (see §4.3.); and (iii) systematizes an experimental study of paraphrase, reformulation, conclusion and correction for the first time. The results presented in §5.2. to §5.6. require some previous specifications, addressed in the next subsection.

5.1.2. Analysis: validation tests and their organization

The experimental results obtained are validated by three different tests of increasing detail: (a) Visual description and manual count ─qualitative─, (b) regression decision tree(s) significance ─qualitative-quantitative─, and (c) Mixed models applied to reading time(s) values ─quantitative─. Tests (a) and (b) work together, while test (c) is added later.

Visual description and manual eye-movements count provide an intuitive approach to the data establishing some guidelines for the analysis:

- On the one hand, visual patterns are general representations of the whole processing obtained from all the participants in the experiments: such patterns are based on fixations, regressions, and saccades; they are, so to speak, a graphic definition of paraphrase, reformulation, conclusion, and correction with and without *o sea*.
- On the other, manual count addresses the eye-movement raw data underlying such visual patterns: their qualitative description highlights the type of reactions produced while participants read critical contexts and sentences ─i.e. backward and forward movements, reading jumps, linear readings, etc.─.

Both informations are useful; however, they need to be validated with other tests: some statistical methods should be incorporated to confirm if results are or not acceptable. Regression decision trees contribute to do so in two ways:

- They detect which types of fixation or regression reflect the way in which the read information is assimilated;
- They show if such eye-movements are more relevant during the FPRT or the SPRT─. To do so, raw reading-time values are introduced in the tree.

Regression decision trees (see §4.5.2.) confirm or falsify qualitative descriptions and establish a bridge between ocular movements and their corresponding duration based on p-values. Despite the presence of statistical values, however, decision trees require again further confirmative tests:

- Regression decision trees introduce p-values predicting and relating observed parameters; nevertheless, these p-values establish if relations between parameters are or not significant, but they do not measure how big these relations are;
- As noted in §3.2. and §4.2., the eye-mind hypothesis depends also from the duration of eye-movements; the total time a reader remains still observing some content reflects its assimilation. Decision trees relate ocular movements to raw-reading data; however, temporal values need an individual treatment considering possible hidden variables affecting the data which cannot be incorporated in decision trees.

For these reasons, linear regression mixed models are incorporated. These statistical methods provide the specificity demanded by reading-time values. Mixed models show an advantage complementing regression decision trees: they allow to compare and measure statistical differences or similarities between groups of temporal data (see §3.2.3.) derived from the number of fixations and regressions retrieved (see §4.5.3.). Such comparisons have focused on the different AOI within sentences (m1, m2, *o sea*, Ä; see §4.2.3.) throughout different reading stages (FPRT, SPRT, TRT; see §3.2.3.).

In sum, each new validation test introduced is more specific than the preceding one: visual description and manual count draw a qualitative picture of the functions confirmed or refused by significant decision trees; these, in turn, are completed with statistical comparisons on reading times based on mixed-models[150]. These tests and the results obtained are applied and organized in this thesis as follows.

5.1.2.1. Visual description, eye-movement count and decision trees

Visual description, manual eye-movements count, and decision trees are presented first in each section (see §5.2.1., §5.3.1., §5.4.1., and §5.5.1.). These tests focus mainly on ocular movements. The visual description and the eye-movements count are detailed in two ways:

[150] It is necessary to mention that all the functions addressed in this chapter cannot be compared in quantitative terms: the 40 participants required for each function (see §4.3.1.) only read one function ─for example, paraphrase expressed with and without discourse marker─ and not the four functions. This does not mean, however, that the results obtained are not representative: the fact that this is a first experimental approach to, on the one hand, the limits between reformulation and other functions and, on the other, to the polyfunctionality of discourse markers, confirms its relevance. The results presented here will conform the basis for future studies on experimental reformulation.

on the one hand, with the visual pattern automatically generated from each participant; on the other, with tables gathering all the eye-movements produced by the 40 participants in the four experiments. These tables address qualitatively three main groups of ocular movements (see §3.2.2.): *fixation count* provides a cognitive processing overview; *progressive* and *regressive fixations* show how eyes retrieve information; finally, *regressions in* and *out* of AOI reflect the type of ocular movements produced.

Decision trees test the preceding qualitative descriptions and incorporate reading durations to the analysis. They transform raw data ─in absolute numbers of movements─ into various sub-sets of numeric information: a p-value lower than 0.05, and an *n* value representing the number of observations in the sub-set addressed (Roberts *et al.* 2015: 6-8). Such data transformation is automatically produced: the original data are introduced in R (R Studio 2018[151]); after executing some codes[152] the system detects and gathers the statistical information, distributed into different nodes and leaves ─or terminal nodes─ (see §4.5.1.). All decision trees contemplate the following variables: FC ─independent variable─, PF, RF, regressions into AOI, regressions out of AOI, single fixation duration, first fixation duration, FPRT, first return to AOI [ms.], SPRT ─dependent variables─.

5.1.2.2. Linear mixed regression models

Linear mixed regression models (henceforth, mixed models) constitute the last test applied (§5.2.2., §5.3.2., §5.4.2., and §5.5.2): they focus only on reading times. Their presence is key for solving the temporal hypotheses behind this thesis (see §4.2.2.). Mixed models

---

[151] See https://www.rstudio.com/products/rstudio/ for further information.

[152] Such codes are:

- rp_osea <- read.csv("Critical 1RP con pd results.txt", header = T, sep= ",") library(readxl)
- o_sea <- read_excel("D:/Tesis/DATOS/Excels/Experimento 1 (1RP con pd 2RP sin pd)/Critical 2RP sin pd results.xlsx", sheet = "")
- View(o_sea)
- o_sea[sapply(o_sea,is.character)] <- lapply(o_sea[sapply(o_sea,is.character)],as.factor)
- o_sea.tree <- ctree(o_sea$`Fixation count`~., data=o_sea) plot(o_sea.tree)
- o_sea.tree <- ctree(o_sea$`Fixation count`~., data=o_sea[c(9:18)], controls = ctree_control(maxdepth = 4))
- plot(o_sea.tree)

transform raw temporal data[153] into generalizable temporal results based on **predicted values** compared to extract their **differences** [154] expressed through **percentages.** Percentages contribute to interpret the results in terms of size and relevance: they confirm if differences between groups of data are based on large, medium, small or trivial statistical *effects*. They also determine how much each function costs to be processed or to what extent the experimental hypotheses can be accepted (e.g. the difference between two compared -groups of- data can show a 32% of statistical effects). The linear mixed model adopted here stipulates a >5% value as the minimum magnitude[155] of the difference state as relevant (Guderlei, Bauer 2018)[156]:

- **>20% = very large effects**
- 10% -19.99% = large effects
- 5% -9.99% = medium effects
- 4% - 4,99% = small effects
- **<3,99 % = trivial effects**

Fig. 26. Scale of percentages managed in this thesis (StabLab, LMU).

In sum, tests (a) —visual patterns and manual count— (b) —decision trees— and (c) —mixed models— provide a layered analysis solving the two main theoretical problems addressed in this thesis: on the one hand, the distinction between reformulation and other functions; on

[153] Raw data —in milliseconds— should not be addressed as definitive. As noted in §4.5., individual analyses may become a vast task because the raw reading data obtained in these eye-tracking experiments include a total of 800 real reading time values in milliseconds from every participant, theme, condition, function, and reading stage. It is impossible for the researchers to account for all the data one by one, a reason why data reduction would be very useful; furthermore, comparisons between raw data are not legitimate because these values are retrieved under different experimental circumstances.

[154] All predicted values are compared so as to extract their **differences** and measure how big or small groups of data are —in other words, to measure the magnitude of differences (Cohen 1988, 1995; Argimon 2002)—. Such statistical comparisons also allow for qualitative explanations of how each function or variable works. For instance, if two values are compared and one of them is bigger than the other, the theoretical impact will vary (400 ms. vs 125 ms. → the second content is 275 ms. less costly).

[155] This value is similar to p-value models, which define the 0.05 as the minimum value. The minimum percentage and the rest of percentages were accorded and established by the research group and the StabLab team with which it works.

[156] Both positive and negative percentages are valid (5% or -5%).

the other, the experimental characterization of discourse markers as procedural and polyfunctional items (see §1.2., §2.2. and §2.3).

Last, each section will resume the hypotheses suggested in 4.2.1. and 4.2.2. in order to test them; these hypotheses are next reproduced to facilitate their interpretation next in sections §5.2. to §5.5.:

Temporal hypotheses	**Movement hypotheses**
1)Discursive functions are related to long durations for the TRT; however, grammatical functions are related to shorter TRT;	6)Progressive and regressive fixations influence the establishment of paraphrases and reformulations with and without a discourse marker;
2)Discursive functions are related to long durations for the FPRT; however, grammatical functions are related to shorter FPRT;	7)Several progressive fixations are expected for conclusions with and without a discourse marker because of the informativity of this function; progressive fixations represent forward readings;
3)Discursive functions are related to long durations for the SPRT; however, grammatical functions are related to shorter SPRT;	8)Progressive and regressive fixations are relevant in establishing corrections with and without a discourse marker.
4)The presence of a discourse marker facilitates and even reduce costs in assimilating the function read;	9)The presence or absence of a discourse marker changes the eye-movements retrieved.
5)The absence of a discourse marker does not influence the assimilation of the function read.	

5.2. Paraphrase

As noted previously, paraphrase is based on the notion of equivalence: the meanings behind the older and the new formulation are identified as very similar or identical. The new formulation is introduced to clarify the meaning of the former, which the recipient might not understand due to its more specialized character (see §4.2.1. and §4.2.2.). Furthermore, connectives can help establishing paraphrases since they provide a clear instruction relating both formulations (see §2.3.). These theoretical features of paraphrase are tested under two general assumptions: (i) paraphrase involves a hard processing given its discursive nature; (ii) paraphrases are better processed with the aid of a discourse marker. These assumptions are, in turn, operationalized through concrete experimental hypotheses (see §4.2.):

- The first assumption is tested by hypotheses (1), (2), (3) and (6). Fixations and regressions prove the hypothesis (6); FPRT, SPRT and TRT prove hypotheses (1) to (3);

- The second assumption is tested by hypotheses (4) and (9). Fixations and regressions prove the hypothesis (9); FPRT, SPRT and TRT prove the hypothesis (4).

In order to obtain the experimental data output, participants read the following contexts and critical sentences during the experiments (see their design in §4.3.2. and §4.3.3.):

Contexts	Critical sentences
Estefanía y Miguel son profesores de la universidad. Son especialistas en flora. En clase han estudiado flores autóctonas y ahora quieren estudiar flores exóticas.	Estefanía y Miguel quieren una rosa rugosa [M1]; o sea [DM], japonesa [M2]. Estefanía y Miguel quieren una rosa rugosa [M1]; japonesa [M2].
Lorenzo y Alejandro son fontaneros. Arreglan cañerías, canalones, grifos, retretes o bañeras.	Lorenzo y Alejandro reparan sumideros [M1]; o sea [DM], desagües [M2]. Lorenzo y Alejandro reparan sumideros [M1]; desagües [M2].

Table 21. Contexts and critical sentences for paraphrase in the experiment.

In a nutshell, some of the reading results obtained are:

(a) Paraphrase is defined qualitatively by a big number of progressive and regressive fixations. Additionally, some differences between paraphrases expressed with and without discourse marker are detected;

(b) Decision trees confirm the importance of progressive and regressive fixations in establishing paraphrases with and without discourse marker. Results are significant: this suggests that progressive and regressive fixations (in this order) are strongly related to the functioning of paraphrase and its adequate assimilation and that, under similar experimental conditions, these results would be obtained again;

(c) Finally, FPRT shows high processing costs reduced in SPRT, where the meanings of both formulations are integrated. This reduction reflects an adequate assimilation of contents, especially when pragmatic features are incorporated to their processing. The absence of discourse marker still involves bigger efforts.

These results are detailed in the next subsections: §5.2.1. addresses (a) and (b); §5.2.2. focuses on (c).

5.2.1. Visual description, manual count and decision trees

5.2.1.1. Visual patterns in paraphrase

Paraphrase should involve a big number of progressive and regressive fixations distributed into the different parts of the critical sentence, supporting a backward-forward ocular movement between M1 and M2 (hypothesis 6); furthermore, the presence of a discourse marker should provide differences regarding sentences without it (hypothesis 9) since the recipient must establish equivalence only from the words composing each formulation (see expected results in §4.2.2.). Visual patterns, manual count and decision trees support these hypotheses. Observe the following visual patterns:

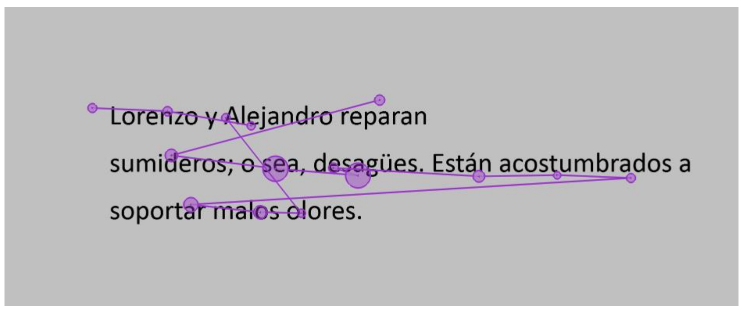


Fig. 27. Paraphrase visual pattern with o sea.

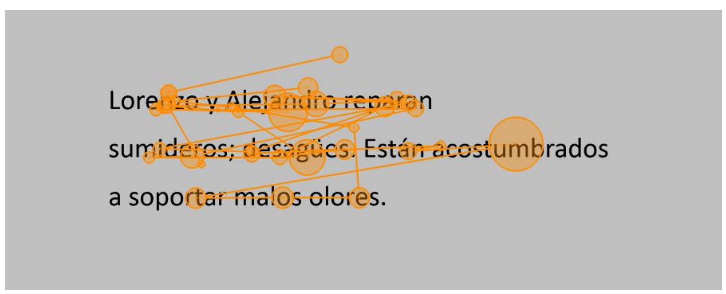


Fig. 28. Paraphrase visual pattern without o sea.

Figs. 27 and 28 are two visual patterns extracted from two random participants who read paraphrase critical sentences. Both share a common feature: paraphrase is not completely linear, which, in turn, shows that reading, in general, is not a linear activity (Rayner 1988; Just & Carpenter 1992). These figures reveal possible differences in processing paraphrases with and without a discourse marker: Fig. 27 presents less lines and smaller circles than Fig. 28. In other words, less and shorter fixations and regressions are needed in Fig. 27 and, apparently, longer fixations and more regressions are the basis of Fig. 28; additionally, ocular movements seem to be more redistributed in Fig. 27 than in Fig. 28. These visual patterns suggest that readers need to focus on M1 and M2 in paraphrase, which is expected since M2 complements the meaning of M1, and that the absence of a discourse marker makes it difficult. This coincides with what theory has described for this function (see §4.2.1. and §4.2.2.).

The visual patterns in Figs. 27 and 28 are triggered by a set of eye-movements based on fixations and regressions (see §5.1.2.1.).

5.2.1.2. Eye-movements manual count in paraphrase

These eye-movements confirm the descriptive results above. Tables 22 and 23 gather all the eye-movements produced after reading paraphrase sentences; relevant values are highlighted in Figs. 29 and 30. They show that, in terms of ocular movements, paraphrase is not as easy as it would seem; differences between AOIs and conditions are found:

AOI	FC	PF	RF	R into AOI	R out of AOI
M1	143	**83**	**41**	11	11
K [o sea]	67	45	17	16	4
M2	**75**	68	**6**	**3**	**20**

Table 22. Total eye-movements manual count in paraphrases introduced by a discourse marker.

AOI	Fixation count	PF	RF	R into AOI	R out of AOI
M1	141	73	60	**36**	14
M2	**103**	**74**	**25**	**11**	22

Table 23. Total eye-movements manual count in paraphrases introduced without discourse marker.

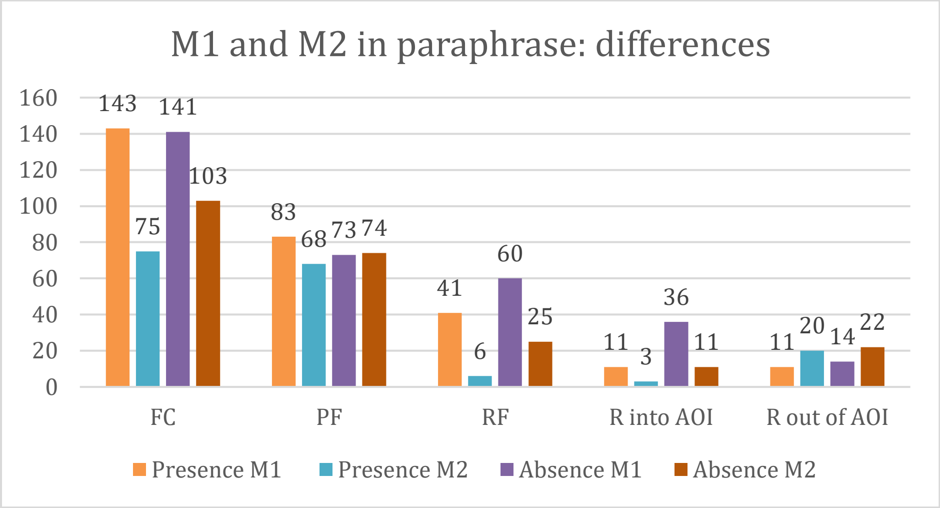


Fig. 29. Processing M1 requires more efforts than M2 in general.

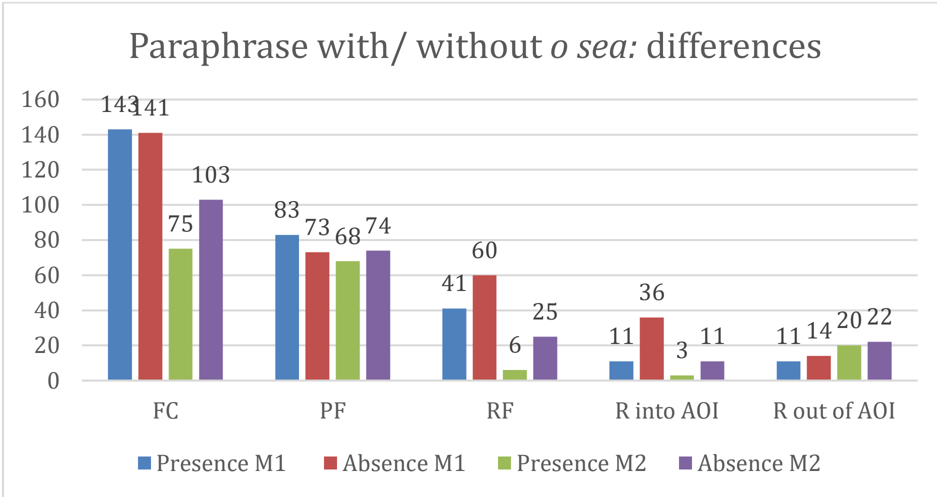


Fig. 30. Differences between paraphrases with and without o sea.

Fixation count (FC)

FC shows two general results for paraphrase: on the one hand, fixation count is big in sentences with and without *o sea*; readers put their attention on the M1 more than on the M2 in both contexts, which indicates that the M1 is relevant in paraphrases: it contains the expression which should be clarified, and readers want to retrieve its meaning so as to integrate it with M2. Furthermore, the technical nature behind M1 also difficulties its processing. For these reasons, readers stop several times to assimilate it (Nelson et al. 2008: 294): this idea coincides with the theoretical definition of paraphrase (see §2.3.3.)

On the other hand, the number of fixations on M2 increases in absence of the discourse marker. This difference result from the effect of *o sea*: readers process the marker (67 fixations) and think of M1 and M2 as two parts of the same structure. Consequently, the number of fixations on M2 is reduced[157]. Without a discourse marker, readers must disambiguate the relationship behind M1 and M2 ─equivalence, distance, or invalidation─ without an instruction (Traxler, Bybee & Pickering 1997). This last result coincides with that behind the visual patterns above.

[157] As further experimental studies focusing on focus particles and connectives demonstrate (Zufferey, Mak, Degand & Sanders 2015; Nadal et al. 2016; Cruz & Loureda 2019), discourse markers provide an immediately useful cue easing the mental processing of the related segments (Zufferey & Gygax 2017: 3).

Progressive (PF) and regressive fixations (RF)

PF and RF are bigger than regressions; they support FC results: the number of PF in M1 and M2 is similar in paraphrases with and without a discourse marker, which suggests that their lexical meaning contributes to advance in the reading even when procedural instructions do not guide readers. However, the M1 requires more RF than the M2. This indicates that readers assimilate the meaning of the new formulation better and that the M1 is harder. Probably, readers fixate M2 only to extract its information and to establish a bridge between the M1 and the M2 to clarify the former. In other words, M1 is the reference point. The number of RF on M1 and M2 increases when *o sea* is not employed in the sentence: again, this result indicates that the discourse marker facilitates the processing since less re-fixations are required to assimilate the content (see §2.3.2., §2.3.3. and §4.2.1.).

Regressions in and out of AOI

Finally, the reduced number of R out of AOI[158] shows that readers integrate contents without difficulties. The same can be said regarding the R into AOI: the sole exception to this is found in the M1 in sentences without a discourse marker, to which readers need to come back 36 times so as to understand its lexical meaning (Underwood 1998).

According to these data, paraphrase triggers big processing efforts reflected by the high number of fixations produced. Two main conclusions can be retrieved:

- Paraphrase is rich in backward and forward movements. Readers need to focus on both M1 and M2 to retrieve and relate their meanings. Most of fixations land in the first formulations (i.e., “rosa rugosa” and “sumidero”) probably because of their more technical character, which demands an easier expression through a new formulation (i.e., “japonesa” and “desagüe”).

[158] Section 3.2.3. also notes that regressive fixations and regressions into AOI are not the same measure: the former refers to the fixation(s) produced after a regression, regressions represent the movement per se. For example, an AOI can receive a total of 6 regressive fixations and 11 regressions into an AOI

- The absence of a discourse marker generates a costlier pattern: the number of progressive and regressive fixations increases for both formulations; regressions into and out of AOI also support this idea.

Decision trees test statistically the qualitative results described and their corresponding hypotheses. They confirm that PF and RF are more predictive than other movement and temporal parameters considered; indeed, regressions are not contemplated in. These two threes show, however, some subtle differences: while PF are decisive in paraphrases with *o sea*, RF are key in paraphrases without a discourse marker. Furthermore, these parameters are related to different reading stages: the former includes FPRT besides SPRT; the latter does not. The predictability of these parameters depends on the strength behind their p-values and the position occupied in the threes:

Fig. 31. Predictive parameters in paraphrase with o sea organized according to their relevance.

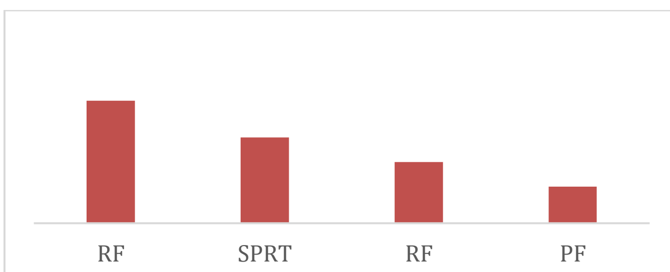


Fig. 32. Predictive parameters in paraphrase without o sea organized according to their relevance.

According to decision trees (Fig. 33 represents paraphrase with a discourse marker; Fig. 34, without a discourse marker), SPRT is always relevant in processing paraphrases with and without a discourse marker: the main difference between these two conditions is that most of the fixations produced during SPRT are progressive in presence of *o sea* and regressive in its absence:

- PF and SPRT in Fig. 33 appear several times under the same p-value (< 0.001), which supports their importance and relationship (Lizasoain et al. 2003: 105). This means that sentences with a discourse marker are assimilated through progressive visual movements during their pragmatic interpretation; in other words, readers do not need to come back in the texts and continue observing contents without difficulties. SPRT is placed within a node above the FPRT, which means that the former is more important. Finally, RF lose strength (p=0.007), which indicates that they are not as relevant as other parameters.
- RF and SPRT in Fig. 34 are always significant and strong, which confirms their relationship in sentences without a discourse marker. This means that, contrary to paraphrases with *o sea*, their pragmatic assimilation involves more backward movements to M1 and M2 so as to interpret adequately their meaning; the absence of procedural instruction seems to complicate its processing. PF also appear in the decision tree, but they are placed at final positions, and their significance is slightly reduced (p=0.004). This suggests that they are relevant but not decisive. Finally, the absence of FPRT as predictive parameter in this tree shows that eye-movements have not effect during this reading stage.

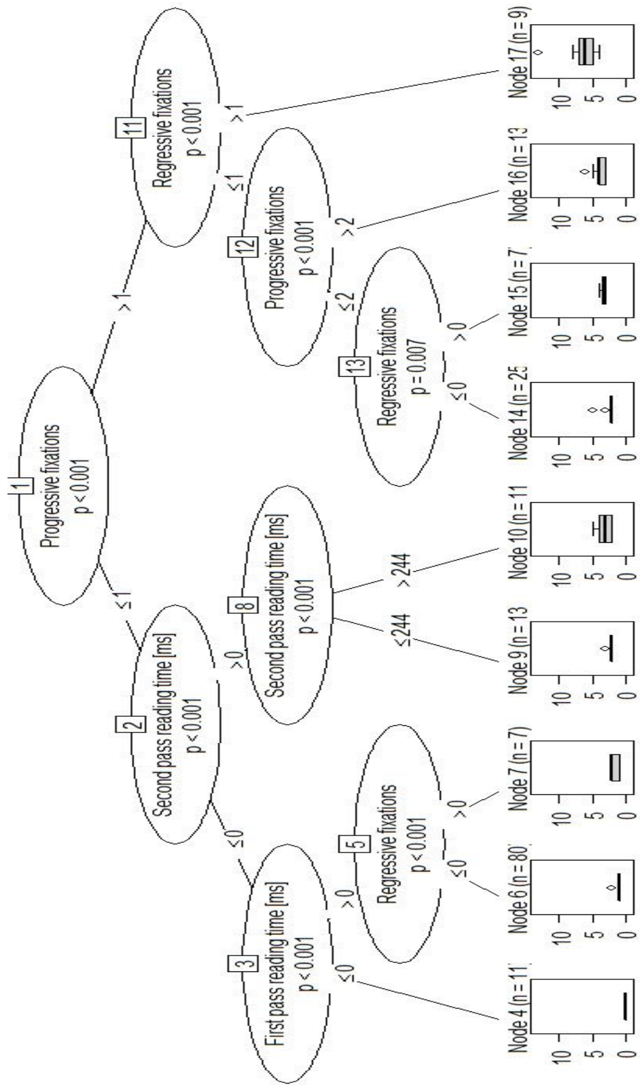


Fig. 33. Decision tree. Paraphrases with o sea.

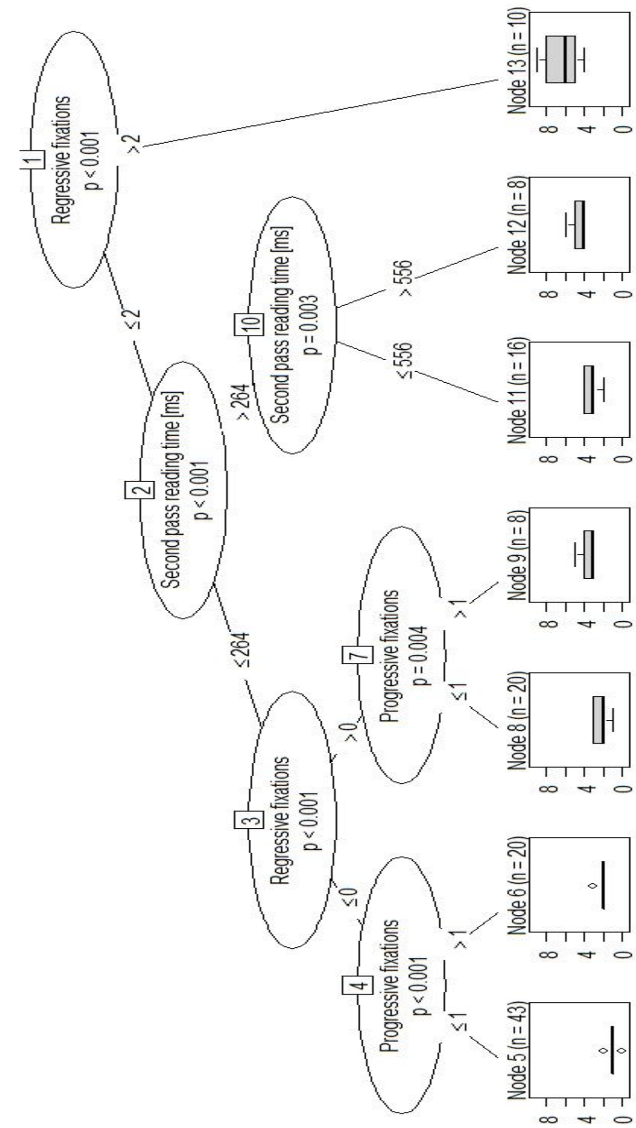


Fig. 34. Decision tree. Paraphrases without o sea.

Decision trees validate the qualitative analysis and suggest new information about reading and duration. The next features about paraphrase can be drawn: (I) progressive fixations are decisive in paraphrases with *o sea*; (II) regressive fixations are the basis of paraphrases without *o sea*. Additionally, (III) it seems that the second-pass reading time also affects the backward-forward movement in sentences with and without a discourse marker, (IV) while first-pass reading time presents a stronger relation with paraphrases with a discourse marker. Therefore, hypotheses (6) and (9) are confirmed. Paraphrases are not easy to be processed: they are based on a backward-forward movement manifested by PF and RF (hypothesis 6), which coincides with theoretical descriptions of this function (see §4.2.1.). As shown by an increasing of the number of RF, the absence of *o sea* becomes such ocular movements more complex. Furthermore, in a global sense, equivalence is differently processed depending on the lexical meaning behind the formulations involved and, evidently, the effects derived from reformulation markers.

Nevertheless, these conclusions require a more detailed exploration; eye-movements *per se* cannot answer the following questions: (a) how long are fixations ─regressive and progressive─ produced in paraphrases? (b) How much FPRT and SPRT reflect the functioning of paraphrases with and without a discourse marker? Reading-times data solve these questions. All raw temporal data ─see Appendix 2─, partially addressed in regression decision trees, are addressed with linear mixed regression models (see §4.5.2.). The next subsection presents the results obtained, which will lead to the definitive cognitive pattern behind paraphrase.

5.2.2. Mixed-models and paraphrase: testing temporal measures

5.2.2.1. Temporal pattern in paraphrase

Temporal hypotheses 1 to 5 predict that TRT, FPRT, and SPRT should be longer in discursive functions and shorter in grammatical functions (see §4.2.2. and §5.6.), and that the presence of a discourse marker facilitates its assimilation in terms of reading speed. Decision trees results should also be related to these hypotheses: according to them, SPRT is expected to be decisive; in other words, it should show bigger statistical effects. Results are presented in the following mixed-model (model 1).

Paraphrase is a discursive function; then equivalence presents medium-high processing costs. Figs. 35 and 36 show some interesting results to this regard:

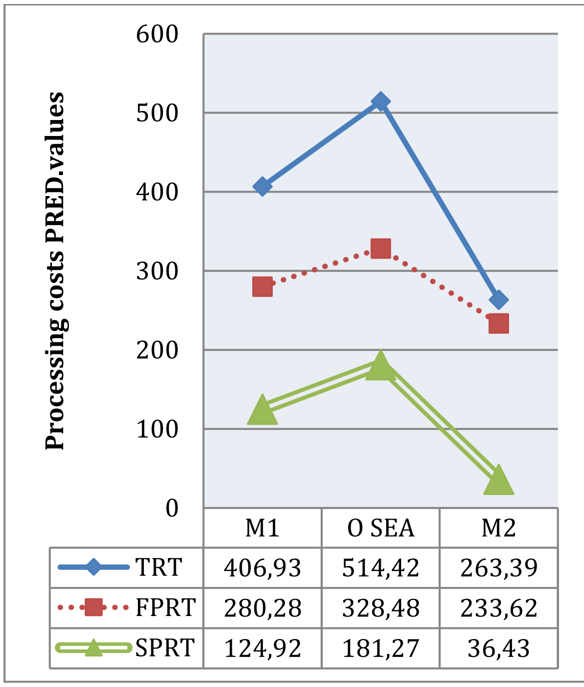


Fig. 35. M1, o sea, and M2 in paraphrases.

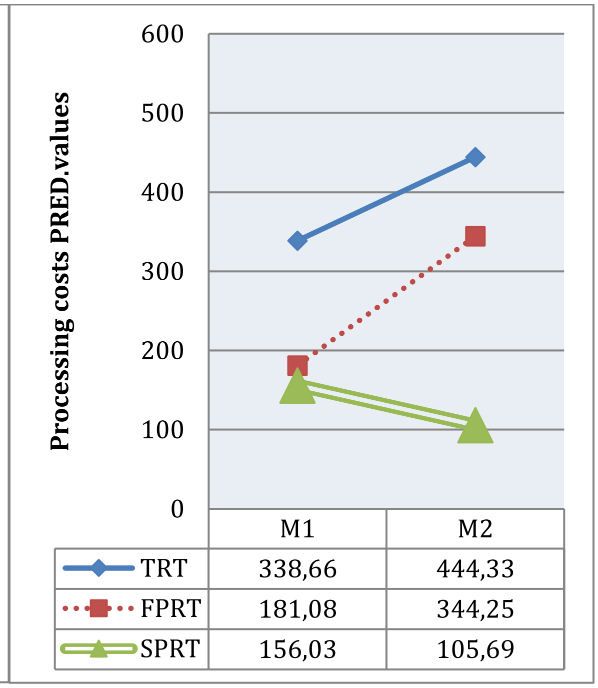


Fig. 36. M1 and M2 in paraphrases without o sea.

At first sight, TRT costs more than 400, which suggests that paraphrase is not easy to be processed given its discursive nature: this result coincides with FC (see §5.2.1.2.). FPRT accumulates most of the cognitive efforts involved in processing paraphrase in both conditions. This result indicates that lexical word-recognition and, in general, construction of first communicative assumptions are key in assimilating paraphrases: high values correspond to bigger cognitive efforts reflecting possible complex linguistic features behind the read content, as noted in §3.2.2. (Rayner & Sereno 1994; Rayner 1998). SPRT is reduced in both conditions, specifically in sentences with a discourse marker. Furthermore, the discourse marker retrieves high reading costs in the three reading times: it requires more efforts than reading the whole sentence where it appears[159].

Tables 24, 25 and 26 develop such ideas, especially concerning the relation between M1 and M2. Results are statistically supported by percentages and effects:

[159] Comparing the discourse marker and the whole utterance provides the following statistical effects: TRT= 28,19% (very large effects); FPRT= 3,89% (trivial effects); SPRT= 116,18% (very large effects). The fact that one discourse marker receives more attention from readers than the whole sentence in terms of average values supports the importance of *o sea* in establishing paraphrases.

TRT	M1	connective	M2
Con. *O sea*	406.93	**514.42**	263.39
Con. ∅	338.66		444.33
Effects	**16.78%**		**68.70%**

Table 24. Total reading time. Paraphrase.

FPRT	M1	connective	M2
Con O *sea*	280.28	**328.48**	233.62
Con. ∅	181.08		344.25
Effects	***35.39%***		***47.35%***

Table 25. First-pass reading time. Paraphrase.

SPRT	M1	connective	M2
Con. *o sea*	124.92	**181.27**	36.43
Con. ∅	156.03		105.69
Effects	**24.90%**		**190.12%**

Table 26. Second-pass reading time. Paraphrase.

TRT reveals that M2 in sentences without discourse marker costs 68,70% more to be assimilated (very large effects) than the same M2 in sentences with discourse marker. The M1 preceding the discourse marker is a 16,78% (large effects) higher than the same M1 in sentences without *o sea*. These results lead to two general conclusions: (a) the procedural instruction(s) of the discourse marker easies processing the content it introduces; and (b) M1 gets more attention from readers when they focus previously on *o sea*. This makes sense since paraphrases link a complex or technical content (M1) with a simpler expression (M2) explaining the meaning of the former: once the new formulation assimilated, the older is clarified. In the absence of a discourse marker, readers spend more time on processing M2 rather than M1: if there are no instructions guiding them, both formulations are linearly assimilated; its presence, however, integrates contents.

FPRT shows similar results: on the one hand, M1 costs a 16,65% more than M2 (large effects) when a discourse marker links them; however, the same M2 without a procedural instruction costs 90.11% more than M1 (very large effects)[160]. These values suggest that the

[160] Surprisingly, readers address the M1 longer in sentences with *o sea*: that effect could result from parafoveal lexical processes by which the human eye anticipates immediate content during reading. According to the *boundary paradigm* (Rayner 1975 and Rayner & McConkie 1975 as seminal references), "skilled readers not only process fixated words in foveal vision (see §3.2.1.), but also pre-process words in parafoveal vision, corresponding to approximately 2-5º on either side of the vertical meridian" ─perceptual span─ (Payne, Stites & Federmeier 2017). Pre-detecting the discourse markers alerts readers from possible relationships within the sentence, specifically between the preceding and the subsequent contents (M1 and

assimilation of an equivalence relation is hard[161] since first reding stages: readers need time to disambiguate, integrate and assimilate M1 and M2 as equivalent. This task becomes harder especially in sentences without a discourse marker: in such cases, the M2 is a 47,35% higher (very large effects) than the same M2 preceded by *o sea*. Efforts are redistributed among M1 and M2 when *o sea* links them, which guarantees the adequate lexical access to the M2 meaning to reinterpret the M1 and decode its complex meaning. Readers, however, need 100 more to process the same content when a discourse marker does not precede it: they should identify the meaning behind the M2 and interpret the type of structural relation it shares with the M1 without help.

Finally, SPRT reflects a considerable reduction of reading times. M1 costs 55.43% and 13.83% less (very large and large effects); M2 an 84.41% and 69.30% (very large effects):

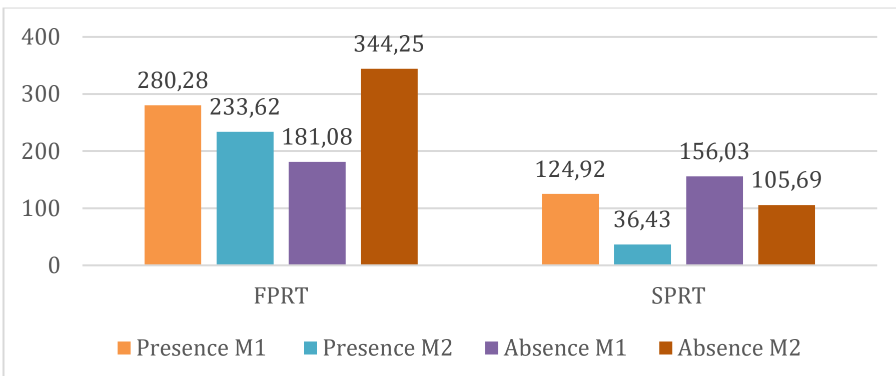


Fig. 37. Reduction of FPRT in SPRT in paraphrases with and without o sea.

M1 in sentences without *o sea* is 24,90% higher than the same M1 in sentences containing it (large effects). For its part, M2 without marker costs 190,12% more than the same M2 in

---

M2). See Schotter, Angele & Rayner (2012) or Hÿona et al. (2004) for further details on this issue and the number of eye-tracking paradigms which have been developed to study such perceptual span and its limits.

[161] "Rugosa" and "japonesa" are not properties of "rosa" but two types of rose. The meaning of "rugosa" in this context must be identified to discard a literal meaning. After that, "rugosa" should be related to "japonesa" to assume that both words are expressions to refer to a concrete rose cultivated in Japan and near areas. After disambiguating their meanings, both expressions are assimilated as equivalent (paraphrase); readers also understand that they are not syntactically subordinated. "Sumidero" and "desagüe" would also present processing difficulties. Despite being a well-known word, "sumidero" is more technical than "desagüe". Again, disambiguation is necessary: they are separated expressions ─despite their structural proximity in the text─ which should be interpreted as equivalent.

sentences with *o sea* (very large effects). Again, it seems that more re-readings are produced without procedural instructions guiding participants. SPRT values are lower than FPRT values, which reflects a reinterpretation validating linguistic assumptions established previously (Escandell 2004). M1 costs more than the M2 in both sentences, which coincides with eye movements results.

5.2.2.2. Final remarks

Paraphrase shows a non-linear cognitive pattern with some nuances ─see Fig. 40─: it encompasses values varying from 100 to 500 approx.; however, the absence of *o sea* increases reading costs, especially concerning M2, which requires almost a 200% of bigger cognitive efforts to be processed in comparison with the same formulation preceded by the discourse marker. These results confirm temporal hypotheses 1 to 4 above. Hypotheses 1 to 3 are accepted: TRT, FPRT and SPRT are high in paraphrase because this function involves a reorganization of the discourse orientation to make a formulation more understandable. Given that readers need to read both formulations and assimilate them as equivalent, efforts are bigger and less equilibrated than with grammatical functions (see causes and consequences in §5.4.):

- In both patterns FPRT is harder than SPRT (see Fig. 43), which leads to the idea that paraphrase (and, therefore, **equivalence**) generates early processing costs due to (i) its discursive nature and (ii) its lexical basis ─two semantic similar expressions are linked, and their relationship must be assimilated since first readings─ .
- The SPRT is assimilated faster because all big efforts are made before: readers only require processing the M2 as part of the M1 and continue assimilating the message. However, sentences without a discourse marker are still harder.

Additionally, hypothesis 4 is accepted: the presence of *o sea* facilitates the assimilation of paraphrase, which is certified specifically during SPRT; readers can understand this relationship without a procedural instruction, but the task definitely becomes harder, as the M2 indicates. Finally, hypothesis 5 is rejected (see §4.2.1.): the presence of discourse marker is not irrelevant in cognitive terms. These results (§5.2.1. and §5.2.2.) will be contrasted with the other functions in §5.6.

5.3. Reformulation

Reformulation depends on the notion of *distance*: the old and new formulation are not identical; rather, they share differences which must be identified. These formulations do not refer to the same state of affairs and, consequently, discourse orientation changes: the new formulation is introduced to modify the preceding formulation and provide it with more accuracy to avoid misunderstandings with the recipient (see §4.2.1. and §4.2.2.). Connectives are useful in establishing such distance since they make it explicit (see §2.3.2 and §2.3.3.).

These theoretical features behind reformulation can be experimentally operationalized under two general assumptions: (i) reformulation also requires hard processing costs due to its discursive nature; (ii) reformulation is better processed if a discourse marker relates the contents involved. The next hypotheses concretize such assumptions:

- The first assumption is tested by hypotheses (1), (2), (3) and (6). Fixations and regressions prove hypothesis (6); FPRT, SPRT and TRT prove hypotheses (1) to (3);
- The second assumption is tested by hypotheses (4) and (9). Fixations and regressions prove hypothesis (9); FPRT, SPRT and TRT prove the hypothesis (4).

Such hypotheses have been tested by considering the results obtained after reading the following contexts and critical sentences[162] (see their design in §4.3.2. and §4.3.3.):

Contexts	Critical sentences
Emilio y Javier son hermanos. Normalmente, nunca están enfermos. Hoy se han levantado con dolores de barriga.	Emilio y Javier están enfermos [MEMBER 1]; o sea [DM], indispuestos [MEMBER 2]. Emilio y Javier están enfermos [MEMBER 1]; indispuestos [MEMBER 2].
Sonia y Mónica estudian medicina. Siempre preparan con antelación los exámenes del semestre. Las dos quieren sacar buenas notas.	Sonia y Mónica están angustiadas [MEMBER 1]; o sea [DM], nerviosas [MEMBER 2]. Sonia y Mónica están angustiadas [MEMBER 1]; nerviosas [MEMBER 2].

Table 27. Contexts and critical sentences for paraphrase in the experiment.

[162] The critical sentences employed in reformulation are semantic-based: contextual (or pragmatic) differences cannot be represented without triggering extra-cognitive efforts (see §3.2.).

Some of the results obtained for reformulation are:

(a) Reformulation is defined qualitatively by progressive and regressive fixations;
(b) Decision trees confirm the importance of progressive and regressive fixations combined with first returns to AOI and first fixation durations in establishing reformulations with and without discourse marker;
(c) Finally, SPRT is easier than the FPRT, especially in sentences without a discourse marker concerning the M2.

Despite assumptions and hypotheses for paraphrase and reformulation are similar, reformulation results change slightly in comparison with paraphrases (see §5.2.). As noted in §2.3., §4.2.1. and §4.2.2., these two functions are formulative (Antos 1982), but they differ on (i) the type of content they relate and (ii) the communicative aim behind each one:

- Paraphrase presents two contents as equivalent to clarify a non-clear M1; reformulation introduces an M2 as the adequate expression of a previous M1.
- Both functions involve coming back to M1, but with different purposes: paraphrase intends to complement M1 with M2 to make its meaning clearer; reformulation intends to discard M1 meaning and accept M2.

These features should be reflected in the experimental output obtained: subtle differences regarding the number of eye-movements and their duration will distinguish paraphrase from reformulation (§see 5.6.). It might be useful to have a close look at these differences so as to establish an accurate experimental description for both functions. Next subsections detail reformulation results: §5.3.1. focuses on (a) and (b); §5.3.2. on (c).

5.3.1. Visual description and manual count

5.3.1.1. Visual patterns in reformulation

Reformulation should be established through numerous PF and RF distributed into the different parts of the critical sentence (hypothesis 6); a backward-forward movement is expected, but the number of eye-movements should not be the same as for paraphrases. Additionally, the presence of a discourse marker should provide differences in processing the function (hypothesis 9) (see expected results in §4.2.2.). Observe the following visual patterns:

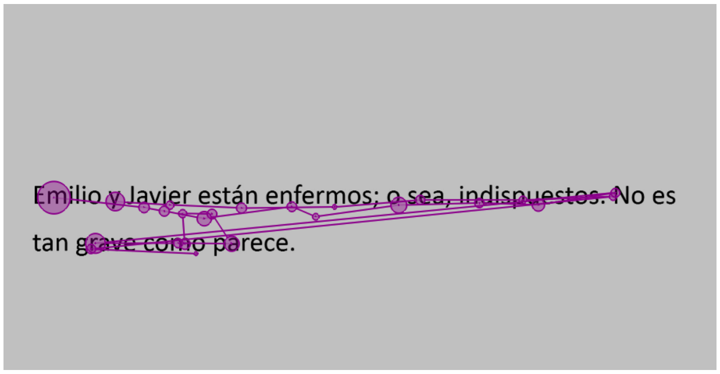


Fig. 38. Visual pattern. Reformulation with o sea.

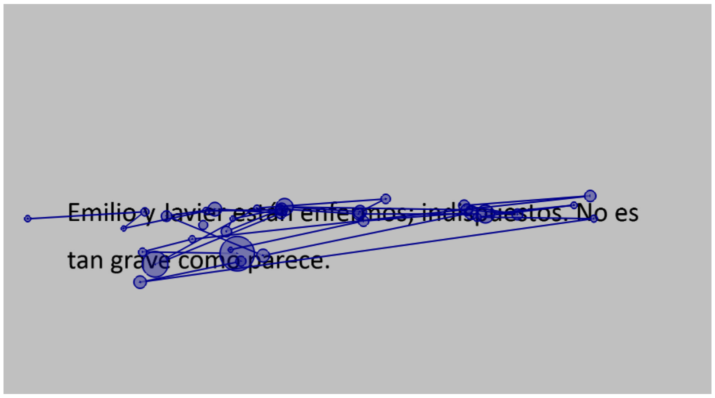


Fig. 39. Reformulation without o sea.

Figs. 38 and 39 show, again, a non-linear reading; they present an unstable picture compared to paraphrases ─see Figs. 27 and 28─, which evidences that they are differently produced and assimilated. Apparently, both figures reflect a similar high number of circles and lines: that is, reformulation with and without a discourse marker is cognitively complex; no several differences between them are found.

These visual patterns suggest that reformulation could work experimentally as theory describes: speakers should remember M1 to compare it to M2 and confirm if the latter is the best option to achieve a complete interaction (Roulet 1987; Pons 2013). That is why, *indispuestos* and *enfermos* receive several fixations. Concerning the discourse marker, it is not clear how its presence or absence influences reformulation ─at least by observing the two pictures above—. Visual patterns are triggered by a series of ocular movements analyzed next.

5.3.1.2. Eye-movements manual count in reformulation

A detailed observation of these eye-movements validates the description above. Tables 28 and 29 gather all ocular movements from 40 participants triggering such visual patterns; Figs. 40 and 41 compare such values. Unexpectedly, reformulation with and without a discourse marker do not differ so much in terms of eye-movements:

AOI	FC	PF	RF	R into AOI	R out of AOI
M1	80	60	10	6	10
K	69	47	20	18	1
M2	**90**	74	10	3	14

Table 28. Total eye-movements manual count in reformulation introduced by a discourse marker.

AOI	FC	PF	RF	R into AOI	R out of AOI
M1	76	60	14	8	6
M2	**100**	**77**	**20**	8	7

Table 29. Total eye-movements manual count in reformulation without a discourse marker.

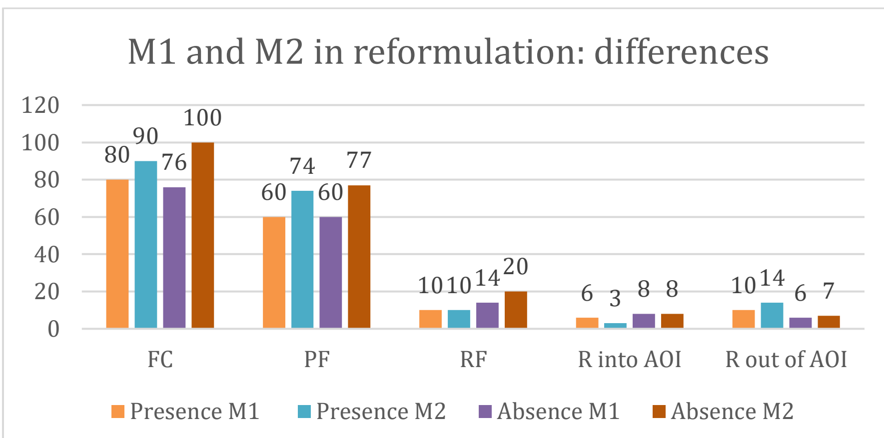


Fig. 40. Differences between M1 and M2 in reformulation are not so big.

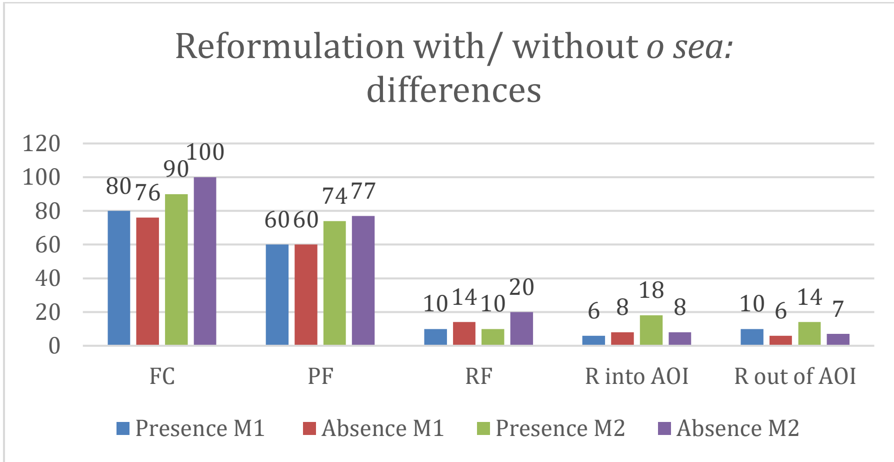


Fig. 41. Reformulations with and without a discourse marker do not differ significantly.

<u>Fixation count (FC)</u>

Reformulation requires almost the same number of eye-movements ─and, therefore, of attention─ for M1 and M2 with or without a procedural instruction: in a global sense, the absence of a discourse marker does not seem to affect the final output obtained. Furthermore, there is a little difference of fixations between M1 and M2: M2 triggers more fixations than M1, which means that it contains more relevant ─and probably harder─ information and readers want to retrieve it all in both conditions (Borys, Plechawska-Wójcik 2017: 12). The M2 introduces a new, more accurate meaning which partially contradicts M1 and, consequently, readers need to focus on to understand it. This distinguishes this function from processing equivalence and technical contents ─paraphrase─.

<u>Progressive (PF) and regressive fixations (RF)</u>

Contrary to paraphrase, PF and RF are relatively closer to regressions. PF and RF results support the ideas outlined above: on the one hand, the absence of *o sea* does not involve drastic changes for PF and RF compared to sentences having it. On the other, M1 retrieves less progressive fixations than M2 in sentences with a discourse marker. Their difference is small but, in qualitative terms, suggests that M2 has been addressed after abandoning another AOI several times. It coincides with the idea of the importance behind the new formulation, which re-orientates the discourse and fills the lack of accuracy in the message. Last but not least, the discourse marker seems to receive a very similar number of fixations in paraphrase and reformulation, which can result from the same discursive nature both functions share —see Fig. 42— (see also reading times in §5.3.2.):

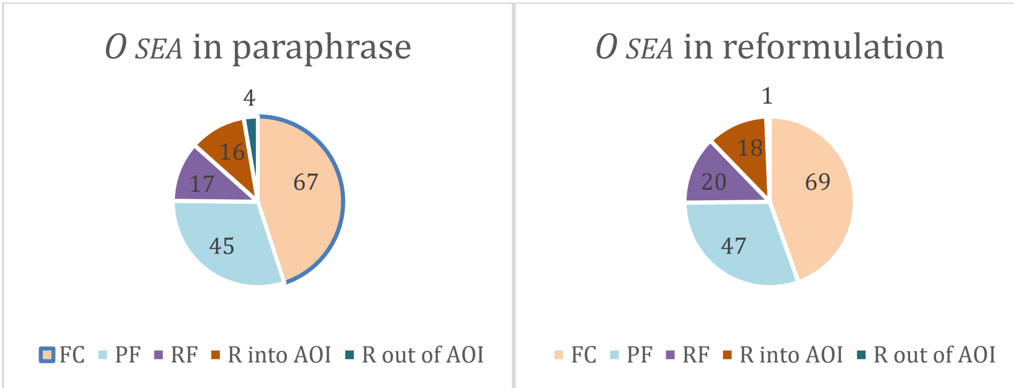


Fig. 42. Eye-movement values for o sea in paraphrases and reformulations.

<u>Regressions in and out of AOI</u>

Finally, R into and out of an AOI also reflect that there are some subtle differences between sentences with and without a discourse marker, which is related to PF and RF results: the presence of *o sea* adds more number of R out of AOI for M2, which suggests that the procedural instruction integrates the new formulation with the former. Additionally, M1 and M2 are similar —if not almost identical— under both conditions, which indicates that decoding the lexical meanings behind reformulation and relating them is easier than in paraphrases (see Figs. 27 and 28).

In sum, eye-movements reveal that:

- Differences between M1 and M2 are not very big in reformulation; the presence or absence of *o sea* neither affects results: the two visual patterns first presented are quite similar, which is confirmed by the manual eye-movements count. FC, PF and RF do not vary.
- Reformulation is rich in FC, PF and RF, but that, in general, eye-movements are lower than in paraphrase: most of such fixations land in M1, but some others in M2. PF are similar to paraphrase, specifically concerning M2, which indicates that both functions work similarly in assimilating the new formulation. They differ concerning M1, which suggests that the semantical meaning behind formulations

determines how functions are processed: M1 in paraphrase is a technical content; M1 in reformulation is a non-accurate but accessible content.

These qualitative results ─and their corresponding hypotheses─ are tested with decision trees. Figs. 45 and 46 reproduce reformulation with and without a discourse marker respectively: first return to AOI, first fixation duration, PF and RF are the most predictive parameters among all those introduced in the statistical model. However, they present a different organization. Their predictability is next reproduced:

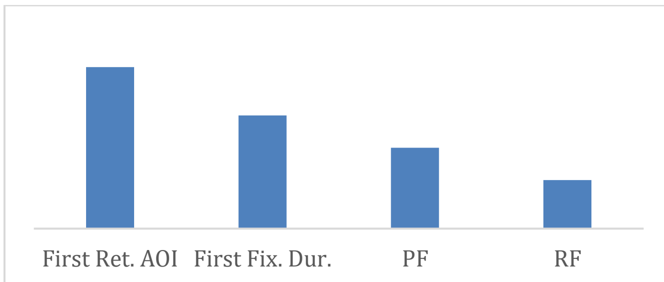


Fig. 43. Predictive parameters in reformulation with *o sea* organized according to their relevance.

Fig. 44. Predictive parameters in paraphrase without o sea organized according to their relevance.

According to the decision trees, PF and RF are always relevant in establishing reformulation; however, these parameters present a strong relationship with temporal parameters in sentences with a discourse marker:

- The presence of First return to AOI and First fixation duration in the top of the decision tree indicates that part of the processes related to reformulation with *o sea* happen when readers come back to an AOI for the first time (or, in other words, in a specific moment during FPRT; see §5.3.2.). These values reveal another interesting information: if the first fixation duration in an AOI is lower than 87, it depends on PF; if it costs more than 352, is related to RF. In other words, a longer first fixation duration will trigger further RF, this showing more difficulties in assimilating the function. In any case, p values demonstrate that the relationship PF-first fixation duration is stronger than that of RF-first fixation duration and, therefore, that the former is more abundant.

- PF and RF in reformulation without *o sea* are not related to temporal parameters: this suggests that they are relevant throughout the whole experimental reading. PF are more relevant than RF: their position in the tree reveals that readers are able to move forward the read contents easily when they do not have to process *o sea*, which probably happens because assimilating distance between contents and the procedural meaning of the marker is too much work for the recipient.

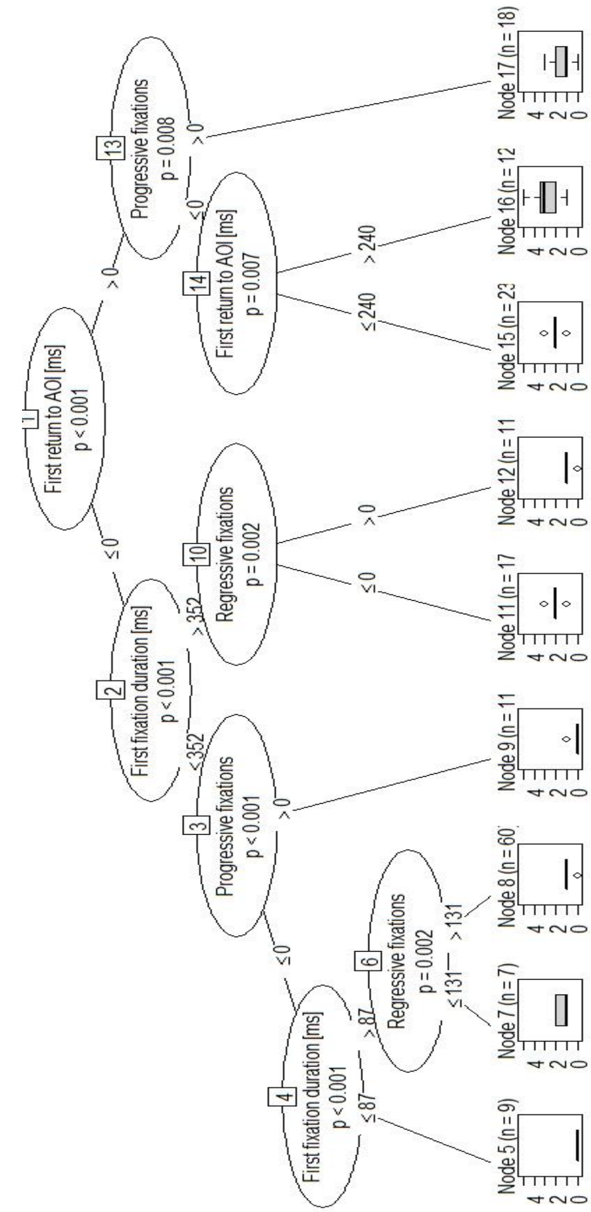


Fig. 45. Decision tree. Reformulation with o sea.

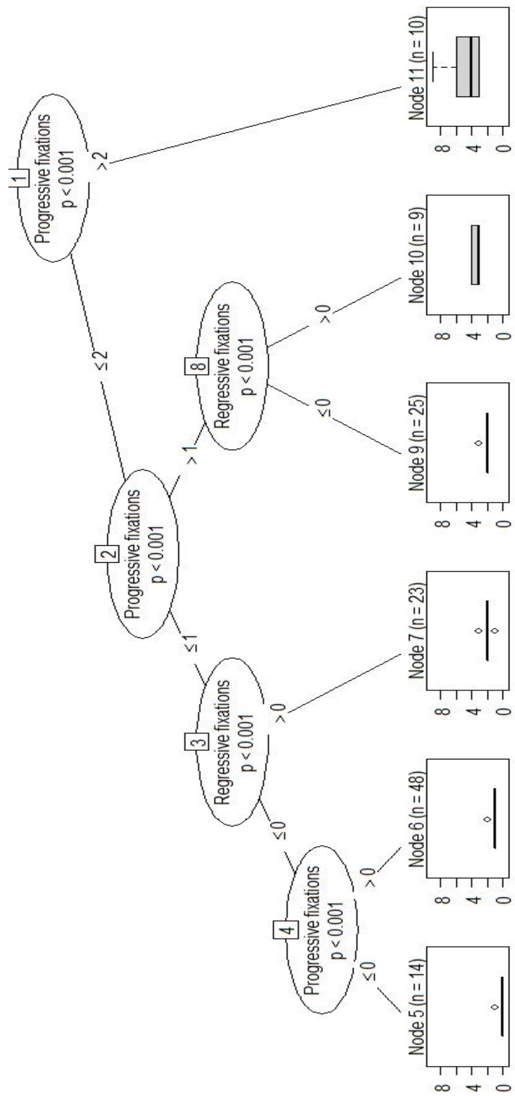


Fig. 46. Decision tree. Reformulation without o sea.

These statistical results confirm hypotheses 6 and 9; however, some remarks on them are required:

- Concerning the former, data show that PF and RF are relevant in establishing reformulations, but their influence is not as strong as in paraphrases, which is proven, on the one hand, by the very similar results for M1 and M2 under both conditions generated in the qualitative description and, on the other hand, by decision trees based on: (a) less strong p-values in sentences with *o sea*; and (ii) the lack of further relations between PF and RF and other movement or temporal parameters in sentences without *o sea*. Despite this, PF and RF are still decisive in reformulation: hypothesis 6 is thus confirmed.

- Concerning the latter, results are complex: the qualitative analysis reveals that the absence of a discourse marker does not affect, in general, the data output obtained; decision trees, however, relate different parameters to PF and RF depending the presence or absence of o sea. Hypothesis 9 can be accepted, but it needs to be reinforced with temporal results for a more accurate description.

At this point, some research questions related to eye-movements are triggered; they cannot be answered by qualitative description and decision trees: (a) do all the eye-movements produced in reformulations have their corresponding shorter or longer durations? (b) How long are fixations ─regressive and progressive─ produced in reformulations? Do re-readings have a relevant role? (c) How much first and second-pass reading time reflect the functioning of reformulation with and without a discourse marker? (d) Does the discourse marker present differences in terms of reading times? Temporal data solve these questions and strengths the analysis above. To do so, linear mixed regression models are applied. Results are presented next (§5.5.3.).

5.3.2. Mixed-models and paraphrase: testing temporal measures

Hypotheses 1 to 3 predict longer TRT, FPRT and SPRT for reformulation compared to grammatical sentences; hypothesis 4 and 5 that the discourse marker eases or not the recovery of inferences behind distance (see §4.2.2. and §5.6.). FPRT should show some relevant results in accordance to decision trees; that is to say, statistical effects should be bigger there than in the SPRT. Differences between paraphrase and reformulation should be reflected in this part of the analysis.

5.3.2.1. Temporal pattern in reformulation

Reformulation is expected to present medium-high values due to its discursive nature (see also §5.2.3.) (Roulet 1987; Adam & Revaz 1989; Murat & Cartier-Bresson 1987; Rossari 2000). Observe Figs. 47 and 48:

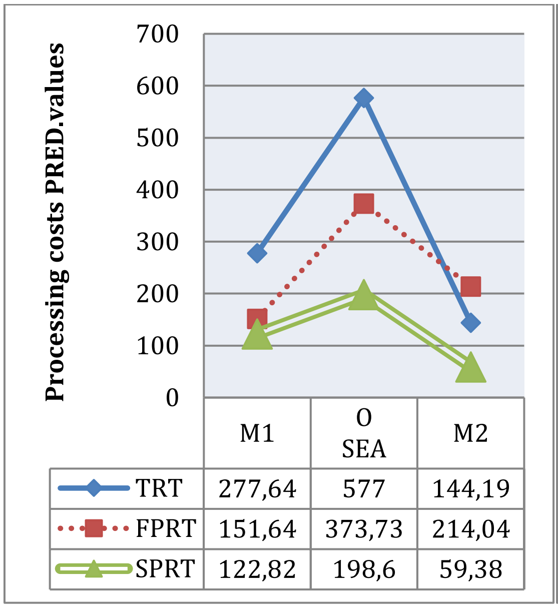


Fig. 47. M1, o sea, and M2 in reformulation.

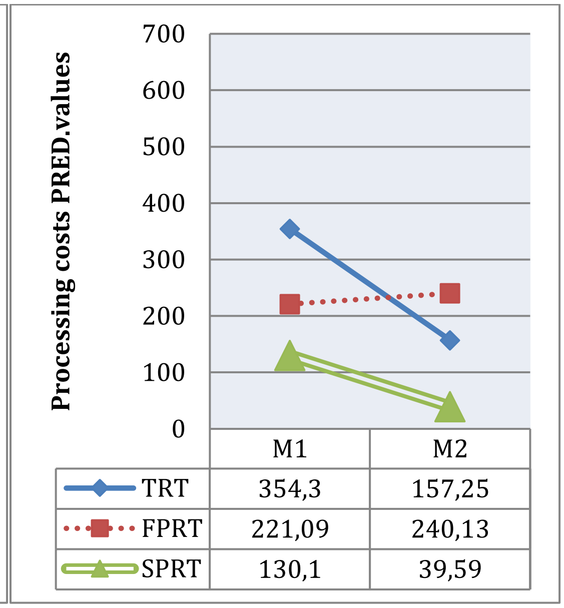


Fig. 48. M1 and M2 in reformulation.

Reformulation is similar to paraphrase in some values but differs regarding others: these differences define limits between these functions. TRT costs between 140 and 350 approx., which indicates the existence of some processing peaks throughout the experiment. In this sense, reformulation would seem easier to be processed in comparison with paraphrase (see §5.2.2.1.). FPRT accumulates cognitive efforts involved in processing paraphrase in both conditions; in this case, this result is stronger than in paraphrase: reformulation presents a considerable reduction of the SPRT, especially in M2 of sentences without a discourse marker. This suggests that bigger efforts are required during first readings of this function, but that its pragmatic assimilation is easier: it makes sense since readers must process lexical differences between two formulations which, in the end, are structurally related. First assumptions are key to distinguish reformulation from others similar —such as correction, for example (see §5.5.). Once this information is disambiguated, the new formulation is well assimilated. Concerning the discourse marker, high values are again retrieved, coinciding with paraphrase results (§5.2.2.1.) and eye-movement results (§5.2.1.2. and §5.3.2.2.).

Tables 30, 31 and 32 detail these ideas and support them statistically with percentages and effects; they focus especially on the relation shared by M1 and M2 with and without a discourse marker:

TRT	M1	*o sea*	M2
Con. *o sea*	277,64	**577**	144,19
Con. Ø	354,30		157,25
[effects]	27,61%		9,06%

Table 30. Total reading time. Reformulation.

FPRT	M1	*o sea*	M2
Con. *o sea*	151,64	**373,73**	214,04
Con. Ø	221,09		240,13
[effects]	**45,80%**		**12,19%**

Table 31. First-pass reading time. Reformulation.

SPRT	M1	*o sea*	M2
Con. *o sea*	122,82	**198,6**	59,38
Con. Ø	130,1		39,59
[effects]	**5,93%**		-33,33%

Table 32. Second-pass reading time. Reformulation.

The TRT shows that M1 costs 27.61% more than the same formulation in sentences without *o sea* (very large effects); M2 also costs 9.06% more under this condition (medium effects). Furthermore, M2 costs 48.07% and 55.62% less than M1 in both conditions respectively (see Appendix 2). These results lead to two ideas: (a) reformulation involves bigger efforts in sentences without *o sea* during FPRT or SPRT; and that, in general terms, (b) the second formulation is easier than the former. Paraphrase is costlier:

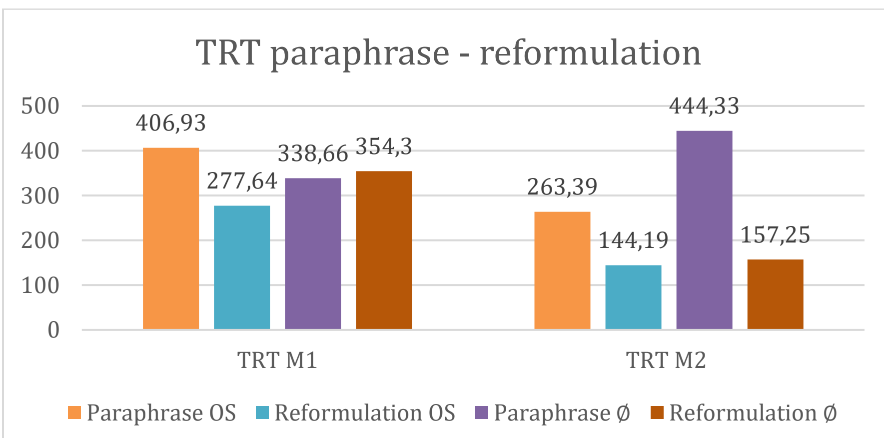


Fig. 49. M1 Comparison between paraphrase and reformulation. TRT.

According to this, readers process reformulation easier with the discourse marker: they put their attention on *o sea* almost for 580 ms. , but such efforts allow to retrieve the procedural instruction behind the marker and reduce the difficulty on assimilating both formulations throughout the experiment. After detecting the marker, the upcoming explanation or reformulation is taken and connected with the content preceding it (Schwenter 1999: 859). M1 and M2 are more instable without procedural instructions (they differ on 55,62% ─very large effects─, more than in sentences with *o sea*, which cost 48,07% ─also very large effects─). Implicit relationships are, therefore, harder in general terms.

FPRT presents closer results: M1 and M2 are reorganized. Contrary to paraphrase (see §5.2.2.), M2 costs 41.15% more than M1 in sentences with *o sea*, and 8.61% more in sentences without it. After addressing M1 for the first time (during 151.64 ms. and 221.09 ms. respectively), differences between contents are established: readers detect that M2 is not equivalent to the M1 despite being placed together and thus need more time to assimilate their relation. They perceive that *enfermo* and *indispuestos* share subtle semantic differences once *indispuestos*[163] is observed. High percentages behind FPRT coincide with decision tree results revealing the importance of first fixation durations (see §5.3.1.2.).

Finally, SPRT decreases reading costs for both conditions, especially in sentences without a discourse marker:

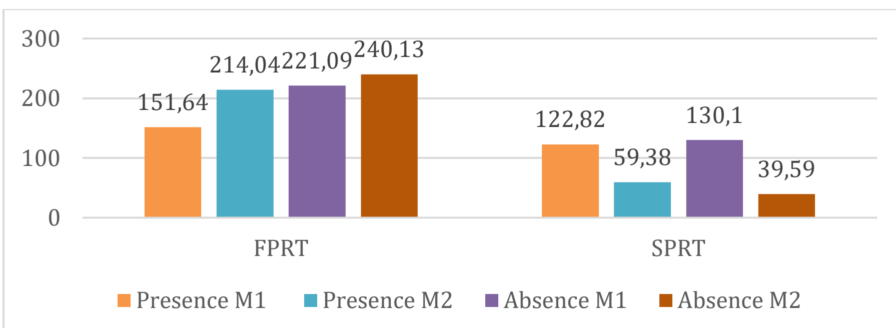


Fig. 50. SPRT reduction in reformulation with and without a discourse marker.

SPRT confirms all cognitive processes produced during FPRT: on the one hand, the M2 costs 148,35% and 130,45% less than M1 in sentences with and without a discourse marker

[163] (1) "Enfermos" (M1) and "indispuestos" (M2) are words expressing a kind of physical discomfort; (2) they belong to the same lexical family. (3) "Enfermos" and "indispuestos" are not synonyms neither show a high-similarity, given that they present different semantic connotations: (4) they cannot be employed in the same context without changing the global meaning communicated. (5) M1 and M2 are not syntactically but discursively subordinated; (6) "Indispustos" fits better the communicative context where it is employed (that is why it is uttered after "enfermos"). (7) It is necessary to keep the meaning of "indispuestos" to continue the discourse. (8) However, the comparison between "indispuestos" and "enfermos" also helps in establishing their relation: such a comparison allows confirming that "indispuestos" communicates better the writer's initial aim. (9) As a result, the M2 "indispuestos" gets most of the attention from readers.

respectively (very large effects). M1 is bigger than the M2 probably because M1 meaning should be kept in mind once the M2 meaning is assimilated. This allows comparing both of them to confirm that the new formulation is the best option to continue the discourse. As a result, lower results for the M2 are obtained. On the other hand, M1 are similar in both conditions (5,93% of small effects), but M2 in sentences without a discourse marker costs 33,33% less than in sentences containing it. Once assumed the meaning behind the new formulation, it is much easier to understand the whole sentence and to perceive M1 and M2 as different.

5.3.2.2. Final remarks

To conclude, three main differences between paraphrase and reformulation are found:

- Paraphrase presents big costs in comparison with reformulation; that is to say, to establish equivalence between contents is harder than to distinguish their features (reformulation). Both functions, however, can only be explaind through subtle differences.
- Reformulation shows that M2 is costlier than M1 during FPRT with and without a discourse marker. Paraphrase, on the contrary, show a bigger M1 in sentences with a discourse marker. This suggests that even with the presence of *o sea*, the technical meaning behind M1 in paraphrases require big efforts to be assimilated;
- In a global balance, paraphrase requires big efforts during the FPRT and SPRT (pragmatic assimilation, reinterpretations), specifically regarding M2; reformulation, for its part, only during FPRT (lexical access, structural relations establishment); SPRT is clearly easier. This idea coincides with their corresponding results obtained in qualitative and decision trees analyses: paraphrase is related to SPRT; reformulation to FPRT (see §5.2.1.2. and §5.3.1.2.).

The triple analysis proposed in this section reveals that reformulation is also based on a non-linear cognitive pattern. Results confirm temporal hypotheses 1 to 3: TRT, FPRT and SPRT are high in reformulation (see linearity in §5.4.). This function involves a new discursive organization to offer a new accurate formulation in order to accomplish communication successfully (Roulet 1987: 116; see §2.3.2.). As a result, processing peaks are produced. Additionally, hypothesis 4 is rejected and 5 accepted: the presence of *o sea* seems to complicate the processing of reformulation during SPRT (see Table 33). In accordance with Noren (1999), the discourse marker is not decisive in establishing reformulation: speakers are able to assimilate distance between contents without procedural instructions. In this case, the presence of *o sea* increases processing costs because participants must (i) assimilate distance and (ii) procedural meanings[164].

In sum, sections §5.2. and §5.3. propose a discursive pattern for paraphrase and reformulation, which reflects (almost) entirely what theory described in the literature published during the last thirty years. Section §5.6. will contrast these results with more exhaustivity and, in turn, will compare them to conclusion (§5.4.) and correction (§5.5.) in order to obtain a complete cognitive-functional map.

5.4. Conclusion

As shown in §4.2.1. and §4.2.2., conclusion has a double-nature, different from that behind paraphrase and reformulation: this function can be addressed as discursive in pragmatic contexts (Spooren, Sander, Huskes & Degand 2010); however, it is mainly grammatical, based on cause-consequence relationships (Cuenca 1991; Galán 1999 in GDLE). Conclusion components are placed at the same communicative level: consequences are derived from one or more causes which can be semantically or pragmatically interpreted, but they do not involve a discourse reorganization. In other words, the conclusion introduced encompasses the features of the preceding causes, but it does not represent another way to express the same ideas. Connectives are helpful in establishing conclusions (Anscombre 1983: 41), but their presence is not indispensable: causes (or, in terms or Argumentation Theory, *arguments*) are organized under linguistic intrinsic parameters[165] (see §4.2.1.).

[164] The discourse marker assumes the leading role in the processing: it costs more than M1 and M2 in the three reading times (see Tables 31 to 33).

[165] Portolés explains this idea: "Oswald Ducrot y Jean Claude Anscombre, en su libro L'argumentation dans la langue (1983) consideran que no es acertado el análisis lingüístico que propone que un enunciado debe pasar por el tamiz consecutivo de una sintaxis, una semántica y una pragmática autónomas y que utilizan para sus conclusiones únicamente los resultados proporcionados por el componente precedente" (Portolés 1989: 117).

In this sense, two general assumptions test conclusion experimentally: (i) contrary to paraphrase and reformulation, conclusion does not require big and irregular efforts given its grammatical nature; (ii) conclusion is processed with discourse markers, but its absence does not increase processing costs. These assumptions are translated into the following experimental hypotheses (see §4.2.):

- The first assumption is tested by hypotheses (1), (2), (3) and (7). Fixations and regressions prove the hypothesis (7); FPRT, SPRT and TRT prove hypotheses (1) to (3). Grammatical functions involve lower processing efforts in terms of reading times; the same is true for eye-movements in hypothesis (7).
- The second assumption is tested by hypotheses (4) and (9). Fixations and regressions prove the hypothesis (9); FPRT, SPRT and TRT prove the hypothesis (4). Conclusions with a discourse marker should not show very reduced processing costs, given that the relationship should be clear without its presence. Hypotheses (4) and (9) test this idea through eye-movements and reading times.

Participants read the following contexts and critical sentences for conclusion; results are obtained from them (see their design in §4.3.2. and §4.3.3.):

Contexts	Critical sentences
Antonio y Juan están preparando los exámenes de fin de carrera. Normalmente estudian en la biblioteca. Sus compañeros se extrañaron porque ayer no los vieron durante todo el día. El primer examen es mañana.	Antonio y Juan tomaron unas cervezas y vieron una película [MEMBER 1]; o sea [DM], estudiaron poco para el examen [MEMBER 2]. Antonio y Juan tomaron unas cervezas y vieron una película [MEMBER 1]; estudiaron poco para el examen [MEMBER 2].
Marina y Jaime son empresarios. Esta semana se celebra un congreso para emprendedores. Normalmente todos practican su exposición un día antes de presentarla. Sus socios se extrañaron porque ayer no estuvieron en el ensayo.	Marina y Jaime comieron unas pizzas y vieron una serie [MEMBER 1]; o sea [DM], practicaron poco su exposición [MEMBER 2]. Marina y Jaime comieron unas pizzas y vieron una serie [MEMBER 1]; practicaron poco su exposición [MEMBER 2].

Table 33. Context and critical sentences for conclusion in the experiment.

Some of the results obtained are:

(a) Conclusion is experimentally defined by a very big number of progressive fixations; regressive fixations are also abundant. Conclusions expressed with and without a discourse marker do not differ so much;

(b) Decision trees confirm the importance of progressive fixations in establishing conclusions with and without discourse marker; specifically, progressive fixations are related to SPRT in sentences without *o sea*;

(c) Finally, reading times are very similar in FPRT and SPRT, showing thus a linear processing of arguments and conclusions, which are finally integrated.

The experimental output obtained should reflect all the ideas above: conclusion should be distinguished from paraphrase and conclusion in a clear way (§see 5.6.). As a result, limits between grammar and discourse, from a general perspective, might be proposed. Next subsections detail results: §5.4.1. focuses on (a) and (b); §5.4.2. on (c).

5.4.1. Visual description and manual count

5.4.1.1. Visual patterns in conclusion

Conclusion should depend on numerous PF on M1 and M2, given that these fixations are related to linear and forward movements expected for grammatical functions (Nadal, forthcoming). Fixations should not lead to a backward-forward movement but to a linear reading with low re-readings (hypothesis 7). Regressions should also be bigger, showing an adequate integration of the conclusion with the arguments. Additionally, the presence of a discourse marker should provide differences in processing the function (hypothesis 9), but not in the same vein as paraphrases and reformulations: the semantic basis of the arguments related constrain possible interpretations and, therefore, facilitate the assimilation of the message (see §4.2.2.). Observe the following visual patterns:

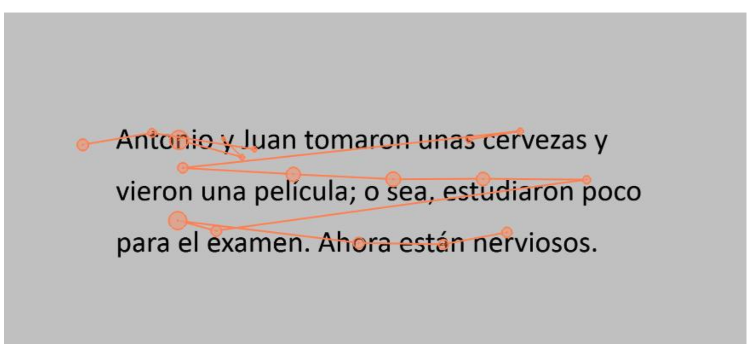


Fig. 51. Visual pattern. Conclusion with o sea.

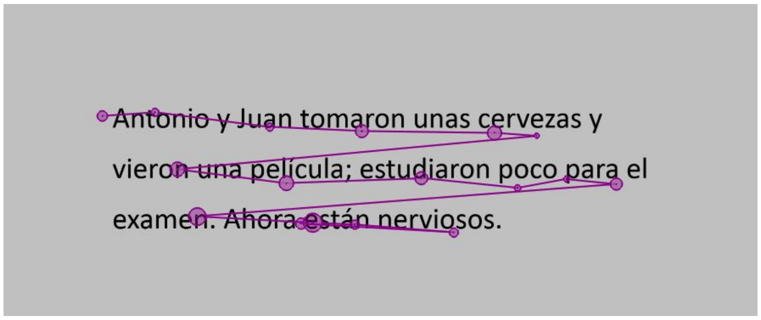


Fig. 52. Visual pattern. Conclusion without o sea.

Figs. 51 and 52 show a stable reading in contrast with paraphrase (Figs. 27 and 28) and reformulation (Figs. 38 and 39): the number of circles and lines both figures is balanced, which indicates that fixations and regressions are well distributed among the contents composing the sentences. This favors the linear representation of conclusion, in accordance with theory. M1 and M2 must be evenly fixated because they present relevant information: on the one hand, M1 covers the premises from which the conclusion is derived; readers should keep these contents in mind because the conclusion would not exist without them. On the other, M2 presents the conclusion, which allows to continue the discourse adequately. To this regard, Figs. 52 and 53 show that participants read the continuation after the sentence (i.e., the post-phrase), which indicates that they assimilate arguments and conclusions without problems (see again paraphrase and reformulation, in which readers needed to come back to M2 to ensure ideas). At first sight, these pictures do not show clearly it is not clear how the discourse marker influences the whole processing of the critical sentence since they do not seem to show several differences.

This description is, however, tentative: it requires a more detailed observation to count all the eye-movements triggering such pictures.

5.4.1.2. Eye-movements manual count in conclusion

Tables 34 and 35 preseent all the ocular movements retrieved during the experiments (see Figs. 53 and 54). Differences regarding paraphrase and reformulation are found:

AOI	FC	PF	RF	R into AOI	R out of AOI
M1	307	227	62	56	52
K [o sea]	56	44	9	8	10
M2	226	169	46	49	44

Table 34. Total eye-movements manual count in conclusion introduced by a discourse marker.

AOI	FC	PF	RF	R into AOI	R out of AOI
M1	307	223	56	44	50
M2	225	165	42	33	38

Table 35. Total eye-movements manual count in conclusion without a discourse marker.

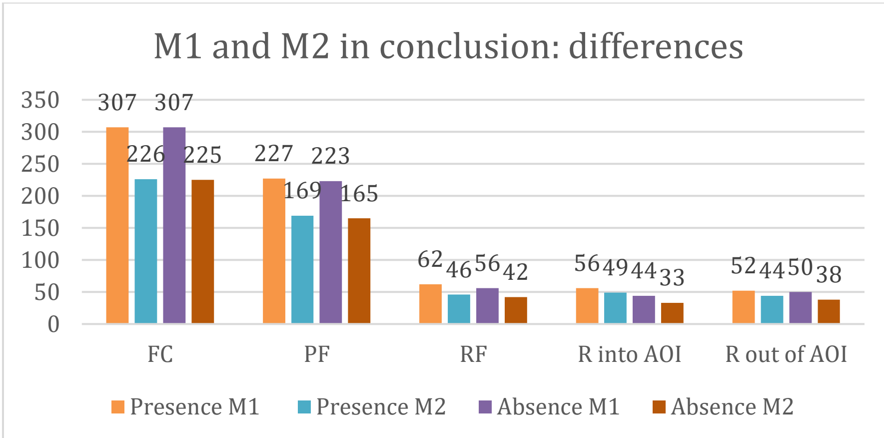


Fig. 53. Differences between M1 and M2 in conclusion are not big.

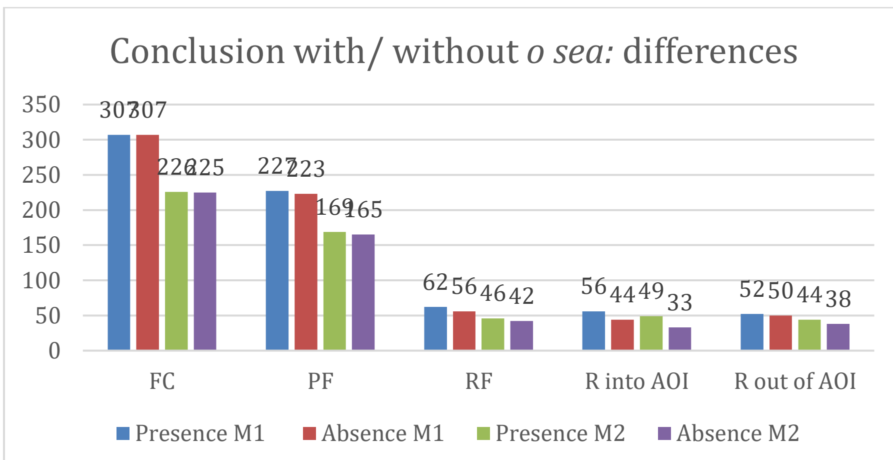


Fig. 54. Conclusion with and without a discourse marker are similar in terms of eye-movements.

Tables 34 and 35 show a greater number of eye-movements in comparison with paraphrase and reformulation (see Tables 18, 19, 27, and 28). Such an increase results from two factors: (i) the presence of the discourse marker and, specifically, (ii) the length of M1 and M2 in this function (conclusion presents much more information to be read). Readers stop to retrieve information from each AOI. A closer look to these results show interesting insight.

Fixation count (FC)

In general, conclusion requires the same number of FC for M1 and M2 under both conditions According to this, conclusion is similarly assimilated despite the presence or absence of a discourse marker; in other words, conclusions with and without a discourse marker do not differ so much. The number of fixations on *o sea* supports this idea: it does not gather several fixations compared to the M1 or M2 (k= 56). Furthermore, M1 receives some fixations more than the M2 in both cases: that result would reflect that premises are more important with regard to their informativity; it also supports the bottle-neck cognitive movement expected for conclusions (see §4.2.2.), in which several information first united is transformed into a unique consequence.

Progressive (PF) and regressive fixations (RF)

On the one hand, the number of PF and PF is almost identical in sentences with and without a discourse marker, which supports FC results: at least in eye-movements, the absence of a discourse marker does not involve decisive changes. This is supported by the discourse marker results. Again, it retrieves less fixations than M1 and M2: concerning PF, M1 is five times bigger, and M2 triplicates the ocular input of *o sea*; concerning RF, M1 is seven times bigger; M2 costs five times more (see Fig. 55).

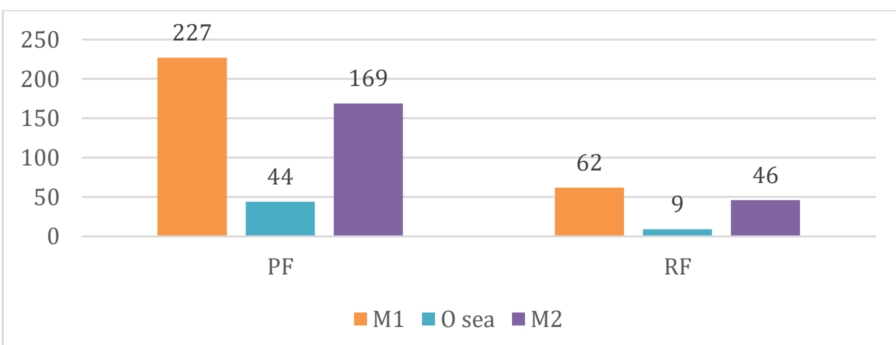


Fig. 55. Disbalance between M1, o sea and M2 in PF and RF behind conclusions. Discourse marker is ignored.

This result would derive from the grammatical nature of the function addressed: conclusions are easier established with or without a discourse marker compared to formulative functions (Rossari 1994, 2000).

On the other hand, PF are bigger than RF: this indicates that the arguments before the conclusion retrieve more the readers' attention, probably after focusing on the verb so as to integrate both AOIs; for its part, PF on M2 might result from focusing on the verb or the discourse marker. Considering that the same sentence without *o sea* shows almost the same number of PF, possibly readrs move towards M2 from M1 and not from the discourse marker. Regarding RF, they are smaller as PF, which suggests that, in general, readers move forward in interpreting conclusions: arguments are re-read a few times more than conclusion, which coincides with that idea of arguments as essential to understand the information behind the conclusion; for this reason, readers come back from M2 to refocus them.

Three basic ideas are derived from these results: (a) M1 is important to assimilate the whole sentence; (b) the number of fixations is also big for the M2 ─if compared to paraphrase or reformulation (see Tables 21 and 29)─, which suggests that it also requires cognitive efforts from readers; and (c) readers do not focus as much as it would seem on the discourse marker; there are no general differences between critical sentences with and without *o sea*. Regressions into and out of AOI also reflect this.

Regressions in and out of AOI

Readers integrate arguments and conclusions syntactically and semantically without problems: the number of R into and out of AOI is almost identical with or without the presence of *o sea*; furthermore, they are very equilibrated: only 1 to 5 regressions distinguish R into from R out of AOI. In other words, readers have the same interest on both M1 and M2, rather than on the discourse marker (8 and 10). Regressions out of AOI show how both arguments and conclusions are structurally integrated (Underwood 1998): M1 is integrated to the M2 (52 regressions out of), and M2 does the same to M1 (44 regressions out of). The fact that, again, M1 is a bit bigger than M2 suggests the importance of arguments behind this AOI, and how their assimilation facilitates understanding the conclusion.

In a nutshell, the qualitative analysis of ocular movements in conclusions can be summarized with the following statements:

- Conclusion seems to distribute eye-movements among arguments M1 and conclusions M2. In general, conclusion present further fixations than discursive functions, which is due to the length of the sentence and, especially, to the informativity behind contents. Most of the fixations are PF, which suggests that most of the information is assimilated once readers move forward on the text than after coming back;
- The discourse marker is less fixated; it seems that there are no big differences between sentences with and without *o sea* concerning ocular movements. Such data should be also reflected by reading times (see §5.4.2.)
- The number of regressions is also bigger than in paraphrases and reformulations: that would indicate a clearer syntactic (R out of AOI) and semantic (R into AOI) integration of contents.

Conclusion qualitative results —and their corresponding hypotheses— are tested with decision trees. Figs. 58 and 59 reproduce data for conclusion with and without a discourse marker respectively. Results above seem to be supported by decision trees: on the one hand, PF are the most predictive parameter; on the other, there are no further differences between Fig. 58 and 59. Predictive parameters are organized as follows:

Fig. 56. Predictive parameters in conclusion with o sea organized according to their relevance.

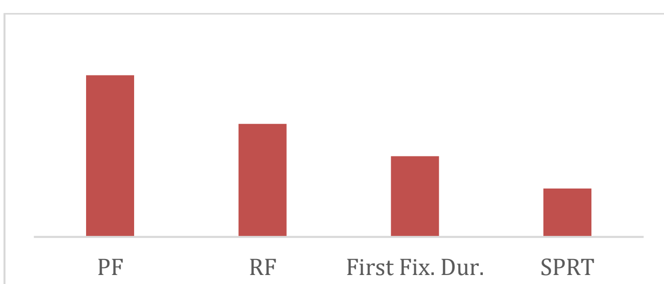


Fig. 57. Predictive parameters in conclusion without o sea organized according to their relevance.

Both decision trees present a strong relationship with SPRT; they show small differences:

- Fig. 58 shows that SPRT is decisive in conclusions: if it costs less than 504, then depends on the PF produced. PF are also decisive during the FPRT, but this parameter is less relevant, as shown by the position occupied in the tree and the number of repetitions (FPRT=1; SPRT=2). Finally, RF are also related to conclusions with a discourse marker, which suggests that the assimilation also depends on this parameter; however, RF is placed at the bottom of the tree, which means that it is supedited to PF.
- Fig. 59 is almost identical to that above. Conclusion without discourse marker is also based on PF; however, the relevance of SPRT is not as big as in the preceding one: instead this, the tree reveals that RF are related to Single fixation duration; in other words, that most of the RF produced result from fixations produced only once. According to Table 36, M2 retrieves 42 RF, which suggests that readers only need to focus once on conclusion so as to understand its meaning after addressing M1 further times. For its part, SPRT does not convey an acceptable p-value (0.018); this might mean that conclusions without a discourse marker are assimilated even before this reading stage, or that efforts are needed before.

These statistical results confirm hypotheses 7; hypothesis 9, however, is apparently rejected:

- Concerning hypothesis 7, data show that PF and RF are relevant in establishing reformulations, but that PF are the most predictive values. Manual count and strong p-values confirm this.
- Data are very similar in sentences with and without a discourse marker; they only differ regarding the reading stage where PF are relevant: conclusions with *o sea* are solved during SPRT, while Single fixation durations are decisive in conclusions without the discourse marker.
- This suggests that the absence of *o sea* does not affect the processing of conclusion: indeed, according to decision trees, it seems that M2 is well processed the first time it is observed without the help of the marker. In other words, contrary to paraphrase

and reformulation, discourse markers do not facilitate processing conclusions; at least, as shown by eye-movements. This forces to reject hypothesis 9.

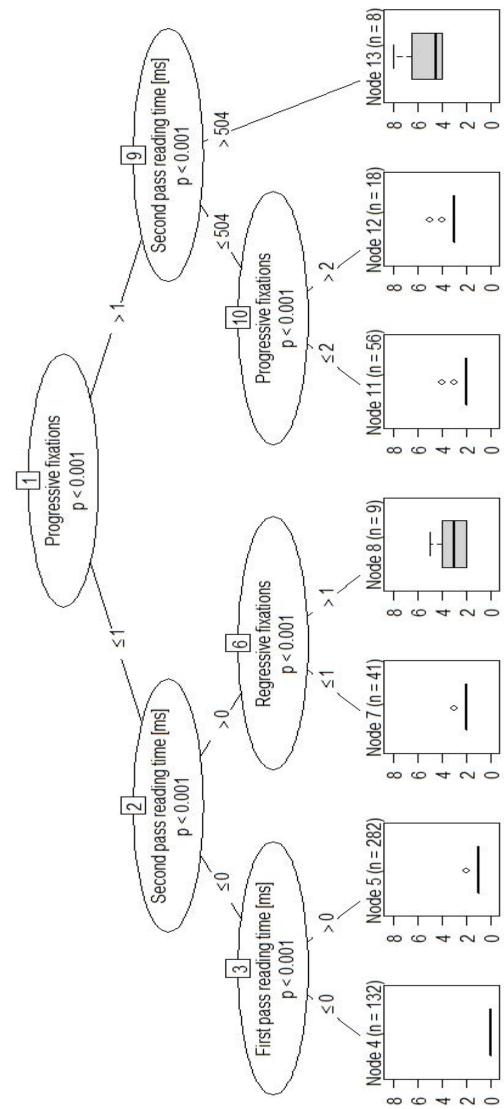


Fig. 58. Decision tree. Conclusion with o sea.

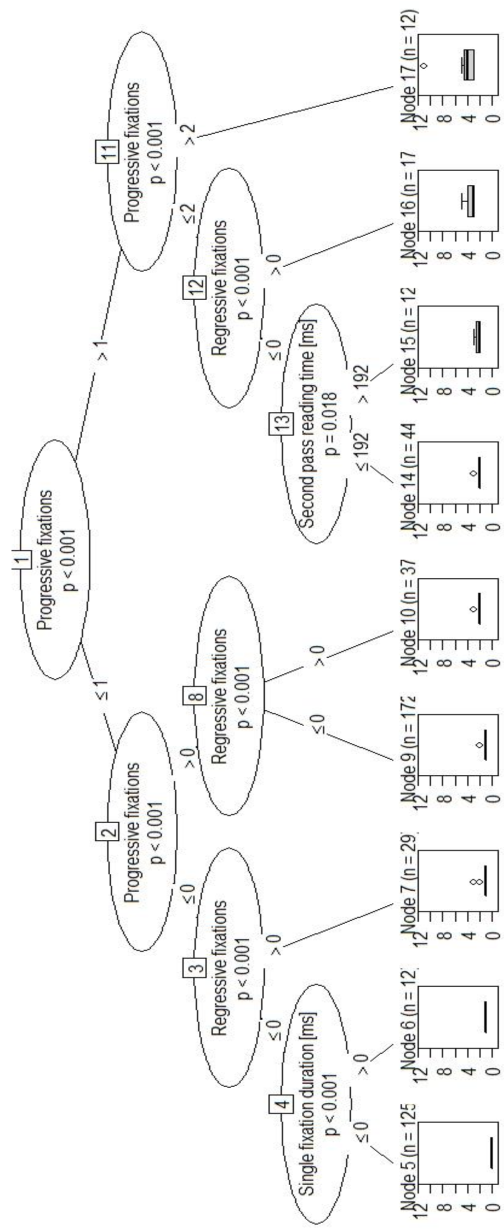


Fig. 59. Decision tree. Conclusion without o sea.

Temporal reading values contribute to better understand the results obtained in this section. Additionally, they answer some research questions derived from the high degree of similarity between conclusions with and without a discourse marker: (a) can conclusion eye-movements be distinguished from their corresponding reading times? (b) How long are PF and RF in conclusion? (c) Do discourse markers have a relevant role in terms of processing times? (d) Does the linearity behind eye-movements has its counterpart in reading times? Linear mixed regression models solve these questions and provide the analysis with more accuracy. Results are presented next (§5.4.2.)

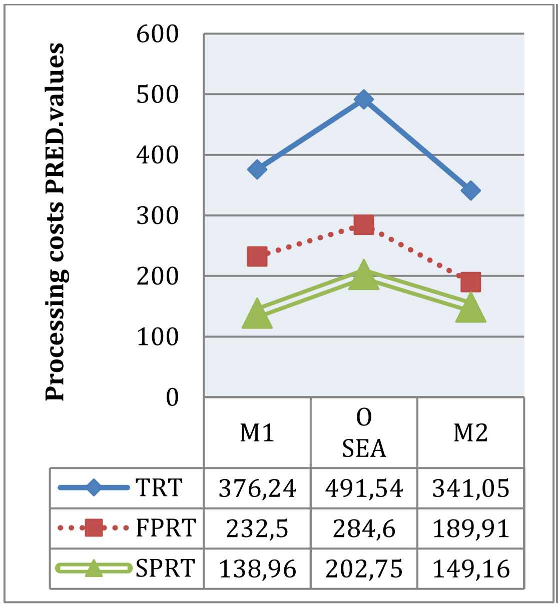
5.4.2. Mixed-models and conclusion: testing temporal measures

Temporal hypothesis 1 to 3 predict that TRT, FPRT and SPRT are shorter and more regular in grammatical functions such as conclusion (see §5.2. and §5.3.): it is expected for M1 and M2 not to be different. Despite ocular movements results, hypothesis 4 predicts that discourse markers should have some effect in processing conclusions (see §4.2.2. and §5.6.), while hypothesis 5 argues for its unrelevance. If these hypotheses are confirmed, experimental conclusion should coincide with Zenone's (1982) triple division proposed from theory: (i) a logical-semantical level, "where inferential links are established between contents explicitly or implicitly connected by the sentence orientation or the discourse marker(s) employed"; (ii) the argumentative level, "during which different argumentative movements are established (concessions, consecutions, and so on)"; (iii) and the functional level, "where the hierarchical organization and contents integration involved in the conclusive procedure take place" (Zenone 1982: 108). Levels (i) and (ii) would correspond to the FPRT; (iii) with the SPRT. The next subsection presents the statistical results supporting or rejecting the hypotheses proposed ─model 3 (see Appendix 3; CONCLUSION)─.

5.4.2.1. Temporal pattern in conclusion

Conclusion expects equilibrated temporal results due to its grammaticality: on the one hand, TRT shows equilibrated values coinciding with the idea of "backward causal construction" (Sanders & Spooren 2015: 62): differences between sentences with and without a discourse marker are trivial (3,21% of trivial statistical effects). This suggests that (a) arguments and conclusions are similarly assimilated ─as a whole─; (b) the discourse marker is very regular compared to discursive functions; for this reason, FPRT and SPRT differ only on 82 ms. (see Fig. 62); and that (c) discourse markers are not as relevant as it would seem in establishing relations of conclusion (see eye-movements distribution in §5.4.1.2). These experimental findings related to *o sea* are also conveyed by Loureda et al.

(2016) with *por tanto*: this supports the idea that polyfunctionality of discourse markers would have their experimental counterpart (see §2.2., §4.2.2.). Observe Figs. 60 and 61:



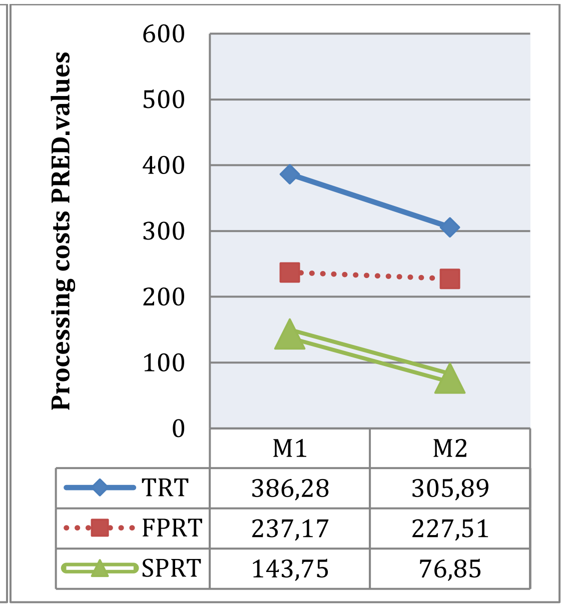


Fig. 60. M1, o sea, and M2 in conclusion with o sea

Fig. 61. M1 and M2 in conclusion

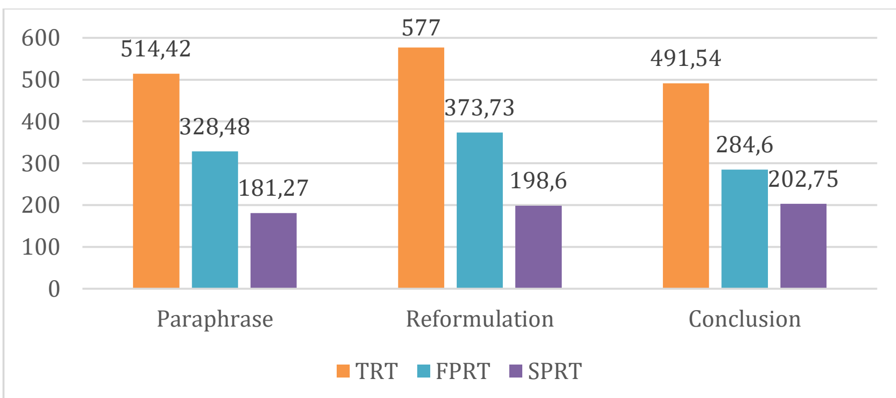


Fig. 62. Comparison between o sea in paraphrase, reformulation and conclusion. Conclusion is the easiest one.

Tables 36, 37 and 38 detail these ideas, especially regarding the fact that conclusions without a discourse marker are processed with less (apparent) difficulties:

TRT	M1	*O sea*	M2
Con. *o sea*	376,24	491,54	341,05
Con. Ø	386,28		305,89
[effects]	2,67%		-10,31%

Table 36. Total reading time. Conclusion.

FPRT	M1	*O sea*	M2
Con. *o sea*	**232,5**	**284,6**	**189,91**
Con. Ø	**237,17**		**227,51**
[effects]	2,01%		19,80%

Table 37. First-pass reading time. Conclusion.

SPRT	M1	O *sea*	M2
Con. *o sea*	**138,96**	**202,75**	**149,16**
Con. Ø	**143,75**		**76,85**
[effects]	3,45%		48,48%

Table 38. Second-pass reading time. Conclusion.

On the one hand, M1 and M2 show similar values in the three reading times: they do not differ more than 80 ms., which is supported by medium, large, and very large statistical effects, as shown in Table 39. This indicates that conclusion is as regular as is expected:

	M1 Osea	M2 **Osea**	Effects	M1	M2	Effects
TRT	376,24	341,05	**9,35%**	386,28	305,89	**20,81%**
FPRT	232,5	189,91	**18,32%**	237,17	227,51	4,07%
SPRT	138,96	149,16	**7,34%**	143,75	76,85	**46,54%**

Table 39. Conclusion. Overview M1-M2 in sentences with and without a discourse marker.

Despite differences are small, they reveal interesting information. M1 is costlier than M2; there exists only one exception to this generalization: SPRT values in sentences with a discourse marker (138,96 vs. 149,16). In these cases, M2 requires extra time to be processed instead of being reduced; this result suggests that the presence of the discourse marker perhaps complicates the integration of its procedural instruction and the linguistic meaning behind arguments and the conclusion. In absence of the discourse marker, however, M2 is reduced a 46,54% (very large effects), from 143,75 to 76,85 ms.: it seems that the grammatical basis of this function does not need procedural instructions to be processed without problems. The faster contents are read, the better assimilated they are. These results are in line with theoretical approaches to conclusion (see 4.2.1. and 4.2.2.).

SPRT	138,96	149,16	**7,34%**	143,75	76,85	**46,54%**

On the other hand, a focus on the three reading times shows further information supporting that above: M1 in sentences with and without *o sea* is similar during FPRT and SPRT, which coincides with eye-movement count and decision trees results about relevance and informativity of arguments. Furthermore, this regularity behind results supports that lexical word-recognition (FPRT) seems easier if compared to discursive functions. The same M2, however, presents differences depending on the reading stage and the presence or absence of the marker:

	O sea	*No o sea*		*O sea*	*No o sea*	
	M1	M1	[effects]	M2	M2	[effects]
TRT	376.24	386.28	2,67%	341.05	305.89	**10,31%**
FPRT	232.5	237.17	2,01%	189.91	227.51	**19,80%**
SPRT	138.96	143.75	3,45%	149.16	76.85	**48,48%**

Table 40. Overview of conclusion.

The discourse marker reduces costs for M2 during FPRT (189,91 vs. 227,51); however, SPRT inverts results: readers require less efforts to assimilate it in sentences without a discourse marker (76,85 vs. 149,16), as proven by a 48,48% of very large statistical effects behind their comparison. In other words, efforts are reduced during FPRT, but the discourse marker provokes that SPRT shows big values, reflecting difficulties in assimilating arguments and conclusions.

5.4.2.2. Final remarks

In sum, conclusion presents a stable cognitive pattern with nuances which do not alter its regularity:

- Conclusion with and without a discourse marker is more regular than paraphrase and reformulation (see §5.2. and §5.3.);
- The discourse marker is easier than in discursive functions; given that it presents different processing values it is possible to establish differences leading to its polyfunctionality;
- M1 require cognitive efforts in sentences with and without *o sea* during FPRT and SPRT; such efforts are bigger during FPRT since lexical assumptions concerning the arguments are established. M2, however, requires bigger efforts if it is preceded by the marker: although M2 during FPRT in sentences without *o sea* is increased, it reduces costs considerably during SPRT. This means that, pragmatically, readers assume that the consequence is derived from the preceding arguments by considering their semantic and contextual features rather than by the instruction of *o sea*, which demands more efforts with its presence.

The analysis proposed in this section reveals that conclusion is based on a linear pattern. Results confirm temporal hypotheses 1 to 3: TRT, FPRT and SPRT are lower and more stable than in discursive functions. Given that conclusion does not involve a new discourse plan but communicate a complete message, discursive functions and conclusion work at different levels. Processing peaks are not found, with supports the linear reading based on PF retrieved in §5.4.1.2. Hypothesis 4, however, cannot be accepted: it is true that its presence reduces processing costs during FPRT, but readers are able to assimilate M1 and M2 faster when they do not have to focus on the discourse marker (see Tables 40 and 41). Section §5.6. will contrast these results with detail.

5.5. Correction

Correction (Keating 1991; Schegloff, Jefferson & Sacks 1977) is related to the notion of invalidation: equivalence or distance are discarded. This discursive function requires the cancellation of the old formulation in order to accept the new one, which contains the only valid information for this communicative situation. Invalidation is possible thanks to a meaning-based negation: the speaker's aim to introduce a semantic-pragmatic adequate expression negates which is said before; in other words, it is not necessary to negate explicitly the old formulation because the new one do so by itself (see §4.2.1., §4.2.2. and §5.6.).

Two general assumptions summarize this theoretical description: (i) correction requires very high processing costs to be completely assimilated; (ii) correction needs the aid of a discourse marker given its discursive complexity. Again, the following hypotheses operationalize such assumptions:

- The first assumption is tested by hypotheses (1), (2), (3) and (8). Fixations and regressions prove the hypothesis (7); FPRT, SPRT and TRT prove hypotheses (1) to (3). An outlier discursive function such as correction involves the biggest processing efforts in terms of reading times; the same is true for eye-movements in hypothesis (8).
- The second assumption is tested by hypotheses (4) and (9). Fixations and regressions prove the hypothesis (9); FPRT, SPRT and TRT prove the hypothesis

(4). Corrections with a discourse marker should be faster and easier than those without it. Hypotheses (4) and (9) test this idea through eye-movements and reading times.

The following contexts and critical sentences have tested the assumptions and hypotheses above (see their design in §4.3.2. and §4.3.3.):

Contexts	Critical sentences
Mar y Rafael son un matrimonio asturiano. Para la cena familiar de navidad quieren preparar pescado con salsas de vino. Seguirán la receta tradicional para elaborar la salsa.	Mar y Rafael usan vino tinto [MEMBER 1]; o sea [DM], blanco [MEMBER 2]. De este modo la salsa queda más sabrosa. Mar y Rafael usan vino tinto [MEMBER 1]; blanco [MEMBER 2]. De este modo la salsa queda más sabrosa.
Adrián y Elena son dos estudiantes de doctorado en la universidad. Durante los últimos meses han estado muy estresados con el trabajo y la investigación. Para desconectar un poco, anoche salieron a cenar fuera de casa.	Adrián y Elena cenaron en un restaurante italiano [MEMBER 1]; o sea [DM], mexicano. [MEMBER 2]. La comida estaba picante. Adrián y Elena cenaron en un restaurante italiano [MEMBER 1]; mexicano [MEMBER 2]. La comida estaba picante.

Table 41. Contexts and critical sentences for correction in the experiment.

Some of the results obtained in these experiments are:

(a) Corrections show a big number of fixations reflecting high cognitive processing efforts. Corrections expressed with and without a discourse marker present differences concerning eye-movements and reading duration;

(b) Decision trees confirm the importance of PF in establishing correction with and without discourse marker; specifically, PF are related to the second pass reading time in sentences with *o sea*;

(c) Corrections without a discourse marker are costlier, especially during the SPRT, which suggests problems in disambiguating meanings behind M1 and M2 and integrating them within the context ─or, in other words, problems in understanding invalidation─.

These results are detailed in the next subsections: §5.5.1. addresses (a) and (b); §5.5.2. focuses on (c).

5.5.1. Visual description and manual count

5.5.1.1. Visual patterns in correction

Correction should involve a big number of PF and RF supporting a repeated backward-forward ocular movement between M1 and M2 (hypothesis 8); fixations should be bigger in M2 because it constitutes the invalidating formulation. The presence of a discourse marker should facilitate processing correction in a clear way (hypothesis 9); without its presence, the recipient would invalidate M1 only by comparing the extreme distance it shares with M2. This might lead readers to a lack of understanding (see expected results in §4.2.2.). Visual patterns, manual count and decision trees support these hypotheses. Observe the following figures:

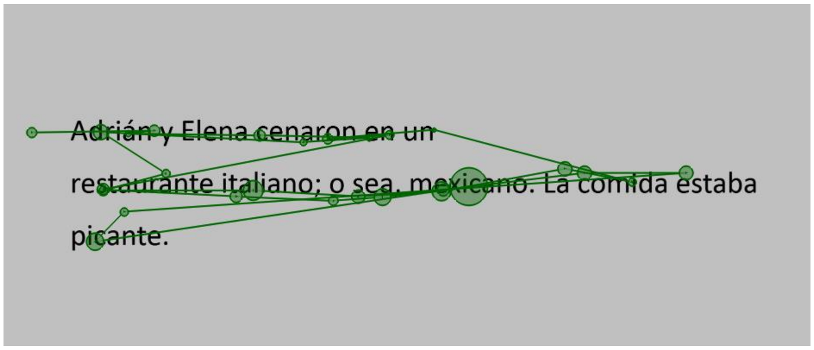


Fig. 63. Visual pattern in correction with a discourse marker.

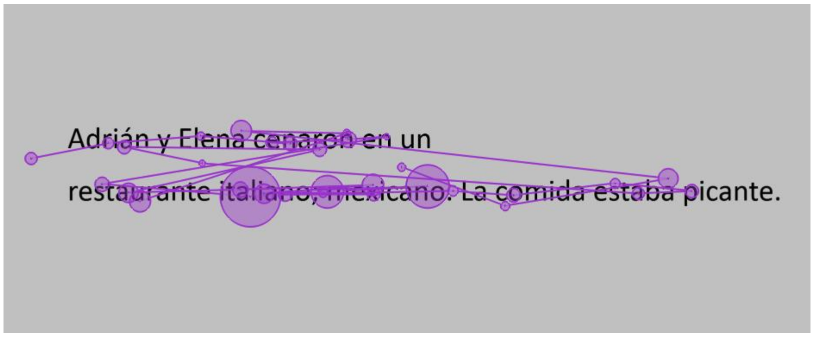


Fig. 64. Visual pattern in correction without a discourse marker.

Figs. 63 and 64 show two costly patterns, bigger than in other functions (see §5.2.1.1., §5.3.1.1., and §5.4.1.1.). Circles and lines are abundant and unalike; additionally, Fig. 64 presents bigger circles reflecting possible processing difficulties. According to this, M2 should retrieve more fixations than M1: alghough M1 is also relevant for the invalidation process, the second formulation changes the orientation of the whole message, achieving the speaker's initial communicative aim with the recipient. Concerning the discourse marker, apparently its presence facilitates processing the two formulations─.

This qualitative description requires further details by counting the ocular movements which triggered it.

5.5.1.2. Eye-movements manual count in correction

Eye-movements confirm the descriptive results above: correction is not a simple cognitive function. A big number of eye-movements reveal problems to understand contents in a clear way. This function seeems to be hardly processed especially in sentences without *o sea*. Observe Tables 42 and 43, complemented by Figs. 65 and 66 facilitating their interpretation:

AOI	FC	PF	RF	R into AOI	R out of AOI
M1	111	77	30	26	25
K [o sea]	98	**65**	28	24	14
M2	95	81	9	5	29

Table 42. Total eye-movements manual count in correction introduced by a discourse marker.

AOI	FC	PF	RF	R into AOI	R out of AOI
M1	115	56	48	**42**	17
M2	**129**	**95**	**25**	15	**39**

Table 43. Total eye-movements manual count in correction without a discourse marker.

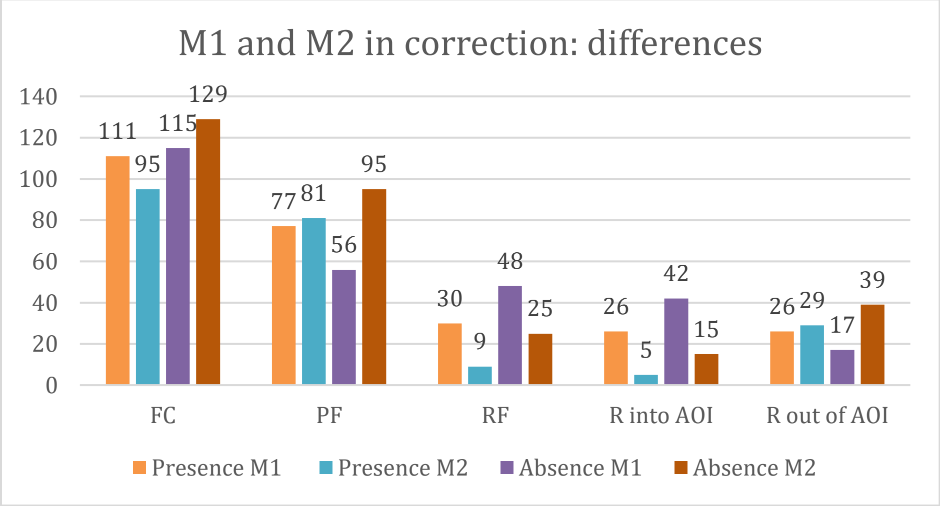


Fig. 65. M2 involves more efforts than M1 in correction

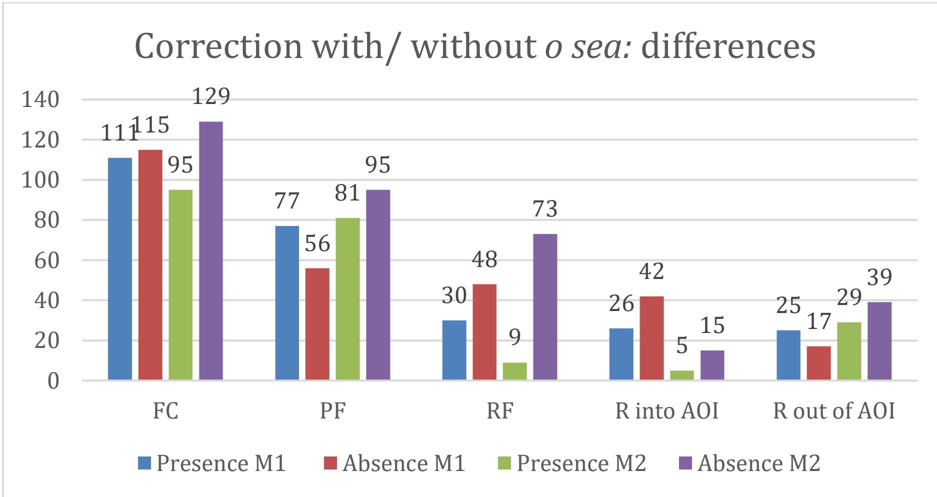


Fig. 66. The absence of a discourse marker involves more eye-movements in correction

Fixation count (FC)

Readers need the same efforts to process M1 under both conditions since it involves a similar number of fixations. However, processing M2 in sentences with a discourse marker is easier than in sentences without it. Given that fixations correspond to the moments when the brain assimilates observed information, M2 without *o sea* would receive longer attention from readers because it is hard to disambiguate its meaning without a clear instruction prceding it. This result suggests that the discourse marker has a leading role in interpreting corrections.

Progressive (PF) and regressive fixations (RF)

Concerning PF, M1 requires a more reduced number than M2 in sentences with a discourse marker. Their difference however is small, which indicates that readers go forward and back between both formulations: readers move on from the verb to the M1; they also move on from the discourse marker and from the M1 to the M2. The absence of discourse marker affects especially M2: readers reduce their attention on M1 but increase PF on M2. This suggests that readers jump a lot from M1 to M2 perhaps because they do not recognize their relationship.

RF complement PF the interpretation above. Again, M1 retrieves more RF than M2 in sentences with a discourse marker. Once the new formulation assimilated, readers do not need to come back and reinterpret it. The fact that M1 continues requiring further fixations to assimilate it suggests a hard-integration of both M1 and M2: readers see them together, but they are not semantically related but as contrary terms. Such an operation is not easily identified at first sight. Furthermore, sentences without a discourse marker show different behavior: participants re-read M1 and M2 more times compared to sentences with *o sea*. Therefore, the absence of a discourse marker seems to trigger further reading difficulties concerning the two formulations.

<u>Regressions in and out of AOI</u>

Finally, the number of Rs in and out of AOI support the ideas above: R into AOI reveal that readers need to come back to M1 more times when the discourse marker is not employed, which means that its meaning is not being well-assimilated. The reduced number of R out of AOI (specifically, from M1) in the same condition suggests that the content is not integrated to M2; the same can be said for this last one. These values indicate an unsteady panorama of corrections introduced without procedural instructions. For its part, the discourse marker stabilizes the process: readers focus on M1 and integrate it producing almost the same efforts (26 regressions into and 25 out of); M2 receives fewer regressions after the discourse marker, but the formulation seems to be related to M1 and *o sea* (29 regressions out of; that is why it presents 81 progressive fixations and 9 regressive fixations only ─see Table 43─).

To sum up, the following statements define correction in terms of eye-movements:

- FC are high in M1, M2 and *o sea* ─in this sense, this function is similar to reformulation─ . The absence of discourse marker increases PF and RF for M2 (see Table 42 and 43).
- Readers have thus difficulties to assimilate the content behind an invalidation: paraphrases are hard because readers should relate two repeated meanings and, so to speak, they work twice as hard. The same happens with correction: in this sense, the gradual idea of paraphrase > reformulation > correction explored in Pons (2013) would be experimentally plausible. Regressions into and out of the AOIs seem to support this idea (see §5.6. for further details).

- Regressions into and out of the AOI seem to support this idea: correction triggers abundant ocular movements —see, in contrast, reformulation, for example—; the absence of *o sea* triggers more regressions, especially out of M2 and into M1. These jumps probably reflect a lack of assimilation.

Decision trees test statistically these qualitative results and their corresponding hypotheses. They confirm that PF and RF are related to SPRT, which constitutes the most predictive parameter in both threes. Figs. 69 and 70 present trees with and without the discourse marker; subtle differences are found: on the one hand, the decision tree without *o sea* seems more complex, probably due to the processing problems behind such condition. On the other, fixations and SPRT are related to other different parameters depending on the condition addressed. The predictability of these parameters is next summarized in Figs. 67 and 68:

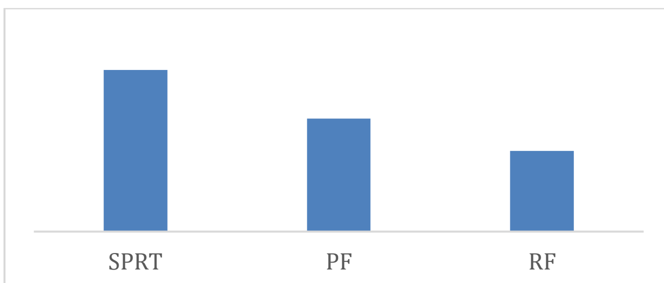


Fig. 67. Predictive parameters in correction with o sea, organized according to their relevance.

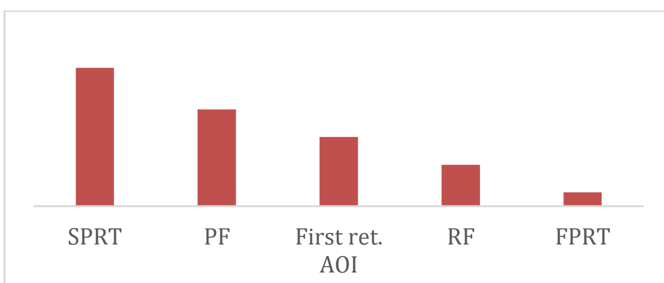


Fig. 68. Predictive parameters in correction without o sea, organized according to their relevance.

According to the decision trees, PF and RF are always relevant in establishing correction; this result is similar to reformulation decision trees (see §5.3.1.2.); however, they present strong relationship with other temporal parameters, especially in sentences without a discourse marker, and SPRT is even more predictive than PF and RF, which suggests that reading times will reveal decisive information for this function (see §5.5.2.):

- Fig. 69 presents a simpler decision tree for sentences with a discourse marker. SPRT is placed in the top. This reading stage predicts the fixations produced in correction: if SPRT costs 231 ms. or less, PF are produced; however, if it is higher than 231 ms. they are RF (especially if they present 748 ms. or more). This suggests that correction gathers most of the cognitive activity during re-readings and the pragmatic interpretation of the relationship. According to this, the highest SPRT is, the bigger number of RF is produced or, in other words, readers present difficulties to assimilate the read contents and thus need to come back to focus on them again. This decision tree is supported by strong p-values (p=0.001 and 0.003) and nodes repetition (PF appears once but with a reduced p-value; SPRT and RF appear twice, but the last is repeated with a bigger p-value).
- Fig 70 shows that the absence of a discourse marker changes results and provides a more complex statistical test. Again, SPRT is decisive, but further reading stages are related to PF and RF: First return to AOI is detected by the tree, which suggests that first re-readings trigger high processing costs in assimilating the function (see 5.5.2.), specifically if it costs around 307 ms. If SPRT costs more than 307 ms., RF play the key role. This result coincides with the qualitative analysis above: PF and RF in sentences without a discourse marker are very big (see Table 44). Additionally, the tree predicts the importance of FPRT; it is not as relevant as SPRT, but its presence suggests that correction is not easy during the establishment of first lexical assumptions: this result is expected given that two antonym expressions are related in this function.

These statistical results confirm hypotheses 8 and 9:

- Concerning hypothesis 8, data confirm that PF and RF are relevant in establishing corrections, especially during SPRT under both conditions. Their influence is bigger than in paraphrase and reformulation, which is proven, on the one hand, by the high qualitative results for M1 and M2 above and, on the other, by decision tree results.

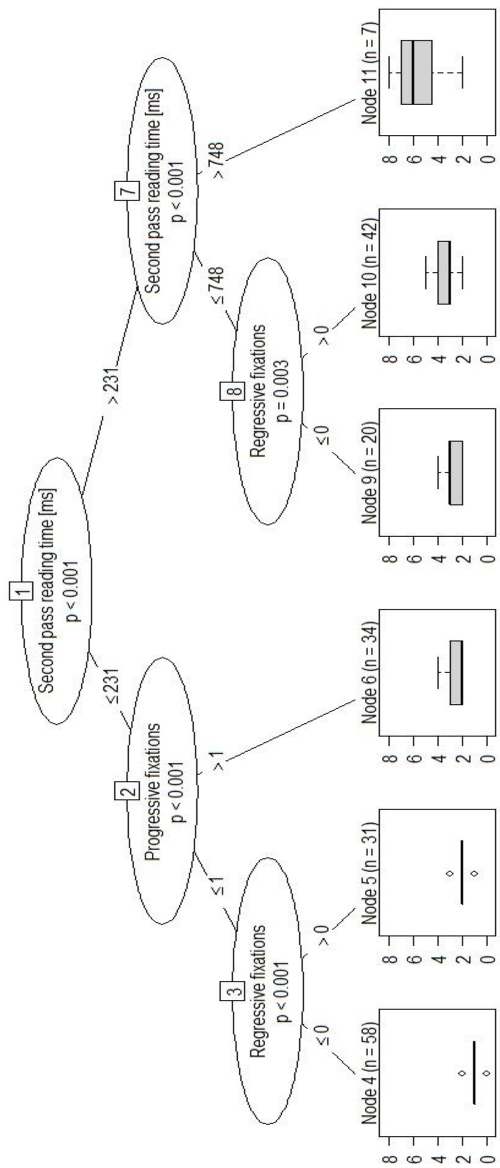


Fig. 69. Decision tree. Correction with o sea.

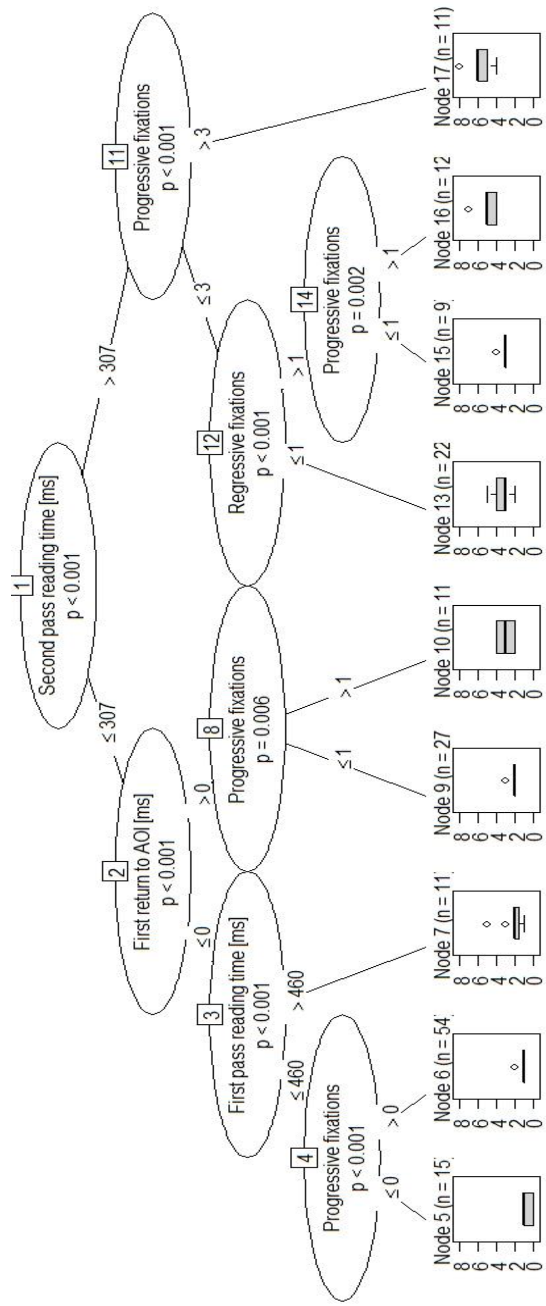


Fig. 70. Decision tree. Correction without o sea.

- Concerning hypothesis 9, it can be accepted: qualitative analysis reveals that the absence of a discourse affects the output obtained; furthermore, the decision tree is different from that in corrections with a discourse marker.

These results establish a bridge between eye-movements and reading times. Again, some research questions are triggered: (b) How long are fixations ─regressive and progressive─

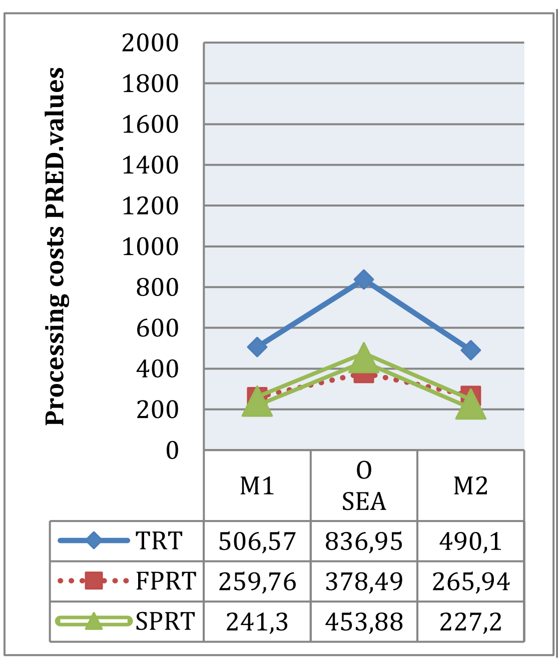
produced in correction? Do re-readings have a relevant role as suggested in decision trees? (c) Are there differences between FPRT and SPRT with and without a discourse marker? (d) Does the discourse marker present different reading times? Temporal data solve these questions and strengths the analysis above. To do so, linear mixed regression models are applied. Results are presented next (§5.5.2.).

5.5.2. Mixed-models and correction: testing temporal measures.

Hypotheses 1 to 3 predict longer TRT, FPRT and SPRT for correction compared to the preceding functions: given that invalidation involves a semantic-pragmatic abandon of contents, the recipient should detect that M1 and M2 do not share equivalence, cause-consequence, or subtle differences, and this is not an easy operation. Hypothesis 4 validates how useful are discourse markers to do so (see §4.2.2. and §5.6.). In accordance with decision tree results, SPRT will be decisive in assimilating this relationship, and sentences without a discourse marker will be harder. The next subsection presents the statistical results testing these hypotheses ─model 4 (see Appendix 3; CORRECTION)─.

5.5.2.1. Temporal pattern in correction

Correction is expected to present very high values due to its outlier discursive nature. Observe Figs. 71 and 72 to this regard:



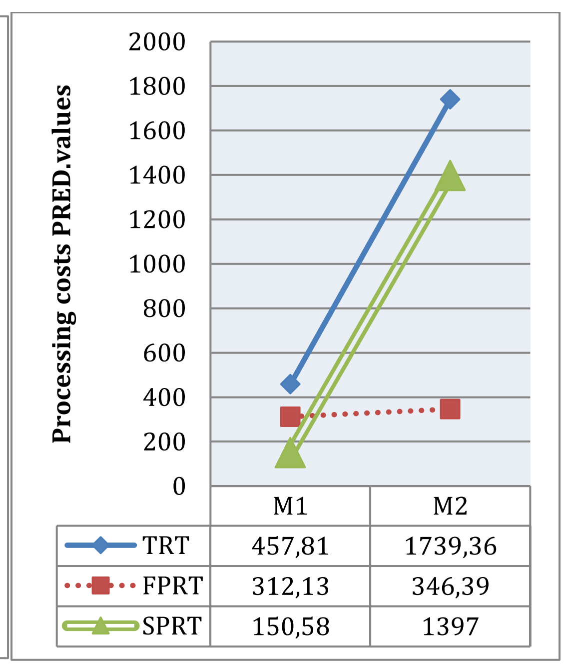


Fig. 71. M1, o sea, and M2 in correction. Fig. 72. M1 and M2 in correction

At first sight, TRT presents high results, especially in sentences without a discourse marker, which shows a big peak between M1 and M2. This reflects the difficulty behind processing (a) an invalidation of contents and (b) the discourse marker relating these contents structurally but, at the same time, highlighting that the new formulation cancels the preceding one. This last idea is supported by the discourse marker, which costs almost 850 ms. to be totally processed; this is the highest result retrieved for *o sea* in the four functions addressed in this chapter. FPRT and SPRT are high again, specifically sentences without *o sea*, which suggests that the discourse marker plays a relevant role in the contextual assimilation of correction. It seems that lexical word-recognition and construction of first communicative assumptions are regular processes in correction, but invalidation triggers assimilation difficulties during the pragmatic (re)interpretation: this is the biggest difference between correction and the other functions. These ideas are explored through the following reading times data, statistically supported by percentages and effects:

TRT	M1	*O sea*	M2
Con. *o sea*	506,57	**836,95**	490,1
Con. Ø	457,82		**1739,36**
[effects]	9,63%		**254,90%**

Table 44. Total reading time. Correction.

FPRT	M1	*O sea*	M2
Con. *o sea*	259,76	**378,49**	265,94
Con. Ø	312,13		346,39
[effects]	20,16%		30,25%

Table 45. First-pass reading time. Correction.

SPRT	M1	*O sea*	M2
Con. *o sea*	241,3	**453,88**	227,2
Con. Ø	150,58		**1397**
[effects]	37,60%		514,88%

Table 46. Second-pass reading time. Correction.

TRT in present big values for both sentences with and without marker. However, the presence of *o sea* seems to balance such cognitive efforts: M1 costs 506.57, and M2 490.1; the discourse marker costs 836.95, which suggests that readers focus on it almost 1000 average milliseconds, but that such effort guarantees a global assimilation of correction integrating both formulations despite the invalidation they show. The absence of a discourse marker changes results drastically: M1 costs less than in sentences with *o sea* (their difference is based on a 9,63% of medium statistical effects); M2, however, triggers several processing costs abruptly (1739.36 ms., which costs a 254,90% of very large effects more than M2 preceded by *o sea*).

This result seem to confirm global qualitative data addressed in 5.5.1.1 and 5.5.1.2.: the discourse marker has a leading role in processing corrections. FPRT and SPRT should also reflect problems to assimilate M2: sentences with a discourse marker show similar processing costs for the M1 and M2 (data supported by a 2,38% of trivial statistical effects showing how similar they are). However, sentences without a discourse marker are not as stable as those having it: M1 costs 312.13 ms., but the m2 costs 346.39 ms. (a 10,98% ─medium statistical effects─). These data show that corrections with *o sea* during the FPRT are also complicated for readers; indeed, FPRT in correction present the biggest values in comparison with the other functions addressed in this dissertation, supporting the complexity of this function. However, difference between conditions are evident: while M1 and M2 in sentences with a discourse marker differ in a 2,38% only, M2 in sentences without a discourse marker cost 10,98% more than the M1[166].

Finally, the SPRT confirms what the FPRT partially shows. This reading stage triggers several cognitive processing costs in sentences without a discourse marker: on the one hand, sentences with *o sea* present a subtle reduction, which suggests an adequate assimilation of the read contents: M1 costs 241.3 ms. (a 7,11% less ─medium statistical effects─); M2 costs 227.2 (a 14,57% less ─large effects─); the discourse marker shows 453.88 ms. The efforts involved in the discourse marker redistribute cognitive efforts and ease the assimilation of M1 and M2 opposed expressions. On the other hand, sentences without *o sea*, however, reflect an abrupt change: M1 loses its regularity and is reduced to 150.58 (a 51, 76% less ─very large effects─). This would be a positive result, but M2 increases its processing costs 303,30% (from 346.39 ms. to 1397 ms.).

[166] The relevance of the discourse marker is also supported by comparing both conditions: the m1 from sentences without *o sea* costs a 20,16% more (very large effects) than the same content in sentences with *o sea*; the m2 needs a 30,25% more than the m2 in sentences preceded by the discourse marker.

According to the data, the assimilation of correction is solved during the second-pass reading time, as shown by decision trees. Readers must integrate both m1 and m2 contextually to understand the invalidation relationship they share:

- Once both formulations observed for the first time, readers should continue disambiguating the invalidation behind a correction. “Restaurante italiano” and “mexicano” are not equivalent contents (paraphrase); they do not share subtle differences (reformulation) neither are simply informative additions (conclusion): the latter (m2) cancels all inferences derived from the former (m1) and changes the discourse orientation completely. Readers continue asking themselves why they are expressed together, and separated by a semicolon only, if they are opposed contents. This produces constant jumps between contents to understand their meanings in such a strange communicative situation.

All these operations are not easy, and readers require several milliseconds to do so. However, the presence of a discourse marker guides their interpretation and eases the process: when corrections are not introduced by *o sea*, the m2 costs a 514,88% (very large effects) more than the same content preceded by the marker.

5.5.2.2. Final remarks

Two information are derived from such data:

1. One the one hand, correction is hard but balanced with the discourse marker *o sea*: it shows a very similar FPRT and SPRT despite being a discursive function. The efforts produced to process the discourse marker contribute to assimilate m1 and m2 adequately; the m2 (mexicano) even costs less than the m1 (restaurante italiano), which suggests a good cognitive process ─see condition 1 in tables 44, 45, and 46─.
2. On the other, another complex cognitive pattern: the absence of discourse marker difficulties the invalidation of the m1 with m2; especially during the SPRT ─which distinguishes correction from reformulation and especially from paraphrase, in which the FPRT is more relevant─.

As it has been shown, correction presents the most non-linear cognitive pattern. These results confirm time-related hypotheses 1 to 4 above. Hypotheses 1 to 3 are accepted: TRT, FPRT and SPRT are high in correction because this function involves not only a reorganization of the discourse orientation but an abrupt change of the message content and the communicative aim. Given that readers need to read both formulations and assimilate that they are related but antonym terms, efforts are bigger than in any of the other functions addressed in this dissertation. In both patterns SPRT is harder than FPRT, especially in sentences without a discourse marker, which leads to the idea that correction (and, therefore, **invalidation**) generates late processing costs due to the outlier character of the function, which difficulties its understanding. In this sense, hypothesis 4 is accepted: the presence of *o sea* facilitates the assimilation of correction, which is validated specifically during SPRT; readers are not able to understand correction without a procedural instruction, as M2 results show. Finally, hypothesis 5 is rejected: the presence of discourse marker is not irrelevant in cognitive terms.

Results obtained in 5.2. to 5.5. are contrasted in the next subsection in order to address the theoretical problems proposed in Chapters 2, 3 and 4.

5.6. Confirming or rejecting hypotheses. Summary and main conclusions.

5.6.1. Introduction

The analysis presented (see §5.2. to §5.5.) confirms and rejects the temporal (§4.2.1.) and movement hypotheses (§4.2.2.) proposed for the four functions addressed in this dissertation. These hypotheses are based on:

a) The theoretical features defining each function addressed; such features consider the presence or absence of a discourse marker expressing these functions;
b) The theoretical problems related to paraphrase, reformulation, conclusion, and correction (see §1.3., §2.3.).

Both groups of hypotheses seem to be verified. Table 48 summarizes the acceptation/not acceptation of the hypotheses and further relevant information about them. Each number corresponds to the numbers for each hypothesis above-introduced; grey-colored squares represent the choice:

Hyp.	Acceptation		Type of result			Section
	Y	N	**EM**	**DT**	**MM**	
1						§5.2.3. §5.3.3. §5.5.3.
2						
3						
4						
5						
6						§5.2.1. §5.2.2. §5.3.1. §5.3.2.
7						§5.4.1. §5.4.2.
8						§5.5.1. §5.5.2.

Table 47. Acceptation (Y)/ not acceptation (N) of temporal and movement hypotheses (HYP). The eye represents qualitative results; the tree, decision trees; MM corresponds to mixed-models.

Hypotheses 1 to 5 are confirmed: the more discursive a function is, the longer the FPRT, SPRT and TRT are. This is the case of paraphrase, reformulation and, especially, correction. The interpretation of hypotheses 1 to 5 depends on the milliseconds obtained for each AOI; otherwise, the results would be imprecise; hypotheses 6 to 9 are based on the eye-movements obtained and their relationship with time-related parameters. Confirming these hypotheses allows, in turn, to establish clear limits between functions (see §5.6.2.). Results are next summarized.

5.6.1.1. Paraphrase

According to the data, paraphrase shows a backward figure concerning its duration: on the one hand, M1 is higher than M2 in the three reading times ─supported by large and very large effects from 16,65% to 90,11%─. The discourse marker costs more than 300 ms. during the FPRT, which suggests that M1 meaning is cognitively harder because of its technical character. SPRT reduces reading times considerably for M2 ─supported by very large effects of 190,12%─, which indicates an adequate assimilatio thanks to the procedural meaning of the discourse marker. In this sense, the temporal hypotheses (1) to (3) for paraphrase are confirmed by the data retrieved from M1 and M2: M1 is generally bigger, which involves reading difficulties attributed to discourse ─compare paraphrase with conclusion─. On the other hand, the absence of discourse marker leads to differences: readers focus more on M2 rather than on the m1 ─supported by very large effects of

90,11% and 32,26%─. SPRT reduces costs, but they are bigger than in sentences with the discourse marker. In short, readers require more time to establish equivalence relations between contents without a clear procedural instruction linking them. Hypothesis 4 is confirmed for paraphrase: the discourse marker is key in discursive functions. Hypothesis 5 is rejected: discourse markers absence in fact leads to relevant changes in the reading stage and the AOI addressed.

Together with time-related hypotheses, movement hypotheses 6 and 9 are confirmed for paraphrase. PF and RF are decisive in establishing paraphrases with and without a discourse marker; such result is supported by the decision tree. In critical sentences with a discourse marker, M1 has more regressive fixations than M2. This would explain the fact that the M1 involves higher reading times than M2: readers must fixate longer and more times the technical expression. It seems that the presence of a discourse marker is helpful: the cognitive efforts involved on *o sea* facilitate the reinterpretation of M2, which presents a reduced number of fixations (and, therefore, of reading times). For its part, critical sentences without a discourse marker show different behavior. M1 and M2 show similar PF but different RF: M1 retrieves more than M2. Again, M1 is bigger than the paraphrasing content, but the increasing of fixations on M2 in comparison with the same sentence without the marker highlights the relevance of *o sea*.

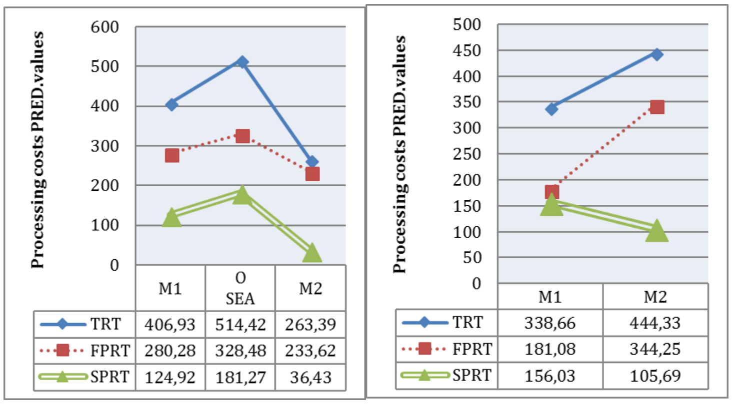
To sum up, paraphrases trigger high cognitive efforts for the technical expression under both conditions; the function is harder without a discourse marker, in which case the new formulation costs more during the FPRT ─in other words, during the construction of initial lexical assumptions─. The absence of a discourse marker thus becomes things difficult.

5.6.1.2. Reformulation

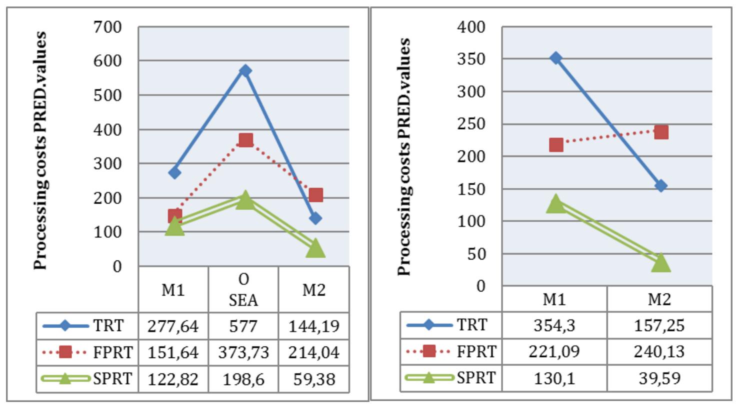
Similar to paraphrase, reformulation also shows a backward-forward figure, but with subtle differences: concerning reading times, M2 is bigger than M1 during FPRT with and without a discourse marker─supported by 41,15% and 8,62% respectively─; such efforts are reduced during the SPRT. While paraphrase shows bigger efforts for the technical expression which should be clarified, reformulation, in turn, shows high efforts in processing the new formulation, which establishes a distance from the immediate previous

M1. Problems are solved during SPRT, and readers assimilate M2 easier than M1 ─supported by very large effects of 148,35 % and 130,45% respectively─: they come back again to “están enfermos” because its meaning cannot be forgot to well-understand the meaning of “indispuestos”, whose costs are reduced considerably. According to this, temporal hypotheses 1 to 3 are confirmed for reformulation; such acceptation depends on M1 and M2: they do not show lineal processing because of their discursivity and complex lexical meaning ─see, on the contrary, conclusion in this section─. For its part, the absence of discourse marker increases the FPRT but, unexpectedly, reduces even more the SPRT ─supported by very large effects of 33,33%─. This result would reject hypothesiss 4: the discourse marker helps only during SPRT but difficults the processing during SPRT, that is to say, when the pragmatic integration of distance is completed.

Reformulation has its counterpart in eye-movements and their relation to other experimental parameters. The movement hypothesis 6 is significant: as shown by decision trees, PF and RF are decisive in establishing reformulations with and without a discourse marker. In fact, paraphrases and reformulation show a similar behavior concerning the number of fixations, specifically PF ─see Tables 18, 19, 27 and 28─. They differ on the number of RF only: reformulation shows less PF and RF than paraphrases in both sentences with and without a discourse marker. The presence of a discourse marker seems to equilibrate ocular movements. Such RF, however, are bigger for M2 than for M1 in sentences without a discourse marker. In this sense, not only PF but RF are decisive for reformulation: this idea seems to reflect the longer duration of the reading times for the FPRT and SPRT; the bigger regressive fixations, the longer reading times are expected; probably for this reason, paraphrases show longer temporal values ─see Fig.73─.



Paraphrase with/ without *o sea*.



Reformulation with/ without *o sea*.

Fig. 73. Contrast between types of reformulation. Paraphrase vs. reformulation with and without a discourse marker.

In short, reformulation triggers bigger cognitive efforts for the new formulation expressing distance regarding the former under both conditions; this function is harder without a discourse marker, but it presents an easier SPRT. In other words, readers need more time to understand that “indispuestos” is not equivalent but a bit different from “enfermos”, but their relationship is completely assimilated during the SPRT.

5.6.1.3. Conclusion

Conclusion presents a bottleneck figure between arguments and the conclusion concerning its duration. Data show a linear cognitive pattern: the reading values obtained are in fact very balanced since they do not surpass the 235 ms. average. On the one hand, sentences with a discourse marker show that M1 is bigger than M2 during FPRT ─supported by 18,32 %─; this result changes in SPRT: the conclusion costs slightly more than the arguments, but their processing costs are almost identical ─result supported by a 7,34%─. Time-related hypotheses 1 to 3 are confirmed for conclusion: given the grammatical status behind this function reading costs are not extremely big (especially if compared to paraphrase and reformulation above). On the other hand, the absence of discourse marker does not trigger changes in processing conclusions; indeed, M2 costs less than in sentences with a discourse marker (almost 80 ms.) ─supported by a 48,48% of very large effects─. According to this, the role of the discourse marker is not as relevant as in discursive functions because its absence does not increase the processing costs behind M2. Assimilating conclusions without a discourse marker is not as difficult as for other functions: results are very similar under both conditions, which supports the linearity underlying grammaticality. Such results would thus confirm hypothesis 5: the absence of a discourse marker does not change the global pattern neither any reading stage (FPRT or SPRT); it only affects the conclusion, which seems easier when readers must not read a procedural instruction in between of two arguments and a conclusion logically related and oriented towards the same direction.

These temporal values in conclusion have their counterpart in eye-movements and their relation to other experimental parameters. The movement hypothesis 7 is confirmed: a big number of progressive fixations is obtained because of the informativity behind arguments and conclusions; numbers are very similar, **which reflects the temporal description above**. There are less RF which would allow jumping from arguments to conclusion. Several PF are retrieved; the number of RF is also big but similar under both conditions. This result shows a clear homogeneity expected for a grammatical function; furthermore, M1 involves a bigger ocular activity to process the relevant information they contain and supporting time-related results. Regressions also support this idea: R into and out of AOI are bigger than in other functions, which suggests that arguments and conclusions are well-integrated. Readers look constantly both types of information to put them together and consider them as a whole: causes and consequences represent a set of events and not a change of discourse orientation.

In short, conclusion is a balanced function in both sentences with and without a discourse marker. A clear division between grammar and discourse can be established from these results (see §5.6.2.).

5.6.1.4. Correction

Finally, correction shows two clear patterns depending on the presence or absence of the discourse marker. TRT in sentences with a discourse marker show high values: M2 costs almost 500 ms. and the discourse marker 836.95 ms. During FPRT readers more time to disambiguate the meaning of M2 in comparison with M1; it seems, however, that the discourse marker redistributes the efforts ─which is supported by trivial and medium effects of 2,38%; in other words, apparently they are not much different─. This redistribution of efforts is also found during SPRT, in which reading costs are even slightly reduced ─supported by a 5,84%─. Thanks to the procedural instruction behind o sea, readers understand that "tinto" and "blanco" are contrary but related terms and continue assimilating the discourse adequately. In fact, the discourse marker increases its costs during the SPRT (453.88 ms.) and that reduces costs for the m2 (227.2 ms.).

However, the absence of *o sea* leads to a totally different pattern: it triggers a drastic increasing of processing costs for the whole function, specifically during SPRT and concerning the M2. The new formulation costs 1740 ms. during TRT, predicting the results in FPRT and SPRT ─results supported by 254,90% of very large effects─. FPRT increases values for both M1 and M2: they show the biggest values throughout the whole experiment. Readers focus on the two formulations similarly but need further efforts to assimilate M2: this suggests that they have difficulties in establishing the semantic and structural disposition of both formulations; M2 is higher because readers probably do not understand why both formulations are together if they are antonyms ─results supported by 30,25% of very large effects─. SPRT increases the problem: M2 costs **seven time more** than when it was preceded by *o sea* (1400 ms.) ─supported by 514,88% of very large effects─. Readers finally are not able to establish an invalidation relation between both formulations.

These data validate time-related hypotheses 1 to 4: TRT, FPRT and SPRT are not easy to be processed in correction. This function is the extreme version of discursivity in this dissertation. This result is especially clear in sentences without a discourse marker, which confirms the relevance of the discourse marker in establishing an invalidation: *o sea* distributes cognitive efforts between M1 and M2, which become considerably simpler; its absence complicates the whole processing.

Temporal hypotheses are complemented with eye-movement hypotheses; eye-movement hypotheses 8 and 9 are also confirmed: concerning hypothesis 8, RF ─together with other parameters, especially during the SPRT─ are decisive in establishing corrections. PF are combined with RF: sentences with a discourse marker show a big number of M2 PF; the same content in sentences without *o sea* presents 95 progressive fixations. This means that readers jump from M1 to M2 because the invalidation is not easy to be processed. For this reason, regressions in the SPRT are key: they contribute in the assimilation of such contents as contrary expressions, which is mainly pragmatic. Concerning hypothesis 9, the discourse marker is relevant in terms of eye-movements (see Table 43), which reflects the high processing values it retrieves, especially during SPRT, where it is decisive.

To sum up, correction is complicated, and the absence of a discourse marker confirms its difficulty: processing costs show a very big peak supported by very large statistical effects. These results allow to propose a **gradual distinction** between paraphrase, reformulation and correction in the next subsection, where this and other research questions are addressed.

5.6.2. Research questions and final remarks

As data show, the results and hypotheses presented confirm that paraphrase, reformulation, conclusion, and correction can be experimentally defined. They allow answering the three research questions behind this thesis:

1. Are there measurable limits defining paraphrase, reformulation, conclusion, and correction?
2. Do reformulation markers have a relevant role in highlighting the establishment of reformulation and other neighboring categories?
3. Can the polysemy behind a discourse marker be experimentally addressed?

Concerning the first question, this chapter **supports the existence of limits distinguishing reformulation from other neighboring categories**. The fact that four reading experiments made with 160 participants show different cognitive patterns for paraphrase, reformulation, conclusion, and correction, leads to objective and measurable evidences for functions which up to now have been confused or defined as equivalent in the literature.

Given the clearness behind these results, and their possible replication in further experiments under different conditions (Popper 2008 [1935]), they lead to the following double-statement: on the one hand, **discourse and grammar can be experimentally distinguished**; on the other, paraphrase, reformulation, and correction should not be defined from an inclusive approach; rather, these four functions are **gradually organized** (Pons 2013).

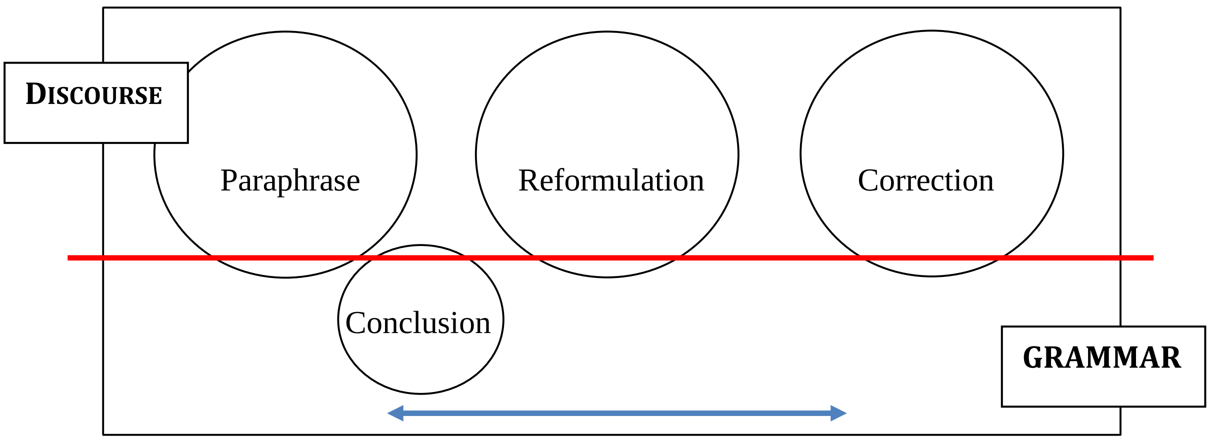


Fig. 74. Representation of reformulation and neighboring categories. On the one hand, discourse; on the other, grammar. Adapted from Fig. 9 in Chapter 2.

This gradual organization places paraphrase at the left and correction at the right; conclusion does not fit the same discursive schema than the other functions. The experimental results coincide with Pons's exclusive approach to reformulation: even though functions can share some similarities ─in qualitative terms─, they present distinctive features in terms of eye-movements and temporal values (see 5.6.1.).

Paraphrases and corrections share some cognitive similarities, which supports the theoretical left-right idea; conclusion is very different from the other functions, especially concerning (a) the discourse marker and (b) the number of eye-movements produced to assimilate it. These experimental results would complement the theoretical definitions of such four functions published in the literature; their description leads to two general conclusions:

a) Eye-movements, decision trees and reading times provide a set of defining features for each function. Four parameters, four definitions.

b) Such features can be qualitatively compared to establish limits between functions. These comparisons will be amplified in the future with further research considering paraphrase, reformulation, conclusion, and correction in the same experiment.

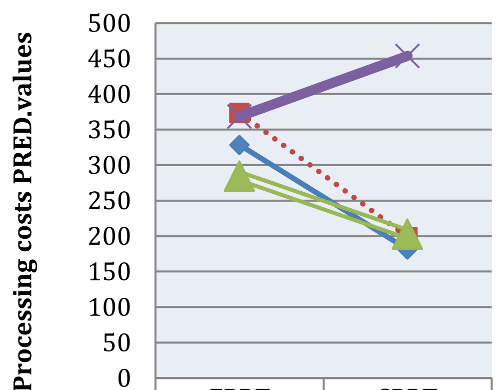
The second relevant result concerns the presence or absence of *o sea*: sentences with and without a discourse marker show different cognitive efforts. This argues for an affirmative answer to the **second research question**: **discourse markers are key in highlighting the establishment of such functions**. Table 48 summarizes differences between paraphrase, reformulation, conclusion, and correction expressed with and without *o sea*:

Critical sentences	Description
Paraphrase with a discourse marker [rosa rugosa; o sea, japonesa.]	Paraphrases with *o sea* are easier processed with a discourse marker: costs are gradually reduced, leading to a well-understanding of the equivalence relation. The absence of *o sea* increases processing costs behind “japonesa”, which indicates problems for readers (specifically in the FPRT).
Paraphrase without a discourse marker [rosa rugosa; japonesa.]	
Reformulation with a discourse marker [enfermos; o sea, indispuestos.]	Reformulations with *o sea* are similar to those without *o sea*: however, the former is longer than the latter. The presence of a discourse marker contributes to assimilate contents faster. “Enfermos” is harder to be understood, especially during the FPRT. Distance is not an easy process.
Reformulation without a discourse marker [enfermos; indispuestos.]	
Conclusion with a discourse marker [comieron unas pizzas y vieron una película; o sea, estudiaron poco su examen.]	Conclusions with and without *o sea* are not very different. It probably redistributes processing costs but, in the end, conclusions are linearly established under both conditions.
Conclusion without a discourse marker [comieron unas pizzas y vieron una película; estudiaron poco su examen.]	
Correction with a discourse marker [vino tinto; o sea, blanco.]	Corrections with and without *o sea* are drastically different: are not very different. It probably redistributes processing costs but, in the end, conclusions are linearly established under both conditions.
Correction without a discourse marker [vino tinto; blanco.]	

Table 48. Overview. Differences between sentences with and without a discourse marker in paraphrase, reformulation, conclusion and correction.

Except for conclusion, which is grammatical, the other functions addressed show differences depending on the presence or absence of a discourse marker. These results (see further details in sections §5.2. to §5.5.) validate the theoretical idea about discourse markers and their relevance in establishing functions, especially reformulation (Rossari 1994): even though paraphrases, reformulations or corrections can be assimilated with any procedural instruction guiding the process (Noren 1999), it is easier by using them. For example, this is quite evident in corrections or paraphrases. Results about conclusion are interesting: the fact that the absence of discourse marker even facilitates processing efforts show, again, the grammaticality behind this function. According to theory, conclusion is the easiest one (Pons 2013).

Finally, data about the discourse marker also answer the **third research question**: **the polysemy of a discourse marker can be addressed in experimental terms**. Temporal reading values are more precise than eye-movements to define the experimental functioning of a discourse marker: *o sea* could receive the same number of fixations in two contexts ─e.g. 40 progressive fixations in paraphrases and 42 progressive fixations in reformulations─; however, their duration show their real behavior since fixations can be shorter or longer. Fig.75 shows different experimental behavior for *o sea* depending on the critical context and the type of contents it links. Such results can be interpreted as follows:



	FPRT	SPRT
Par.	328,48	181,27
Ref.	373,73	198,6
C.	284,6	202,75
Cor.	368,59	453,88

Fig. 75. Four patterns for o sea. Polysemy can be proven experimentally.

FPRT presents similar values for the four functions: conclusion shows the smallest result, which confirms that idea about discourse markers and grammatical functions; paraphrase, reformulation, and correction reflect bigger values. Correction is the biggest one (368.59 ms.) and paraphrase the lowest (328.48 ms.); reformulation is middle-placed (373.73 ms.). Differences between patterns, however, are detected during the SPRT: as noted in previous chapters (see §2.4.2.), the second-pass is related to reinterpretations, re-readings and, in sum, pragmatic assimilation. The discourse marker polysemy gets thus consolidated during this reading time: paraphrase and reformulation are closer (181.27 ms. and 198.6 ms. respectively), which is expected for two functions addressed as subtypes of reformulation (paraphrastic and non-paraphrastic reformulation) in the literature; conclusion does not share temporal values with the other functions (202.75 ms.); finally, correction is the hardest meaning to be processed in *o sea* (453.88 ms.).

To conclude, it must be noted that the absence of experimental approaches to reformulation and the other neighboring categories, on the one hand, and the lack of agreement between researchers concerning the theoretical status of these functions, on the other (see §2.3.3.), validates the hypotheses and results addressing the theoretical problems on which this thesis relies. Reformulation should not be confused with conclusions or corrections; this function is similar to paraphrase but, in the end, they are distinguishable.

Chapter 6

Conclusions

As noted in Chapter 1, this research has focused on two general objectives: (a) to distinguish paraphrase, reformulation, conclusion, and correction with clear boundaries; and (b) to describe the role of discourse markers in establishing reformulation and the rest of functions; the latter objective, in turn, has been related to the polyfunctionality of discourse markers. These objectives derive from one theoretical problem in the research field of reformulation: neighboring functions such as conclusion, summary, correction, or invalidation, are addressed as subtypes of reformulation. Several researchers (see Chapter 2) tend to define such other functions as reformulation because of (i) the similarities between them and (ii) the fact that reformulation markers cover meanings based on such other functions ─because their polyfunctionality (Martín Zorraquino & Portolés 1999)─. As a result, generalizations are produced, and some functions which originally were clearly defined are now quite confusing (see the Pons and Murillo's polemic in §2.3.3.): the defining features behind the other functions, on the one hand, and reformulation markers, on the other, are attributed to the definition of reformulation at the functional level, which loses its accuracy and becomes wider to include other categories.

In order to shed some light on this theoretical problem ─the so-called *form-function trap* (Pons 2017)─ this dissertation has proposed an experimental-based approach introducing eye-tracking methods (see chapter 3). A series of reading experiments based on the eye-mind assumption (Rayner 1988) (see §2.4.2.) have been created (§4.1.) to extract cognitive measurable patterns defining each function. Such experiments have addressed paraphrase, reformulation, conclusion, and correction sentences expressed with and without a reformulation marker ─*Sp. o sea*─[167] (§2.4.3.). These experiments have proved a set of research questions and hypotheses (§4.2.1. and §4.2.2.) dealing with the two general objectives above-named. The results obtained have been divided into three types: eye-movements ─qualitative─, decision trees ─qualitative-quantitative─, and temporal reading times ─quantitative-qualitative─ (see Chapter 4).

[167] The presence and absence of reformulation markers will allow to distinguish onomasiological and semasiological results in a clear way.

Based on the analysis (chapter 5), and addressing such two objectives above-presented, the following general results have been obtained:

1. Four experimental patterns have been retrieved for paraphrase, reformulation, conclusion, and correction (see §5.2. to §5.5.). Such four patterns show a gradation coinciding with Pons's theoretical exclusive approach (2013, 2017);
2. The presence or absence of a discourse marker tends to make the difference within functions; in other words, different experimental types of paraphrase, reformulation, conclusion, and correction are found (see also (see §5.2. to §5.5.). Contrary to grammatical functions, the absence of discourse complicates the assimilation of discursive functions;
3. The polyfunctional discourse marker *o sea* (see §2.2.2. and§2.4.3.) reflects its polysemy through different experimental temporal patterns (see specifically §5.6.3.). Paraphrase and reformulation are closer; conclusion works differently to the others; finally, correction presents the hardest pattern. These results seem to reflect what theory has described for these multiple meanings behind the discourse marker *o sea*: the two types of reformulation are similar but distinguishable, conclusion is the most grammatical ─and thus easier─, and correction is more complicated since it highlights contents abandoning.

Such general results are detailed as follows (see further details in §5.6.2.):

4. Paraphrases show a **backward experimental representation**: concerning ocular movements, paraphrase is backward-forward, and **several fixations land on the m1** ─paraphrased technical expression─ (see §5.2.1.); the presence of a discourse marker increases the number of progressive and regressive fixations (see §3.2.2.). Decision trees validate these results (§5.5.2.). These movements have their **counterpart in terms of temporal measures**: this function is completely assimilated during the SPRT; that is, during re-readings, reinterpretations and, therefore, pragmatic functional disambiguation (Holmqvist et al. 2011). **The m1 tends to be harder than the m2**. The absence of a discourse marker increases reading costs, especially during the FPRT ─i.e. the construction of first lexical assumptions─ where the m2 ("japonesa" and "desagüe") cost more. That suggests

that the **technical content is harder even with the presence of *o sea***; however, both the m1 and the m2 have a difficult processing when any procedural instruction relates them (see §5.2.3.) These results are based on medium, large and very large statistical effects (see Tables 24, 25, and 26)

5. Reformulation shows a **spiral cognitive representation**: concerning eye-movements, this function lands several progressive fixations on both m1 ─reformulated expression─ and m2 ─reformulator content─. However, differences between m1 and m2 are not determinant as would be for paraphrase (see Fig. 45): such a result should be outlined since paraphrase and reformulation share the same discursive nature (see §5.3.1.). Furthermore, the presence or absence of a discourse marker does not trigger several cognitive differences; decision trees ratify all this (see Tables 34 to 38) (see §5.3.2.). These ocular movements suggest that reformulation present less but longer eye-movements in comparison with other functions. Temporal data provide the former analysis with accuracy: on the one hand, the m1 costs more than the m2 in the SPRT, probably because the meaning of the reformulated expression should be kept in mind once the m2 meaning is assumed (Pons 2013) with bigger efforts than the m1 during the FPRT ─the spiral continues active─ . Discourse markers contribute in such easiness: it assumes the leading role since it tends to cost even more than the m1 and m2. These results are based in large and very large statistical effects (see Tables 31, 32, and 33) (see §5.3.3.).
6. Conclusion presents a bottle-neck figure: regarding ocular movements, this function redistributes **several progressive and regressive fixations** among arguments (m1) and the conclusion (m2) but, in general, on the m1 (bottle-neck representation). Conclusion present **further fixations than discursive functions**; most of the **fixations are progressive**, which suggests that most of the information is assimilated after moving forward on the text than after coming back (regressive fixations). The **discourse marker is less fixated in comparison with the m1 and m2**; it seems that there are no big differences between sentences with and without *o sea* concerning ocular movements. Furthermore, the **number of regressions** is also

bigger than in paraphrases and reformulations: that would indicate a **clearer syntactic** (regressions out of AOI) and **semantic** (regressions into AOI) **integration of contents** (see Tables 34 to 38) (see §5.4.1.). These data lead to easiness behind conclusion: temporally, conclusion is very equilibrated since FPRT and SPRT do not show several differences; attention on arguments and conclusion is divided into the FPRT and SPRT. Finally, the **discourse marker is not as relevant as would be in other functions**: its presence helps with the final assimilation, but sentences do not present marked differences (see Tables 39 to 42) (see §5.4.3.).

7. Finally, correction shows a **zigzag pattern**: eye-movements reflect a **rich attention** on m1, m2, and the discourse marker. The number of fixations is bigger than for reformulation. Most of them land in the m1 ─the invalidated content─; others on the m2 ─corrector content─. The **absence of a discourse marker increases considerably the number of progressive and regressive fixations** for the **m2** and triggers more regressions (see Tables 43 to 47). That supports the expected difficulty in processing the expression invalidating the previous one (see §5.5.1.), also explored in the decision trees (§5.5.2.). Temporally, correction is a hard-processing function in both conditions with and without a discourse marker; however, differences are evident: the SPRT in sentences without *o sea* has an almost impossible processing. The m2 costs seven times more in such cases than in sentences with a discourse marker; the **presence of *o sea* reduces global processing costs behind correction** (see Tables 48, 49, and 50) (see §5.5.3.).

Results (1) to (7) lead to the following global experimental-theoretical conclusions:

(a) Thanks to the detailed triple analysis presented in each section addressing the four functions, it has been concluded that such functions present four different cognitive patterns arguing for the need of distinguishing them at the theoretical level. The main semantic-pragmatic defining features of each function ─equivalence for paraphrase, distance for reformulation, linearity for conclusion, invalidation for correction─ can be measured through eye-movements and their corresponding duration. This research constitutes a first experimental attempt gathering four functions which theory confuses and describe as equivalent or subordinated[168].

(b) Two benefits have been retrieved from such an analysis: on the one hand, the theoretical problem behind reformulation and neighboring categories would be answered with new qualitative and quantitative data supporting the exclusive approach to this function, which separates paraphrase, reformulation, and correction but as part of a discursive gradation; conclusion is not a subtype of reformulation ─see the different results they present─. On the other, functional and corpus-based studies would have new data to triangulate their results and present rich descriptions of the functions addressed. This thesis thus does not intend to substitute theoretical studies on reformulation, which constitute the main theoretical framework on which it is based; rather, it would complement it with a new explicative dimension.

(c) The description of discourse markers has also been improved: in general, the experimental patterns retrieved support the existence of a procedural meaning behind discourse markers; this is one of the most common features attributed to discourse markers in the literature, but in line with other recent experimental approaches (Loureda et al. 2013; Nadal 2016; Loureda et al. 2017), these results reflect how discourse markers are assimilated as procedural guides helping at interpreting messages. In particular, it is experimentally demonstrated that reformulation markers facilitate establishing and assimilating such a discursive function (Roulet 1987; Rossari 1999; Cuenca 2003): even though that these functions can be assimilated with any procedural instruction, its presence is helpful, reduces the process and affects the final result.

(d) The results obtained validate the applicability of experimental methods such as eye-tracking in testing discursive and grammatical functions during reading (see §2.4.) and, in turn, sheds light on theoretical problems related to such discursive and grammatical functions. In short, both research fields have been benefited.

[168] See also Schröck (2018) with experimental paraphrase and reformulation through the Sp. reformulation marker *es decir*.

Considering the results and main conclusions above-presented, the following ideas for future research are suggested:

- Concerning the experimental design, future research should present a bigger experiment gathering the four functions addressed at the same time to obtain further quantitative and generalizable results;
- Further neighboring (sub) functions should be included in such experiments: for example, summary, amplification, reduction, mathematical operation, recapitulation, reconsideration, expansion, and so forth (see §2.3.2.);
- This dissertation has presented a synchronic theoretical-experimental approach to the form-function trap; however, as previous works suggest, the trap should also be addressed from diachrony. After the experimental results showing four distinguishable patterns for the discourse marker *o sea*, future research should focus on the historical facts which relate reformulation and conclusion as part of polysemy in most of the reformulation markers across languages (Pons 2017). By doing so, the analysis would become more accurate and even new experiments could be proposed.
- The experimental definitions of paraphrase, reformulation, conclusion, and correction should be tested in further languages to obtain a contrastive experimental map supporting some theoretical ideas about reformulation and reformulation markers across languages (Murillo 2016); this dissertation proposes a replicable method to do so.

Capítulo 6

Conclusiones

En la introducción de esta tesis se han planteado dos objetivos principales: (a) distinguir paráfrasis, reformulación, conclusión y corrección con fronteras claras; y (b) describir el rol de los marcadores discursivos a la hora de diferenciar dichas funciones; este último, a su vez, se ha relacionado con la polifuncionalidad de los marcadores discursivos. Estos objetivos derivan de un problema teórico bastante actual en el campo de estudio de la reformulación: la pérdida de límites entre funciones que ha llevado a definir otras categorías como resumen, conclusión, corrección, o abandono, entre otras muchas, como subtipos de la reformulación discursiva. Muchos autores (véase Capítulo 2) tienden a definirlas como reformulación debido a (i) las similitudes que comparten y (ii) al hecho de que los marcadores de reformulación cubran valores basados en dichas funciones dada su polifuncionalidad (Martín Zorraquino y Portolés 1999). Como resultado, se producen generalizaciones, y muchas funciones que, en su origen, estaban claramente definidas ahora presentan problemas y descripciones borrosas (véase la polémica Pons-Murillo en 2.3.3.): las propiedades definitorias pertenecientes a otras funciones, por un lado, y a los marcadores de reformulación, por el otro, acaban atribuyéndose a las propiedades generales de la reformulación en el nivel funcional, razón por la que esta incluye en su descripción otras categorías hasta antes trabajadas aparte.

Con el fin de arrojar algo de luz sobre este problema teórico (la llamada trampa forma-función), esta tesis ha propuesto un acercamiento experimental basado en métodos eye-trackr (véase Capítulo 3). Se han diseñado (véase 4.1.) experimentos de lectura basados en la hipótesis ojo-mente (Rayner 1988) (véase 2.4.2.) para extraer patrones cognitivos medibles y cuantificables para cada función tratada. Los experimentos se han centrado, precisamente, en paráfrasis, reformulación, conclusión y corrección expresadas, además, bajo dos condiciones básicas: con y sin marcador discursivo. El marcador seleccionado, por su frecuencia en el español, su carácter polifuncionalidad y, especialmente, por cubrir las funciones seleccionadas, ha sido *o sea* (véase 2.4.3.). Estos experimentos han demostrado un conjunto de preguntas de investigación e hipótesis (véase 4.2.1. y 4.2.2.) con base en los objetivos arriba mencionados. Los resultados obtenidos se dividen en tres categorías: movimientos oculares, de corte cualitativo, árboles de decisión, cuantitativos y cualitativos, y, por último, tiempos de lectura, cuantitativos y cualitativos (véase Capítulo 4).

Los resultados generales obtenidos en los experimentos, presentados en el Capítulo 5, son los siguientes:

1. Cuatro patrones experimentales diferenciables definen paráfrasis, reformulación, conclusión y corrección (véanse 5.2. a 5.5.). Los cuatro patrones muestran, por un lado, una doble división general entre la gramática, por un lado, y el discurso, por otro; en cuanto a las funciones discursivas, todas pueden clasificarse en una gradación que coincide con la propuesta exclusiva de Pons (2013, 2017);
2. La presencia o ausencia del marcador discursivo marca diferencias dentro de cada función; en otras palabras, se encuentran distintos tipos de paráfrasis, reformulación, conclusión y corrección. En las funciones gramaticales como conclusión, sin embargo, la presencia de marcador discursivo dificulta el procesamiento de la función. Esto parece deberse a que la función se asimila a partir de los rasgos lingüísticos propios de argumentos y conclusiones, más que por la instrucción de un marcador. Su presencia duplica esfuerzos.
3. El marcador polifuncional *o sea* (véase 2.2.2. y 2.4.3.) refleja polisemia a través de los diferentes patrones experimentales obtenidos (ver específicamente 5.6.2.) basados en movimientos oculares y tiempos. En paráfrasis y reformulación los valores son similares, conclusión funciona por su cuenta y, por último, corrección presenta el patrón más difícil. Estos resultados parecen reflejar lo que se ha descrito en el marco teórico del marcador *o sea*: los dos tipos de reformulación son similares pero distinguibles, conclusión es el más gramatical (y, por tanto, el más fácil), y corrección es el más complicado, puesto que destaca un abandono de formulación.

Estos resultados generales se detallan a continuación (véase también 5.6.2.):

4. Paráfrasis muestra una representación adelante-atrás: con respecto a los movimientos oculares, las fijaciones progresivas y regresivas se combinan continuamente, especialmente sobre el M1 (es decir, el miembro técnico) (véase 5.2.1.1. y 5.2.1.2.); la presencia de marcador discursivo incrementa el número de fijaciones progresivas y regresivas. Los árboles de decisión validan estos resultados. Los movimientos se complementan con tiempos de lectura: esta función se asimila

durante el SPRT. Los resultados se basan en efectos medios, grandes, y muy grandes (véase 5.2.2.);

5. Reformulación muestra un patrón similar a paráfrasis, pero presenta diferencias sutiles que ayudan a poner límites ente ambas funciones discursivas: los movimientos oculares son muy similares pero, por ejemplo, reformulación presenta más esfuerzos cognitivos en el M2 del enunciado (es decir, en la nueva formulación que se introduce para matizar algo dicho anteriormente). Nuevamente, los árboles de decisión confirman esta información cualitativa. En cuanto a los tiempos de lectura, el M1 suele costar más que el M2, especialmente durante el SPRT, probablemente porque el significado de la expresión vieja debe mantenerse en mente una vez la nueva formulación se asimila; de este modo, ambas pueden compararse y confirmarse que la segunda es la mejor opción comunicativa (Pons 2013, concepto de reformulación asertóricamente inerte). Los marcadores discursivos contribuyen a un patrón más fácil: asumen el rol principal, dado que su valor es más alto incluso que el de los M1 y M2. Su presencia aligera costes de procesamiento (véase 5.3.2.);
6. Conclusión presenta un patrón de "cuello de botella": en cuanto a los movimientos oculares, muchas fijaciones progresivas y regresivas se producen en argumentos (M1) y conclusión (M2), pero especialmente sobre el M1. Esto es esperable, ya que los argumentos contienen toda la información necesaria para entender adecuadamente la conclusión. Argumentos y conclusiones podrían funcionar informativamente por separado, pero en conjunto permiten transmitir un mensaje e intención comunicativa completos. Esta es, quizá, la diferencia más clara con respecto a las funciones discursivas. Por otro lado, el marcador se fija pocas veces en comparación con M1 y M2 (de nuevo, otra diferencia con las funciones formulativas). Los árboles de decisión demuestran que estas ideas son estadísticamente fuertes. Con respecto a los tiempos de lectura, la conclusión es muy equilibrada, lo que se ve en las pocas diferencias entre FPRT y SPRT si se comparan, otra vez, con las otras dos funciones. Por último, el marcador discursivo

no es tan relevante: de hecho, su presencia dificulta la asimilación en algunos tramos de la lectura, aunque en otros la facilita (véase 5.4.2.);

7. Finalmente, corrección muestra un patrón más inestable que paráfrasis y reformulación, basado en una figura zigzag: los movimientos oculares reflejan mucha atención sobre M1, M2 y el marcador discursivo. La cantidad de fijaciones es más grande que, por ejemplo, en reformulación. Muchas de las fijaciones se obtienen del M1, otras en el M2; pero la ausencia de marcador discursivo dispara claramente los esfuerzos cognitivos para procesar el segundo miembro, que invalida el anterior. Esto también es esperable, puesto que el lector puede no entender la relación que guardan ambas formulaciones: son totalmente contrarias pero, a su vez, guardan un tipo de relación estructural y discursiva. Por su parte, corrección es muy difícil de asimilar en términos de tiempos de lectura, especialmente cuando no hay un marcador discursivo guiando su interpretación: los costes se multiplican por siete en estos casos, algo que sucede en la fase de asimilación pragmática de la función (SPRT). Los lectores definitivamente no pueden entender la corrección sin un marcador, tal como reflejan los movimientos oculares y su duración. Esto apoya los resultados obtenidos en el árbol de decisiones, que indican que fijaciones progresivas y regresivas están fuertemente asociadas al SPRT, el tiempo de lectura más costoso en esta función.

Los resultados 1 a 7 conducen a las siguientes conclusiones teórico-experimentales globales:

a) El triple análisis presentado en cada sección muestra que todas las funciones añaden cuatro patrones cognitivos distintos, lo que apoya su distinción también en el plano teórico. Sus principales características definitorias (equivalencia para paráfrasis, distancia para reformulación, linealidad para conclusión, o invalidación para corrección) son mensurables a través de movimientos oculares y sus correspondientes duraciones. Esta investigación constituye un primer paso experimental uniendo cuatro funciones.
b) El análisis implica dos beneficios: por un lado, el problema teórico subyacente a la reformulación y las categorías vecinas puede responderse con datos cuantitativos y

cualitativos que apoyan un acercamiento excluyente (ver 2.3.3.) a esta función. Tal acercamiento separa, por un lado, las funciones discursivas de las gramaticales y, por otro, establece una gradación entre paráfrasis, reformulación, y corrección. El segundo beneficio consiste en la obtención de datos experimentales que pueden triangularse con datos de corpus y teóricos para así proponer descripciones de estas funciones más precisas. Como resultado, el campo de la reformulación puede alimentarse de una nueva dimensión explicativa, hasta ahora no explorada.

c) La descripción de los marcadores discursivos también ha sido mejorada: en general, los patrones experimentales obtenidos apoyan la existencia de un significado procedimental para los marcadores (Blakemore 1987; Wilson 2016). Esta es una de las propiedades que más comúnmente se asocia a estos elementos en la bibliografía pero, en línea con otros trabajos recientes (Loureda et al. 2013; Nadal, en prensa; Loureda et al. 2017), estos resultados reflejan cómo los marcadores se asimilan y producen como guías procedimentales que ayudan a interpretar mensajes. Concretamente, se demuestra experimentalmente que los marcadores de reformulación facilitan establecer y asimilar esta función (Roulet 1987; Rossari 1999; Cuenca 2003): incluso aunque estas funciones puedan asimilarse sin ayuda de marcadores, su presencia es útil. Por otro lado, también se valida la polisemia de los marcadores discursivos, ampliamente tratada como propiedad definitoria de los marcadores (véase 2.2.2.): según los datos, existen cuatro patrones diferenciables para *o sea*.

d) Los resultados validan la aplicabilidad del método experimental eye-tracking para testar funciones gramaticales y discursivas (véase 2.4.). Esto, a su vez, aclara los problemas teóricos relacionados con dichas funciones. En suma, ambos campos se enriquecen.

Teniendo en cuenta estos resultados y conclusiones principales, las siguientes líneas de investigación futuras se quedan abiertas:

- Con respecto al diseño experimental, se propondrá un experimento más grande que abarque las cuatro funciones a la vez cuantitativamente (es decir, con el mismo número de réplicas) para obtener más resultados generalizables;

- Se incluirán otras (sub) funciones vecinas relacionadas con la reformulación: por ejemplo, resumen, amplificación, redución, operación matemática, recapitulación, reconsideración, explicación, y otras más (véase 2.3.2.);
- Esta tesis ha presentado un tratamiento teórico-experimental sincrónico a la trampa forma-función; sin embargo, como se sugiere en trabajos anteriores, la trampa también tendría que tratarse diacrónicamente. Tras obtener cuatro patrones experimentales para cada función, futuros trabajos deberían centrarse en los hechos históricos que, por ejemplo, relacionan reformulación y conclusión como parte de polisemias en la mayoría de los marcadores de reformulación en varias lenguas (Pons 2017). Haciendo esto, el análisis ganaría en precisión e incluso nuevos experimentos podrían proponerse.
- Las definiciones experimentales de paráfrasis, reformulación, conclusión y corrección deberían testarse en otras lenguas para obtener un mapa contrastivo experimental (Murillo 2016): de momento, esta investigación ha propuesto un método replicable para hacerlo.

REFERENCES

Abramoff M D, Lee K, Niemeijer M, Alward W L M, Greenlee E C, Garvin M K, Sonka M and Kwon Y H 2009. Automated segmentation of the cup and rim from spectral domain OCT of the optic nerve head Invest. Ophthalmol. Vis. Sc

Abrusan, M. and K. Szendroi. 2013. Experimenting with the king of France: Topics, verifiability, and definite descriptions. Semantics & Pragmatics 6(10):1–43.

Addo et al. 2016. Ocular Drug Delivery: Advances, Challenges and Applications. Springer.

Anderson, J.R., D. Bothell & S. Douglas. 2004. Eye movements do not reflect Retrieval Processes Limits of the Eye Mind Hypothesis, Psychological Science, 15, 4, 225-231.

Aguado, G. 2004. Retraso del lenguaje. In Peña, J. Manual de Logopedia. 3ª Edición, 239-256. España, Barcelona: Masson.

Aijmer, K. 2002. English discourse particles: evidence from a corpus. Amsterdam: Benjamins.

Aijmer, K., Simon-Vandenbergen, A.-M., 2003. The discourse particle well and its equivalents in Swedish and Dutch. Linguistics 41, 1123-1161.

Altmanm, G. & Y. Kamide. 2009. Discourse-mediation of the mapping between language and the visual world: Eye movements and mental representation. Cognition 111, 55-71.

Alvarado, H. A. 2007. Significados institucionales y personales del teorema del límite central en la enseñanza de estadística en ingeniería, Tesis doctoral, Universidad de Zaragoza.

Ambridge, B. & C. Rowland. 2013. Experimental methods in studying child language acquisition. WIREs Cogn Sci 2013. Doi: 10.1002/wcs.1215.

Andorno, C. & F. Rosi. 2016. Confirming or asserting?: Conflicting values and cross-linguistic influence in the use of yes/no particles in L2 Italian. In Discourse markers in Second Language Acquisition / Les marqueurs discursifs dans l'acquisition d'une langue étrangère. Special Issue of Language, Interaction and Acquisition, 7 :1. John Benjamins Publishing Company.

Anscombre, J. C./Ducrot, O. (1983 [1988]): L'argumentation dans la langue. Bruselas: Pierre Mardaga.

Anscombre, J.C. (1983): "Pour autant, pourtant (et comment): À petites causes, grands effets", Cahiers de Linguistique Française 5, pp. 37-84.

Argimon, Josep M. 2002. "El intervalo de confianza: algo más que un valor de significación estadística." Medicina Clínica 118: 382-384.

Artal, P. 2015. Image formation in the living human eye. Annual Review of Vision Science, 1(1), 1–17.

Bach, C. 1996. “Reformular: ¿una operación argumentativa aséptica? Estudio del Conector de Reformulación Parafrástica és a dir”, Sendebar, 7, pp. 255-271

Bach Martorell, C. (2000a): “Mecanismos de reformulación parafrástica del catalán. Estudio de los conectores reformulativos parafrásticos és a dir (es decir), més ben dit/ millor dit (mejor dicho) y dit d’una altra manera (dicho de otro modo)”, in Ruiz de Mendoza Ibáñez, F.J. (ed.), pp. 41-51.

Bach Martorell, C. 2002. Els connectores reformulatius catalans: analisi i proposta d’aplicacio lexicografica, Tesis doctoral, UPF.

Bach, C. (2008/2009): “Al cap i a la fi, en fi i en definitiva: tres marcadors discursius vehiculadors de la reformulación conclusiva en català”, Revista de lenguas y literaturas catalana, gallega y vasca 14, pp. 15-33.

Balota, D.A., Pollatsek, A. & Rayner, K. 1985. The interaction of contextual constraints and parafoveal visual information in reading.CognitivePsychology,17,364-390.

Bambini, V. & D. Resta. 2012. Metaphor and Experimental Pragmatics: When Theory Meets Empirical Investigation. Humana.Mente Journal of Philosophical Studies, 2012, Vol. 23, 37–60.

Baayen R. H., Milin P. (2010). Analyzing reaction times. Int. J. Psychol. Res. 3, 12–28.

Baayen, R. H. 2008. “Mixed-Effects modeling with crossed random effects for subjects and items”, Journal of Memory and Language 59, 390-412.

Bazzanella, C. 1986: “I connettivi di correzione nel parlato: usi metatestuali e fatici.” In K. Lichem- E. Mara- S. Knaller (a cura di) Parallela 2. Aspetti della sintassi dell’italiano contemporaneo, Gunter Narr Verlag: 35-45.

Bazzanella, C. 1995. “I segnali discorsivi.” In *Grande grammatica italiana di consultazione*, by L. Renzi, G Salvi and A. Cardinaletti, 225–257. Bologna: Il Mulino.

Bazzanella,C., C. Bosco, A. Garcea, B. Gili Fivela, J. Miecznikowskii, et al. 2007. Italian allora, French alors: Functions, Convergences and Divergences. Catalan Journal of Linguistics, UAB édition, 6, pp.9-37.

Behill, A.T. and Troost, B.T. 1979. Types of saccadic eye movements. Neurology, 29: 1150-1152.

Blakemore, D. 1987. Semantic Constraints on Relevance. Oxford: Blackwell.

Blakemore, D. 1993: “The relevance of reformulations”, Language and Literature 2, pp. 101-120.

Blakemore, D. (1996), “Are apposition markers discourse markers?”, Journal of Linguistics 32(2): 325-347.

Blakemore, D. 2002. Relevance and linguistic meaning: the semantics and pragmatics of discourse markers. Cambridge: Cambridge University Press.

Boettner, E.A. and Wolter, J.R. 1962. Transmission of the Ocular Media. Investigative Ophthalmology & Visual Science, 1, 776-83.

Booth, R.W. & U.W. Weger. 2013. The function of regressions in reading: backward eye movements allow rereading. Mem Cognit. 2013 Jan;41(1):82-97

Bosque, I. and Demonte, V. (eds.) (1999): Nueva gramática descriptiva de la lengua española. Madrid: Espasa Calpe.
Brewster, D. 1832. Letters in Natural Magic. London: John Murray.
Brinton, L. J. 1996. Pragmatic markers in english: grammaticalization an discourse functions. Berlin, Mouton de Gruyter.
Briz, A. 1993a. Los conectores pragmáticos en español coloquial (I): su papel argumentativo, Contextos, XI/21-22, 145-188.
Briz, A. 1993b. Los conectores pragmáticos en español coloquial (II). Su papel metadiscursivo, Español actual, 59, 39-36.
Briz, A. 2001. "El uso de o sea en la conversación", en De Kock, J. (ed.) (2001): Gramática española. Enseñanza e investigación. Apuntes metodológicos. I. 7.
Lingüística con corpus. Catorce aplicaciones sobre el español, Salamanca, Ediciones
Universidad de Salamanca, 287-318.
Briz, A. & A. Hidalgo Navarro. 1998. "Conectores pragmáticos y estructura de la conversación", en MARTÍN ZORRAQUINO, M.ª T. y E. MONTOLÍO DURÁN (coords.) (1998), 121-142.
Briz, A. (2002), "Otra vez sobre o sea". En C. Saralegui Platero y M. Casado Velarde (eds.), Pulchre, bene, recte. Estudios en homenaje al Prof. Fernando González Ollé, Pamplona, EUNSA: 169-190.
Briz, A. 2006. "Unidades del discurso, partículas discursivas y atenuantes. El caso de no/ tienes razón", en Discurso, interacción e identidad. Homenaje a Lars Fant, Stöckholms Universitet, Institutionem för Spanska, Portugisiska och Latinamenkastudier, 13-36.
Briz, A.; S. Pons and J. Portolés. 2008. Diccionario de partículas discursivas del español. www.dpde.es.
Briz, A. 2009. "On the relationship between Attenuation, Discourse Particles and Position", Studies in Pragmatics, XX, 289-304.
Briz, A. y S. Pons. 2010.: "Unidades, marcadores discursivos y posición". Los estudios sobre marcadores discursivos, hoy, Madrid, Arco/Libros.
Bron AJ & Tripathi RC. 1997. Wolff's anatomy of the eye and orbit, 8th ed. London Chapman and hall Medical, 1997: Chapter 7, pp 233-260.
Cabedo Nebot, A. 2013. Sobre prosodia, marcadores del discurso y unidades del discurso en espanol: evidencias de un corpus oral espanol espontáneo, Onomazein 28, 201‐213.
Cabedo Nebot, A. 2014. On the delimitation of discursive units in colloquial Spanish: Val.Es.Co application model, en: Pons Borderia, Salvador (ed.), Discourse segmentation in romance languages, Amsterdam, John Benjamins.
Campbell, F. W., Green, D. G. (1965) Optical and retinal factors affecting visual resolution. The Journal of Physiology 181: 576–593.
Canestrelli, Anneloes R.; Willem M. Mak and Ted J. M. Sanders. 2013. "Causal connectives in discourse processing: How differences in subjectivity are reflected in eye movements." Language and Cognitive Processes 28 (9): 1394-1413. doi:10.1080/01690965.2012.685.
Carpenter, P. A., & Just, M. A. (1975). Sentence comprehension: A psycholinguistic processing model of verification. *Psychological Review, 82*(1), 45-73.

Casado, M. (1991): “Los operadores discursivos es decir, esto es, o sea y a saber en español actual: valores de lengua y funciones textuales”, Lingüística española actual 13, pp. 87-116.
Casado, M. (1996): “Notas sobre la historia de los marcadores textuales de explicación es decir y o sea”, en M. Casado et al. (eds.): Scripta philologica in memoriam Manuel Taboada Cid, v. 1. A Coruña: Universidade da Coruña, pp. 321-328.
Charolles, M; Coltier, D. 1986. “Le contrôle de la compréhension dans une activité rédactionnelle: Éléments pour l’analyse des reformulations paraphrastiques”, Pratiques, 49: 51-66.
Charolles, M., & Ehrlich, M.-F. (1991). Aspects of textual continuity: Linguistic approach. In G. Denhière & J.-P. Rossi (Eds.),Text and text processing. Amsterdam: North Holland
Chennamma et al. 2013. A survey on eye-gaze tracking techniques. Indian Journal of Computer Science and Engineering (IJCSE), 4, 5, 388-393.
Ciapuscio, G.E. 2003. Textos especializados y terminología. Barcelona: Instituto Universitario de Lingüística Aplicada, Universidad Pompeu Fabra.
Clifton, C. & K. Rayner. 2007. Eye movements in reading words and sentences. In R. Van Gompel, M. Fischer, W.S. Murray & R.L.Hill (eds.), Eye movements: A window on Mind and Brain, 341-372. Amsterdam: Elsevier.
Clifton, C. 1992. “Tracing the course of sentence comprehension: How lexical information is used”, en K. Rayner (ed.), Eye Movements and visual cognition: Scene perception and reading, 387-414.
Clifton, C. & A. Staub. 2007. Syntactic influences on eye movements during reading. Oxford Handbook on Eye Movements. Oxford.
Cohen, J. 1988. Statistical Power Analysis for the Behavioural Sciences. Hillsdale, N.J.: Erlbaum Associates.
Cortés Rodríguez, L. y M.M. Camacho Adarve (2003): ¿Qué es el análisis del discurso? Barcelona, Octaedro.
Coulson, S. 2004. Electrophysiology and Pragmatic Language Comprehension. In I. Noveck & D. Sperber (eds.). Experimental Pragmatics: 187-206. Palgrave MacMillan.
Coseriu, E. 1977. “Linguistic (and other) Universals.” In Linguistics at the Crossroads, by Adam. Makkai, Valerie Becker Makkai and Luigi Heilmann, translated by V. Becker Makkai, 317-346. Padua and Lake Bluff, IL: Liviana Editrice and Jupiter Press.
Cowart, Wayne. 1997. Experimental syntax: applying objective methods to sentence judgments.London, UK: Sage Publications.
Cuenca, M. J. 2001. “Los conectores parentéticos como categoría gramatical”, Lingüística Española Actual, XXIII, Fasc. 2, 211-235.
Cuenca, M. J. 2003. “Two ways to reformulate. A contrastive analysis of paraphrastic and exemplification markers”, Journal of Pragmatics, 35/7: 1069-93.
Cuenca, M. J. 2006: La connexió i els connectors. Perspectiva oracional i textual. Vic: Eumo.
Cuenca, M.J. and Bach Martorell, C. (2007): “Contrasting the form and use of reformulation markers”, Discourse Studies 9, pp. 149-175.

Cutler, A. 1983. Semantics, syntax and sentence accent. Proceedings of the Tenth International Congress of Phonetic Sciences, Utrecht; Vol. 2A, 85-91.

Danjou-Flaux, N. (1980): “À propos de de fait, en fait, en effet et effectivement”, Le Français Moderne, 48, pp. 110-139.

Danon-Boileau et al. 1991. Intégration discursive et intégration syntaxtique. In Langages, 104, 111-128.

Davidian, M., and Giltinan, D.M. (1995), Nonlinear Models for Repeated Measurement Data, New York: Chapman and Hall.

Dawson DG, J. Ubels & H.F. Edelhauser. 2011. Cornea and Sclera. In Levin et al. (eds). Psychology of the eye. 71- 126.

Degand, L. 1996a. A situation-based approach to causation in Dutch with some implications for text generation. Louvain: Université Catholique de Louvain.

Degand, L. 1996b. “Causation in Dutch and French: Interpersonal aspects.” In Functional Descriptions, Theory in Practice, by Ruqaiya Hasan, Carmel Cloran and David Butt, 207-235. Amsterdam/Philadelphia: John Benjamins Publishing Company.

De Jong, G. M., McDougall, K., Hudson, T. and Nolan, F. (2007a) The speaker-discriminating power of sounds undergoing historical change: a formant-based study. In J. Trouvain and W. Barry (eds) Proceedings of the 16th International Congress of Phonetic Sciences, 6–10 August 2007, Saarbrücken: 1813–1816

Delabarre, E.B. 1998. A method for recording eye movements. American Journal of Psychology, 9, 4, 572-574.

Del Saz, M. 2003. An analysis of English discourse markers of reformulation. Tesis doctoral. Universitat de València. Valencia.

Diewald, G. 2006. “Discourse particles and modal particles as gramatical elements. Approaches to Discourse Particles. Amsterdam, Elsevier.

Dijk, Teun A. van. 1979. “Pragmatic connectives.” Journal of Pragmatics 3: 447-456.

Domínguez García, N. 2007. Conectores discursivos en textos argumentativos breves. Madrid: Arco Libros.

Domínguez García, M.ª N. 2010: “Los marcadores discursivos y los tipos textuales”, en O. Loureda y E. Acín, Los estudios sobre marcadores del discurso en español, hoy, 359-414.

Dongheng Li, J.B. & Parkhurst, D. J., 2006. openeyes: a low-cost head-mounted eye-tracking solution. Proceedings ofthe 2006 symposium on Eye tracking research & applications. New York, NY, USA, pp. 95-100.

Dorta, J. y M.ª N. Domínguez. 2001. “Polifuncionalidad discursiva y comportamiento prosódico prototípico del marcador pues”, Español Actual, 75, 45-53.

Duchowski, A. 2007. “Eye Tracking Methodology: Theory and Practice”.

Ducrot, O. 1980. Les mots du discours. París : Minuit.

Ducrot, O. 1983. “Operateurs argumentatifs et visée argumentative.” Cahiers de Linguistique Francaise 5: 7-36.

Ducrot, O. 1993. «Pour une description non-véritative du langage.» Actes du congrès de linguistique de Séoul. 86-98.

Dully, S. A. 1992. Eye movements and complex comprehension processes. In K. Rayner (Ed.), Eye movements and visual cognition: Scene perception and reading (pp. 462-471). New York: SpringerVerlag.

Enderle, J. 2010. Models of Horizontal Eye Movements, Part I: Early Models of Saccades and Smooth Pursuit. Synthesis Lectures on Biomedical Engineering 5(1).

Engbert, R., Longtin, A., & Kliegl, R. 2002. A dynamical model of saccade generation in reading based on spatially distributed lexical processing. Vision Research, 42, 621–636

Erickson, F., 1979. Talking down: Some cultural sources of miscommunication in interracial interviews. In: A. Wolfgang, ed., Nonverbal behavior: Applications and cultural implications, 99-126. New York: Academic Press.

Escandell-Vidal, V. 2005. La comunicación. Madrid: Gredos.

Estellés, M. 2009. Gramaticalización y gramaticalizaciones: el caso de los marcadores del discurso de digresión en español, Universitat de València, Valencia.

Estellés, M. y S. Pons. 2014. "Absolute initial position", en S. Pons Bordería (ed.), Discourse segmentation in Romance Langauges, 121-155.

Estellés, M. 2017. ¿Se puede determinar el grado de gramaticalización de los marcadores del discurso a través de la prosodia? Un estudio preliminar a partir de corpus orales del español. Normas, 7(2), 227-252.

Featherston, S. 2007. Data in generative grammar: the stick and the carrot. Theoretical Linguistics 33.269–318.

Fernández Bernárdez, C. 1994. "Marcadores textuales de "ejemplificación"", ELUA, 10: 103-44.

Ferrari, A. L. Cignetti, & A.M. De Cesare et al. 2008. L'interfaccia linguatesto. Natura e funzioni dell'articolazione informativa dell'enunciato. Alessandria: Edizioni dell'Orso.

Ferreira, F., & Clifton, C. 1986. The independence of syntactic processing. Journal of Memory and Language, 25, 348-368

Ferreira, F.; J. Apel and J. M. Henderson. 2008. "Taking a new look at looking at nothing." Trends in Cognitive Sciences 12 (11): 405-410.

Fitsimmons, G. & D. Drieghe. 2012. How Fast Can Predictability Influence Word Skipping During Reading? Journal of Experimental Psychology Learning Memory and Cognition 39(4).

Flores Acuña, E. 2003. Los marcadores de reformulación: análisis, aplicado a la traducción español/ italiano, de En fin y de hecho. Universidad de Málaga. Facultad de Filología y Letras.

Figueras, C. 2000. "Puntuación y conectores causales." Espéculo. Revista de estudios literarios 13.

Figueras, C. 2018. "La puntuación y el significado del texto", en Escandell, M.V., Ahern, A. y Amenós, J. (eds.): Pragmática, Akal (2018), 1-42.

Findlay, J.M. 1992. Programming of Stimulus-Elicited Saccadic Eye movements. In K. Rayner (Ed.) Eye movements and Visual Cognition: Scene Perception and Reading (pp. 8-30). New York: Springer-Verlag (Springer series in Neuropsychology).

Fischer, K. (ed.). 2006. Approaches to Discourse Particles, Amsterdam, Elsevier.

Fløttum, K. (1994): "À propos de c'est-à-dire et ses correspondants norvégiens", Cahiers de Linguistique Française 15, pp. 109-130.

Foolen, A. 1991. Metalinguistic negation and pragmatic ambiguity: Some comments on a proposal by Laurence Horn. Pragmatics, 1 (1991), pp. 217-237

Fraser, B. 1988. “Types of English discourse markers.” Acta Linguistica Hungarica 38 (1-4): 19-33
Fraser, B. (1999): “What are discourse markers?”, Journal of Pragmatics 31, pp. 931-952.
Fraser, B. (2006): “Towards a theory of discourse markers”, en K. Fischer (ed.): Approaches to discourse particles. Ámsterdam: Elsevier, pp. 189-204.
Fraser, B. An account of discourse markers, International Review of Pragmatics 1 (2009), 1–28.
Fraser, B. 2015. The combining of Discourse Markers: A beginning. Journal of Pragmatics 86, 48-53.
Fretheim, Thorstein (2000). “Procedural encoding of propositional attitude in Norwegian conditional clauses”. In: Andersen, Gisle; Fretheim, Thorstein (eds.) Pragmatic Markers and Propositional Attitude. Amsterdam/Philadelphia: John Benjamins, pp. 53-84.
Fuchs, C. (1982): La paraphrase. Paris: Presses Universitaires de France.
Fuchs, C. 1994. Paraphrase et énonciation. París. Ophrys.
Fuchs et al. 2013. Acoustic and respiratory evidence for utterance in planning in German. Journal of Phonetics 41, 29-47.
Fuentes Rodríguez, C. 1987. Enlaces extraoracionales. Sevilla: Alfar.
Fuentes Rodríguez, C. 1993. “Conclusivos y reformulativos”, Verba, 20: 171-96.
Fuentes Rodríguez, C. 2000. Lingüística pragmática y Análisis del discurso, Madrid, Arco/Libros.
Fuentes Rodríguez, C. 2009. Diccionario de conectores y operadores del español. Madrid: Arco/Libros.
Gale, A. G., & Findlay, J. M. 1983. Eye movement patterns in viewing ambiguous figures. In R. Gr0net; C. Menz, D. F. Fisher, & R. A. Monty (Eds.), Eye movements and psychological functions: International views (pp. 145-168). Hillsdale, NJ: Erlbaum.
Gallardo, B. & M.J. Marín. 2005. Marcadores discursivos procedentes de verbos perceptivos en el discurso afásico. Revista de investigación lingüística. VIII, 53.94.
Gaulmyn, M.M. de. 1987. “Reformulation et planification métadiscursives”, in Cosnier, J. and Kebrat-Orecchioni, C. (eds.), Décrire la conversation. Lyon: Presses Universitaires de Lyon, pp. 167-198.
Garcés, M. P. (2005): “Reformulación y marcadores de reformulación”, en M. Casado et al. (eds.): Estudios sobre lo metalingüístico (en español). Fráncfort: Peter Lang, pp. 47-66.
Garcés, M. P. (2006): “Las operaciones de reformulación”, en M. Villayandre (ed.): Actas del XXXV Simposio Internacional de la Sociedad Española de Lingüística. León: Universidad de León, pp. 654-672.
Garcés, M. P. (2008): La organización del discurso: marcadores de ordenación y de reformulación. Madrid/Fráncfort: Iberoamericana/Vervuert.
Garcés, M. P. (2010): “Marcadores de corrección y rectificación en los textos escritos”, Revista de Investigación Lingüística 13, pp. 87-105.
Gaulmyn, M.-M. (1986): “Reformulation métadiscursive et genèse du discours”, Études de linguistique appliquée 62, pp. 98-116.

Galán Rodríguez, C. 1995. "Las oraciones causales: propuesta de clasificación." Anuario de estudios filológicos, 18: 125-158.
Geeraerts, D. 2006. Methodology in Cognitive Linguistics. In Cognitive Linguistics: Current applications and future perspectives, Gitte Kristiansen, Michel Achard, René Dirven and Francisco José Ruiz de Mendoza Ibañez (eds.), 21-49. Berlin / New York: Mouton de Gruyter.
Giora, R. 2003. On our Mind: Salience, Context, and Figurative Language. New York: Oxford University Press.
Gibbs, R. 2005. Psycholinguistic Experiments and Linguistic-Pragmatics. In Experimental Pragmatics, eds. Noveck, I. & D. Sperber.
Goodman, K. 1996. On Reading: A Common-sense Look at the Nature of Language and the Science of Reading. Portsmouth, NH: Heinemann.
Godfroid, Aline. 2012. "Eye tracking." In The Routledge encyclopedia of second language acquisition, by Peter Robinson, 234-236. New York/London: Routledge.
Godfroid, A., Boers, F. & Housen, A. 2013. An eye for words: Gauging the role of attention in incidental L2 vocabulary acquisition by means of eye-tracking. Studies in Second Language Acquisition, 35, 3, 483-517. Cambridge University Press.
Gordon, N.J. & W. Fleisher. 2001. International Encyclopedia of the Social & Behavioral Sciences. Retrieved from: https://www.sciencedirect.com/topics/neuroscience/neurolinguistics
Grice, H. Paul. 1975. Logic and conversation. Vol. 3, in Speech Acts, by P. Cole and Morgan J.L., 41-58. New York: Academic Press.
Gülich, E ; Kotschi, Th. 1983. "Les Marqueurs De La Réformulation Paraphrastique", Connecteurs Pragmatiques Et Structure Du Discours (Actes Du 2eme Colloque De Pragmatique De Geneve), Cahiers de linguistique francaise, 5: 305-51.
Gülich, E./Kotschi, Th. (1987): "Les actes de reformulation dans la consultation: La dame de Caluire", en P. Bange (ed.): L'analyse des interactions verbales. La dame de Caluire: une consultation. Berna: Peter Lang, pp. 15-81.
Gülich, E. ; Kotschi, Th. 1995. "Discourse production in oral communication", Aspects of oral communication, ed. Uta Quasthoff. Berlin / New York, Walter de Gruyter: 30-66.
Halliday, M.A.K. and R. Hasan. 1974. Cohesion in English. London: Longman.
Hammoud, R.I. 2008. Passive Eye Monitoring: Algorithms, Applications and Experiments. New York: Springer-Verlag.
Hansen, M. 1998. "The semantic status of discourse markers." Lingua 104, 235–260.
Hansen, M. 2006. A dynamic polysemy approach to the lexical semantics of discourse markers (with an exemplary analysis of French toujours). In Fischer, K. (ed). Approaches to discourse particles. Elsevier, 21-42.
Harris, Z. 1957. Co-occurence and transformation in linguistic structure. Language, 3(33):283–340.
Haselow, A. 2011. "Discourse particle and modal particle: the functions of utterance final then in spoken English." Journal of Pragmatics 14: 3603- 3623.
Heine, B. 2013. On discourse markers: grammaticalization, pragmaticalization, or something else? Linguistics 51, 6, 1205-1247.

Heritage, J. 2018. "Turn-initial particles in English: The cases of oh and well.", In Between Turn and Sequence: Turn-initial particles across languages (John Heritage, Marja-Leena Sorjonen, eds.), Amsterdam / Philadelphia, John Benjamins Publishing, pp. 149–184.
Hidalgo, A. 2010. Los marcadores discursivos y su significante: en torno a la interfaz marcadores-prosodia en español. In Loureda Lamas, Ó and E. Acín-Villa (Eds.) Los estudios sobre marcadores del discurso en español, hoy. Madrid: Arco Libros.
Holmqvist, K; M. Nyström; R. Andersson; R. Dewhurst, H. Jarodzka and J. van de Weijer. 2011. Eye tracking: a comprehensive guide to methods and measures. Oxford, UK: Oxford University Press.
Hopper, P.J. (1991): “On some principles of grammaticization”, in Traugott, E.C. and Heine, B. (eds.), Approaches to grammaticalization. Amsterdam: John Benjamins, pp. 17-35.
Horn, L. 2002. Horn, Laurence (2002), “Assertoric Inertia and NPI licensing”, Chicago Linguistic Society, 38: 55-82.
Huang, Y.T. & J. Snedeker. 2009. Semantic Meaning and Pragmatic Interpretation in 5-Year-Olds: Evidence From Real-Time Spoken Language Comprehension. Developmental Psychologoy, 45, 6, 1723-1739.
Hummel, M. 2012. Polifuncionalidad, polisemia y estrategia retórica: los signos discursivos con base atributiva entre oralidad y escritura, Berlin/Boston, De Gruyter.
Hyönä, J; R. Lorch and M. Rinck. 2003. “Eye Movement Measures to Study Global Text Processing.” In The mind's eyes: Cognitive and applied aspects of eye movement research, by Ralph Radach, Jukka Hyönä and Heiner Deubel, 313-334. Amsterdam: Elsevier
Inhoff, A. W. (1984). Two stages of word processing in the reading of prose during eye fixations in reading. Journal of Verbal Learning & Verbal Behavior, 23, 612–624.
Iwasaki M, Inomara H. 1986. Relation Between Superficial Capillaries and Foveal Structures in the Human Retina. Investigative Ophthalmology & Visual Science, 27: 1698-1705.
Jucker, A. 1993. The discourse marker well: A relevance-theoretical account. Journal of Pragmatics 19 (1993) 435-452.
Juhasz, B. et al. 2006. Binocular coordination of the eyes during reading: Word frequency and case alternation affect fixation duration but not fixation disparity. The quarterly Journal of Experimental Psychology 59, 9, 1614-1625.
Juola, J. et al. 1982. Visual Search and Reading of Rapid Serial Presentations of Letter Strings, Words, and Text. Journal of Experimental Psychology: General.
Just, M. A., & Carpenter, P. A. (1980). A theory of reading: From eye fixations to comprehension. Psychological Review, 87 (4), 329-354.
Just, M. Adam and P. A. Carpenter. 1976. “Eye Fixations and Cognitive Processes Marcel Adam Just Patricia A. Carpenter.” Cognitive psychology (8): 441-480.
Just, M. A, and P.A. Carpenter. 1980. “A theory of reading: From eye fixations to comprehension.” Psychological Review, 87: 329-354.
Keating, G. 2014. “Eye-tracking with text.” In Research Methods in Second Language Psycholinguistics, by Jill Jegerski and Bill van Patten, 69-92. New York: Routledge.

Kennedy, A., & Murray, W. S. (1987). Spatial coordinates and reading: comments on Monk. The Quarterly Journal of Experimental Psychology, 39A, 649-656

Keren AS, Yuval-Greenberg S, Deouell LY. Saccadic spike potentials in gamma-band EEG: characterization, detection and suppression. Neuroimage 49: 2248-2263.

Kohler-Chesny, J. (1981): “Aspects explicatifs de l’activité discursive de paraphrasage”, Revue européenne des sciences sociales 56, pp. 95-114.

Komar, S. (2007). The interface between intonation and function of discourse markers in English. In S. Komar and U. Mozetič, Studies in the English language and literature in Slovenia (Volume IV/1-2). Ljubljana: Trajanus d.o.o., Kranj. 43–55.

Labov, W and J. Waletzky. 1967. “Narrative analysis: oral versions of personal experience.” In Essays on the verbal and visual arts, by June Helm, 12-44. Seattle: University of Washington Press.

Laird, N.M. & J. Ware. 1983. Random-effects Models for Longitudinal Data. Biometrics 38:963-974.

Lencer, R. & P. Trillenberg. 2008. Neurophysiology and neuroanatomy of smooth pursuit in humans. Brain and Cognition 68, 219-228.

Lewis, D. 2006. Discourse markers in English: a discourse-pragmatic view. In Fischer, K. (ed). Approaches to discourse particles. Elsevier, 43-60.

Liversedge, S. P.; K. Rayner; S. J. White; D. Vergilino-Perez; J. M. Findlay and R.W. Kentridge. 2004. “Eye movements when reading disappearing text: is there a gap effect in reading?” Vision Research 44: 1013–1024.

Liversedge, S., Paterson, K.B., & Pickering, M.J 1998. Eye movements and measures of reading time. In G. M. Underwood (Ed.), Eye guidance in reading and scene perception. Oxford: Elsevier.

Liversedge, S.P. et al. 2000. The Oxford Handbook of Eye-movements. Oxford. Oxford University Press.

Llamas Saíz, C. 2010. “Los marcadores del discurso y su sintaxis.” In Los estudios sobre marcadores del discurso en español, hoy, by Óscar Loureda Lamas and Esperanza Acín Villa, 183-239. Madrid: Arco Libros.

Lohmann, A & C. Koops. 2016. Aspects of Discourse Marker sequencing. In Keizer, Evelien; Kaltenböck, Gunther & Arne Lohmann (eds.) Outside the Clause: Form and Function of Extra-Clausal Constituents. [Studies in Language Companion Series]. Amsterdam/Philadelphia: John Benjamins.

López Serena, A and M. Borreguero Zuloaga. 2010. “Los marcadores del discurso y la variación lengua hablada vs. lengua escrita.” In Los estudios sobre marcadores del discurso en español, hoy, by Óscar Loureda Lamas and Esperanza Acín-Villa, 415-496. Madrid: Arco Libros.

Loureda Lamas, Ó and E. Acín-Villa. 2010. Los estudios sobre marcadores del discurso en español, hoy. Madrid: Arco Libros.

Loureda, Ó. and L. Nadal. 2011. “Dime dónde miras, y te diré qué comprendes: experimentos sobre la comprensión de las partículas discursivas.” Español Actual 96: 131-157.

Loureda, Ó.; L. Nadal and I. Recio. 2016. “El significado procedimental y las partículas discursivas del español: una aproximación experimental.” Revista Signos. Estudios de Lingüística 49: 52-77.

Loureda, Óscar, Laura Nadal and Inés Recio. 2016b. “Partículas discursivas y cognición: 'por tanto' y la conexión argumentativa.” Romanistisches Jahrbuch (de Gruyter Mouto) 67 (1): 240-254.

MacWhinney, B.J. 2001. International Encyclopedia of the Social & Behavioral Sciences. Retrieved from: https://www.sciencedirect.com/topics/neuroscience/psycholinguistics

Mackworth. N. H., & Hiebert. Joyce. 1967. Measuring the useful field of view during visual search. (In preparation) 1967. Michels. K. M., & Zusne. L. Metrics of visual form. Psychol. Bull., 1965. 63. 74–86.

Mann I. 1964. The development of the human eye. New York: Grune and Stralton.

Matlock, T. & B. Winter. 2013. Experimental Semantics. In Bernd Heine & Heiko Narrog (Eds.), The Oxford handbook of linguistics analysis. Oxford / New York: Oxford University Press.

Martín Butragueño, P. 2006. “El estudio de la entonación en el español de México”, en Haciendo lingüística. Homenaje a Paola Bentivoglio. Comp. M.Sedan, A. Bolívar y M. Shiro. Caracas: Universidad Central de Venezuela, pp. 105-125

Martín Zorraquino, María Antonia. 1998. “Los marcadores del discurso desde el punto de vista gramatical.” In Los marcadores del discurso. Teoría y análisis, by María Antonia Martín Zorraquino and Estrella Montolío Durán, 19-53. Madrid: Arco/Libros.

Martín Zorraquino, M. A. (2010): “Los marcadores del discurso y su morfología”, en Ó. Loureda/E.Acín (eds.): Los estudios sobre marcadores del discurso en español, hoy. Madrid: Arco Libros, pp. 93-181.

Martín Zorraquino, M. A./Montolío, E. (eds.) (1998 [2008]): Los marcadores del discurso. Teoría y análisis. Madrid: Arco Libros.

Martín Zorraquino, María Antonia and José Portolés Lázaro. 1999. “Los marcadores del discurso.” In Gramática descriptiva de la lengua española, by Violeta Demonte and Ignacio Bosque, 4051-4214. Madrid: Espasa Calpe S.A.

McConkie, George W. and Keith Rayner. 1975. “The span of the effective stimulus during a fixation in reading.” Perception & Psychophysics (17): 578-586.

McConkie, G.W., P.W.Kerr M.D.Reddix D.Zola. 1988 Eye movement control during reading: I. The location of initial eye fixations on word.

Meek, K.M., N.J. Fullwood. 2001. Corneal and scleral collagens - A microscopist’s perspective. Micron, 32:261–272.

Mel’ˇcuk, I. A. 1992. Paraphrase et lexique: la th´eorie sens-texte et le Dictionnaire explicatif et combinatoire. In Igor A. Mel’ˇcuk et al., editors, Dictionnaire explicatif et combinatoire du fran¸cais contemporain. Recherches lexico-s´emantiques III. Les Presses de l’Universit´e de Montr´eal, pages 9–59.

Meibauer J. & M. Steinbach (eds.). 2011. Experimental Pragmatics/Semantics. Amsterdam/Philadelphia: John Benjamins.

Mertins, Barbara. 2016. “The use of experimental methods in linguistic research: advantages, problems and possible pitfalls.” In Slavic languages in

Psycholinguistics. Chances and Challenges for Empirical and Experimental Research, by Tanja Anstatt, Christina Clasmeier and Anja Gattnar, 15-33. Tübingen: Narr Francke Attempto.
Milicevic, J. 2007. La paraphrase. Peter Lang, Berne.
Milliken, G.A. 1992. Analysis of Mixed Models without Mixed Models Software. Conference on Applied Statistics in Agriculture. Kansas State University Libraries. New Prairie Press.
Millis, Keith K. and Marcel Adam Just. 1994. "The Influence of Connectives on Sentence Comprehension." Journal of Memory and Language, 128-147.
Moeschler, Jacques. 1985. Argumentation et conversation : Éléments pour una analyse pragmatique du discours. Saint Cloud: Hatier Credif.
Moeschler, J. (2002), "Connecteurs, encodage conceptuel et encodage procédural", Cahiers De Linguistique Française, 24, 265-292.
Montolío, E. (2001): Conectores de la lengua escrita. Barcelona: Ariel.
Mortureux, M. F. (1982): "Paraphrase et métalangue dans le dialogue de vulgarisation", Langue française 53, pp. 48-81.
Murat, Michel; Cartier-Bresson, Bernard. 1987. "C'est-a-dire ou la reprise interprétative". La reformulation du sens dans le discours, Langue Francaise, 73: 5-15.
Murillo , S. (2007), A conribution to the Pragmalinguistic Contrastive Study of Explicatory Reformulative Discourse Markers in Contemporary Journalistic Written English and Spanish, Tesis Doctoral, Universidad de Zaragoza.
Murillo, S. (2010), "Los marcadores del discurso y su semántica". En Ó. Loureda Lamas y E. Acín Villa (eds.), La investigación sobre marcadores del discurso del español, hoy, Madrid, Arco Libros: 151-190.
Murillo, S. (2016a), "Sobre la reformulación y sus marcadores", Cuadernos AISPI 8: 237-258.
Murillo, S. (2016b), "Sobre el uso de que con los marcadores de reformulación explicativa en español escrito". En M. Borreguero Zuloaga y S. Gómez-Jordana Ferary (eds.), Marqueurs du discours dans le langues romanes, une approche contrastive, Limoges, Lambert-Lucas: 168-179.
Myers, J. 2009. Syntactic judgment experiments. Language and Linguistics Compass 3/1: 406–423
Nadal, Laura. forthcoming. Lingüística experimental y contraargumentación: un estudio sobre el conector "sin embargo" del español. Bern: Peter Lang.
Nadal, Laura; Inés Recio; Martha Rudka and Óscar Loureda. 2017. "Processing additivity in Spanish: incluso vs. además." In Focus on Additivity. Adverbial modifiers in Romance, Germanic and Slavic languages, by Anna-Maria De Cesare and Cecilia Andorno, 137-154. Amsterdam/Philadelphia: John Benjamins.
Nelson, R., Damico, J. & S. Smith. 2008. Applying eye movement miscue analysis to the reading patterns of children with language impairment. Clinical Linguistics & Phonetics, 22, 293-303.
Nierhoster, D. & Li, L. & M. Lappe. 2017. The Accuracy and Precision of Position and Orientation Tracking in the HTC Vive Virtual Reality System for Scientific Research. i-Perception 8(3):204166951770820.

Noton, D. & Stark, L. 1971. Eye movements and Visual perception. Scientific American 224, 34-43.
Noveck, Ira & Dan Sperber. 2004. Introduction. In Noveck, I. & Sperber, D. (eds) Experimental Pragmatics, Palgrave.
Noveck, Ira and Dan Sperber. 2007. “The why and how of experimental pragmatics: The case of ‘scalar inferences’.” In Pragmatics, by Noel Burton-Roberts, 184–212. Basingstoke: Palgrave Macmillan.
O’Regan et al. 2000. Changes during blinks: looking without seeing and seeing without looking. Visual Cognition, 7.
O'Regan, J. K. 1980. The control of saccade size and fixation duration in reading: The limits of linguistic control. Perception & Psychophysics, 28, 112-117.
Polanco, F. 2016. Marcadores del discurso y contextos funcionales: la reformulación como construcción discursiva. Onomázein, 34, 14-35.
Pollatsek, Alexander and Keith Rayner. 1990. “Eye movements and lexical access in reading.” In Comprehension processes in reading, by D. A. Balota, G. B. Flores d'Arcais and Keith Rayner, 143-164. Hillsdale, NJ: Erlbaum.
Poole A., Linden J. Ball. 2006. Eye Tracking in Human Computer Interaction and Usability Research: Current Status and Future Prospects. Encyclopedia of Human Computer Interaction, ISBN13: 9781591405627, ISBN10: 1591405629, EISBN13: 9781591407980.
Pons Bordería, Salvador. 1998. Conexión y conectores: estudio de su relación en el registro informal de la lengua. Valencia: Universitat de València.
Pons Bordería, S. (2001), “Connectives/discourse markers: An overview”, Ferrer Mora, H. y S. Pons Bordería (eds.), La pragmática de los conectores y las partículas modales, Valencia, Universidad, 219-243.
Pons, S. 2004. Conceptos y aplicaciones de la Teoría de la Relevancia, Madrid, Arco/Libros.
Pons Bordería, Salvador. 2006. “A functional approach for the study of discourse markers.” In Approaches to discourse particle, by Kerstin Fischer, 77–99. Amsterdam: Elsevier.
Pons, S. (2008a): “Gramaticalización por tradiciones discursivas: el caso de esto es”, en J. Kabatek (ed.): Sintaxis histórica del español. Nuevas perspectivas desde las tradiciones discursivas. Madrid/Fráncfort: Iberoamericana/Vervuert, pp. 249-274.
Pons Bordería, S. (2008b), “Do discourse markers exist? On the treatment of discourse markers in Relevance Theory”, Journal of Pragmatics 40: 1411-1434.
Pons Bordería, S. (2013), “Un solo tipo de reformulación”. Cuadernos AISIPI 2: 151-170.
Pons Bordería, S. & A. Macário Lópes. 2013. Ou seja vs. O sea: Formal identity and functional diversity. Revista de Estudos Linguísticos da Universidade do Porto - Vol. 9- 103-128
Pons Bordería, S. (2014), “Paths of grammaticalization in Spanish o sea”. En C. Ghezzi y P. Molinelli (eds.), Discourse and Pragmatic Markers from Latin to the Romance Languages, Oxford, Oxford University Press: 108-135.
Pons Bordería, S. (2016), “Evolución diacrónica de o sea”. Boletín de la Real Academia Española XCVI: 291-350.

Pons Bordería, S. (2017). “Volviendo sobre un solo tipo de reformulación: una respuesta a Silvia Murillo”. Cuadernos AISPI: Estudios de lenguas y literaturas hispánicas, ISSN 2283-981X, Nº. 10, 2017 (Ejemplar dedicado a: Criterios de análisis y nuevas perspectivas en el estudio de partículas), págs. 153-172
Portolés, J.. 1993. “La distinción entre conectores y otros marcadores del discurso en español.” Verba 20: 141-170.
Portolés, J. 2001 [1998]. Marcadores del discurso. Barcelona: Ariel.
Portolés, J. 2004. Pragmática para hispanistas. Madrid: Síntesis.
Pynte et al. 1996. The time-course of metaphor comprehension : an event-related potential study. Brain and Language, 316, 293-316.
Quirk, Randolph, Sidney Greenbaum, Geoffrey Leech and Jan Svartvik, 1985. A comprehensive grammar of the English language. London: Longman.
R Core Team. 2014. R: A language and environment for statistical computing. Vienna: R Foundation for Statistical Computing.
Ramamurthy, M. & V. Lakshminarayanan. 2015. Human Vision and Perception. n book: Handbook of Advanced Lighting Technology. Springer.
Raney, G E.; Spencer J. Campbell & J. C. Bovee. 2014. “Using eye movements to evaluate the cognitive processes involved in text comprehension.” Journal of Visualized Experiments 50780.
Rayner, Keith. 1975. “The perceptual span and peripheral cues in reading.” Cognitive Psychology 7: 65-81.
Rayner, K. 1977. Visual attention in reading: Eye movements reflect cognitive processes. Memory & Cognition, 5, 443-448.
Rayner, K. 1978. Eye movements in reading and information processing. Psychological Bulletin 85, 3, 618-660.
Rayner, K. and Duffy, S. 1986. Lexical Complexity and Fixation Times in Reading: Effects of Word Frequency, Verb Complexity, and lexical Ambiguity. Memory & Cognition, 14, 191-201.
Rayner, K., Sereno, S.C., & G. Raney. 1996. Eye Movement Control in Reading: A Comparison of Two Types of Models
Rayner, Keith. 1998. “Eye movements in reading and information processing: 20 years of research.” Psychological bulletin, 372-422.
Rayner, Keith. 2009. “Eye movements and attention in reading, scene perception and visual search.” Quarterly Journal of Experimental Psychology, 1457–1506.
Rayner, Keith; Albrecht Werner Inhoff; Robert E. Morrison; Maria L. Slowiaczek and James H. Bertera. 1981. “Masking of foveal and parafoveal vision during eye fixations in reading.” Journal of Experimental Psychology: Human Perception and Performance 7: 167-179.
Rayner, Keith and Alexander Pollatsek. 1987. “Eye movements in reading: A tutorial review.” Attention and performance, 327-362.
Rayner, Keith; Erik D. Reichle and Alexander Pollatsek. 1998. “Eye movement control in reading: An overview and model.” In Eye Guidance in Reading and Scene Perception, by Geoffrey Underwood, 243-268. Oxford, England: Elsevier.

Rayner, Keith; Sara C. Sereno; Robin K. Morris; A. Réne Schmauder and Charles Jr. Clifton. 1989. “Eye movements and on-line language comprehension processes.” Language and Cognitive Processes, SI21–SI49.

Rayner, Keith; Timothy J. Slattery and Nathalie N. Bélanger. 2010. “Eye movements, the perceptual span, and reading speed.” Psychonomic Bulletin & Review 17 (6): 834–839. doi:10.3758/PBR.17.6.834.

Rayner, K., & Pollatsek, A. 1987. Eye movements in reading: A tutorial review. In M. Coltheart (Ed;), Attention and performance (Vol. 12, pp. 327-362). London: Erlbaum.

Rayner, K., Sereno, S. C., Morris, R. K., Schmauder, A. R., & Clifton, C. 1989. Eye movements and on-line language comprehension processes [Special issue]. Language and Cognition Processes, 4, 21- 49.

Rayner, K., & Well, A. D. 1996. Effects of contextual constraint on eye movements in reading: A further examination. Psychonomic Bulletin & Review, 3, 504-509.

Rayner, Keith; Arnold D. Well; Alexander Pollatsek and James H. Bertera. 1982. “The availability of useful information to the right of fixation in reading.” Perception & Psychophysics 31: 537-550.

Rayner, K., & Sereno, S. C. 1994. Eye movements in reading: Psycholinguistic studies. In M. Gernsbacher (Ed.), Handbook of psycholinguistics (pp. 57-82). New York: Academic Press.

Rayner, K. K. H. Chace, T. J. Slattery,& J. Ashby. 2006. Eye Movements as Reflections of Comprehension Processes in Reading. Scientific Studies of Reading 10(3).

Real Academia Española (1999): Ortografía de la lengua española (Edición revisada por las Academias de la Lengua Española). www.rae.es

Real Academia Española. 2014. Diccionario de la lengua española. Madrid: Espasa.

Recio Fernández, Inés. forthcoming. Discourse Processing in Spanish L1 and L2: An Experimental Study on Causality and Counter-Argumentation. Heidelberg: Universität Heidelberg.

Recio, Inés; Laura Nadal and Óscar Loureda. 2018. “On argumentative relations in Spanish: experimental evidence on the grammaticalization of cause-consequence discourse markers.” In Beyond Grammaticalization and Discourse Markers: new Issues in the Study of Language Change, by Salvador Pons and Óscar Loureda, 384-409. Leiden: Brill.

Redeker, G. 1990. “Ideational and pragmatic markers of discourse structure.” Journal of Pragmatics 14(3): 367-381.

Reichle, Erik D.; Alexander Pollatsek; Donald Fisher and Keith Rayner. 1998. “Toward a model of eye movement control in reading.” Psychological Review 105: 125-57.

Reichle, Erik D.; Keith Rayner and Alexander Pollatsek. 1999. “Eye movement control in reading: Accounting for initial fixation locations and refixations within the E-Z Reader model.” Vision Research 39: 4403 – 411.

Reichle, Erik D.; Keith Rayner and Alexander Pollatsek. 2003. “The E-Z Reader model of eye-movement control in reading: Comparisons to other models.” Behavioral and Brain Sciences 26: 445–526.

Richardson, D., R. Dale & M. Spivey. 2004. Eye movements in language cognition. A brief introduction. In González-Márquez et al. (eds.). Methods in Cognitive Linguistics. John Benjamins Publishing Company.

Rogers, K. 2011. The eye. The psychology of human perception. Britannica Educational Publishing. New York.

Rossari, C. 1990. Projet pour une typologie des opérations de reformulation. Cahiers de Linguistique Française, 11, 345-359.

Rossari, C. (1994): Les opérations de reformulation: analyse du processus et des marques dans une perspective contrastive française-italien. Berna: Peter Lang.

Rossari, C. et al. (2004): Autour des connecteurs: réflexions sur l'énonciation et la portée. Berna: Peter Lang.

Roulet, E. 1986. Complétude interactive et mouvements discursifs. Cahiers de Linguistique Française 7, 193.210.

Roulet, E. (1987): "Completude interactive et connecteurs reformulatifs", Cahiers de linguistique française 8, pp. 111-140

Roulet, Eddy, Antoine Auchlin; Jacques Moeschler; Christian Rubattel and Marianne Schelling. 1985. L'articulation du discours en français contemporain. Berna: Peter Lang.

Sacks, H. et al. 1974. A Symplest Sistematics for the Organization of Turn-Taking Conversation, Language, 696-735.

Schumacher, P.B.2001. The hepatitis called …: Electrophysiological Evidence for Enriched Composition. In J. Meibauer M. Steinbach (Eds.). Experimental Pragmatics/Semantics, Amsterdam/Philadelphia: John Benjamins, 199-219.

Schütze, Carson T. 1996. The empirical base of linguistics: grammaticality judgments and linguistic methodology. Chicago, IL: University of Chicago Press.

Sanders, Ted. 2005a. "Coherence, causality and cognitive complexity in discourse." Proceedings/Actes SEM-05, First International Symposium on the Exploration and Modelling of Meaning. Toulouse: Université de Toulouse - Le Mirail. 105–114.

Sanders, Ted J. M. and Wilbert P. M. Spooren. 2007. "Discourse and text structure." In The Oxford Handbook of Cognitive Linguistics, by Dirk Geeraets and Hubert Cuyckens, 916-941. Oxford: Oxford University Press.

Sanders, Ted J. M. and Wilbert P. M. Spooren. 2015. "Causality and subjectivity in discourse: The meaning and use of causal connectives in spontaneous conversation, chat interactions and written text." Linguistics 53 (1): 53 – 92.

Santana, Andrea; Dorien Nieuwenhuijsen; Wilbert Spooren and Ted Sanders. 2017. "Causality and Subjectivity in Spanish Connectives: Exploring the Use of Automatic Subjectivity Analyses in Various Text Types."

Santos Río, Luis. 2003. Diccionario de partículas. Salamanca: Luso-Española de Ediciones.

Schegloff, E. A. et al. (1977): "The preference for self-correction in the organization of repair in conversation", Language 53, pp. 361-382.

Schelling, M. 1982. "Quelques modalités de clôture: les conclusifs finalement, en somme, au fond, de toute façon", Cahiers de Linguistique Française, 4, pp. 63-106.

Schiffrin, Deborah. 1987. Discourse markers. Cambridge: Cambridge University.

Schiffrin, D., Tannen, D. and Hamilton, H.E. (eds.) (2001): The handbook of discourse analysis. Oxford: Blackwell.

Schiffrin, D. 2006. From linguistic reference to social identity. In A. De Fina, D. Schiffrin & M. Bamberg (eds), Discourse and Identity, 103-32. Cambridge: Cambridge University Press.
Schiffrin, D. 2015. Discourse markers: Language, Meaning and Context. The Handbook of Discourse Analysis, Edited by Deborah Schiffrin, Deborah Tannen, Heidi E. Hamilton Copyright © Blackwell Publishers Ltd 2001
Schourup, Lawrence. 1999. "Discourse Markers." Lingua 107: 227-265.
Schwenter, S. 1996. "Some reflections on o sea. A discourse marker in Spanish." Journal of Pragmatics 25: 855–874.
Schröck, J. 2018. Die Reformulierung und ihre kognitive Verarbeitung: Eine experimentelle Studie zur Verwendung des Markers es decir im Spanischen. Trabajo de fin de máster. Universität Heidelberg.
Sereno, S.C. (1992). Early lexical effects when fixating a word in reading. In K. Rayner (Ed.), Eye movements and visual cognition: Scene perception and reading (pp. 304-316). New York: SpringerVerlag
Simpsons, J. 2011. Routledge Handbook of Applied Linguistics. London and New York: Routledge, 460-471.
Smaby, R.A. 1971. Paraphrase grammars. Dordrecht.
Sperber, Dan and Deirdre Wilson. 1986. Relevance: Communication and Cognition. Oxford: Blackwell.
Spotorno, N. & I. Noveck. 2014. When is irony effortful? Journal of Experimental Psychology: General, 143, 1649-1665.
Stanfield, R.A. 2000. The effects of verbal context on picture recognition. Unpublished master's thesis, Florida State University, Tallahassee.
Stati, Sorin. 1986. "Connettivi interfrasali e coerenza pragmatica." Parallela 2: 309-316.
Starr, M.S. & K. Rayner. 2001. Eye movements during reading:some current controversies. Trends in Cognitive Science, 5 ,156–163
Standring, S., Borley, N. R., & Gray, H. (2008). Gray's anatomy: the anatomical basis of clinical practice. 40th ed., anniversary ed. [Edinburgh]: Churchill Livingstone/Elsevier.
Torreira, F. Bögels, S. & S.C. Levinson. 2015. Breathing for answering: The time course of response planning in conversation. Frontiers in Psychology, 6: 284.
Torres Santos, Lourdes. forthcoming. The scalar focus operator "hasta": an experimental study on processing costs in Spanish. Heidelberg: Universität Heidelberg.
Travis, C. 2006. The Natural Semantic Metalanguage approach to discourse markers. In Fischer, K. (ed). Approaches to discourse particles. Elsevier, 219-242.
Traugott, Elizabeth. 1995. "Subjectification in grammaticalization." In Subjectivity and subjectivisation: Linguistic perspectives, by Dieter Stein and Susan Wright, 31–54. Cambridge: Cambridge University Press.
Traugott, E.C. (1995): "The role of the development of discourse markers in a theory of grammaticalization", paper presented at the 12th International Conference on Historical Linguistics, Manchester.
Traugott, E.C. and Dasher, R. (2002): Regularity in semantic change. Cambridge: Cambridge University Press.

Traugott, E. & G. Trousdale. 2013. Constructionalization and constructional changes. Oxford : Oxford University Press.
Traxler, Matthew J. 2011. Introduction to Psycholinguistics: Understanding Language Science. Chichester, West Sussex; Malden MA: Wiley-Blackwell.
Underwood, G., Everatt, J. 1992. The role of Eye movements in Reading: Some Limitations of the Eye-Mind Assumption. Advances in Psychology, 88, 111-169. Elsevier B.V.
Van Dijk, T.A. & W. Kihtsch. 1983. Strategies of discourse comprehension. Academic Press. London.
Vázquez Veiga, N. 1994. "Una aproximación a algunos marcadores con función textual de 'resumen', 'conclusión' y 'cierre'", Estudios de Lingüística, 10, pp. 349-390.
Vicher, A. & D. Sankoff. 1989. The Emergent Syntax of Pre-Sentential Turn Openings. Journal of Pragmatics 13, 81–97.
Verbeke, G.; Molenberghs, G. Linear Mixed Models for Longitudinal Data. Springer; New York: 2000.
Waltereit, R. 2003. The rise of discourse markers in Italian: a specific type of language change. In Fischer, K. (ed). Approaches to discourse particles. Elsevier, 61-76.
Wanat, S. 1971. Linguistic structure and visual attention in reading. Newark, Del: International Reading Association.

Weydt, H. 2006. What are particles good for? In Fischer, K. (ed). Approaches to discourse particles. Elsevier, 205-218.
Wilson, R.A. & Keil, F.C. (Eds.).1999. The MIT Encyclopedia of the cognitive sciences. Cambridge: MIT press.
Winer, Benjamin J. 1962. Statistical principles in experimental design. New York: McGraw Hill.
Winke, P. M., Godfroid, A., & Gass, S. M. 2013. Introduction to the special issue. Eye-movement recordings in second language research. Studies in Second Language Acquisition, 35 (2), 205-212. (c) Cambridge University Press
Wood, Simon N. 2011. "Fast stable restricted maximum likelihood and marginal likelihood estimation of semiparametric generalized linear models." Journal of the Royal Statistical Society, 3-36.
Wright, K.W. et al. 2006. Handbook of Pediatric Strabismus and Amblyopia. Springer: New York.
Yarbus, A. 1967. Eye movements and vision. Plenum Press. New York.
Yang, L. 2006. Integrating prosodic and contextual cues in the interpretation of discourse markers. In Fischer, Kersin. (ed.) Approaches to Discourse Particles. Amsterdam, Boston, Heidelberg, and London Etc.: Elsevier.
Zenone, Anna. 1982. "La consecution sans contradiction : donc, par conse-quent, alors, ainsi, aussi (première partie)." Cahiers de Linguistique Française 4: 107-141.
Zhan, Z., Zhang, L., Mei, H. & P. Fong. 2016. Online Learners' Reading Ability Detection Based on Eye-Tracking Sensors. Sensors 2016, 16, 9, 1457.
Zhu, J. E. Zhang & K. Del Rio-Tsonis. 2012. Eye anatomy.

Zufferey, S. 2010. .Lexical Pragmatics and Theory of Mind. The Acquisition ofConnectives. Amsterdam: John Benjamins

Zufferey, S. 2012. “'Car, parce que, puisque' revisited: Three empirical studies on French causal connectives.” Journal of Pragmatics, 138–153.

Zufferey, S.; Willem Mak; Sara Verbrugge and Ted Sanders. 2018. “Usage and processing of the French causal connectives 'car' and 'parce que'.” Journal of French Language Studies 8 (1): 85-112.

Zufferey, S. & P. Gygax. 2017. Processing connectives with a complex form-function mapping in L2: the case of French “En Effet”. Front Psychol. 8: 1198.

Zwicky, A.M. 1985. Clitics and particles. Language, 61, 2, 283-305.

APPENDIX 1. Raw-data.

APPENDIX 2. Statistical report. Mixed-models.

Paraphrase: FPRT, SPRT, TRT

Area of Interest	Estimate	Std. Error	FPRT.pred	FPRT.pred Std. Err
Ä-K [intercept]	92.31	37.5	336.39	28.52
Ä_1	-20.2	35.15	316.19	28.56
Ä_2	6.84	34.93	343.23	28.23
M1_1	-56.11	35.17	280.28	28.61
M1_2	-155.32	34.96	181.08	28.32
M1 RF_1	38.18	35.28	374.57	28.59
M1 RF_2	91.92	35.06	428.31	28.28
M2_1	-102.77	36.51	233.62	29.9
M2_2	7.85	36.08	344.25	29.34
K	-7.91	35.62	328.48	29.31

Area of Interest	Estimate	Std. Error	SPRT.pred	SPRT.pred Std. Err
Ä-K [intercept]	-203.04	73.34	105.99	54.16
Ä_1	-22.14	72.89	83.85	54.24
Ä_2	-25.64	72.42	80.35	53.51
M1_1	18.93	72.93	124.92	54.36
M1_2	50.04	72.48	156.03	53.71
M1 RF_1	-7	73.16	98.98	54.31
M1 RF_2	62.07	72.67	168.06	53.62
M2_1	-69.56	75.62	36.43	57.17
M2_2	-0.3	74.71	105.69	55.9
K	75.29	73.82	181.27	55.86

Area of Interest	Estimate	Std. Error	TRT.pred	TRT.pred Std. Err
Ä-K [intercept]	-127.19	84.76	443.11	64
Ä_1	-41.81	80.25	401.29	64.08
Ä_2	-18.97	79.74	424.14	63.32
M1_1	-36.18	80.3	406.93	64.21
M1_2	-104.45	79.82	338.66	63.54
M1 RF_1	29	80.56	472.11	64.16
M1 RF_2	151.76	80.03	594.87	63.44
M2_1	-177.71	83.36	265.39	67.19
M2_2	1.23	82.37	444.33	65.89
K	71.31	81.32	514.42	65.82

Reformulation: FPRT, SPRT, TRT

Area of Interest	Estimate	Std. Error	FPRT.pred	FPRT.pred Std. Err
Ä-K [intercept]	-18.4	37.12	225.68	27.94
Ä_1	31.74	34.24	257.42	27.98
Ä_2	14.84	34.02	240.52	27.67
M1_1	-74.04	34.42	151.64	28.3
M1_2	-4.59	34.22	221.09	28.03
M1 RF_1	-4.28	37.12	221.4	31.01
M1 RF_2	20.59	36.97	246.27	30.81
M2_1	-11.64	37.98	214.04	31.97
M2_2	14.45	37.73	240.13	31.67
K	148.05	34.73	373.73	28.74

Area of Interest	Estimate	Std. Error	SPRT.pred	SPRT.pred Std. Err
Ä-K [intercept]	-214.03	72.5	95	52.86
Ä_1	2.82	71	97.82	52.95
Ä_2	-1	70.54	94	52.25
M1_1	27.83	71.37	122.82	53.64
M1_2	35.1	70.94	130.1	53.04
M1 RF_1	-139.58	76.74	-44.58	59.48
M1 RF_2	-150.95	76.43	-55.96	59.04
M2_1	-154.37	78.46	-59.38	61.55
M2_2	-134.59	77.96	-39.59	60.89
K	103.6	71.97	198.6	54.6

Area of Interest	Estimate	Std. Error	TRT.pred	SPRT.pred Std. Err
Ä-K [intercept]	-248.94	83.89	321.36	62.65
Ä_1	35.13	78.17	356.49	62.75
Ä_2	-116.83	77.67	204.53	62.03
M1_1	-43.72	78.59	277.64	63.49
M1_2	32.94	78.12	354.3	62.87
M1 RF_1	-153.6	84.75	167.76	69.76
M1 RF_2	-140.25	84.4	181.12	69.3
M2_1	-177.17	86.71	144.19	71.99
M2_2	-164.11	86.15	157.25	71.29
K	255.64	79.29	577	64.51

Conclusion: FPRT, SPRT, TRT

Area of Interest	Estimate	Std. Error	FPRT.pred	FPRT.pred Std. Err
Ä-K [intercept]	-9.88	34.04	234.2	28.54
Ä_1	2.58	34.02	236.77	28.29
Ä_2	-35.68	34.26	198.52	28.31
M1_1	-2.05	34.06	232.15	28.67
M1_2	2.98	34.28	237.17	28.95
M2_1	-44.29	34.15	189.91	27.81
M2_2	-6.68	34.46	227.51	28
K	49.96	34.03	284.16	28.48

Area of Interest	Estimate	Std. Error	SPRT.pred	SPRT.pred Std. Err
Ä-K [intercept]	-194.99	65.98	114.04	54.17
Ä_1	6.43	70.54	120.47	53.61
Ä_2	0.33	71	114.37	54.19
M1_1	24.92	70.62	138.96	54.43
M1_2	29.71	71.08	143.75	55.04
M2_1	35.12	70.8	149.16	52.55
M2_2	-37.18	71.45	76.85	52.98
K	88.72	70.57	202.75	54.02

Area of Interest	Estimate	Std. Error	TRT.pred	TRT.pred Std. Err
Ä-K [intercept]	-218.07	76.78	352.23	64.05
Ä_1	9.07	77.67	361.3	63.48
Ä_2	20.68	78.17	372.91	64.08
M1_1	24.01	77.76	376.24	64.35
M1_2	34.05	78.27	386.28	64.99
M2_1	-11.18	77.96	341.05	62.35
M2_2	-46.33	78.68	305.89	62.78
K	139.31	77.7	491.54	63.92

Correction: FPRT, SPRT, TRT

Area of Interest	Estimate	Std. Error	FPRT.pred	FPRT.pred Std. Err
Ä-K [intercept]	22.43	34.76	266.51	29.83
Ä_1	41.29	36.13	307.8	29.83
Ä_2	55.96	35.23	322.46	28.62
M1_1	-6.75	36.17	259.76	30.27
M1_2	45.62	37.77	312.13	28.84
M1 RF_1	25.24	40.4	291.74	31.39
M1 RF_2	-65.84	36.28	200.67	28.02
M2_1	-0.57	37.7	265.94	29.46
M2_2	79.88	37.37	346.39	28.57
K	111.99	36.13	378.49	29.93

Area of Interest	Estimate	Std. Error	SPRT.pred	SPRT.pred Std. Err
Ä-K [intercept]	-70.42	67.59	238.61	57.03
Ä_1	-10.61	74.92	228	57.04
Ä_2	-55.4	73.03	183.21	54.34
M1_1	2.69	75.02	241.3	57.99
M1_2	-88.13	78.07	150.48	54.81
M1 RF_1	150.75	83.44	389.36	60.39
M1 RF_2	1.83	75.11	240.44	53.02
M2_1	-11.41	78.05	227.2	56.24
M2_2	1158.39	77.27	1397	54.23
K	215.27	74.93	453.88	57.24

Area of Interest	Estimate	Std. Error	SPRT.pred	SPRT.pred Std. Err
Ä-K [intercept]	-60.91	78.42	509.39	67.02
Ä_1	30.69	82.49	540.08	67.03
Ä_2	0.61	80.43	510	64.23
M1_1	-2.81	82.6	506.57	68.06
M1_2	-51.57	86.21	457.81	64.74
M1 RF_1	163.73	92.24	673.11	70.63
M1 RF_2	-69.73	82.81	439.66	62.83
M2_1	-19.29	86.08	490.1	66.16
M2_2	1229.98	85.3	1739.36	64.12
K	327.57	82.5	836.95	67.25

Paraphrase

	first pass				second pass				total reading time		
	Pred x o sea	Pred x y	DIF		Pred x o sea	Pred x y	DIF		Pred x o sea	Pred x y	DIF
enunciado sin coi	336,39	343,23	2,03%	enunciad	105,99	80,35	-24,19%	enunciad	443,11	424,14	-4,28%
enunciado	316,19	343,23	8,55%	enunciad	83,85	80,35	-4,17%	enunciad	401,29	424,14	5,69%
m1	280,28	181,08	######	m1	124,92	156,03	24,90%	m1	406,93	338,66	-16,78%
k	328,48			k	181,27			k	514,42		
m2	233,62	344,25	47,35%	m2	36,43	105,69	190,12%	m2	263,39	444,33	68,70%
área reformulada	374,57	428,31	14,35%	área refo	98,98	168,06	69,79%	área refo	472,11	594,87	26,00%

reformulación

	first pass				second pass				total reading time		
	Pred x o sea	Pred x y	DIF		Pred x o sea	Pred x y	DIF		Pred x o sea	Pred x y	DIF
enunciado sin coi	225,68	240,52	6,58%	enunciad	95	94	-1,05%	enunciad	321,36	204,53	-36,35%
enunciado	257,42	240,52	-6,57%	enunciad	97,82	94	-3,91%	enunciad	356,49	204,53	-42,63%
m1	151,64	221,09	45,80%	m1	122,82	130,1	5,93%	m1	277,64	354,30	27,61%
k	373,73			k	198,6			k	577		
m2	214,04	240,13	12,19%	m2	-59,38	-39,59	-33,33%	m2	144,19	157,25	9,06%
área reformulada	221,4	246,27	11,23%	área refo	-44,58	-55,96	25,53%	área refo	167,76	181,12	7,96%

Conclusión

	first pass				second pass				total reading time		
	Pred x o sea	Pred x y	DIF		Pred x o sea	Pred x y	DIF		Pred x o sea	Pred x y	DIF
enunciado sin coi	234,02	198,52	######	enunciad	114,04	114,37	0,29%	enunciad	352,23	372,91	5,87%
enunciado	236,77	198,52	######	enunciad	120,47	114,37	-5,06%	enunciad	361,3	372,91	3,21%
m1	232,5	237,17	2,01%	m1	138,96	143,75	3,45%	m1	376,24	386,28	2,67%
k	284,6			k	202,75			k	491,54		
m2	189,91	227,51	19,80%	m2	149,16	76,85	-48,48%	m2	341,05	305,89	-10,31%

Corrección

	first pass				second pass				total reading time		
	Pred x o sea	Pred x y	DIF		Pred x o sea	Pred x y	DIF		Pred x o sea	Pred x y	DIF
enunciado sin coi	266,51	322,46	20,99%	enunciad	238,61	183,21	-23,22%	enunciad	509,39	510,00	0,12%
enunciado	307,8	322,46	4,76%	enunciad	228	183,21	-19,64%	enunciad	540,08	510,00	-5,57%
m1	259,76	312,13	20,16%	m1	241,3	150,58	-37,60%	m1	506,57	457,81	-9,63%
k	378,49			k	453,88			k	836,95		
m2	265,94	346,39	30,25%	m2	227,2	1397	514,88%	m2	490,1	1739,36	254,90%
m1 reformulado	291,74	200,67	######	m1 refor	389,36	240,44	-38,25%	m1 refor	637,1	439,66	-30,99%