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Shared syntactic representations in non-native languages: the case of Italian-English-Spanish late trilinguals

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to Xhuljen
who believed in me (way) before I believed in myself.

“He who knows no foreign languages knows nothing of his own.”
— Johann Wolfgang von Goethe

Abstract

Shared syntactic representations in non-native languages: the case of Italian-English-Spanish late trilinguals

The purpose of this study is to investigate the mental representation of sentences in a speaker's second (L2) and third (L3) language. Specifically, the study examines whether Italian native speakers have one integrated representation of syntax between their English (L2) and Spanish (L3) or whether syntactic and semantic information of the two languages are kept separate. The present research aims at expanding the current literature on syntactic representation in trilinguals.

We used a cross-linguistic syntactic paradigm from English to Spanish and vice versa. Participants read a prime sentence in one language (e.g., English) and describe a target picture in the other language (Spanish). The design is within-subjects with two independent variables: prime structure type, (active/passive), and animacy type (Inanimate agent-Inanimate patient and Inanimate agent-Animate patient). We also explored whether proficiency in L2 and L3 modulates priming effects. We found no interaction between target language proficiency and the magnitude of priming. Having only tested intermediate to advanced speakers of English and Spanish may have prevented us from seeing a modulating effect of proficiency. The results from both experiments confirm our initial prediction that participants would produce more passive responses after animate patient primes. However, the magnitude of priming magnitude was not influenced by animacy conditions in either language direction.

Taken together, our findings are compatible with the extension of the bilingual shared-syntax model (Hartsuiker et al. 2004) to multilingual syntactic processing: provided that speakers have a high enough proficiency in L2 and L3, they conveniently merge abstract representations of similar syntactic structure. To conclude, our study demonstrated that priming can occur between two non-native languages, irrespective of direction. Furthermore, in our case, evidence of shared representations was found based on structural similarity rather than language relatedness.

Abstract in italiano

Rappresentazioni sintattiche condivise in lingue non native: il caso di adulti trilingue italiano-inglese-spagnolo

Lo studio si propone di esaminare la rappresentazione mentale di frasi e, nello specifico, di testare se parlanti di madrelingua italiana presentano una rappresentazione della sintassi integrata tra la loro L2 (Inglese) e la loro L3 (Spagnolo) o se le informazioni sintattiche e semantiche delle due lingue sono mantenute separate.

La presente ricerca vuole contribuire alla letteratura esistente sulla rappresentazione sintattica in parlanti trilingue.

Usiamo un paradigma di *priming* cross-linguistico dall'Inglese allo Spagnolo nell'esperimento 1 e dallo Spagnolo all'Inglese nell'esperimento 2.

I partecipanti leggono una frase *prime* in una lingua (e.g., L2) e descrivono un'immagine nell'altra lingua (L3). Il disegno sperimentale (*within-subjects*) prevede due variabili indipendenti: struttura del prime (attiva/passiva) e animatezza (Agente Inanimato-Paziente Inanimato/Agente Inanimato-Paziente Animato). Non abbiamo trovato un'interazione tra la competenza linguistica nella lingua target e la forza del *priming*. Il fatto che il nostro campione non includesse parlanti con livelli di L2 o L3 bassi ci ha impedito di vedere un effetto modulatore della competenza linguistica. I risultati di entrambi gli esperimenti hanno confermato la nostra ipotesi iniziale che i partecipanti avrebbero prodotto più descrizioni passive dopo un *prime* con paziente animato, in generale. Tuttavia, la percentuale di priming non è stata influenzata dalla manipolazione dell'animatezza in nessun esperimento. I risultati ottenuti sono compatibili con l'estensione del modello *shared-syntax* (Hartsuiker et al. 2004) al processamento sintattico multilingue: ammesso che il livello di competenza nella L2 e nella L3 sia abbastanza alto, i parlanti multilingua uniscono convenientemente le rappresentazioni astratte di strutture sintattiche simili. In conclusione, il nostro studio ha dimostrato che è possibile ottenere un effetto *priming* tra due lingue non-native, indipendentemente dalla direzione del *priming*. Inoltre, nel nostro caso specifico, i partecipanti uniscono le rappresentazioni astratte nelle due lingue basandosi sulla similitudine tra strutture sintattiche anziché sulla relazione tipologica tra lingue.

Resumen en español

Representaciones sintácticas compartidas entre idiomas no nativos: el caso de hablantes trilingües adultos de italiano, inglés y español.

Introducción. La mayor parte de la literatura sobre el procesamiento del lenguaje se ha centrado principalmente en los monolingües, aunque es un hecho bien conocido que la mayoría de la población mundial habla más de un idioma. Solo en las últimas décadas los psicolingüistas se han interesado en comprender cómo los bilingües almacenan y representan la información sintáctica en su lengua materna (L1) y en su segunda lengua (L2). La mayoría de los investigadores están de acuerdo en que los bilingües tienen una representación integrada para estructuras sintácticas similares en diferentes idiomas (Hartsuiker et al., 2004). Entonces, un hablante bilingüe que habla italiano e inglés, por ejemplo, tendría una sola representación de las estructuras pasivas que está etiquetada para ambos idiomas, ya que la estructura es similar en los dos idiomas. Estudios posteriores también encontraron que las representaciones compartidas están moduladas por la competencia, lo que significa que los hablantes de L2 comienzan con representaciones distintas para cada idioma que luego se fusionan con las representaciones abstractas de L1 (u otra L2) una vez que aumenta la competencia en la lengua no nativa (Bernolet et al., 2013; Hartsuiker & Bernolet, 2017).

Sin embargo, ¿qué ocurre cuando se adquiere un tercer idioma? ¿Cómo y cuándo se integran las representaciones entre idiomas no nativos? Si de verdad se integran, ¿los hablantes las fusionan en función de la similitud estructural o de la similitud entre idiomas? La forma en que L3 interactúa con L2 y L1 en la mente de los hablantes multilingües es un rompecabezas con muchas piezas diferentes, cuya solución requiere un enfoque multidisciplinario. En nuestro estudio, observamos una pieza de este puzzle e intentamos investigar cómo interactúa la representación sintáctica de la L2 y la L3 durante la producción de oraciones.

Específicamente, investigamos cómo los hablantes nativos de italiano que han adquirido el inglés como L2 y el español como L3, representan estructuras sintácticas similares en su L2 y L3. Con nuestro estudio, pretendemos ampliar la literatura actual sobre el procesamiento sintáctico en trilingües adultos. Utilizamos un paradigma del priming sintáctico translingüístico de inglés a español y viceversa. El priming sintáctico se refiere a la tendencia de los hablantes a producir enunciados con la misma estructura sintáctica que los enunciados a los que han estado expuestos previamente (Ferreira & Bock, 2006). Así, el priming translingüístico es el fenómeno según el cual el procesamiento de un enunciado (prime) en un idioma afecta el procesamiento de un enunciado posterior (target) en otro idioma. De ello se

deduce que si el procesamiento de un enunciado influye en el procesamiento de otro enunciado, entonces estos dos enunciados deben estar relacionados de alguna manera en el nivel de representación (Branigan & Pickering, 2017). Hartsuiker et al. (2016) investigó el priming sintáctico translingüístico en multilingües. Su propósito era intentar adjudicar entre tres modelos diferentes de procesamiento sintáctico bilingüe que se han ampliado para dar cuenta de las representaciones sintácticas multilingües. Los hallazgos de Hartsuiker y colegas (2016) respaldan el modelo de sintaxis compartida: si la representación de una estructura se comparte entre idiomas, todos los idiomas pueden activarla con la misma fuerza. Evidentemente, esta suposición implica que i) los hablantes son lo suficientemente competentes en todos los idiomas para tener sistemas integrados, y ii) que las estructuras son lo suficientemente similares para permitir la integración. Hasta donde sabemos, Hartsuiker y colegas (2016) es el único estudio que investigó el priming entre dos idiomas no nativos. Por lo tanto, tomamos sus resultados como apoyo para nuestra predicción de que el priming puede ocurrir entre idiomas no nativos.

Nuestras preguntas de investigación son:

1. ¿Los trilingües adultos comparten información sintáctica entre su L2 y L3 (Hartsuiker et al., 2004)? Para responder a esta pregunta, examinamos si el priming sintáctico translingüístico de oraciones pasivas ocurre entre inglés L2 y español L3, y viceversa.

2. ¿La representación compartida entre L2 y L3 y viceversa depende de los niveles de competencia (Bernolet et al., 2013; Hartsuiker & Bernolet, 2017)? En otras palabras, ¿existen diferencias en la fuerza de priming que se pueden atribuir a diferentes etapas de adquisición del segundo o tercer idioma?

3. ¿El priming interlingüístico de oraciones transitivas entre L2 y L3 (y viceversa) está influenciado por información conceptual como la animacidad del paciente? Es decir, ¿la diferencia en los niveles de animacidad (agente inanimado y paciente animado frente a agente inanimado y paciente inanimado) se refleja en una diferencia en la elección de la estructura?

Participantes. 47 hablantes nativos de italiano (45 mujeres, 2 hombres, Medad = 27) participaron en los dos experimentos. Su formación lingüística se evaluó mediante un Cuestionario de perfil lingüístico (Apéndice C) que se administró en inglés a través de la

plataforma Qualtrics. En la encuesta, se pidió a los participantes que respondieran preguntas sobre su historia lingüística, su uso de los idiomas y que autoevaluaran su nivel de idioma de acuerdo con los estándares del MCER y su competencia con referencia a las cuatro habilidades lingüísticas (escribir, escuchar, hablar y leer) en ambos idiomas utilizando una escala Likert de 1 a 6.

Diseño experimental. Los experimentos tenían un diseño 2x2 donde las dos variables independientes eran el tipo de estructura, es decir estructura activa o pasiva, y el nivel de animacidad, es decir, Agente inanimado - Paciente animado (InAn) y Agente inanimado - Paciente inanimado (InIn). El diseño era un diseño within-subjects, lo que significa que todos los participantes estuvieron expuestos a todas los niveles experimentales durante.

Estimulos. Se utilizaron 32 oraciones facilitadoras (prime), 8 para cada condición experimental, emparejadas con una imagen con condiciones de animacidad coincidentes y un verbo crítico (target/blanco) al infinitivo. En el Experimento 1, todos las oraciones prime se presentaron en inglés y todos los verbos target eran verbos transitivos en español, mientras que el Experimento 2 tenía oraciones facilitadoras en español (traducciones de los primos en inglés) y verbos target transitivos en inglés.

Procedimiento. Los experimentos se administraron en remoto. En cada prueba experimental, los participantes tenían 4,5 segundos para leer en voz alta una oración facilitadora en un idioma. Luego, se les presentaba una imagen durante 3 segundos. Por último, tenían que formar una oración (en el otro idioma) para describir la imagen usando las palabras que se les presentaban en una matriz: un verbo y dos sustantivos (un agente y un paciente). La duración total de cada experimento era de 35-40 minutos.

Resultados. En ambos experimentos, encontramos un claro efecto de priming interlingüístico entre dos idiomas no nativos (inglés y español) en hablantes nativos de italiano. El Experimento 1 investigó el priming de estructuras pasivas de inglés a español, mientras que el Experimento 2 examinó la misma estructura en la dirección opuesta (es decir, de español a inglés). Nuestros hallazgos sugieren que los hablantes nativos de italiano que hablan inglés como L2 y español como L3, se basaron en la estructura sintáctica del prime para guiar su producción de oraciones. La magnitud del priming fue ligeramente mayor en el Experimento 1 (9 %) en comparación con el Experimento 2 (6 %). Nuestros hallazgos indican que, en el grupo de multilingües que probamos, la representación abstracta de las estructuras pasivas se comparte entre sus dos idiomas no nativos. Esto es congruente con el modelo shared-syntaxis propuesto por Hartsuiker et al. (2004). No encontramos interacción entre el dominio del idioma de destino y la magnitud del priming. Haber evaluado sólo hablantes

intermedios a avanzados de inglés y español puede haber impedido que veamos un efecto modulador de la competencia como el encontrado por Bernolet et al. (2013) y Hartsuiker & Bernolet (2017). En general, estos hallazgos no nos permiten tener una imagen clara del efecto del dominio del idioma objetivo en el priming de L2 a L3/L3 a L2. Solo podemos confiar en los datos sin procesar para identificar una tendencia hacia un efecto modulador de la competencia y el dominio del idioma donde cuanto mayor sea la competencia en el idioma de destino, mayor será la magnitud del priming. Será necesario recopilar más datos, especialmente de hablantes de bajo nivel. Los resultados de ambos experimentos confirman nuestra predicción inicial de que los participantes producirían más respuestas pasivas después de oraciones facilitadoras con pacientes animados. Curiosamente, ninguno de nuestros modelos identificó una interacción significativa entre la estructura del prime y la animacidad del paciente, lo que sugiere que la magnitud priming no estuvo influenciada por las condiciones de animacidad en ningún experimento. Estos hallazgos respaldan la hipótesis de que el priming sintáctico y la animacidad influyen en la elección de la estructura sintáctica de forma independiente (Pickering & Ferreira, 2008).

Conclusiones. En conjunto, nuestros hallazgos son compatibles con la extensión del modelo bilingüe de sintaxis compartida (Hartsuiker et al. 2004) al procesamiento sintáctico multilingüe: siempre que los hablantes tengan una competencia lo suficientemente alta en L2 y L3, fusionan convenientemente representaciones abstractas de estructuras sintácticas similares. En nuestros participantes, planteamos la hipótesis de que no solo la representación pasiva es compartida entre el inglés L2 y el español L3, como lo demuestra nuestro estudio, sino que también es compartida con su L1, debido a la similitud estructural de las oraciones pasivas en los tres idiomas. Con los datos actuales, no es posible delinear un papel claro de la competencia lingüística en el procesamiento del lenguaje multilingüe, pero solo podemos suponer que, dados más datos, surgirá un patrón más claro y significativo para brindar apoyo al modelo de desarrollo de la adquisición de sintaxis de idiomas no nativos como propuesto por Hartsuiker & Bernolet (2015). Además, si bien encontramos que la animacidad del paciente afectó la producción de estructuras pasivas de manera translingüística, esta no influyó en la magnitud del priming. Por eso, postulamos que estos patrones pueden no confirmarse una vez que se recopilan y analizan los datos para hablantes de bajo nivel. Para concluir, nuestro estudio demostró que el priming puede ocurrir entre dos idiomas no nativos, independientemente de la dirección. Además, en nuestro caso, se encontró evidencia de representación compartida basada en la similitud estructural más que en la similitud entre idiomas.

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Chapter 1 - Literature review

Most of the literature on language processing has primarily focused on monolinguals although it is a well known fact that most of the world population actually speaks more than one language. Only in the past few decades have psycholinguists been interested in understanding how bilinguals store and represent syntactic information in their native language (L1) and their second language (L2). Most of the literature on this topic agrees that bilinguals have an integrated representation for similar syntactic structure across different languages (Hartsuiker et al., 2004). So a bilingual speaker who speaks Italian and English, for example, would have a single representation of the passive structures that is tagged for both languages since the structure is similar in the two languages. Subsequent studies have also found that shared representations are modulated by proficiency meaning that L2 speakers start out with language-specific representations that are later merged with their L1 (or another L2) abstract representations once proficiency increases (Bernolet et al., 2013; Hartsuiker & Bernolet, 2017).

But what happens when a third language is acquired? How and when are representations integrated cross-linguistically? If they are integrated at all, do speakers merge them based on structural similarity or on language relatedness? The way that L3 interacts with the L2 and the L1 is a puzzle with many different pieces, the solution to which requires a multidisciplinary approach. In our study, we look at one piece of this puzzle and try to investigate how speakers' syntactic representation of the L2 and the L3 interact during language production.

Specifically, we investigate how Italian native speakers who have acquired English as an L2 and Spanish as an L3, represent similar syntactic structures in their L2 and L3.

Our research questions are:

1. Do late trilinguals share syntactic information between their L2 and L3 (Hartsuiker et al., 2004)? To answer this question we examine whether cross-linguistic syntactic priming of passive sentences occurs between English L2 and Spanish L3, and vice versa?

2. Is the shared representation between L2 and L3 and viceversa dependent on proficiency levels (Bernolet et al., 2013; Hartsuiker & Bernolet, 2017)? In other

words, are there differences in the strength of priming that can be attributed to different stages of acquisition of the second or third language?

3. Is cross-linguistic structural priming of transitive sentences between L2 and L3 (and vice versa) influenced by conceptual information such as patient animacy? That is, is the difference in animacy conditions (Inanimate agent and animate patient vs. inanimate agent and patient) reflected in a difference in choice of structure?

Our study therefore focuses on multilingual language processing, however, most of what we know so far about how this population represents and processes three languages has been proposed based on research on bilinguals. In this chapter we will give a brief introduction to the priming paradigm as a tool to investigate linguistic representation. Secondly, we will review the relevant literature on bilingual language processing and the models that have been proposed thus far, as well as how these models have been adapted to multilingual language processing and representation. Moreover, we will discuss how conceptual information, e.g. animacy, can influence structural priming. Lastly, we will briefly examine the differences and similarities between English and Spanish passive structures.

1.1. The priming paradigm: investigating abstract representations of syntax

In language sciences, priming refers to the phenomenon according to which processing a language stimulus (*target*) is influenced by the processing of a previous stimulus (*prime*). However, for the purpose of this dissertation, we will focus our attention on syntax and therefore concentrate on syntactic (or structural) priming: syntactic priming refers to the speakers' tendency to produce utterances with the same syntactic structure as utterances they have previously been exposed to (Ferreira & Bock, 2006). Although structural priming was found to be a factor influencing production and comprehension by different research teams previously (Levelt & Kelter, 1982; Weiner & Labov, 1983; Estival, 1985), the consensus among psycholinguists is that it was seminal work by Bock (1986) that paved the way for controlled experimental study of the phenomenon of priming as a tool to investigate language and, particularly, the underlying mechanisms. Bock (1986) set out to examine what processes are involved when speakers employ the same syntactic form in subsequent utterances. In her work, Bock proposes the idea that there are activation processes that operate over the syntactic mechanisms responsible for the generation and interpretation of utterances. The activation is not item-specific, but it operates over the processes hence increasing the

likelihood of the use of these processes resulting in syntactic repetition. Bock experimentally studied this by having naive participants repeat prime sentences (consisting of active and passive sentences, and double-object and prepositional object dative sentences) and subsequently describe pictures depicting unrelated transitive and ditransitive events. She found that speakers were more likely to produce a passive sentence to describe the target picture after having processed a passive sentence (e.g. *the referee was punched by one of the fans*) compared to an active sentence (e.g. *one of the fans punched the referee*). This pattern held also for dative sentences: speakers preferred the prepositional object form (e.g. the man is reading a story to the boy) after having repeated a prepositional object dative sentence and produced more double-object datives (e.g. the man is reading the boy a story) after reading a double-object prime. Bock's findings showed that structural priming occurs when prime and target are minimally related in terms of lexical, conceptual, or discourse content. Furthermore, priming is confirmed to be an activation-based mechanism: an utterance takes a specific syntactic form (instead of the alternating form) because the processes controlling that syntactic form are more active than the processes controlling the alternative form due to language use (Bock, 1986, p. 378-379). From this study arose the hypothesis of priming as a useful method to investigate linguistic representation: if processing one utterance influences the processing of another utterance then these two utterances must share some aspect of their representation. Furthermore, when the two utterances only share structure but are otherwise unrelated, this means that what they have in common is syntactic representation (Branigan & Pickering, 2017).

Subsequent studies (Bock, 1989, Bock & Loebell, 1990) demonstrated that, in fact, structural priming cannot be attributed to the repetition of certain words or thematic roles. The fact that priming occurs in the absence of lexical overlap is an argument in favor of the existence of an autonomous syntactic representation (Branigan & Pickering, 2017, p. 5). Nonetheless, it can't be excluded that syntactic priming also draws on semantic information (e.g. thematic roles and animacy) necessary to express conceptual aspects of the speaker's message (Vasilyeva & Gámez, 2015).

To conclude, Pickering & Branigan (1998) constructed five experiments to investigate how speakers use syntactic information to combine lexical entries to produce utterances. The authors identify three types of information that must be included in verb representations: category information (i.e. verb), and featural information (e.g. number, person, tense, aspect) must be represented. In addition, the representation must include combinatorial information that specifies all the ways in which a verb can be combined with other words to form

utterances. Pickering & Branigan (1998) propose an extension of the lemma stratum of Roelof's model of language production (1992, 1993) to include syntactic aspects of verb representation. They assume that whenever a lemma node is activated, so are the links to the feature nodes, and category nodes are also activated. The authors also propose the existence of combinatorial nodes that are activated every time a verb is used in specific construction. For example, the English verb *give* can be used in double-object constructions (DO) where it combines with two noun phrases (e.g. *give the dog a bone*), and in a prepositional object structure (PO) in which it is combined with a noun phrase and a prepositional phrase (e.g. *give a bone to the dog*). Using the DO form entails activation of the lemma node *give* and of the NP_NP node. In their extended model, Pickering & Branigan assume that lemma nodes are not linked to any feature nodes (e.g. tense, aspect, number) and that combinatorial nodes are shared between lemmas. This means that verbs like *give* and *send* will be linked to the same NP_NP and NP_PP nodes. Based on these assumptions, they predict that the magnitude of priming will not be influenced by featural information and that priming between the same head verb will be greater than priming between two different verbs.

Their results confirmed that speakers tend to use the same syntactic structure as a previously processed utterance although the magnitude of priming can be enhanced by lexical overlap of the head verb suggesting that combinatorial nodes are indeed shared between verbs (Pickering & Branigan, 1998, p. 645-646). This phenomenon is known as the *lexical boost*. Additionally, they demonstrated that variation of verb features such as tense and aspect did not impair priming.

These and all the works that followed contributed to a large and ever-growing body of literature on priming that aims to address the different mechanisms underlying structural priming as well as its functions. An agreement among researchers about these topics has yet to be reached. Nonetheless, what is presently apparent is that priming is a powerful method of investigation that can inform on a variety of issues related to linguistic representation. It is also important to note that priming is a somewhat ubiquitous phenomenon as it occurs within different languages (e.g. English, Dutch, German), as well as for a variety of constructions, provided that there's an alternation (e.g. transitive, datives, complex noun phrases, relative clause attachment). Priming occurs from production to production, from comprehension to comprehension, and from comprehension to production, both in isolation and in dialogue settings, showing that processing during comprehension and production overlap to some extent (Branigan & Pickering, 2017, p. 3). Priming effects have also been found in different

types of populations: native speakers, non-native speakers, children, and people with language impairments (e.g. aphasia) (Pickering & Ferreira, 2008, pp. 36–42).

In the following section, we will review the salient literature on cross-linguistic syntactic priming, the paradigm on which our current research is based.

1.2. Cross-linguistic priming: the shared-syntax hypothesis

The question of how bilinguals represent and process in their L2 can be answered by two accounts: i) the separate-syntax account and ii) the shared-syntax account. The separate-syntax account implies that, in the bilingual mind, linguistic representations of the L1 and representation of the L2 are stored separately, meaning that speakers will have language-specific representational systems, each containing the linguistic representations of that language. This account has the advantage of potentially reducing confusion and interference between structures of the two languages during language use. On the other hand, we have the shared-syntax account which entails shared representations across languages for similar structures. According to this account, a bilingual speaker who speaks German and English, for example, will have a single representation of the DO structure that is tagged for both languages. This system has the advantage of avoiding redundancy of representation and may allow speakers to use L1 established representations to support L2 acquisition (Pickering & Ferreira, 2008).

One of the first studies to find cross-linguistic priming was found by Loebell & Bock (2003): in a picture description task carried out with German (L1) and English (L2) fluent speakers, they found that German DO and PO constructions primed English DO and PO constructions, respectively. This study provided evidence of the cross-linguistic generalization of priming and proposed the hypothesis that when languages have similar structure-building procedures, using the procedure in one language may make it more accessible to the other (Loebell & Bock, 2003, p. 809).

Subsequently, seminal work by Hartsuiker et al. (2004) specifically used a cross-linguistic structural priming paradigm to test the separate-syntax and shared-syntax hypothesis. These two accounts make different predictions about priming, but also about bilingual processing in general. In the case of Hartsuiker et al. (2004), the languages taken into consideration are English and Spanish. These two languages have structural differences but also many structural similarities, for example, transitive sentences can take an active (1) and passive forms (2) that are similar across the two languages.

(1) The taxi chases the truck.
El taxi persigue el camión.

(2) The truck is chased by the taxi.
El camión es perseguido por el taxi.

The separate-syntax account predicts that English-Spanish bilinguals store English representation for active (and passive) sentences separately from Spanish active (and passive) constructions. This inevitably means that some information is stored twice. In contrast, the shared-syntax account predicts that bilingual speakers tend to reduce redundancy of representation as much as possible by representing similar rules in two languages only once and only having language-specific representations for non-shared constructions. Provided that English and Spanish transitive forms are similar, the shared-syntax account predicts cross-linguistic syntactic priming, whereas the separate-syntax account does not. (Hartsuiker et al., 2004, p. 409-410).

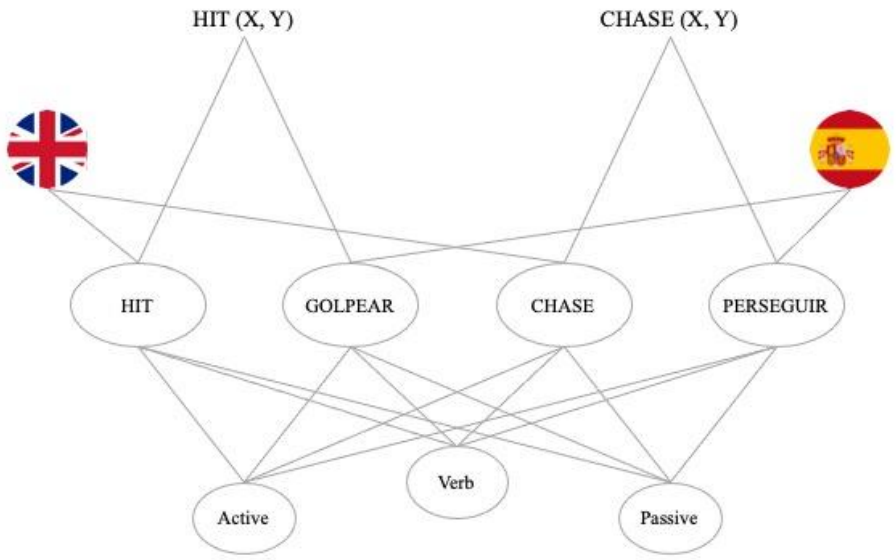
To test their prediction they set up a dialogue game where naïve participants heard a sentence in Spanish from a confederate participant and then described a picture depicting a transitive event in English. Participants were Spanish L1 - English L2 speakers, with moderate to high English proficiency. The experimenters also included intransitive and dislocated constructions (OVS) in the materials and manipulated animacy (agents were always inanimate and patients were animate in half of the trials and inanimate in the other half).

Their results positively identified cross-linguistic syntactic priming of passive sentences from Spanish to English. According to the authors, these results can only be consistent with the shared-syntax account. Hartsuiker and colleagues, therefore, proposed to extend Pickering & Branigan's (1998) model by adapting it to bilingualism (fig. 1). According to this new, extended model, lemmas for English and Spanish verbs, for example, HIT and GOLPEAR, are connected to the same conceptual node HIT (X, Y), but also to the same category and, crucially, to the same combinatorial nodes. If a speaker is exposed to a passive sentence in English with the verb *hit*, the lemma node HIT will be activated along with the combinatorial node for the passive form, this leads to the activation of that structure, irrespective of language, thus making it more likely that the speaker will use that same

combinatorial node to produce a sentence in Spanish with the verb *perseguir*, for example (Hartsuiker et al., 2004, pp. 412–413).

Figure 1

Example of lexical entries for "to chase" and "to hit" in an integrated account of bilingual linguistic representation



Note. from Hartsuiker et al. (2004, p. 413)

Hartsuiker et al.'s results (2004) support the view that bilingual speakers have integrated syntactic representations between their two languages, a finding that has been confirmed by many subsequent studies involving different language pairs and different populations (e.g. Schoonbaert et al., 2007, Kantola & van Gompel, 2010, Bernolet et al., 2013, Hwang et al., 2017, Vasilyeva et al., 2010). Nonetheless, Hartsuiker et al.'s work (2004), while groundbreaking and compelling, is limited at least in two ways: i) it fails to account for the L2 to the L1 direction of priming, ii) and ii) it can only be extended to the later stages of second language acquisition since it doesn't consider speakers on the lower side of the proficiency spectrum. Researchers that followed have tried to answer these questions to provide a more comprehensive account of the bilingual mental representations. We'll review these studies in the following sections, but first, we'll examine the relevant findings related to third language processing.

1.3. Processing a third language

The literature presented insofar has was primarily focused on monolingual or bilingual speakers, nonetheless, the aim of the present dissertation is to investigate sentence processing

in a population that can be defined as multilingual, as opposed to bilingual, in the sense that these speakers are able to communicate in at least three languages, namely Italian, English, and Spanish. We generally assume that people who speak one language are monolingual, people who speak two are bilingual and people who speak more than two are multilingual. These seem like straightforward definitions. However, researchers still debate on what actually constitutes bilingualism and multilingualism. For example, Grosjean (2010) states that bilinguals are those speakers who use two or more languages in their everyday life. On the other hand, Hoffmann (2001), focusing on trilingualism, states that trilingual competence is different from bilingual competence implying that the two cannot be defined as the same phenomenon. Moreover, Cenoz & Genesee (1998) posit that multilingualism is the state of an individual who has acquired several non-native languages. Many more scholars have proposed a definition of multilingualism but, in general terms, they all move along two main perspectives: i) multilingualism is a general term to define the acquisition of *n* non-native languages, making bilingualism and trilingualism subcategories of multilingualism; or, ii) multilingualism refers to the acquisition of *2+n* non-native languages, making bilingualism a separate phenomenon and trilingualism as a specific instance of multilingualism where the individual has acquired at least two non-native languages (Cenoz, 2013). For this study, we will keep our discussion focused on trilingualism as the particular configuration of multilingualism in which the individual has acquired three languages. Clearly, for a comprehensive framing of the population in our study, we must introduce variables that refer to the time and process of acquisition. A second or third language (L2 or L3, respectively) can be acquired naturally, as it happens for the native language (L1), or through structured learning, as in formal school instruction. But, an L2 can also be acquired naturally and simultaneously to the L1, leaving the L3 to formal instruction. Another configuration is the acquisition of L2 and L3 simultaneously naturally or formally or a mixture of the two, after the acquisition of the L1 (Cenoz, 2000). Evidently, it's not always clear where one type of acquisition ends and one begins: for instance, a person might start acquisition of their L2 through school instruction but then move to a country where that language is dominant and continue the acquisition naturally. Additionally, not all authors agree to label the languages spoken by a person with the temporal order of acquisition but prefer to do so by relying on language competence (or proficiency), or frequency of use (Hammarberg, 2001; De Bot & Jaensch, 2015). With respect to our study, we'll adopt L1, L2, and L3 labels based on a temporal criterion and we will keep language proficiency as a separate variable. Therefore, in our case, the population of reference is adult trilinguals who have Italian as an L1, English as

an L2, and Spanish as an L3 and who have acquired their L2 and L3 through formal instruction after the acquisition of the L1.

Research on multilingual language processing has gained a lot of attention in recent years: the focus has been primarily on i) the multilingual lexicon and its representation in the multilingual mind, and ii) cross-linguistic interactions (Cenoz, 2013, p. 9). In contrast, what we are more concerned with in this study is multilingual syntactic processing during language production. An important issue in this field of research has been whether models of bilingual sentence production can be applied also to trilinguals (and multilinguals). Hartsuiker et al. (2016) have tried to investigate this possibility using syntactic priming in multilinguals. Their purpose was to attempt to adjudicate between three different models of bilingual syntactic processing that have been extended to account for multilingual syntactic representations.

The first model is the shared-syntax model first proposed by Hartsuiker et al. (2004) which was extensively discussed in the previous section. Briefly, this model assumes that syntactic (and lexical) representations in multilinguals are shared and integrated between L1 and later acquired languages as much as possible. This account predicts that, provided sufficient proficiency in all languages, priming between L1 and L2/L3, is equal in strength to priming between L2 and L3.

Secondly, De Bot (1992) proposed a bilingual adaptation of Levelt's (1989) language production model. Levelt suggested that there are three levels to language production, conceptualization, encoding (lexical and syntactic). According to De Bot, in bilingual processing, the conceptual and the lexical level overlap, and syntactic processing is separate but interacts across languages, meaning that each language has its own representations that interact with one another. The strength of the interaction depends on many factors including language relatedness and L2 proficiency. If syntax is separate but interacting between languages, then structural priming is predicted to be stronger within-language compared to between-language (Hartsuiker et al., 2016, p. 16). Crucially, this account suggests that higher L2 proficiency results in less cross-linguistic interactions because speakers become better at separating languages.

A third account was presented by Ullman (2001): he called it the *declarative/procedural model* and it's based on the assumption that syntactic and lexical/semantic processing are carried out by different memory systems. According to the mode, L1 syntactic processing is specific to procedural memory, whereas declarative memory takes care of lexical and semantic processes. In later acquired L2s, syntactic processing is carried out by declarative memory, meaning, on explicit knowledge of grammar. Regarding

priming, this account predicts that L1-L2 priming is weaker than L2-L3 priming because L1 and L2/L3 rely on different memory systems and representations in the same memory system are more likely to be activated by each other (Hartsuiker et al., 2016, p. 16).

Hartsuiker and colleagues (2016) proposed to adjudicate between these accounts by comparing the strength of priming between L2 and L3 with priming between L1 and L2/L3. They constructed four syntactic priming experiments. In all experiments, participants were Dutch-L1 speakers who acquired English, German and French as second or third languages. Experiments 1, 2 and 3 investigated syntactic priming of relative clause attachments, whereas Experiment 4 focused on datives. Experiments 1, 2 and 3 had Dutch, English and French prime, whereas the target language was, respectively, Dutch, English and French. This way, they were able to investigate within- and between-language priming in all possible combinations. Experiment 4 had Dutch, English, German dative primes and English targets. They found strong priming effects across all experiments and within-language priming was always as strong as between-language priming, confrming previous findings (Schoonbaert et al., 2007, Kantola & van Gompel, 2011), but adding the novel finding that priming between two non-native languages can occur and can be as strong as priming between L1 and L2. Hartsuiker and colleagues' (2016) findings support the shared-syntax model: if the representation of a structure is shared between languages, then all languages can activate it with equal strength. Evidently, this assumption entails that i) speakers are proficient enough in all languages to have integrated systems, and ii) that structures are similar enough to allow integration in the first place. These results are incompatible with both De Bot's (1992) and Ullman's (2001) accounts since both predicted different magnitudes between within-language and cross-linguistic priming.

To our knowledge, Hartsuiker and colleagues (2016) is the only study to have investigated priming between two non-native languages. We therefore take their results as support for our prediction that priming can occur between non-native languages. Nonetheless, we are also aware that investigating different structures, across different languages may yield different results. Furthermore, in our current study, we will not investigate priming involving the participants' first languages.

1.4. Extensions of the shared syntax model and the role of L2 proficiency

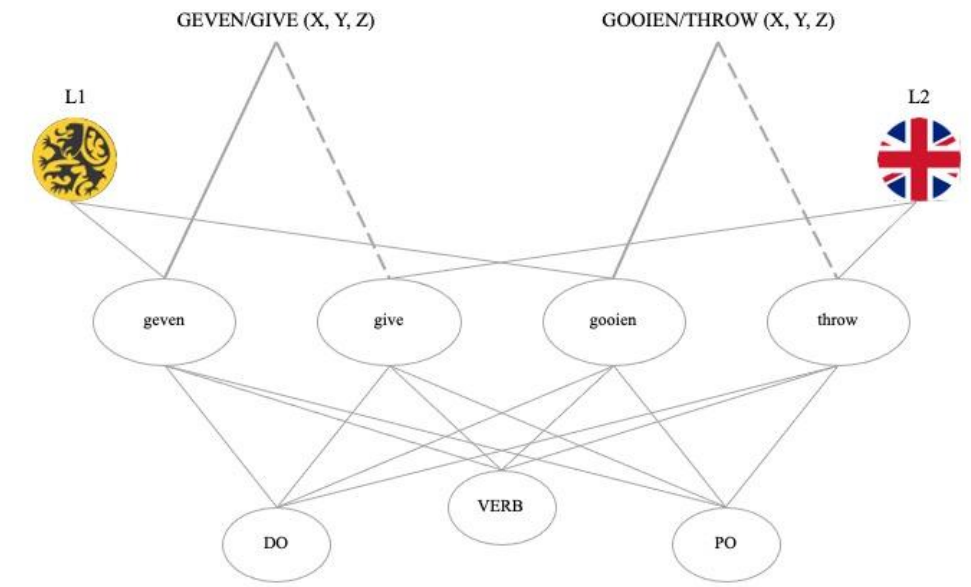
Bilingual speakers, besides having to select the proper lexicon and the proper rules to build structure, are faced with the additional task of selecting words and rules from only one

of the languages they speak (Hartsuiker & Pickering, 2008). Schoonbaert et al. (2007), in light of

Hartsuiker et al. (2004), conducted a cross-linguistic priming study to further investigate to what extent syntactic and lexical information is shared in the bilingual mind. Her predictions are based on Hartsuiker et al.'s (2004) model: if bilingual speakers have an integrated representation of syntactic information across languages then priming will occur from L1 to L2 but also from L2 to L1. Moreover, the model predicts priming within the L1 and within the L2, and, lastly, it predicts that priming will be enhanced by the lexical boost within L1 and within L2. Schoonbaert and colleagues also predict the *translation equivalent boost* where translation equivalent verbs activate each other's lemmas resulting in an enhancement in the magnitude of priming. The participants in this study were Dutch L1 - English L2 unbalanced bilinguals. Schoonbaert et al.'s (2007) results confirmed their predictions in terms of priming effect since it occurred within L1, within L2, between L1 and L2, and vice versa. Within language, priming was enhanced by lexical overlap, and priming from L1 to L2 showed *translation equivalent boost.* In the L2 to L1 experiment, priming effect did not increase when prime and target used translation equivalent verbs (Schoonbaert et al., 2007, p. 165). To explain this asymmetry, the authors proposed an extension of Hartsuiker et al.'s (2004) model where the links between the L2 and conceptual nodes are less strong than the links with the L1, causing less activation of the L1 lemma when the activation starts from the L2. Figure 2 shows an extension of the previous model that takes into account the non-symmetrical activation of lemma nodes in the L2.

Following these findings, Bernolet et al. (2013) examined the influence of L2 proficiency on cross-linguistic syntactic priming as well as within-L2 priming. To do so, they test two accounts of bilingual syntax acquisition: one possibility is that L2 learners may start to represent L2 construction separately from L1, regardless of possible structural similarities, and only later, as proficiency increases, collapse similar representations. This account predicts that cross-linguistic priming occurs only in more proficient bilinguals. A second possibility is that L2 learners immediately start with shared representations between L1 and L2. If this is the case, cross-linguistic priming will occur irrespective of L2 proficiency levels. In three priming experiments (L1-L2, L2-L1, L2-L2) involving genitive alternation in Dutch (L1) and English (L2), Bernolet et al. (2013) tested these accounts and concluded that bilingual syntactic acquisition starts out with item- and language-specific representations (no priming for less proficient speakers) that are later abstracted and collapsed into the existing L1 representations.

Figure 2
Adaptation of Hartsuiker et al.'s (2004) shared-syntax model.



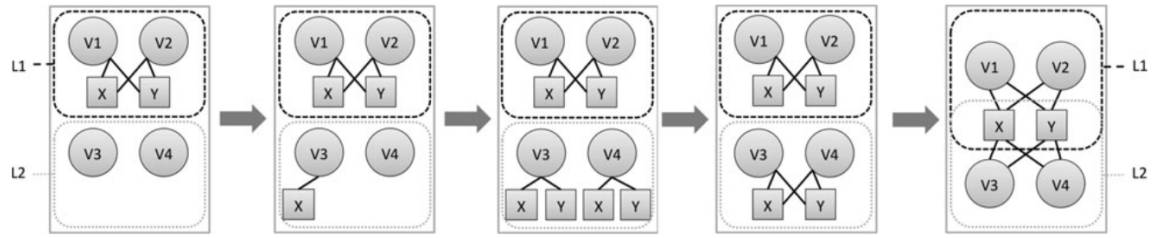
Note. from Schoonbaert et al. (2006, p. 167).

According to the author, this also explains why within-language priming was stronger than between-language priming, in contrast with Kantola & van Gompel (2011) who found that those two types of priming were equal in magnitude.

Hartsuiker & Bernolet (2015) further investigated the development of L2 syntax by re-analyzing Schoonbaert et al. (2007) data. They make two main assumptions: i) bilinguals with low proficiency lack abstract representations hence they don't show cross-linguistic syntactic priming; ii) these same bilinguals rely more on explicit memory processes making them rely more on prime structure when in a withing-language task. These findings led the author to a developmental model of L2 syntax acquisition (Figure 3). In the first stage of L2 acquisition, lexical representations are not connected to any syntactic information, that is, there are no combinatorial nodes. When L2 learners are at this stage, they are faced with two possibilities: transferring L1 syntactic information onto the L2 lexical representation; or, producing structures by imitating more competent speakers. Due to exposure to the L2, speakers start to build combinatorial nodes for frequent and infrequent structures. Note how these combinatorial nodes are still language-specific and item-specific at the third stage. In the fourth stage, L2ers show more abstraction and slowly start to collapse representations. At this stage, a priming effect is expected to occur only within-language. Cross-linguistic

priming, and, therefore, shared abstract representations are the final stage of L2 syntax development: L2 speakers at this stage have merged their L1 and L2 abstract representations.

Figure 3
Developmental model of L2 syntax acquisition



Note. from Hartsuiker & Bernolet (2015, p. 229)

The interaction between priming and proficiency was confirmed also by Hwang et al. (2017). The study is particularly relevant because it takes into consideration a typologically different and never-before-tested language pair, namely English and Korean, and because it tests both structures that are similar and different in the two languages. For similar structures, they primed Korean L1 - English L2 speakers with Korean active and passive constructions. A positive priming effect was found and the magnitude increased as L2 proficiency increased. Interestingly, passive sentences in Korean and English are similar but have a different word order which didn't prevent priming, (cf. Loebell & Bock, 2003).

For different constructions, they used a sentence-picture verification task where Korean L1 speakers had to decide if the sentence (English causative or active sentence) matched the event in the picture. Causatives in Korean are expressed with an active sentence. The authors predicted that if speakers matched the English active sentence with the picture depicting a causative event, then they would be exhibiting syntactic transfer. Moreover, proficient speakers should show higher accuracy rates when pictures are paired with English causatives as opposed to English actives (Hwang et al., 2017, p. 12). Results showed that Korean-English bilinguals were less accurate than native controls and that there was a main effect of proficiency on accuracy: the error rate (syntactic transfer) decreased as proficiency increased. These findings confirm that shared abstract representations are a developmentally advanced stage of L2 acquisition: in this respect, proficiency plays a key role in cross-linguistic priming, and, more in general, in bilingual sentence processing.

A more recent study, Favier et al. (2019), confirmed the pattern of the studies presented thus far: in a between-language (Irish-to-English) priming experiments testing the

English dative alternation, the authors found that English (L2) proficiency was a predictor of the strength of priming in the cross-linguistic experiment, in line with previous research (Favier et al., 2019).

Liu et al. (2021) investigated syntactic abstract representations of dative sentences in highly similar languages, namely Mandarin-Chaoshanese (L1) and Cantonese (L2). Although speakers had moderate proficiency in their L2, they found that proficiency did not modulate priming from L1 to L2 and vice versa. These results suggest that speakers of highly similar languages integrate abstract syntactic representations early on in the acquisition of L2 syntax (Liu et al., 2021).

All the findings presented above have implications for our study as we deal with a population with various levels of proficiency. In addition, we look at two non-native languages and our participants might be at two different stages of syntactic acquisition in the two languages, hence proficiency, as a measure of acquisition, is bound to play a crucial role in our study. Nonetheless, we anticipate that L1 and L3 high similarity may also interfere with the magnitude of priming.

In the following section, we will discuss cross-linguistic priming studies between English and Spanish involving active and passive constructions, the object of our study.

1.5. Priming transitive constructions in English-Spanish bilinguals

The aforementioned study by Hartsuiker et al. (2004) was a seminal work that undoubtedly shaped psycholinguistic research on bilingual language processing, and, in particular, English-Spanish (and Spanish-English) bilingual sentence processing. Nonetheless, for the purposes of the present research, it is important to note that many other studies have been carried out to investigate the acquisition of syntactic representations in this specific population.

The first study worth mentioning is Flett (2013): in a within-language experiment, she tested the priming of passive constructions in native and non-native speakers of Spanish. The aim was to compare the two priming effects. She predicted that priming would be found in both groups but that it would be stronger in the L2 group because these speakers may have weaker abstract representations that are more likely to be influenced by language exposure (Flett, 2013). Both the groups tested showed priming of Spanish passive constructions. Additionally, the L2 group showed stronger priming effects, consistent with the author's prediction. Within this group, speakers with advanced proficiency showed larger priming

effects compared to the intermediate proficiency group. Flett (2013) hypothesized that limited language exposure to the Spanish passive for the intermediate group may have prevented the formation of an abstract representation resulting in a weaker priming effect.

Within the English-Spanish (and Spanish-English) population, much research has been carried out in bilingual children to explore the developmental trajectory of bilingual abstract representations.

Vasilyeva et al. (2010) tested Spanish-English bilingual children (aged 5;2 - 6;5) in a cross-linguistic syntactic priming experiment aimed at assessing whether exposure to passive structure in one language could increase the production of passives in the other language, hence showing that young children have between-language abstract representations of transitive constructions, similarly to adults. The author found a priming effect from Spanish to English: exposure to Spanish *fue*-passives (a rather infrequent structure in spoken Spanish, see section 4) increased the production of English passives. In the opposite direction, English-to-Spanish, children showed no priming effect, in fact, they didn't produce any *fue*-passives, consistent with Gámez et al. (2009). This asymmetry was interpreted as an asymmetry of representation that reflects the differences in the overall exposure to those structures. Children may never encounter Spanish *fue*-passives in conversations thus preventing them from building abstract representations of this structure at a young age.

In Gámez and Vasilyeva (2015), the authors focused on unbalanced bilinguals, specifically on young Spanish learners of English as an L2. In a within-L2 study, they primed 5-to 6-year-old children with English actives and full passives to examine how this exposure would influence their subsequent production of English actives and passives. They found that children did produce English passives after being primed with English passive structures and, interestingly, priming was stronger when children repeated the prime.

More recently, the same research team investigated cross-linguistic syntactic priming in balanced bilingual children. Gámez & Vasilyeva (2020) examined the extent to which exposure to one structure in one language influences the reuse of that structure in the other language in young bilinguals. In the Spanish-to-English syntactic priming study, children were exposed to Spanish active and passive sentences and then were asked to describe a drawing in English. Results showed an overall preference for active constructions, consistent with baseline studies, but also showed that English passive constructions were more likely to be produced after Spanish passive primes. The same pattern of results was found in the English-to-Spanish study, which used the same procedure as the other study. These findings

are consistent with the model presented by Hartsuiker & Bernolet (2015) that predicts cross-linguistic priming in both directions in balanced bilinguals.

Finally, Carando (2015) investigated the voice alternation in a Spanish-to-Spanish and an English-to-Spanish syntactic priming experiment in two groups of Spanish-English late-bilinguals, namely English-immersed and Spanish-immersed bilinguals. In both experiments, the authors found a priming effect for passive sentences for both groups.

It is important to note that in all the studies outlined above, including Hartsuiker et al. (2004), participants always preferred actives over passives.

Taken together, the findings presented in this section, provide evidence that priming occurs between English and Spanish, even in the case of speakers with lower proficiency, namely children, and late bilinguals. This provides support for our initial prediction that we will find a positive priming effect in our study, although it will most certainly be modulated by proficiency in the two languages.

In the following section, we'll expand on the interaction between syntactic and semantic information during syntactic priming tasks focusing on the role of animacy.

1.6. Semantic features and syntactic priming: the role of animacy

In paragraph 1, we have reviewed experimental evidence that highlighted how syntactic processes in language production within the priming paradigm can be independent of lexical and semantic information, although both these types of information can be primed. The fact that syntax and lexico-semantic information can be investigated separately using a priming paradigm, doesn't exclude that lexical and semantic knowledge can influence priming. The extent to which semantic features, such as animacy, interact with syntactic knowledge in structural priming is still a subject of debate among researchers.

According to Levelt's (1989) model of language production, a speaker first engages in a conceptualization of the message that needs to be communicated, this is a non-linguistic phase where the speaker gathers all the relevant concepts related to what he or she wants to express. Conceptual information concerns who-does-what-to-whom representation hence including information about thematic roles (e.g. agent, patient), and also animacy. Once the message is conceptualized, it undergoes a grammatical encoding process during which the speaker selects lexical items and maps them onto grammatical functions (e.g. subject, object) to express the message. What drives grammatical encoding, meaning, and what features of the message cause an entity in the message to be encoded as the subject of an active or the object of a passive sentence, remains unclear (Vasilyeva & Gámez, 2015). On one hand, thematic

roles could be driving the message-to-structure binding: an entity in the message may be conceptualized as the acting entity and therefore be given the role of agent of an event. In English (and Spanish) grammar, this means that the entity can be encoded as the grammatical subject thus resulting in the production of an active sentence or as the grammatical object, causing the speaker to utter a passive sentence. On the other hand, information on the animacy of the entities involved in the message may drive grammatical encoding. This hypothesis predicts that in an event where a dog is chasing a car, the animate entity *dog* can be grammatically encoded as subject, yielding an active or the inanimate entity *car* can be linked to the subject position, yielding a passive (Pickering & Ferreira, 2008, p. 8).

As previously mentioned, Bock & Loebell (1990) found no interaction between thematic roles and structural priming: participants were more likely to produce a structure after being primed with the same structure, regardless of whether prime and target shared the order of thematic roles. There is however evidence that structural priming can be greatly influenced by thematic roles (e.g Ferreira, 1994, Cai et al., 2012, Cho-Reyes et al., 2016). These results suggest that syntactic priming is sensitive to semantic information unrelated to animacy. However, there's also evidence that animacy can influence priming (Ziegler & Snedeker, 2018). Animacy and thematic roles, while both are conceptual features generated at message-level processes, are inherently distinct: thematic roles are specified with respect to the whole event, whereas animacy is a feature that pertains to the single entities involved in the event. This distinction may be responsible for the different effects of thematic roles and animacy on priming (Vasilyeva & Gámez, 2015, p. 17-18).

For the purposes of our study, we'll focus our discussion on the role of animacy. Many researchers have reported that speakers have a tendency to more frequently encode animate entities as subjects compared to inanimate entities. According to this view, if the action involves an inanimate patient and an animate agent, then speakers will more likely produce an active sentence where the agent (animate) is the subject. On the other hand, when the event involves an animate patient and inanimate agent speakers would tend to encode the message using a passive structure where the animate patient is the grammatical subject. This tendency has been demonstrated experimentally for different languages (English: Prat-Sala & Branigan, 2000, Spanish: Prat-Sala, 1997, Japanese: Branigan et al., 2008). This pattern has often been attributed to animate entities being more accessible to speakers, that is, they are more easily retrieved from memory and they are given priority when it's time to map them onto structure (Bock & Warren, 1985). In Bock & Warren's (1985) terms, animacy, and specifically humanness, makes entities more accessible to the speaker because they can enter into

conceptual relations with a higher number of predicates compared to inanimate entities. This proposal refers to the predictability hierarchy according to which animate entities are more predictable than inanimate ones and, therefore more conceptually accessible to speakers, simply because more things can be said about animate entities than inanimate ones. (Branigan et al., 2008, Bock et al., 1992). Prat-Sala & Branigan (2000) postulate that conceptual accessibility is composed of two elements: inherent accessibility and derived accessibility. The former relates to the intrinsic semantic characteristics of the entity such as animacy, concreteness, and prototypicality. The authors assume that this type of accessibility is independent of context. The latter refers to the notion that the inherent accessibility of an entity may be temporarily enhanced by the context, be it linguistic or nonlinguistic (Prat-Sala & Branigan, 2000, p. 169). Context-derived accessibility may be due, for example, to the entity being previously mentioned in the discourse. Given information is more likely to appear in more prominent syntactic positions compared to new information. Prat-Sala and colleagues (2000) experimentally investigated how derived accessibility influences syntactic structures and also how the two types of accessibility interact with one another and with syntactic processing. They did so with a picture description task preceded by a short story providing context. Crucially, they examined these interactions in English and Spanish, providing important cross-linguistic evidence. Inherent accessibility was manipulated by changing the animacy condition of the entities in the target pictures. In Experiment 1, the agent and the patient were both inanimate, making them equally inherently accessible to speakers. Derived accessibility was manipulated by making one of the entities more salient in the previous context. In Experiment 2, the agent was inanimate and the patient animate, making it inherently more salient. The short story context made the patient more prominent, hence adding to its inherent accessibility. Overall, participants in both languages tended to map more salient entities to prominent syntactic positions: this translates to more active responses when the agent was made salient and more passives when the patient was made salient. Animacy did mediate this tendency because speakers produced more passive descriptions when the patient was more salient and animate, compared to when it was salient but inanimate. Spanish speakers also produce an active dislocated structure that allows for the animate patient to be made syntactically prominent in an active construction (e.g. *A la mujer$_i$ la$_i$ atropelló el tren / to the woman$_i$ she$_i$ ran over the train / "The train ran over the woman"*). This provides evidence that speakers exploit syntactic structures available in their language to produce more accessible information before less accessible information (Prat-Sala & Branigan, 2000, p. 179).

As previously stated, animate entities are inherently more accessible and more likely to be talked about due to their inherent features and predictability, this means that they have high inherent accessibility and high derived accessibility overall. Assuming incremental processing, the accessibility may lead them to be grammatically encoded first. nonetheless, it is unclear whether animacy facilitates grammatical function attribution, word order, or both (Branigan et al., 2008).

If animacy and previous mention of an entity influence production, as postulated by Prat-Sala & Branigan (2000), then we can wonder what is the role of animacy in syntactic priming. According to Pickering & Ferreira (2008), syntactic priming is a useful method for investigating the existent relationship between syntactic structure and semantic features, such as animacy. The hypotheses with this respect are i) syntactic priming and animacy influence the choice of syntactic structure independently of each other; or, ii) they interact and both influence syntactic choices. The first scenario entails that syntactic priming and animacy have independent effects on the magnitude of priming: a passive prime with an animate patient is just as likely to cause priming as a passive prime with an inanimate patient.

The second scenario predicts an additive effect of animacy and priming where the magnitude of priming would increase when speakers are primed with a passive sentence containing an animate patient compared to a passive sentence with an inanimate patient (Pickering & Ferreira, 2008, pp. 9-10).

To our knowledge, the first study using syntactic priming to investigate its relationship with semantic features was Bock et al. (1992). In this seminal study, the authors manipulated the syntactic form of the prime and animacy, yielding active and passive prime utterances bearing animate and inanimate subjects. The animacy condition of the target pictures were always animate patient and inanimate agents. They found a priming effect of active and passive primes and also a main effect of animacy: primes containing animate subjects elicited more target responses with animate subjects compared to inanimate subjects, irrespective of prime structure. The authors concluded that animacy (and semantic features in general) and syntactic priming have independent effects on production.

Vasileyva & Gámez (2015) argued that Bock et al.'s (1992) study may have not been able to capture the full extent of animacy influences on production since the target's animacy was always kept constant across trials. Thus, in their study, Vasileyva & Gámez (2015) investigated the interaction between animacy and syntactic priming by varying the animacy of the primes and the targets. The population of interest was English-speaking children aged from 4;5 to 6:2. Their results were consistent with previous studies that found syntactic

priming in children. Moreover, they found that the magnitude of priming was higher when prime and target bore animate patient/inanimate agent compared to the reversed animacy condition. Overall, their findings provide evidence supporting the scenario where syntactic processing is moderated by animacy relations and, specifically, that children, much like adults, tend to attribute animate entities to prominent grammatical functions, resulting in increased production of passive utterances. In terms of language production models, this study suggests that information encapsulated at the conceptual level (animacy) interacts with information at the grammatical encoding level, hence that the two levels interact during language production (Vasilyeva & Gámez, 2015, pp. 25–26).

More recently, Chen et al. (2020) argued in favor of independent semantic and syntactic processing in Mandarin, postulating that if speakers of Mandarin are not influenced by semantic features during syntactic processing, then the same could occur in other languages. Chen and colleagues' approach was different from previously mentioned studies: they investigated whether speakers' tendency to produce a specific syntactic structure was influenced by how animacy and thematic roles are conveyed in the prime sentence. Specifically, if the syntactic form of the target was affected by whether thematic roles in prime and target matched or mismatched in animacy conditions. Chen et al. (2020) found a significant priming effect of dative constructions but there was no evidence of interaction between animacy and structure. Speakers did not tend to repeat the prime's animacy order. Previous research had demonstrated that Mandarin sentence processing is sensitive to semantic information such as animacy. Chen and colleagues proposed, following Pickering & Branigan's (1998) model, that semantic information is represented outside of the lemma stratum that comprises syntactic information. This model would consider syntactic priming an independent phenomenon. These conclusions support the view outlined by Branigan & Pickering (2017): syntactic and semantic processing are separate and autonomous processes.

The results from Vasilyeva & Gámez (2015) and Chen et al. (2020), besides considering two different languages, may also be viewed under a developmental perspective where children may be more sensitive to semantic information during syntactic processing compared to adults.

Concerning this view, Buckle et al. (2017) examined the influence of animacy and semantic role mappings on syntactic structure in children (one group aged 3, one group aged 5) and adults. They first examined whether having dative primes and targets with prototypical (Inanimate theme-Animate goal) or non-prototypical (Animate theme-Inanimate goal), matched or mismatched animacy-semantic role mappings would influence syntactic priming.

They found syntactic priming across all groups but only the 3-year-olds showed sensitivity to semantic manipulations. Secondly, they looked at whether speakers would copy animacy noun orders from prime to target, regardless of syntactic form. Only the two groups of children exhibited animacy noun order priming, specifically they tended to put themes before goals regardless of prime syntactic structure. The authors have taken these results as supporting evidence for developmental changes in the separation of syntax and semantics in priming.

Although the relationship between syntax and semantics during language processing has been the subject of numerous studies, the evidence is mixed. We cannot for certain say that the two are completely independent of each other, nor can we state that they are fully interdependent. There are many reasons why different studies have found different results: methodological differences across studies, including different tasks, scoring schemes, and data analysis methods; different populations of interests and, lastly, related but fundamentally different research questions. All of these discrepancies across studies make comparing the results a difficult and almost impossible task.

Our last remark on the role of animacy on syntactic priming relates to the fact that all of the studies mentioned in this section assume incremental processing, that is, they assume that speakers proceed with a word-by-word encoding: when the first lemma is accessed, it is encoded as the subject of the sentence and sent to phonological encoding. The rest of the sentence is accommodated into the sentence structure as words become available to speakers (Lee et al., 2015). Under this assumption, animacy, as a cue for accessibility, would cause animate entities to be more easily retrievable hence to be processed first and possibly be assigned prominent grammatical functions (Branigan et al., 2008, p. 174). Incremental processing is opposed to hierarchical processing where speakers proceed to encode the verb argument structure before moving to phonological encoding (Lee et al., 2015). There's agreement among researchers that native speakers mostly plan production incrementally, although recent exposure to a specific structure (via syntactic priming) may cause speakers to move toward hierarchical planning. If the structure is already activated, meaning that the subject is already encoded, then speakers can spend more time on the other character as well (Konopka et al., 2018, pp. 73-74). What is much less clear, is how L2 speakers plan their utterances: are they incremental, hierarchical, or both? Konopka et al. (2018) investigated L2ers production strategies in an eye-tracking study. Speakers produced sentence descriptions in Dutch (L1) and English (L2). The results from four experiments where they compared L1 production to L2 production, revealed that planning to speak in the L2 involves hierarchical planning. L2 speakers showed longer speech onset latencies, revealing that they spend more

time on the conceptualization of the event (who-did-what-to whom). Interestingly, the authors explained this difference between L2 and L1 speakers in terms of proficiency, or language experience. Furthermore, L2 speakers with higher proficiency showed more native-like patterns of processing by using incremental strategies to plan utterances (Konopka et al., 2018, p. 98).

Based on what we have reviewed on the role of animacy and L2 processing, the predictions for our study are that non-native speakers may show sensitivity to animacy manipulation but that it will be modulated by proficiency with more proficiency speakers being more sensitive to animacy. We expect these speakers to produce more passive utterances when the animacy condition is Animate patient - Inanimate agent compared to the alternating condition Inanimate patient - Inanimate agent, possibly regardless of prime structure.

1.7. Parallels and differences of passive structures in English and Spanish

In the present study, the target structure is the passive form, as the marked transitive construction opposed to the unmarked structure, namely, the active form. We look at this structure in English and Spanish. An exhaustive, comparative linguistic analysis of the passive structure in these two languages is beyond the scope of this dissertation. We will limit our discussion to the periphrastic passive structure (i.e. *Auxiliary be + past participle*), parallel in both languages.

(3) The tree was broken by the lightning bolt.
El árbol fue quebrado por el rayo.

The examples in (3) contain full periphrastic passives in English and Spanish: both sentences present a subject NP (i.e. *the tree / el árbol*), the auxiliary *be/ser* + past participle and an object NP introduced by a preposition (i.e. *by* in English and *por* in Spanish). Even in this preliminary analysis, the two structures appear to be largely similar. Most scholars have defined passives based on their relationship with active structures: passives became the marked structures with respect to morphology, syntax and semantics (Wanner, 2009, pp. 12–13). It is important to note that there are constraints that operate over the alternation active-passive in the sense that not all active utterances have a passive form. Admittedly, only transitive verbs seem to allow both forms (RAE, 2010). When a transitive active sentence

undergoes passivization, both in English and Spanish, inevitable changes in syntactic structure (and word order) occur.

According to Haspelmath (1990), a passive construction can be defined as follows: i) the subject of the active form correspond to a non-obligatory oblique phrase (i.e. the *by*-phrase); ii) the direct object of the active verb corresponds to the subject of the passive sentence; iii) the construction is restricted with respect to another unrestricted construction, namely the active. Within the realm of generative grammar, the changes are seen in terms of constituent movement. Specifically, the passive syntactic subject originates as the object of the verb and is later moved to subject position, whereas the *by*-phrase originates as an external argument of the passive verb. The passive verb takes the form of the past participle of a lexical verb which is preceded by an auxiliary verb to encode tense and agreement (Wanner, 2009). In Spanish, the past participle agrees with the subject. The syntactic subject is typically assigned the role of patient, while the oblique argument is assigned the role of agent but it can be assigned also the role of goal or source, according to the argument structure of the passivized verb (Jaeggli, 1986, p. 599).

Passive sentences express the same meaning as their active counterparts (RAE, 2010). Consequently, choosing a passive over an active form means that the speaker must make a choice. The change in syntactic structure, while it doesn't change the event structure, entails a change in semantic and information structure. In an active, the syntactic object is also the syntactic object, whereas in a passive structure, the semantic object is the syntactic subject. A reason why a speaker could choose to utter a passive rather than the unmarked active could be the need to map a non-agent argument onto a topical position, that is, the subject position. (Wanner, 2009, pp. 9-10). Furthermore, the agent *by*-phrase can be omitted in both languages, shifting

In Spanish, the periphrastic passive can also have the auxiliary *estar*, also corresponding to the auxiliary *be* in English. However, *ser* and *estar* are not interchangeable auxiliaries in the formation of a passive, there are semantic and aspectual constraints to their use. *Estar* is used when the speaker wants to focus on the result of the event, as in (4), whereas *ser* is used when the focus is on the process without necessarily referring to the result, as in (5) .

(4) El vigilante está golpeado.
"The guard is hit"

(5) El vigilante fue golpeado.
"The guard was hit"

It follows that, *ser*-passives are not possible when the predicate denotes a punctual interpretation, whereas *estar*-passives are allowed (Beas, 2014). Regarding aspectual constraints, authors have observed a complementary distribution of *ser*- and *estar*-passives: the latter seems to be allowed when the former is not, that is, with present tense and imperfective aspect tenses of telic verbs (Castillo Peña, 2013).

(6) El regalo {está ~ estaba ~ *es ~ fue ~ ha sido ~ será} abierto en la cena.
The present {is ~ was-ESTAR ~ *is-SER ~ was ~ has been ~ will be} opened at dinner.

Castillo Peña (2013), points out that the auxiliary *ser* can work with telic and atelic verbs when it's inflected in the *pretérito* tense (i.e. simple past), as shown in (7) and (8).

(7) La conferencia fue grabada.
The conference was recorded.

(8) La luz fue encendida.
The light was turned on.

Following this, we chose to build all of our Spanish prime sentences with the *pretérito indefinido* tense (i.e. simple past), thus ensuring passive interpretation. For this reason, from now on, we refer to perifrastic Spanish passive as *fue*-passives.

The last paragraph of this section we turn to the processing of passive sentences: scholars have proposed many different accounts of passive syntax, but, overall, all these accounts have in common that passives are derivationally more complex than active forms which makes their processing more cognitively demanding compared to actives (Sadri Mirdamadi & De Jong, 2014, pp. 106–107). Furthermore, in terms of acquisition, passives are acquired later , although there are some cross-linguistic differences: Jisa et al. (2002) has shown that Spanish speaking children start to spontaneously produce *fue*-passive only at the end of elementary school, whereas English speaking children start producing passive much earlier (Budwig, 1990). Nevertheless, studies have shown that production of passive forms in young children can be favored by elicitation, for instance, via syntactic priming (Bencini & Valian, 2008; Shimpi et al., 2007). Similarly, L2 learners acquire complex structures at more

advanced stages and, even if they have formally internalized the passive structure, it is likely that they don't produce it often due to the overall low frequency of occurrence in discourse (Sadri Mirdamadi & De Jong, 2014, p. 108). In Spanish, perifrastic passives are uncommon in spoken Spanish and speakers tend to prefer other constructions, namely the *se*-passive and an OVS dislocated active. Prat-Sala (1997) found that 35% of English speakers' responses were passives, while only 11% of Spanish speakers' responses were *fue*-passives. In section 2, we have reviewed evidence that the production of passive constructions can be enhanced via syntactic priming in bilinguals. In other words, the complex computation of the passive may be facilitated by previous activation of the correspondent combinatorial node.

Chapter 2 - Norming and pilot phase

As previously mentioned, the present study aims at investigating the linguistic representation of adult late trilinguals concerning similar structures in their second and third language. The study was specifically designed for Italian L1 speakers who have at least an intermediate proficiency (starting from CEFR level B1) in English and Spanish.

The study consists of two cross-linguistic priming experiments directed at ascertaining whether L2/L3 speakers of English and Spanish share syntactic information cross-linguistically and, if they do, to what extent. Furthermore, as many authors have done before in bilingual psycholinguistic research (e.g Hartsuiker et al., 2004, Favier et al., 2019, Bernolet et al., 2013) we chose to examine the role of proficiency in cross-linguistic processing of syntactically equivalent structures, namely passive structures. Lastly, we look at the role of patient animacy with respect to the priming effect.

In this chapter, we will introduce the preliminary phases that anticipated the priming studies: the norming phase and the pilot phase. We will introduce methods and results for each phase separately, leaving the discussion as a final paragraph where we will discuss the results for the two languages comparatively as the choice for the final experimental items was based on the results obtained across languages, including results from the parallel project in German (Giovannini, 2022).

2.1. Norming phase

According to The SAGE Encyclopedia of Educational Research, Measurement, and Evaluation (2018), norming consists of constructing norms, that is, looking for the typical performance of a group of individuals on a specific psychological task. In the case of our study, with the norming phase, we gathered behavioral data from native speakers of English and Spanish that served as control data for our experimental items. During this phase, we also wanted to ensure that images were clear and there were no issues with any of the drawings.

2.1.1. Picture norming English

2.1.1.1. Method

To assess the baseline preference for transitive sentences in English, we carried out a picture norming study. The task used was a picture description writing task administered via the platform *pavlovia.org* to 11 native speakers of English recruited from personal contacts and social media.

All participants received an email with brief technical instructions and the link to the task which was initially designed on the free platform Psychopy (Peirce et al., 2019) and later synced onto the online platform *Pavlovia* so that it could be administered remotely.

The experiment started with a consent form and an instruction video in English explaining how to perform the task: participants were instructed to describe the images in English using the verb provided. They were invited to type as fast as possible and not worry about spelling. Subsequently, participants were given the chance to carry out 5 practice trials. During the experiment, they saw 35 images paired with 35 transitive verbs, presented one at a time. After the images, participants were asked three questions regarding the pictures and their experience during the study. The questions were:

> What do you think about the images you just described?
>
> We want to use these images to study how people describe certain events using language. Do you think the images were clear and easy to describe?
>
> Please let us know if any image was unclear or difficult to describe.

2.1.1.2. Results

The norming phase confirmed that native English speakers have a preference for active structures compared to passive ones when they are producing sentences in isolation and not within a priming paradigm. Table 1 shows the mean proportion of active and passive sentences produced by participants according to a strict scoring. We will describe the scoring scheme in detail in Chapter 3. For now, it suffices to know that we have considered strict passives only the descriptions that had a patient in subject position followed by the passive auxiliary *area* and the past participle of transitive verb and, finally, that had an expressed agent in post-verbal position introduced by preposition *by*. All descriptions that were neither active (Agent + Verb + patient) nor passive were scored as *other*.

According to our data, passives appear to be the least preferred structure, although not completely avoided by speakers: out of all the picture-verb pairs, 13 items yielded a proportion of 0.18 passive description, only 0.3 below average; 8 items scored above average (0.21), of these, only one scored above 0.5 (*ambulance run over nurse.jpg*).

Table 1

Mean proportion and (sd) of English transitive responses in the norming phase according to a strict scoring scheme.

Target Language	Target description		
	Active	Passive	Other
English	0.46 (0.22)	0.21 (0.13)	0.36 (0.24)

All pictures were tested in three languages, English and Spanish for the current study and German for the parallel study. The final 32 pictures were selected based on the average score across languages. The final 32 pictures along with the mean proportion and (sd) of English transitive responses are reported in Table 2.

Table 2

Mean proportion and (sd) of English transitive responses in the norming phase by item.

Target Picture	Target description		
	Active	Passive	Other
ambulance strike nurse.jpg	0.36 (0.22)	0.55 (0.11)	0.09 (0.23)
ball break vase.jpg	0.45 (0.22)	0.18 (0.11)	0.36 (0.23)
ball hit boy.jpg	0.36 (0.22)	0.27 (0.11)	0.36 (0.23)
bike drag man.jpg	0.36 (0.22)	0.55 (0.13)	0.09 (0.23)
blanket cover baby.jpg	0.18 (0.23)	0.45 (0.12)	0.36 (0.23)
bullet break bottle.jpg	0.73 (0.22)	0.18 (0.11)	0.09 (0.23)
bus follow taxi.jpg	0.82 (0.23)	0.09 (0.11)	0.09 (0.23)
cactus prick balloon.jpg	0.73 (0.22)	0.09 (0.11)	0.18 (0.23)
car follow boy.jpg	0.73 (0.22)	0.18 (0.11)	0.09 (0.23)
clouds cover moon.jpg	0.45 (0.22)	0.27 (0.11)	0.27 (0.23)
drone follow cyclist.jpg	0.64 (0.22)	0.18 (0.11)	0.18 (0.23)
hammer crack egg.jpg	0.64 (0.22)	0.18 (0.11)	0.18 (0.23)
helicopter lift car.jpg	0.45 (0.22)	0.27 (0.11)	0.27 (0.23)
helicopter rescue man.jpg	0.36 (0.22)	0.18 (0.11)	0.45 (0.23)
knife slice lemon.jpg	0.18 (0.23)	0.18 (0.11)	0.64 (0.23)
magnet attract coin.jpg	0.73 (0.22)	0 (0.11)	0.27 (0.23)

missile hit ship.jpg	0.64 (0.22)	0.09 (0.11)	0.27 (0.23)
net trap girl.jpg	0.18 (0.23)	0 (0.11)	0.82 (0.24)
news shock man.jpg	0.18 (0.23)	0.18 (0.11)	0.64 (0.23)
police chase car.jpg	0.64 (0.22)	0.09 (0.11)	0.27 (0.23)
pumpkin scare man.jpg	0.55 (0.22)	0.18 (0.11)	0.27 (0.23)
rock crush man.jpg	0.36 (0.22)	0.45 (0.12)	0.18 (0.23)
rope tie cowgirl.jpg	0 (0.22)	0.09 (0.11)	0.91 (0.25)
tank crush car.jpg	0.82 (0.23)	0.09 (0.11)	0.09 (0.23)
truck carry boxes.jpg	0.82 (0.23)	0 (0.11)	0.18 (0.23)
truck carry horse.jpg	0.45 (0.22)	0.18 (0.11)	0.36 (0.23)
truck tow car.jpg	0.18 (0.23)	0.27 (0.11)	0.55 (0.23)
umbrella protect girl.jpg	0.27 (0.22)	0.09 (0.11)	0.64 (0.23)
water spray fireman.jpg	0.45 (0.22)	0.18 (0.11)	0.36 (0.23)
wave destroy castle.jpg	0.82 (0.23)	0.09 (0.11)	0.09 (0.23)
wind lift girl.jpg	0.64 (0.22)	0.18 (0.11)	0.18 (0.23)
wrecking ball demolish house.jpg	0.55 (0.22)	0 (0.11)	0.45 (0.23)

6 picture items also caused participants to produce more other structures compared to transitive ones (*knife slice lemon.jpg, net trap girl.jpg, news shock man.jpg, rope tie cowgirl.jpg, truck tow car.jpg, umbrella protect girl.jpg*). This number goes down to 5 when considering lax coding, which is considering as passive all passive descriptions, including truncated and instrumental passives (i.e. *The egg was smashed with the hammer*). The reason behind these results may lie in the event depicted in the image: we chose to test events with inanimate agents while aware of the fact that some events may be more likely described with an intransitive constructions (i.e. *The girl is trapped under a net*.).

Finally, none of the participants reported problems with the images and all gave positive feedback. We interpreted these results as a confirmation that our images were clear and easy to understand when paired with an action.

2.1.2. Prime items norming English

2.1.2.1. Method

An acceptability judgment task was used to establish the acceptability of 41 prime transitive items in English: 20 in the Inanimate agent - Inanimate patient bearing active and

passive form and 21 in the Inanimate agent - Animate patient also bearing active and passive form, for a total of 82 sentences. The sentences were presented in two counterbalanced lists across conditions, each containing 46 prime sentences.

Although in the priming experiments only 32 experimental items (64 sentences) were going to be used, we saw it appropriate to came up with extra items as some sentences were hypothesized to be more acceptable in one language compared to the others always due to the fact that all items had to be rated in three languages, English and Spanish for the present study, but also German for the parallel study. By doing so, we had a cushion number of items that we could exclude in case of negative ratings.

24 English native speakers recruited through personal contacts took part in the acceptability rating task administered remotely via Google Forms. Participants (12 for each list) were asked to rate the 82 sentences on a Likert scale. The survey included a consent form but was anonymous and no personal information was gathered.

Instructions were provided at the beginning of the survey asking participants to rate each sentence on a scale from 1 to 6 according to how acceptable they thought the sentence was. Participants were also encouraged to leave comments under each sentence indicating suggestions on how to improve the sentence acceptability. A brief explanation of what "acceptable" meant was given. The instruction text was the following:

> During the questionnaire you'll read a series of sentences. You are asked to answer the question "How acceptable is this sentence in English from 1(totally unacceptable) to 6 (totally acceptable)?"
> A sentence is acceptable if you understand it easily and you might use it in your speech.
>
> If you have any suggestions, critiques or comments regarding the sentences, please write in the box you find under each sentence.

2.1.2.2. Results

The goal of the prime sentences norming phase was to ensure that our experimental items were accepted by native speakers as utterances that could plausibly be produced in specific contexts. Furthermore, having data from native speakers allowed us to make a claim on the validity of our experimental materials as well as serving as a baseline to interpret our priming results by item.

All responses were downloaded from Google Forms and processed using Excel. We computed the mean score for all items and compared it to the mean score of the same item in Spanish and German. All sentences that scored below 4 even in one language were excluded from the final list of experimental items. This caused us to exclude 24 prime sentences and only save 58, forcing us to modify some sentences (e.g. *A sailboat saved the woman* was modified into *A lifeboat saved the woman*) and to create new ones. We ran a second acceptability task, identical in procedure to the first one, where 10 sentences bearing all conditions and counterbalanced into two lists were rated by 24 native speakers of English (11 for list 1 and 13 for list 2) recruited through personal contacts and Social Media.

In Table 3 we illustrate the mean score, minimum and maximum score, and standard deviation for the final 32 experimental items later used in the priming experiments in all languages. Overall, the average mean score of the ratings of all items was 5.27 and 52 sentences out of 64 scored five or higher. As a result we could reasonably state that English native speakers accepted all of our materials by showing positive acceptability ratings and, therefore, that they comprehend the sentences correctly and they would produce such utterances in a proper context.

Table 3
Acceptability ratings of English sentences by experimental item divided by animacy condition.

Item	Prime	Mean	Min.	Max.	SD
	Inanimate-Animate condition				
4	The company hired the young lawyer.	5.42	2	6	1.16
	The young lawyer was hired by the company.	5.67	4	6	0.65
10	The sun blinded the man.	5.42	2	6	1.24
	The man was blinded by the sun.	5.58	4	6	0.67
16	The alarm awakened the old man.	4.25	1	6	1.82
	The old man was awakened by the alarm.	5.08	3	6	1.04
22	The words offended the girl.	5.92	5	6	0.29
	The girl was offended by the words.	5.42	2	6	1.24
28	The tornado injured the girl.	5.33	3	6	1.07
	The girl was injured by the tornado.	5.5	4	6	0.8
34	The story saddened the young boy.	5.58	4	6	0.79
	The young boy was saddened by the story.	5.25	3	6	1.06

40	The speech inspired the students.	5.42	3	6	1.08
	The students were inspired by the speech.	5.75	4	6	0.62
46	The lifeboat saved the woman.	4.54	1	6	1.71
	The woman was saved by a lifeboat.	5	2	6	1.48
52	A helicopter is pursuing the thieves.	4.75	2	6	1.36
	The thieves are pursued by the helicopter.	5	2	6	1.28
58	The tank ran over the soldier.	5.73	4	6	0.65
	The soldier was run over by the tank.	5.38	4	6	0.77
64	The mystery intrigued the detective.	5.67	4	6	0.65
	The detective was intrigued by the mystery.	5.67	4	6	0.78
70	An asteroid hit the dinosaurs.	5.58	4	6	0.67
	The dinosaurs were hit by an asteroid.	5.58	4	6	0.79
76	The fireworks startled the dog.	5.25	3	6	1.14
	The dog was startled by the fireworks.	5.17	2	6	1.34
82	The performance delighted the audience.	5.75	5	6	0.45
	The audience was delighted by the performance.	5.42	4	6	0.9
88	The announcement surprised the passengers.	5.5	4	6	0.9
	The passengers were surprised by the announcement.	5.58	5	6	0.51
94	The boat pulled the water-skier.	5.33	3	6	1.07
	The water-skier was pulled by the boat.	5	2	6	1.54
	Inanimate-Inanimate condition				
1	A computer controlled the traffic lights.	5.75	5	6	0.45
	The traffic lights were controlled by a computer.	5.67	3	6	0.89
7	The sprinkler watered the plants.	5.58	5	6	0.51
	The plants were watered by the sprinkler.	5.08	3	6	1.24
13	The blender chopped the apple.	4.92	2	6	1.51
	The apple was chopped by the blender.	5.5	4	6	0.67
19	The autopilot landed the plane.	4.67	2	6	1.72
	The plane was landed by the autopilot.	4.33	2	6	1.15
25	The program scheduled the exam time.	5	3	6	1.13
	The exam time was scheduled by the program.	5.08	2	6	1.56
31	The truck emptied the garbage bin.	5	3	6	1.13

	The garbage bin was emptied by the truck.	5.42	4	6	0.67
37	The fire burnt the forest.	5.42	4	6	0.79
	The forest was burned by the fire.	4.42	1	6	2.02
43	The machine graded the tests.	5.33	3	6	1.07
	The tests were graded by the machine.	5.67	4	6	0.65
49	The printer printed the papers.	5.75	5	6	0.45
	The papers were printed by the printer.	4.58	1	6	1.73
55	A ball broke the window.	5.45	4	6	0.82
	The window was broken by a ball.	5.08	1	6	1.38
61	The gun fired a bullet.	5	3	6	0.95
	The bullet was fired by the gun.	4.42	2	6	1.62
67	The wind shook the branches.	4.92	2	6	1.68
	The branches were shaken by the wind.	5.08	1	6	1.44
73	The safe was hidden by a picture.	5.33	2	6	1.23
	A picture hid the safe.	5.17	2	6	1.19
79	The dishwasher washed all the dishes.	4.75	3	6	1.36
	All the dishes were washed by the dishwasher.	5.33	2	6	1.23
85	The hurricane ruined the crop.	5.83	5	6	0.39
	The crop was ruined by the hurricane.	5.75	4	6	0.62
91	The water flooded the streets.	5.5	3	6	1.17
	The streets were flooded by the water.	4.83	1	6	1.53

Note. The table shows the mean score, min and max scores and SD of all experimental sentences. Allowed ratings went from 1 (totally unacceptable) to 6 (totally acceptable). The item number refers to the item number in the priming experiment.

It is interesting to notice how all sentences were rated as totally acceptable (score = 6) by at least one participant. Only seven sentences received 1 ratings, of these, five were passive sentences in the Inanimate - Inanimate condition, while two were active sentences in the Inanimate-Animate condition. This holds true also when looking at all ratings under 3: passives in the Inanimate-Inanimate conditions received more ratings under three (12) compared to passives in the other animacy conditions (7). This may indicate that English L1 speakers may tend to reject passive sentences bearing inanimate agent and inanimate patient. Nonetheless, all of these sentences also received positive (4) and very positive (5, 6) scores.

This goes to show that native speakers rarely agree on the acceptability of a sentence and that the interpretation and subsequent rating of the sentences is a process that is influenced by the language experience and language preference of each individual.

2.1.3. Picture Norming Spanish

As our is a cross-linguistic study investigating the representation of syntax in L2 and L3 speakers of English and Spanish, it is imperative that all experimental items be normed in both languages. We have previously described the norming phase for English, we now address the norming of items in Spanish.

2.1.3.1. Method

To assess the baseline preference for transitive sentences in Spanish, we carried out a picture norming study using the same method and procedure as the English one. The picture description writing task was administered via the platform *pavlovia.org* to 11 native speakers of Spanish recruited from personal contacts and social media.

All participants received an email with brief technical instructions and the link to the task which was initially designed on the free platform Psychopy (Peirce et al., 2019) and later synced onto the online platform *Pavlovia* so that it could be administered remotely.

The experiment started with a consent form and an instruction video in Spanish explaining how to perform the task: participants were instructed to describe the images in Spanish using the verb provided. They were invited to type as fast as possible and to not worry about spelling. Subsequently, participants were given the chance to carry out 5 practice trials. During the experiment, they saw 35 images paired with 35 transitive verbs, presented one at a time. After the images, participants were asked three questions regarding the pictures and their experience during the study. The questions were:

> ¿Qué opina de las imágenes que acaba de describir?
>
> Queremos utilizar estas imágenes para investigar cómo las personas utilizan el lenguaje para describir ciertos eventos. En su opinión, ¿las imágenes eran claras y fáciles de describir?
>
> Por favor, háganos saber si alguna imagen no era clara o era difícil de describir.

2.1.3.2. Results

As expected, participants showed a preference for active sentences compared to passive structures when describing transitive events in isolation. Table 4 shows the mean proportion of active and passive sentences produced by participants according to a strict scoring (patient in subject position, passive auxiliary *ser*, past participle of transitive verb, agent in post-verbal position introduced by preposition *por*). All descriptions that were neither active (Agent + Verb + patient) nor passive were scored as *other*.

Table 4

Mean proportion and (sd) of Spanish transitive responses in the norming phase according to a strict scoring scheme.

Target Language	**Target description**		
	Active	Passive	Other
Spanish	0.56 (0.23)	0.19 (0.11)	0.36 (0.24)

Spanish native speakers appear to disfavor passive structures even more than English speakers. In fact, only 3 pictures had a proportion of passives above average (*ambulance strike nurse.jpg, bike drag man.jpg, rock crush man.jpg*). For 7 picture items, participants produced more *other* structures (*blanket cover baby.jpg, cactus prick balloon.jpg, net trap girl.jpg, pumpkin scare man.jpg, rope tie cowgirl.jpg, umbrella protect girl.jpg, wrecking ball destroy house.jpg*). In general, the inanimacy of the agent renders these events non-prototypical in nature and speakers may be more spontaneously inclined to describe them using an external human agent (e.g. *están demoliendo una casa, ataron a la vaquera*) or using the pronomilan version of the verb (e.g. *El chico se asustó por la calabaza de halloween*) instead of using a passive construction with an inanimate agent.

The final 32 pictures were selected based on the average score across languages. The final 32 pictures along with the mean proportion and (sd) of Spanish transitive responses is reported in Table 5.

Table 5

Mean proportion and (sd) of Spanish transitive responses in the norming phase by item.

Target Picture	**Target description**		
	Active	Passive	Other
ambulance strike nurse.jpg	0.45 (0.23)	0.45 (0.12)	0.09 (0.24)

ball break vase.jpg	0.55 (0.22)	0 (0.11)	0.45 (0.23)
ball hit boy.jpg	0.55 (0.22)	0.18 (0.11)	0.27 (0.23)
bike drag man.jpg	0.45 (0.23)	0.36 (0.11)	0.18 (0.24)
blanket cover baby.jpg	0.27 (0.23)	0.09 (0.11)	0.64 (0.24)
bullet break bottle.jpg	0.73 (0.23)	0 (0.11)	0.27 (0.23)
bus follow taxi.jpg	0.91 (0.23)	0 (0.11)	0.09 (0.24)
cactus prick balloon.jpg	0.45 (0.23)	0 (0.11)	0.55 (0.24)
car follow boy.jpg	0.91 (0.23)	0 (0.11)	0.09 (0.24)
clouds cover moon.jpg	0.73 (0.23)	0 (0.11)	0.27 (0.23)
drone follow cyclist.jpg	0.64 (0.22)	0.18 (0.11)	0.09 (0.24)
hammer crack egg.jpg	0.36 (0.23)	0.18 (0.11)	0.45 (0.23)
helicopter lift car.jpg	0.82 (0.23)	0 (0.11)	0.18 (0.24)
helicopter rescue man.jpg	0.36 (0.23)	0.27 (0.11)	0.36 (0.23)
knife slice lemon.jpg	0.45 (0.23)	0.09 (0.11)	0.45 (0.23)
magnet attract coin.jpg	0.82 (0.23)	0 (0.11)	0.18 (0.24)
missile hit ship.jpg	0.64 (0.22)	0.09 (0.11)	0.27 (0.23)
net trap girl.jpg	0 (0.23)	0.09 (0.11)	0.91 (0.25)
news shock man.jpg	0.27 (0.23)	0.27 (0.11)	0.45 (0.23)
police chase car.jpg	0.82 (0.23)	0 (0.11)	0.18 (0.24)
pumpkin scare man.jpg	0.18 (0.23)	0.09 (0.11)	0.73 (0.24)
rock crush man.jpg	0.55 (0.22)	0.36 (0.11)	0.09 (0.24)
rope tie cowgirl.jpg	0 (0.23)	0.18 (0.11)	0.82 (0.25)
tank crush car.jpg	0.73 (0.23)	0.18 (0.11)	0.09 (0.24)
truck carry boxes.jpg	1 (0.24)	0 (0.11)	0 (0.24)
truck carry horse.jpg	0.64 (0.22)	0.09 (0.11)	0.27 (0.23)
truck tow car.jpg	0.36 (0.23)	0.27 (0.11)	0.36 (0.23)
umbrella protect girl.jpg	0.27 (0.23)	0 (0.11)	0.73 (0.24)
water spray fireman.jpg	0.45 (0.23)	0.09 (0.11)	0.45 (0.23)
wave destroy castle.jpg	0.82 (0.23)	0.09 (0.11)	0.09 (0.24)
wind lift girl.jpg	0.55 (0.22)	0 (0.11)	0.45 (0.23)
wrecking ball demolish house.jpg	0.18 (0.23)	0.18 (0.11)	0.64 (0.24)

2.2. Prime items norming Spanish

2.2.1. Method

Method and procedure for the prime item norming phase in Spanish were identical to the ones used for English. We used an acceptability judgment task was used to establish the acceptability of 40 prime transitive items in Spanish: 19 in the Inanimate agent - Inanimate patient bearing active and passive form and 21 in the Inanimate agent - Animate patient also bearing active and passive form, for a total of 80 transitive sentences. The sentences were presented in two counterbalanced lists across conditions, each containing 40 prime sentences.

Similarly to the English acceptability task, we chose to test more items than what we needed for the priming experiment allowing us to exclude poorly judged items.

21 native speakers of Spanish recruiter through personal contacts and social media. All varieties of Spanish were accepted and the task was administered remotely via Google Forms. Participants (12 for each list) were asked to rate the 82 sentences on a Likert scale. The survey included a consent form but was anonymous and no personal information was gathered.

Instructions were provided at the beginning of the survey asking participants to rate each sentence on a scale from 1 to 6 according to how acceptable they thought the sentences were. Participants were also encouraged to leave comments under each sentence indicating suggestions on how to improve the sentence acceptability. A brief explanation of what "acceptable" meant was given. The instruction text was the following:

> El objetivo de esta investigación es comprender cómo los hablantes nativos valoran ciertas oraciones.
> Usted va a leer una serie de oraciones.
> Tiene que responder a la pregunta "¿Esta oración es aceptable?" con un valor de 1 (totalmente inaceptable) a 6 (totalmente aceptable). Una oración se considera aceptable si es correcta, se comprende con facilidad y se podría utilizar en un discurso.
>
> No hace falta que reflexione mucho sobre las frases, puede ir rápidamente. No hay respuestas correctas o incorrectas.
> Después de cada frase hay una casilla donde puede proporcionar correcciones o dejar comentarios y sugerencias.

2.2.2. Results

Native speakers' ratings on experimental items are extremely important to test the plausibility of the sentences as well as establishing a baseline for the items that can be later used in the analysis of the priming data.

Responses were processed using Excel. The mean score for all sentences was compared to the mean score of the same sentence in English and German. The Spanish judgment task was carried out after the English version allowing us to include all new items in the task thus avoiding running a second one.

Table 6 illustrates the mean score, minimum and maximum score, and standard deviation for the final 32 experimental items. Overall, the average mean score of the ratings of all items was 5.42 and 52 sentences out of 64 scored five or higher. As a result we could reasonably state that English native speakers accepted all of our materials by showing positive acceptability ratings and, therefore, that they comprehend the sentences correctly and they would produce such utterances in a proper context.

Table 6
Acceptability ratings on Spanish sentences by experimental item divided by animacy condition.

Item	Prime	Mean	Min.	Max.	SD
	Inanimate-Animate condition				
4	La empresa contrató al joven abogado.	6.00	6	6	0
	El joven abogado fue contratado por la empresa.	6.00	6	6	0
10	El sol cegó al hombre.	6.00	6	6	0
	El hombre fue cegado por el sol.	5.80	5	6	0.4
16	Una alarma despertó al hombre.	5.60	4	6	0.84
	El hombre fue despertado por una alarma.	5.20	3	6	1.01
22	Las palabras ofendieron a la chica.	5.90	5	6	0.3
	La chica fue ofendida por las palabras.	4.50	2	6	1.51
28	El tornado lastimó a la chica.	5.20	3	6	1.14
	La chica fue lastimada por el tornado.	4.80	1	6	1.64
34	La trágica historia afectó al joven.	6.00	6	6	0
	El joven fue afectado por la trágica historia.	5.60	4	6	0.7
40	El discurso motivó a los estudiantes.	6.00	6	6	0
	Los estudiantes fueron motivados por el discurso.	5.80	5	6	0.4

46	Un bote de emergencia salvó a la mujer.	5.60	2	6	1.21
	La mujer fue salvada por un bote de emergencia.	5.60	3	6	0.97
52	El helicóptero persiguió a los ladrones.	4.90	1	6	1.73
	Los ladrones fueron perseguidos por el helicóptero.	5.50	1	6	1.51
58	El tanque arrolló al soldado.	5.90	5	6	0.3
	El soldado fue arrollado por el tanque.	5.90	5	6	0.32
64	El detective fue cautivado por el misterio.	5.40	1	6	1.51
	El misterio cautivó al detective	6.00	6	6	0
70	Un meteorito golpeó a los dinosaurios.	5.60	3	6	0.92
	Los dinosaurios fueron golpeados por un meteorito.	4.80	1	6	1.99
76	Los fuegos artificiales aterrorizaron al perro.	6.00	6	6	0
	El perro fue aterrorizado por los fuegos artificiales.	6.00	6	6	0
82	La actuación deleitó al público.	5.10	1	6	1.83
	El público fue deleitado por la actuación.	5.10	1	6	1.91
88	El anuncio sorprendió a los pasajeros.	6.00	6	6	0
	Los pasajeros fueron sorprendidos por el anuncio.	5.50	1	6	1.51
94	El barco tiró al esquiador acuático.	4.80	1	6	1.97
	El esquiador acuático fue tirado por un barco.	4.10	1	6	1.66
	Inanimate-Inanimate condition				
1	Un ordenador controló los semáforos.	4.8	2	6	1.51
	Los semáforos fueron controlados por un ordenador.	5.9	5	6	0.32
7	El aspersor regó las plantas.	5	1	6	1.81
	Las plantas fueron regadas por el aspersor.	5.1	1	6	1.73
13	La licuadora trituró las manzanas.	5.3	1	6	1.64
	Las manzanas fueron trituradas por la licuadora.	5.1	3	6	1.25
19	El piloto automático aterrizó el avión.	4.7	1	6	1.64
	El avión fue aterrizado por el piloto automático.	5.6	4	6	0.67
25	Un ordenador programó el horario del examen.	5.7	3	6	0.9
	El horario del examen fue programado por un ordenador.	6	6	6	0
31	El camión vació el contenedor de basura.	5.4	3	6	1.07
	El contenedor de basura fue vaciado por el camión.	5.2	1	6	1.68
37	El incendio quemó el bosque.	5.6	3	6	0.92

	El bosque fue quemado por el incendio.	5.4	3	6	1.07
43	Una máquina corrigió los exámenes.	5.8	4	6	0.63
	Los exámenes fueron corregidos por una máquina.	5.7	3	6	0.9
49	La impresora imprimió los papeles.	5.2	1	6	1.56
	Los papeles fueron impresos por la impresora.	4.8	1	6	1.48
55	Una pelota quebró la ventana.	4.5	1	6	2.16
	La ventana fue quebrada por una pelota.	4.6	1	6	2.01
61	El arma disparó una bala.	5.3	1	6	1.5
	La bala fue disparada por el arma.	5.1	1	6	1.52
67	El viento sacudió las ramas.	6	6	6	0
	Las ramas fueron sacudidas por el viento.	6	6	6	0
73	Un cuadro ocultó la caja fuerte.	5.1	1	6	1.83
	La caja fuerte fue ocultada por un cuadro.	4.1	1	6	1.91
79	El lavavajillas lavó todos los platos.	5.7	3	6	0.95
	Todos los platos fueron lavados por el lavavajillas.	5.4	1	6	1.51
85	El huracán arruinó la cosecha.	5.9	5	6	0.3
	La cosecha fue arruinada por el huracán.	5.5	1	6	1.58
91	El agua inundó las calles.	6	6	6	0
	Las calles fueron inundadas por el agua.	5.4	1	6	1.51

Note. The table shows the mean score, min and max scores and SD of all experimental sentences. Allowed ratings went from 1 (totally unacceptable) to 6 (totally acceptable). The item number refers to the item number in the priming experiment.

Active sentences received an average score of 5.5 and passive sentences a score of 5.35, revealing that, at least in comprehension, native speakers do accept passive forms as plausible utterances.

Interestingly, all sentences were rated as totally acceptable (score = 6) by at least one participant. On the other hand, a total of 26 out of 64 sentences also received totally unacceptable ratings (score = 1). 11 of these sentences presented the active form (4 in the Inanimate - Animate condition and 7 in the Inanimate - Inanimate condition) while 15 were in the passive form (6 in the Inanimate - Animate condition and 9 in the Inanimate - Inanimate condition). Similarly to what we found in the English data, this may indicate that some speakers tend to see passive sentences bearing Inanimate agent and patient less favorably.

Nonetheless, it is important to underline that all of these sentences also received very positive ratings (score = 5 and 6). L1 speakers of Spanish, like L1 English speakers, don't always comprehend, interpret and judge sentences in the same way. In our task, we didn't control for varieties of Spanish spoken so part of the variability is likely to be due to this variable.

2.3. Cross-linguistic priming pilot

The pilot phase served as a test run for the priming study to ensure that the recruiting process and experiments were running smoothly.

2.3.1. Method

2.3.1.1. Participants

We recruited 10 Italian native speakers (4 female, 1 male, M_{age} = 28) through personal contacts and social media. All participants were asked to sign up to the study via a recruitment form presented on Google Forms that allowed us to gather personal and contact information as well as informed consent. Subsequently, participants were randomly assigned to one experiment (English to Spanish or Spanish to English) and one of two lists within the experiment. We sent them an email in English that included the personal participant ID, link to the Language Profile Questionnaire (LPQ) and link to the priming task. Through the LPQ we collected information regarding the linguistic background, language use and self-rated proficiency of each participant in English and Spanish. All were Italian native speakers that spoke English as L2 and Spanish as L3 based on age of first exposure. Details regarding the pilot participants are presented in Table 7.

Table 7
Pilot participants' demographic and proficiency overview

ID	Gender	Age	English CEFR level	Average English skills	Spanish CEFR level	Average Spanish skills
P01	F	38	C2	6 (0.82)	B1	3.5 (1.25)
P02	F	30	C1	5 (0.76)	C1	5 (1.25)
P03	F	29	C1	5.5 (0.77)	C1	5.5 (1.28)
P05	F	26	B1	3.5 (0.87)	B1	4.25 (1.22)
P06	F	24	C1	5 (0.76)	A1	1.25 (1.52)
P12	M	26	C1	4.5 (0.77)	B2	3.5 (1.25)
P13	F	21	C1	5 (0.76)	B2	4 (1.23)

P14	F	28	C1	6 (0.82)	B2	5 (1.25)
P15	F	25	B2	4 (0.81)	B2	5 (1.25)
P19	M	23	C1	5 (0.76)	C1	5.5 (1.28)

Note. The table shows an overview of participants' demographic information such as gender (F = Female; M = Male) and their age. Scores referring to skills are based on participants' self rating of their ability to speak, write, understand and read the target language (scale of ratings for language skills went from 1 to 6).

2.3.1.2. Design

The two experiments in our study have identical design, materials and procedure. As far as the design is concerned, ours is a within-subjects study with a 2x2 design where the two independent variables are type of structure, namely active or passive structure, and animacy condition, that is, Inanimate agent - Animate Patient (InAn) and Inanimate agent - Inanimate Patient (InIn).

2.3.1.3. Materials and procedure

The materials included 64 experimental prime sentences (32 actives and 32 passives) paired with 32 target images and 120 filler sentences (64 dative sentences, 32 in the Double Object condition and 32 in Prepositional object condition and 32 intransitive sentences repeated across lists) paired with 64 filler target images. The 64 experimental items were pseudo randomly assigned to two counterbalanced lists so that each list contained either the active or the passive sentence describing the same events whereas the target picture was the same for the same item in the two lists. Table 8 illustrates an example of an experimental trial for each list.

The experimental procedure was as follows: after completing the LPQ, participants accessed the priming task on the pavlovia.org platform via a URL link sent to them via email. All experiments started with an instruction video in English (in both experiments) followed by 5 practice trials. In the experimental trials participants processed a prime sentence in one language for 4.5 seconds, then were presented with a target picture for 3 seconds and, lastly, they saw a visual array with the target verb and nouns to combine to describe the target picture in the other language. We chose to present verbs and nouns in a visual array to further constrain production and ensure that production wouldn't be affected by lexical selection in the target language. Only once they had typed their target sentence, were they able to move on to the next trial.

Table 8
Experimental item example for the English to Spanish experiment.

List	Prime	Prime conditions	Target picture	Target verb
1	The plants were watered by the sprinkler.	Passive - InIn	missile hit ship.jpg	Golpear
2	The sprinkler watered the plants.	Active - InIn	missile hit ship.jpg	Golpear

Note. In the Spanish to English experiment, the prime was presented in Spanish while the target verb was an English verb.

2.3.1.4. Scoring and results

Participants' responses were coded according to the strict scheme and lax scheme briefly mentioned in paragraphs 1.2 and 1.3 and that will be thoroughly discussed in Chapter 3. Table 9 presents examples of scoring for the Spanish to English pilot experiment.

Table 9
Example of scoring for the Spanish to English pilot experiment

Target response	Label	Criteria
	Strict coding scheme	
The water sprayed the fireman.	Active	Agent DP + transitive verb + Patient DP
The man dragged the bike.	Other	Role reversal
The man was shocked by the news.	Passive	Patient DP + auxiliary + past participle of transitive verb + *by* +agent DP
	Lax coding scheme	
The ball smashes into the vase	Other	Different thematic roles
The cowgirl is tied with the rope.	Passive	Instrumental passive

Thanks to the visual array, we were able to minimize the number of other descriptions: 16 out of 160 responses were identified as *strict-other* in the English to Spanish experiment while only 9 remained labeled as other in the lax coding. In the Spanish to English experiment, only 6 sentences out of 160 were scored as *other* according to a strict scoring scheme (5 according to lax scoring).

In this pilot phase, we were mainly interested in verifying the validity of the experimental procedure as regards the priming effect, leaving the effects of animacy and proficiency to the full scale priming study. Table 10 presents the results of the two experiments by prime type.

Table 10
Mean proportion and (sd) of active and passive responses produced after each prime type in the two directions.

Language direction	**Prime Type**	**Target description**	
		Active	Passive
English - Spanish (L2 - L3)	Active	0.86 (0.14)	0.05 (0.11)
	Passive	0.72 (0.32)	0.17 (0.26)
Spanish - English (L3-L2)	Active	0.83 (0.13)	0.13 (0.12)
	Passive	0.60 (0.38)	0.38 (0.40)

In the English-Spanish (L2 to L3) experiment, participants overall produced more actives than passives. However, an increase in passives production can be seen after exposure to passive primes (+12%). Although non-significant and under-powered, these data go in the direction of confirming that priming can occur between L2 and L3 and that participants share syntactic information in two non-native languages. If we turn to the other direction, L3 to L2, the pattern is confirmed: participants produced more actives than passives overall but the production of passives increased after processing a passive prime (+25%) confirming that priming can occur between two non-native languages. Interestingly, the magnitude of priming differed in the two experiments: participants were more prone to produce passives in English compared to Spanish. This may be due to the fact that, in Spanish, the preferred passive structure is the *se*-passive while *fue*-passives are less frequent and mostly restricted to written language (Takagaki, 2005; Noh, 2010). As a result, students may have not been exposed to the structure enough to allow sufficient activation of the abstract representations.

The small size of the sample and the purpose of the pilot experiment don't allow us to further comment on the results. Nonetheless, our preliminary data show a promising priming effect in line with the shared-syntax account (Hartsuiker et al., 2004) although language direction seems to influence the magnitude of priming.

2.4. Discussion

In this chapter, we outlined methods and results of the norming and pilot phases.

In the picture norming phase, we asked native speakers of English and Spanish to describe 35 target pictures using the transitive verb provided. Both English native speakers (N = 11) and Spanish native speakers (N = 11) showed a preference for active sentences with a proportion of active description of 0.46 and 0.56, respectively. These data are in line with our predictions and will serve as a baseline for the priming experiment. Out of the 35 pictures used in this phase, the final 32 experimental pictures were chosen based on the data in English, Spanish and German.

In the prime sentences norming phase, native speakers of Spanish (N = 21) and English (N = 24) were asked to rate a series of active and passive sentences using a 1-to-6 Likert scale. This task allowed us to assess native speakers' interpretation of our prime sentences in order to test their plausibility. The overall mean score for the sentences was 5.27 for English and 5.42 for Spanish. Despite the peculiarity of our animacy manipulation, speakers of both languages comprehended and interpreted our prime sentences correctly, allowing us to establish a baseline as well as claim plausibility of prime sentences.

The purpose of the pilot studies was to test the instructions and the experimental design but also to ensure that the recruiting process was appropriate and that the experiments were running properly. 10 Italian native speakers (5 per each language direction) were recruited to participate in the pilot studies. All participants completed the task correctly and a priming effect was observed in each experiment. Therefore, we chose to maintain instructions, experimental design and procedure unchanged for the priming study. The pilot did bring to light a problematic aspect of the recruiting process: sending two separate links (one for the LPQ and one for the priming task) caused participants to often do only one of the task, forcing us to write one to two reminder emails per participant. To avoid this complication during the subsequent data collection, the LPQ was transferred to the Qualtrics.com online platform so that we could automatically redirect participants to the priming task right after the questionnaire, hence, send only one link instead of two.

In the following chapter, we will present in detail the method for our cross-linguistic priming experiments and discuss the results.

Chapter 3 - The present study

In Chapter 1 we discussed the ways in which cross-linguistic priming has contributed to shedding light on bilingual and multilingual language processing. Specifically, we have thoroughly presented the shared-syntax model developed by Hartsuiker et al. (2004) and integrated with subsequent studies (Hartsuiker & Bernolet, 2015; Bernolet et al. 2013). As previously stated, the present study aims to investigate how Italian native speakers store and represent syntactic information between their second and third language, English and Spanish respectively. In other words, we examine whether combinatorial nodes are shared across these two languages or whether our participants show language-specific representational systems. Bearing in mind the developmental model of shared-syntax proposed by Hartsuiker & Bernolet (2015), we also study whether proficiency modulates the strength of priming. Lastly, we examine the role of animacy in cross-linguistic priming to establish whether multilingual speakers are sensitive to conceptual information during priming and whether this is also modulated by proficiency.

In the present study, we use a cross-linguistic syntactic paradigm in two experiments (English to Spanish and Spanish to English) investigating the alternation between active and passive structures. If our participants have an integrated representation of passive structures between English and Spanish, we expect to find a positive effect of cross-linguistic priming between L2 and L3 in line with the shared-syntax account resulting in an increase in the production of passives following passive primes in both language directions. Moreover, if priming is found, we expect it to be stronger in more proficient speakers.

3.1. Experiment 1: English to Spanish cross-linguistic priming

3.1.1. Method

3.1.1.1. Participants

25 Italian native speakers (22 Female, 2 Male, 1 undeclared, M_{age} = 26) took part in the experiment, two participants were excluded from data analysis because they completed less of 50% of experimental trials and one participant was excluded due to low proficiency in Spanish (A2 CEFR level and 2.75 mean proficiency score). They were recruited through personal contacts and social media from various Italian universities and high schools. All

participants were over 18 years of age, and had started learning English and Spanish after the acquisition of their L1. Participation was voluntary and no compensation was provided.

To sign up for the study, participants were asked to fill out a sign-up form that included the study consent form in Italian (Appendix D). Subsequently, all participants were sent an email with instructions on how to complete the study along with a link to it and their individual ID number. Their linguistic background was assessed using a Language Profile Questionnaire (Appendix C), adapted from the Bilingual Language Profile (Birdsong et al., 2012), and administered via the Qualtrics platform in English. In the survey, participants were asked to answer questions about their linguistic history, their language use, and to self rate their language level according to CEFR standards, and their proficiency with reference to the four language abilities (writing, listening, speaking, and reading) in both languages using a Likert-scale from 1 to 6.

The table below provides a summary of these data for participants whose data were analyzed.

Table 11
Experiment 1 participants' demographic and proficiency overview

Number	22	
Mean age	26:1 years	
Gender	Female: 21 Male: 1 Rather not say: 1	
	ENGLISH	**SPANISH**
CEFR levels (self-rated)		
A2	0%	9%
B1	13%	13%
B2	48%	35%
C1	30%	30%
C2	9%	13%
Proficiency mean score (self-rated)		
Intermediate (3-4.75)	57%	31%
Advanced (5-6)	43%	65%
Language use per week		
>10h	43%	65%
10h-20h	35%	17%
>20h	22%	18%

The table shows an overview of participants' demographic information such as gender and mean age. Proficiency was computed as the mean average of participants' self-rating of their ability to speak, write, understand and read the target language (scale of ratings for language skills went from 1 to 6). Language use was calculated based on the amount of time each participant declared to use the language in different situations (e.g. school, work, friends, family, social media, television, etc.).

Overall, participants rated themselves as either intermediate or advanced learners of English, while in Spanish, two people rated themselves as having low proficiency. More than half of the participants (57%) mentioned having an intermediate level of English, whereas in Spanish, 65% of participants declared having high proficiency. Regarding the language use per week, most participants use the two languages less than 10 hours per week.

For the purposes of our study, we will use the proficiency mean score as a measure of overall language proficiency. This is because the correspondence between self-rated CEFR levels and proficiency scores varied considerably across participants (e.g. three participants both stated they had a B2 level in English but their proficiency scores were 3.75, 4.75, and 5), hence making CEFR levels a less reliable indicator of proficiency compared to proficiency scores.

Following the LPQ, participants were redirected to *pavlovia.org* to complete the priming task.

3.1.1.2. Design & Materials

The experiment had a 2x2 design where the two independent variables are type of structure, namely active or passive structure, and animacy condition, that is, Inanimate agent - Animate Patient (InAn) and Inanimate agent - Inanimate Patient (InIn). The design was a within-subject design meaning that all participants were exposed to all conditions throughout the experiment.

The materials consisted of 32 experimental trials in the four conditions; each event was paired with a target picture with matching animacy conditions and a target verb in Spanish. Table 12 shows an example of stimuli in all four conditions. 64 filler trials (prime sentence + target picture) were also included in the experiment to reduce participants' awareness of the structures under investigation. Filler trials consisted of 32 intransitive sentences and 32 ditransitive sentences (16 prepositional datives, 16 double object datives). The 64 experimental items were pseudorandomized and assigned to two counterbalanced lists. In experimental items, the verb was never shared between prime and target but 7 target verbs

were repeated twice (*carry/transportar, chase/perseguir, crush/aplastar, hit/golpear, lift/levantar*) and counterbalanced across animacy conditions. Table 12 illustrates an example of an experimental trial for each experimental condition.

Table 12
Experiment 1 experimental item example.

List	Prime	Prime conditions	Target picture	Target verb
1	The sun blinded the man.	Passive - InAn	ambulance strike nurse	Atropellar
2	The man was blinded by the sun.	Active - InAn	ambulance strike nurse	Atropellar
1	The hurricane ruined the crop.	Passive - InAn	knife slice lemon	Cortar
2	The crop was ruined by the hurricane.	Active - InAn	knife slice lemon	Cortar

An example of a target picture can be seen in Figure 4. All pictures were black-and-white drawings depicting a transitive event with Inanimate agents, and Inanimate or Animate agents.

Figure 4
Example of a target picture

Note. Target picture for the event ATROPELLAR(AMBULANCIA, ENFERMERA)

3.1.1.3. Procedure

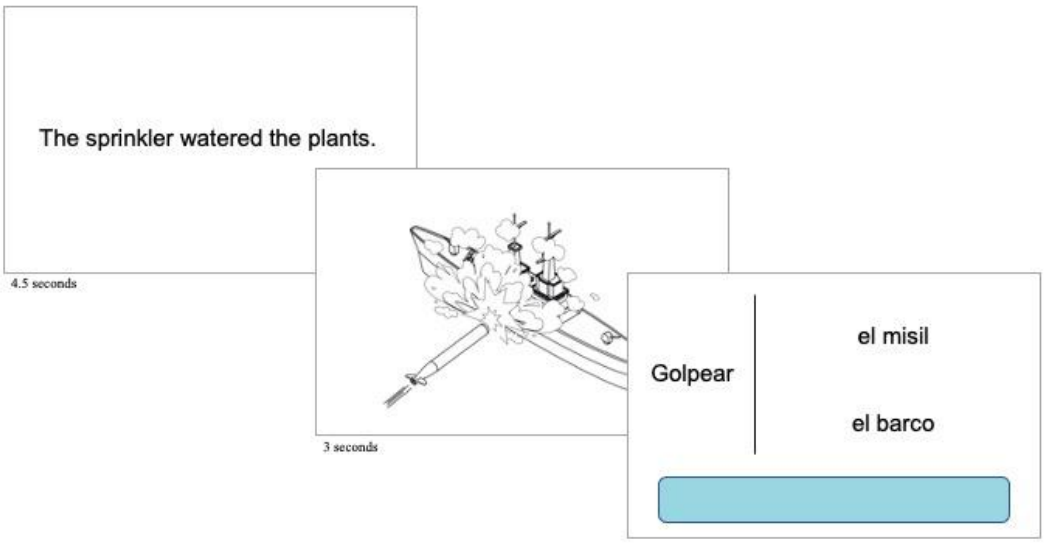
We constructed the experiment using the open source Psycho.py software and subsequently uploaded it on the Pavlovia.org platform in order for it to be administered

remotely. Once participants completed the LPQ, they were redirected to pavlovia.org where they accessed the priming experiment by entering their unique participant ID. A welcome screen introduced the experiment followed by an instruction video where a pre-recorded voice explained how to perform the experiment. The video showed three complete trials. After the video, participants went through a practice phase (5 trials) where they familiarised themselves with the task. Subsequently, they were informed that the experiment would start in the following phase. Each participant could autonomously start the experiment whenever ready by pressing a key. In the experimental trials, participants had 4.5 seconds to read a prime sentence in Spanish out loud. Then, they were presented with a target picture for 3 seconds. Lastly, they saw a visual array containing a verb and two nouns in English (an agent and a patient) with which they had to form a sentence to describe the picture they had just seen in the previous screen. In the visual array, the verb was always on the left, whereas the position of the two nouns, one for the agent and one for the patient, was counterbalanced across trials.

We chose to present the words in a visual array as in Cho-Reyes et al. (2016) in order to minimize non-target descriptions and so that lexical selection would not interfere with production. Participants could move to the next trial only after they had typed in a sentence. Figure 5 illustrates the experimental procedure. At the end of the experiments, participants were thanked for their participation. Responses were automatically saved on pavlovia.org. The total duration of the experiment was 35-40 minutes.

Figure 5

Example of an experimental trial for Experiment 1



3.1.1.4. Scoring

Participants' responses were scored according to a *strict scheme* and a *lax scheme*. In the strict scoring scheme, sentences that presented a sentence-head agent with the syntactic role of subject, followed by a VP with the target verb and sentence-final patient with the syntactic role of direct object introduced by the preposition *a* for Animate human patients, were scored as *strict active.* Conversely, sentences with the patient as syntactic subject, followed by the auxiliary *ser* in any tense, followed by the agent introduced by the preposition *por*, were scored as *strict passive*. All responses that didn't fit these criteria were scored as *strict other*. Table 14 illustrates examples of all strict scoring criteria, including non-target other descriptions.

Table 13
Strict scoring scheme

Label	Criteria	Example
Strict Active	Agent NP + target VP + (*a*) Patient NP	*Las nubes cubren la luna*
Strict Passive	Patient NP + aux_{ser} + VP (past participle) + *por* + Agent NP	*El hombre fue arrastrado por la moto*
Strict Other	Different auxiliary	*El chico está seguido por el coche*
	Different thematic roles	*El imán y la moneda se atraen*
	Wrong verb morphology	*La bola de demolición demole la casa*
	Reversed roles	*El hombre asusta la calabaza*
	Lack of preposition a when necessary	*El dron persigue el ciclista*
	Ungrammatical sentences	*La luna es cubierta para las nubes*
		El nino se golpe la pelota
	Non-target verbs	*El hombre se conmocionó frente al las noticias (target: conmocionar)*
	Incomplete descriptions	*El martillo agrieta*

In the lax scoring scheme, responses were scored as lax active even if they lacked the proposition *a* before the human direct object and when they bore wrong verb morphology. Furthermore, we scored as lax passive all responses that included a different auxiliary verb, namely *estar*, as well as responses with wrong verb morphology, and sentences presenting the preposition *para* instead of the preposition *por* since it is a well-known fact that Italian speakers often use these two prepositions interchangeably in Spanish as the acquisition of the distinct uses of these Spanish prepositions is quite hard due to the fact that in Italian there's only one preposition that serves both uses. Table 15 displays examples of the lax scoring criteria.

Table 14
Lax scoring scheme

Label	Criteria	Example
Lax Active	Agent NP + target VP + (*a*) Patient NP	*Las nubes cubren la luna*
		El dron persigue el ciclista
		El misil está golpeando al barco
	Wrong verb morphology	*La bola de demolición demole la casa*
Lax Passive	Patient NP + aux + VP (past participle) + *por* + Agent NP	*El hombre fue arrastrado por la moto*
	Different auxiliary	*La luna está cubierta por las nubes*
	Para instead of *por*	*La luna es cubierta para las nubes*
Lax Other	Reversed roles	*El hombre asusta la calabaza*
	Ungrammatical sentences	*La luna es cubierta para las nubes*
		El nino se golpe la pelota
	Non-target verbs	*El hombre se conmocionó frente al las noticias (target: conmocionar)*
	Incomplete descriptions	*El martillo agrieta*

3.1.1.5. Results

In this section we will present the data analysis according to the strict and lax scoring scheme. We will discuss the raw data regarding active, passive and other responses. We will also break down the results by proficiency and animacy condition. Since active structures are predicted to be the default preferred structure, we will treat the passive construction as our target structure. Lastly, we will discuss the output of a Generalized Linear Model fit to predict the likelihood of a passive response given a set of independent variables.

General results

According to the strict scoring scheme, participants showed a clear preference for active responses, in fact, out of all the 763 responses, 66% were scored as actives, 33% as other and only 5% were passive responses. This is in line with previous priming studies on English-Spanish bilinguals and on Spanish native speakers (see paragraph 1.4). Furthermore, these results also confirm the trend we found in our image norming phase where native Spanish speakers clearly showed a bias towards active sentences. The high proportion of other non-target responses is due to the abundance of cases where Spanish targets lacked the object marking preposition *a* with human animate entities in the active condition and issues related to irregular verb morphology Table 15 shows the total number, mean proportion and standard deviation of Spanish transitive responses produced after each prime type.

Focusing our attention on the proportion of passive responses, our target structure, we can observe that the proportion of Spanish passive responses slightly increased after exposure to a passive prime. Specifically, it went from 2% of Strict passives following active primes to 8% following passive primes.

Table 15
Total number, mean proportion and (sd) of Spanish transitive responses produced after each prime type according to a strict scoring scheme.

Prime Type	**Target description**					
	Strict Active		**Strict Passive**		**Strict Other**	
	n	prop (sd)	n	prop (sd)	n	prop (sd)
Active	238	.67 (.19)	9	.02 (.06)	105	.31 (.20)
Passive	215	.60 (.21)	28	.08 (.18)	109	.32 (.17)

This indicates that English passive primes did elicit the production of Spanish passive responses in our participants. If we compare these results with the results of the lax scoring scheme (Table 16), we see that the priming effect in the lax scheme increased, yielding 12 % of passive responses after passive primes, compared to the 8% found in the strict scoring. Overall, the magnitude of priming went from 6% to 9%.

Table 16
Total number, mean proportion and (sd) of Spanish passive responses produced after each prime type according to a strict and lax scoring scheme.

Prime Type	Target description	
	Strict Passive	**Lax Passive**
	prop (sd)	prop (sd)
Active	.02 (.06)	.03 (.07)
Passive	.08 (.18)	.12 (.12)

Results by animacy

As previously mentioned, we want to examine whether priming between two non-native languages is influenced by conceptual information, such as the animacy of the patient. In our study, the two animacy conditions were Inanimate agent - Inanimate patient (InIn) Inanimate agent - Animate patient (InAn). In table 17, we present the raw data regarding strict and lax passive responses by animacy condition and prime type. Overall, we can observe that InAn did not reliably boost the production of strict passive responses, at odds with our initial predictions. Furthermore, both InAn and InIn primes overall elicited the same amount of strict passives (10%). Conversely, participants produced 10% of Lax passive responses following InAn primes, compared to 6% of Lax passives following InIn primes. Although the difference is marginal, this pattern shows a trend in line with our initial hypothesis that animate-patient primes would elicit more passive responses than inanimate-patient primes.

Table 17
Mean proportion and (sd) of Spanish passive responses by animacy condition and prime type according to a strict and lax scoring scheme.

Prime Type	Animacy	Target description	
		Strict Passive	**Lax Passive**
		prop (sd)	prop (sd)
Active	InAn	.03 (.08)	.05 (.09)
	InIn	.02 (.06)	.02 (.06)
Passive	InAn	.07 (.15)	.14 (.22)
	InIn	.08 (.22)	.11 (.23)
Mean	InAn	.05 (.12)	.10 (.17)
	InIn	.05 (.16)	.06 (.18)

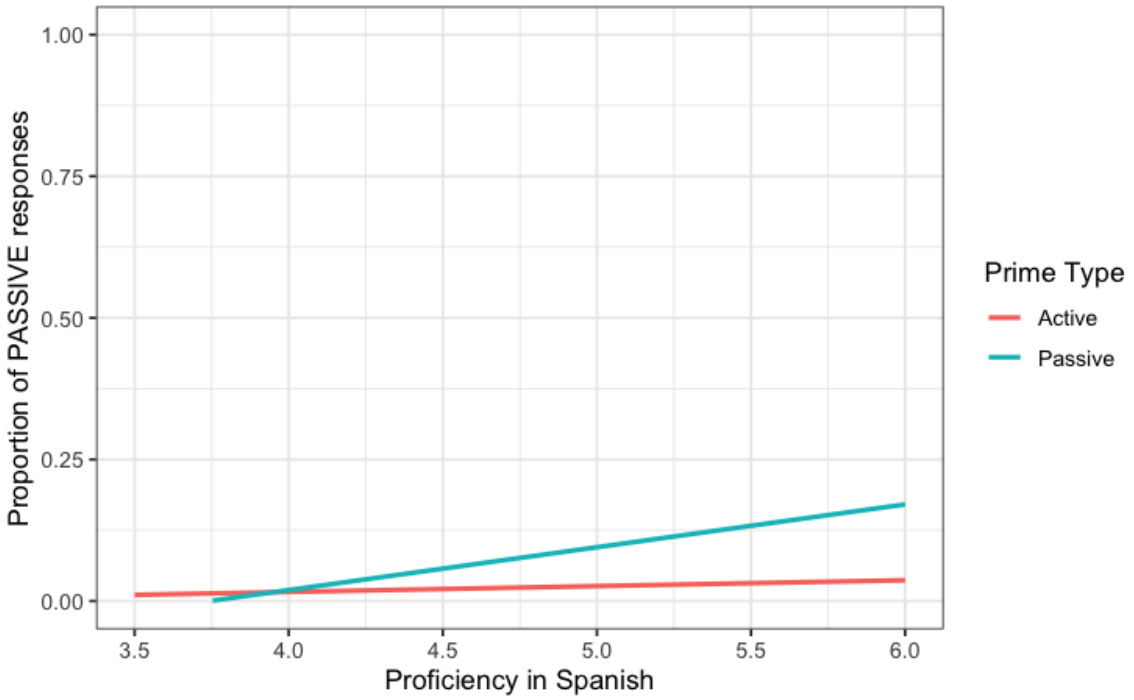
Results by proficiency

In Chapter 1, we extensively reviewed the literature on the role of proficiency in modulating the strength of cross-linguistic syntactic priming. To investigate to what extent our participants' proficiency in the target language influenced the magnitude of priming, we plotted the proportion of lax passive (henceforth passive) responses as a function of mean Spanish proficiency.

Unfortunately, the proficiency groups are not equal in size (Intermediate: N = 7; Advanced: N = 15) so it was not possible to do a group comparison on the proportion of passive target responses. Nonetheless, from the graph, we can see a clear trend indicating that the proportion of passive responses after passive primes increased as proficiency in the target language increased. Our findings suggest that proficiency in the target language does modulate the magnitude of priming between L2 and L3, thus confirming that target language proficiency is a factor in the development of cross-linguistic shared syntactic representation between two non-native languages (Hartsuiker et al., 2016).

Figure 6

Proportion of Spanish passive responses as a function of Spanish proficiency.

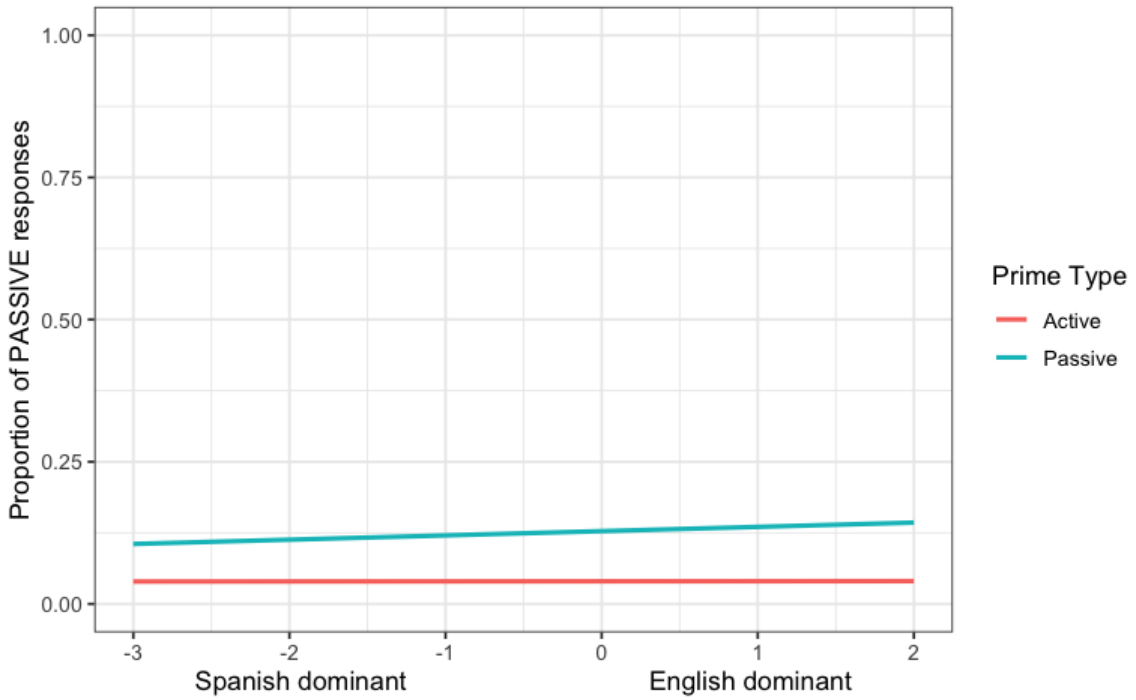


In our study, we ask our participants to comprehend and produce sentences in two non-native languages, therefore, we decided to also compute a measure of language dominance to examine whether being more proficient in the prime language vs the target language, and vice versa, could give us insights on how multilingual speakers produce sentences in their third language, namely Spanish. This measure of language dominance was computed by subtracting the Spanish L3 mean proficiency from the English L2 mean proficiency. Figure 7 shows the proportion of lax passive responses (y-axis) as a function of language dominance (x-axis): due to how the measure was computed, negative scores of language dominance means that speakers were Spanish dominant whereas positive scores represent English dominant participants.

Interestingly, our data reveal that language dominance did not influence the pattern of production with both English dominant participants and Spanish dominant participants producing passive targets after passive primes in relatively equal proportion.

Figure 7

Proportion of Spanish passive responses as a function of language dominance.



Generalized Linear Model

To verify whether our results are significant and to examine to what extent animacy manipulation and target language proficiency modulated our results, we fitted a generalised linear model to the data using the glm package in R (R Core Team, 2021). For this experiment and Experiment 2, we fit the data coded with the lax scoring scheme. The model predicts the likelihood of the dependent variable lax passive (henceforth passive). The best-fit model for experiment 1 is presented in table 18.

The significant negative intercept signifies that there was a general preference for active responses as opposed to passive ones. This was also evident in the analysis of our raw data. Nonetheless, we found a highly significant main effect of prime structure (passive) representing the tendency for participants to produce significantly more passives after passive primes (12%) as compared to after active primes (3%). There was also a marginally significant main effect of animacy: the odds for participants to produce a passive response after InAn primes (10%), were higher than producing a passive response after InIn primes (6%). This tendency was independent of prime structure as indicated by the absence of an interaction between prime structure and animacy. As for target language proficiency, our

model confirmed what the raw data suggested revealing a significant main effect of English Proficiency: the likelihood of producing a passive response prime increased as target language proficiency increased. However, no interaction between prime structure and Spanish proficiency was found, suggesting that priming was in fact not modulated by proficiency. The three-way interaction between prime structure, animacy and proficiency did not improve our model so we decided not to present it. Moreover, the model with language dominance as a predictor instead of English proficiency had a much higher Akaike's information criteria (AIC) score compared to the model presented here, confirming that language dominance did not drive our participants' production of passive utterances.

Table 18
Experiment 1 model results

Predictors	Coefficient	SE	z value	p
(Intercept)	-1.56	1.13	-4.78	**<.001**
Prime Structure	0.67	0.17	3.91	**<.001**
Animacy	0.32	0.17	-1.86	**<.07**
Spanish Proficiency	0.54	0.21	2.55	**<0.05**
Prime Structure x Animacy	0.16	0.17	0.93	>0.1

Discussion

In Experiment 1, we investigated cross-linguistic priming of transitive sentences in late multilingual adult speakers. Specifically, we found highly significant cross-linguistic priming of passive structure between English as L2 and Spanish as L3: our participants reliably produced more Spanish passive responses after exposure to English passive primes. These findings suggest that, during the experiment, English passive primes activated the related conceptual and combinatorial nodes, irrespective of language, resulting in an increase in the production of Spanish passive sentences, hence in a positive priming effect. Crucially, the magnitude of priming was not modulated by target language proficiency nor by language dominance. Proportion of passive responses did increase as Spanish proficiency incresed, but there was no interaction with prime structure. With the present data, we cannot support the hypothesis that fully integrated cross-linguistic abstract syntactic representations in our participants are the final stage of non-native syntax development: our multilingual speakers seem to have integrated abstract representation irrespective of proficiency in the target language. These findings may be confirmed or contradicted as we gather more data.

Regarding the effects of Animacy, our data confirm our initial hypothesis that participants would produce more passive responses after Inanimate Agent - Animate Patient primes, regardless of prime structure. We found no interaction between prime type and animacy suggesting that priming was not affected by difference in anumacy conditions. Furthermore, proficiency also did not interact with animacy in guiding passive production in our speakers.

3.2. Experiment 2: Spanish to English cross-linguistic priming

3.2.1. Method

3.2.1.1. Participants

27 Italian native speakers (25 Female, 2 Male, M_{age} = 28) took part in the experiment. As for Experiment 1, they were recruited through personal contacts and social media from various Italian universities and high schools. All participants were over 18 years of age, and had started learning English and Spanish after the acquisition of their L1. Participation was voluntary and no compensation was provided. Two participants were excluded from data analysis due to low Spanish proficiency (A1 CEFR level and 1.25 mean proficiency score: B2 CEFR level but 2.75 mean proficiency score).

Sign up for Experiment 2 was the same as Experiment 1: once participants had filled out the consent form, they were randomly assigned to one experiment and later sent the email with the link to the study. The same Language Profile Questionnaire (Appendix B) was administered: table 19 provides a summary of these data for the participants whose data was analyzed.

Participants rated themselves as either intermediate or advanced learners of English, whereas in Spanish, like in Experiment 1, two people rated themselves low proficiency speakers of Spanish as an L3. Most participants (54%) have intermediate English proficiency, while in Spanish, the same amount of speakers have intermediate and advanced proficiency. 53% of Experiment 2's participants use Spanish less than 10 hours per week, whereas 58% of them use English between 10 to 20 hours per week.

Following the LPQ, participants were redirected to *pavlovia.org* to complete the priming task.

Table 19
Experiment 2 participants' demographic and proficiency overview

Number	25	
Mean age	28:0 years	
Gender	Female: 23 Male: 2	
	ENGLISH	**SPANISH**
CEFR levels (self-rated)		
A2	0%	8%
B1	12%	15%
B2	23%	38%
C1	62%	27%
C2	4%	8%
Proficiency mean score (self-rated)		
Low (1-2.75)	0%	8%
Intermediate (3-4.75)	54%	46%
Advanced (5-6)	23%	46%
Language use per week		
<10h	19%	53%
10h-20h	58%	35%
>20h	23%	12%

Note. Two participants declared having an A2 CEFR level in Spanish but their self rated mean proficiency scores were 5 and 4.75 putting them in the Advanced and Intermediate proficiency group, respectively. Their data was therefore kept for analysis.

3.2.1.2. Design & Materials

The experimental design and materials were the same as Experiment 1 with the only difference that in Experiment 2, prime sentences were presented in Spanish (translation equivalent of English primes) and target verbs were presented in English. In Table 20 we can see an example of a Spanish to English item. Target pictures were the same as in Experiment 1 (see Figure 4 for example).

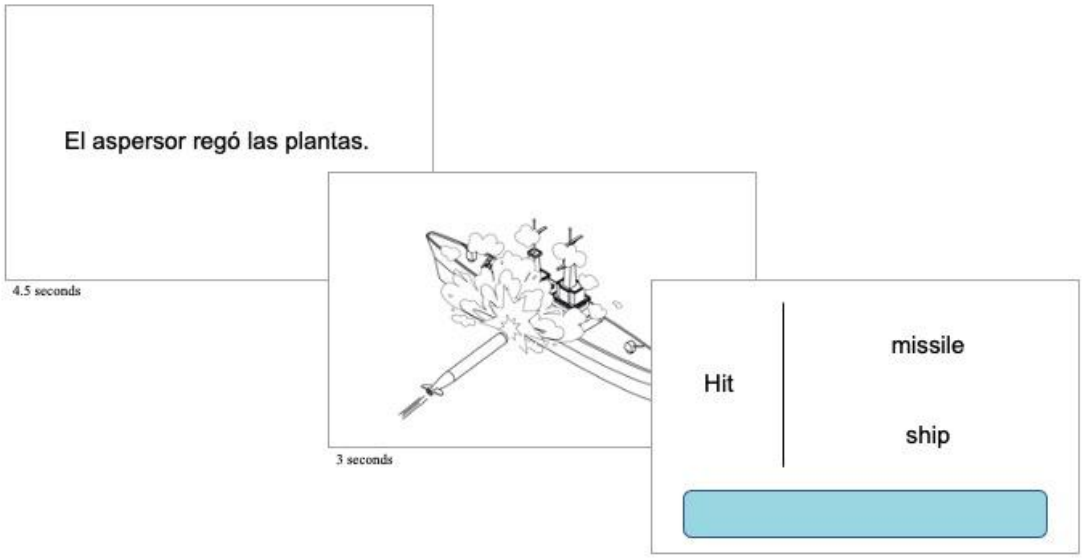
Table 20
Experiment 1 experimental item example.

List	Prime	Prime conditions	Target picture	Target verb
1	El sol cegó al hombre.	Passive - InAn	ambulance strike nurse	Strike
2	El hombre fue cegado por el sol.	Active - InAn	ambulance strike nurse	Strike
1	El huracán arruinó la cosecha.	Passive - InAn	knife slice lemon	Slice
2	La cosecha fue arruinada por el huracán.	Active - InAn	knife slice lemon.jpg	Slice

3.2.1.3. Procedure

Procedure was identical to Experiment 1 but with Spanish primes and English targets.

Figure 8
Example of an experimental trial for Experiment 2



3.2.1.4. Scoring

As for the other experiment, participants' responses were scored according to a *strict scheme* and a *lax scheme*.

In the strict scoring scheme, sentences that presented a sentence-head agent with the syntactic role of subject, followed by a VP with the target verb and sentence-final patient with the syntactic role of direct object, were scored as *strict active.* Sentences with the patient as

syntactic subject, followed by the auxiliary *be* in any tense, followed by the agent introduced by the preposition *by*, were scored as *strict passive*. All responses that didn't fit these criteria were scored as *strict other*. Table 21 illustrates examples of all strict scoring criteria, including non-target other descriptions.

Table 21
Strict scoring scheme

Label	Criteria	Example
Strict Active	Agent NP + target VP + Patient NP	*The bullet shattared the bottle.*
Strict Passive	Patient NP + aux_{ser} + VP (past participle) + *by* + Agent NP	*The cyclist is chased by the drone.*
Strict Other	Passive with location	*The girl is trapped in the net.*
	Wrong verb morphology	*The ambulance stroke the nurse.*
	Reversed roles	*The man is dragging the bike.*
	Instrumental passives	*The lemon was sliced with the knife.*
	Ungrammatical sentences	*The ship is missing by the missile.*
	Non-target VP	*The girl protects herself from the rain with the umbrella.*

In the lax scoring scheme, responses were scored as lax active even if they bore wrong verb morphology. We considered as lax passives all responses with wrong verb morphology (participants may not have been aware of the fact that a specific verb is irregular), and instrumental passives. Table 22 displays examples of the lax scoring criteria.

Table 22
Lax scoring scheme

Label	Criteria	Example
Lax Active	Agent NP + target VP + Patient NP	*The bullet shattered the bottle.*
	Wrong verb morphology	*The ambulance stroke the nurse.*
Lax Passive	Patient NP + aux_{ser} + VP (past participle) + *by* + Agent NP	*The cyclist is chased by the drone.*
	Wrong verb morphology	*The nurse was striked by the ambulance.*
	Instrumental passives	*The lemon was sliced with the knife.*
Lax Other	Passive with location	*The girl is trapped in the net.*
	Reversed roles	*The man is dragging the bike.*
	Ungrammatical sentences	*The ship is missing by the missile.*
	Non-target VP	*The girl protects herself from the rain with the umbrella.*

3.2.1.5. Results

In this section we will present the data analysis according to the strict and lax scoring scheme for Experiment 2 (L3 to L2). We will parallel the discussion of results presented for Experiment 1.

General results

According to the strict scoring scheme, much like Experiment 1, participants showed a clear preference for active responses. Out of all the 832 scored responses, 74% were scored as actives, 21% wew passives and only 9% were scored as *other*. It is interesting to note that the production of passive targets was 16% higher than in Experiment 1. This is in line with the literature stating that, while passive structures are less frequent across languages, they are more frequent in English than in Spanish (Vasilyeva et al. 2009). These results also confirm

our norming phase findings: English native speakers clearly prefer active sentences to passive ones. Table 23 shows the total number, mean proportion and standard deviation of English transitive responses produced after each prime type.

Table 23
Total number, mean proportion and (sd) of English transitive responses produced after each prime type according to a strict scoring scheme.

Prime Type	Target description					
	Strict Active		Strict Passive		Strict Other	
	n	prop (sd)	n	prop (sd)	n	prop (sd)
Active	297	.74 (.21)	67	.17 (.15)	36	.37 (.09)
Passive	271	.68(.27)	94	.23 (.26)	35	.34 (.08)

The proportion of Spanish passive responses increased from 17% after an active prime to 23% after exposure to a passive prime, indicating that Spanish passives boosted the production of English passives in our participants. The magnitude of priming in the strict scoring scheme is 6%. Interestingly, non-target other responses were significantly less in this direction compared to the English to Spanish experiment.

Comparing the proportion of strict passives to the proportion of lax passive (Table 24), our data suggests an increase by 3% in the production of lax passives after each prime type. The priming pattern is confirmed with 26% of passive responses following passive primes as opposed to the 20% following active primes. The magnitude of priming is stable at 6%.

Table 24
Total number, mean proportion and (sd) of English passive responses produced after each prime type according to a strict and lax scoring scheme.

Prime Type	Target description	
	Strict Passive	Lax Passive
	prop (sd)	prop (sd)
Active	.17 (.15)	.20 (.17)
Passive	.23 (.26)	.26 (.26)

Results by animacy

Table 25 illustrates the raw data regarding strict and lax passive responses by animacy condition and prime type. Contrary to what we found in Experiment 1, here the InAn condition did boost the production of passive responses, both strict and lax, as opposed to the InIn condition. Interestingly, active primes with animate patients elicited more passive responses after active primes with inanimate patients, suggesting that animacy did have a modulating effect on our participants' production of transitive descriptions. The same pattern is found in both scoring schemes.

Table 25
Mean proportion and (sd) of English passive responses by animacy condition and prime type according to a strict and lax scoring scheme.

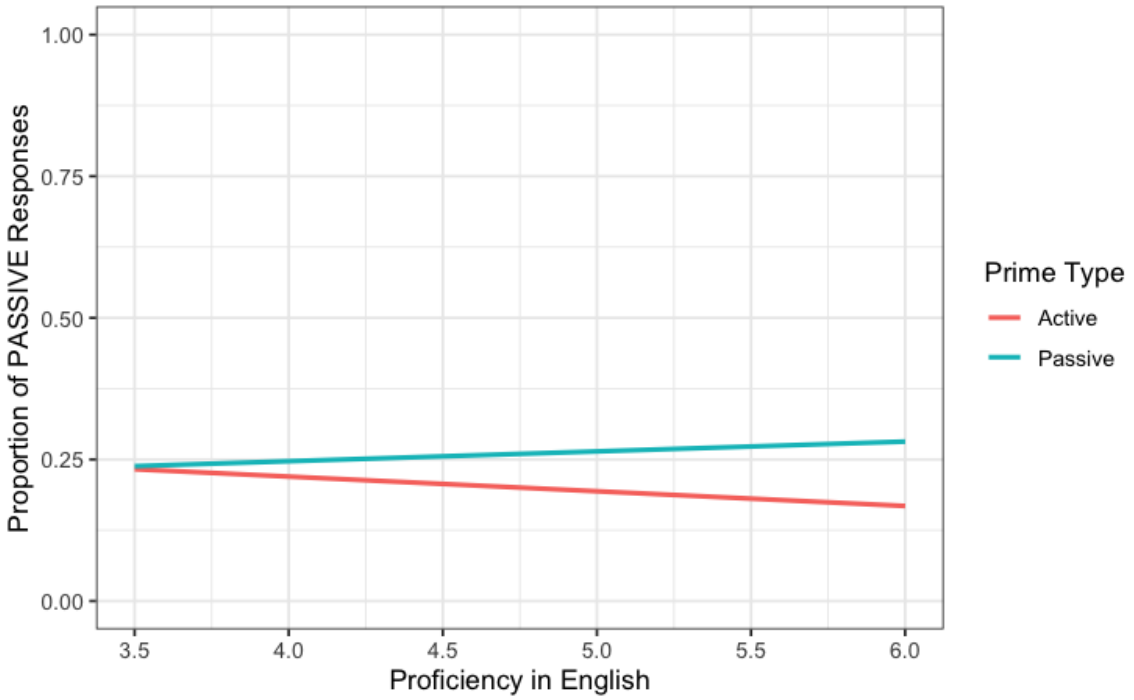
Prime Type	Animacy	Target description	
		Strict Passive	**Lax Passive**
		prop (sd)	prop (sd)
Active	InAn	.22 (.20)	.26 (.23)
	InIn	.12 (.18)	.14 (.21)
Passive	InAn	.27 (.29)	.31 (.28)
	InIn	.21 (.26)	.22 (.27)
Mean	InAn	.24 (.24)	.28 (.26)
	InIn	.16 (.23)	.18 (.24)

Results by proficiency

Figure 9 illustrates the production of strict and lax passive responses by a prime type as a function of English proficiency. Again, since the proficiency groups are not equal in size (Intermediate: N = 15; Advanced: N = 10) it was not possible to do a group comparison. However, from the graph, we can observe that the proportion of passive responses after passive primes was relatively stable across proficiency levels suggesting that, contrary to Experiment 1's results, target language proficiency was not a factor in modulating our participants' production.

Figure 9

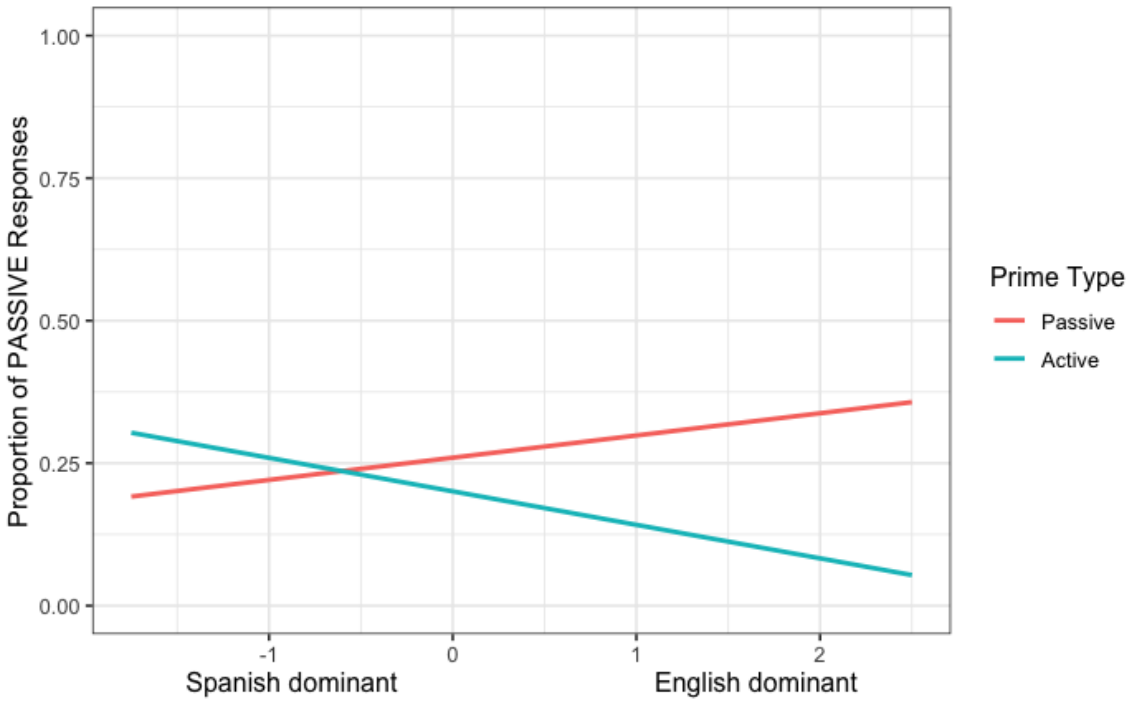
Proportion of English passive responses as a function of English proficiency.



While in Experiment 1 language dominance bore no influence in driving the production of Spanish targets, in Experiment 2 we observed a different pattern: Figure 10 shows the proportion of lax passive responses (y-axis) as a function of language dominance (x-axis). We can see that English (the target language) dominant speakers showed more sensitivity to prime type compared to Spanish dominant speakers, who actually produced more passive responses after active primes. These results, together with the results by English proficiency, tell us that multilingual speakers produce English passive responses after being primed with Spanish passive primes irrespective of their English proficiency levels, but that those speakers who have higher English than Spanish proficiency, are more likely to be subjected to a priming effect.

Figure 10

Proportion of English passive responses as a function of language dominance.



Generalized Linear Model

As in Experiment 1, we ran a Generalised Linear Model to predict the likelihood of English passive responses. We fit different models to the data including English proficiency as a predictor but the final, best-fit model only includes language dominance as a continuous predictor. The model output is summarized in table 26.

Table 26

Experiment 2 model results

Predictors	**Coefficient**	**SE**	**z value**	**p**
(Intercept)	-1.30	0.09	-14.01	**<.001**
Prime Structure	0.22	0.09	2.40	**<.02**
Animacy	0.35	0.09	3.82	**<.001**
Language dominance	-0.15	0.1	-1.48	>.1
Prime Structure x Animacy	-0.11	0.09	-1.15	>.1
Prime Structure x Language dominance	0.36	0.1	3.54	**<.001**
Animacy x Language dominance	0.08	0.1	0.80	>.1
Prime Structure x Animacy x Language dominance	-0.17	0.1	-1.70	**<0.1**

Similarly to what we found in Experiment 1, the model confirmed the overall bias toward active constructions. However, we also found a significant main effect of prime structure confirming the significance of our positive priming effect between Spanish L2 and English L3. While in Experiment 1 the effect of patient animacy was only marginally significant, our model suggests that in the Spanish to English direction, animacy had a highly significant effect. In fact, participants on average produced 28% of passive responses after Animate patient primes as opposed to 18% after Inanimate patient primes. Language dominance did not have a significant independent effect on the production of passive responses. Furthermore, contrary to the trend that the raw data indicated, our model actually suggests that language dominance and passive production are negatively correlated overall but that there is a positive effect of language dominance on the production of English passive responses after Spanish passive primes as indicated by the significant Prime Structure x Language dominance interaction. This interaction tells us that as the language dominance score increases, hence as language dominance moves towards English dominance, the production of passive responses after passive primes increases as well. Lastly, we found a marginally significant negative three-way interaction between Prime Structure x Animacy x Language dominance. We interpret this outcome as the effect of language dominance of the strength of priming being negatively modulated by animacy.

Discussion

In Experiment 2, we found significant cross-linguistic priming of passive structure between Spanish as L2 and English as L3: our participants produced significantly more English passive responses after exposure to Spanish passive primes. In our participants, Spanish passive primes activated an abstract passive representation that is shared between the participant's L3 and L3, resulting in significant positive priming effect. Our model confirmed the raw data that language dominance, rather than target language proficiency, interacted with prime type to drive the production of passive responses, hence influencing the magnitude of priming. Assuming that all of our participants have a high enough English proficiency to be candidates for shared abstract representations (also influenced by the age of acquisition and exposure to the language in daily life), it seems likely, given our results, to hypothesise that only those participants with higher English (target language) proficiency have integrated representations of passive structures across the L2 and L3, as compared to participants who may still have an high level of English proficiency but a higher one of Spanish proficiency.

Although different from the pattern we found in Experiment 1, these findings are still consistent with the shared-syntax model proposed by Hartsuiker et. al (2004) that presupposes a high enough target language proficiency to overcome language-specific representations and move towards an integrated representational system. Our results add to these findings that if two non-native languages are involved, in the case of L3 to L2 priming, that target language proficiency be higher than prime language proficiency to observe significant evidence of shared-syntactic representations. Furthermore, English dominant speakers seemed to be less influenced by patient animacy when producing passive responses after passive primes, as indicated by the three-way interaction. Lastly, Experiment 2 confirms the trend found in Experiment 1 confirming that multilingual speakers are significantly influenced by the patient's semantic features when producing utterances resulting in a boost in passive responses production when the patient animate compared to when it was inanimate. This tendency occurred irrespective of prime structure suggesting that semantic features may drive production in multilingual speakers more than syntactic structure.

Chapter 4 - General discussion and conclusions

The present study aimed to investigate how Italian native speakers store and represent syntactic information between their second and third language, English and Spanish respectively. We used a cross-linguistic syntactic paradigm in two experiments (English to Spanish and Spanish to English) to investigate priming of passive structures between L2 and L3 and vice versa. In other words, we examined whether combinatorial nodes are shared across these two languages or whether our participants show language-specific representational systems for similar structures. We also studied whether target language proficiency and/or language dominance modulated the strength of priming. Lastly, we examined the role of animacy in cross-linguistic priming to establish whether multilingual speakers are sensitive to conceptual information during priming and whether this is also modulated by proficiency.

Our research questions were:

1. Do late trilinguals share syntactic information between their L2 and L3 (Hartsuiker et al., 2004)? Specifically, does cross-linguistic syntactic priming of passive sentences occur between English L2 and Spanish L3, and vice versa?

2. Is the shared representation between L2 and L3 and viceversa dependent on proficiency levels (Bernolet et al., 2013; Hartsuiker & Bernolet, 2017)? In other words, are there differences in the strength of priming that can be attributed to different stages of acquisition of the second or third language?

3. Is cross-linguistic structural priming of transitive sentences between L2 and L3 (and vice versa) influenced by conceptual information such as patient animacy? That is, is the difference in animacy conditions (Inanimate agent and animate patient vs. inanimate agent and patient) reflected in a difference in choice of structure?

4.1. General discussion

Both experiments found a clear cross-linguistic priming effect between two non-native languages, namely English and Spanish, in Italian native speakers. Experiment 1 investigated priming of passive structures from English to Spanish, whereas Experiment 2 examined the

same structure in the opposite direction (i.e. from Spanish to English). Our findings suggest that Italian native speakers who speak English as L2 and Spanish as L3, relied on prime structure to guide their production of utterances. Magnitude of priming was slightly higher in Experiment 1 (9%) compared to Experiment 2 (6%). Nonetheless, in both experiments the priming effect was significant demonstrating that language direction was not a factor in influencing cross-linguistic priming. The difference in magnitude between the two experiments might be attributed to individual differences as well as the low number of participants. Our findings suggest that, in the group of multilinguals we tested, the abstract representation of passive structures is shared across their two non-native languages, namely English and Spanish. This is in like with the shared-syntax account proposed by Hartsuiker at al. (2004): as seen in Chapter 1, this account predicts that bilingual (and multilingual) speakers tend to reduce redundancy of representation as much as possible by representing similar rules in two languages only once. Given that English and Spanish passive forms are similar, the shared-syntax account predicts cross-linguistic syntactic priming, whereas the separate-syntax account does not. (Hartsuiker et al., 2004, p. 409-410). So, according to this model, any of the languages that the speaker speaks can activate the shared passive lemma and its related combinatorial node resulting in the activation of the non-language-specific syntactic structure, causing speakers to be more likely to use that same structure in another language. This appears to be the process that our multilingual speakers employed during our experiments.

In our study, we found no interaction between target language proficiency and the magnitude of priming. We only had a few data points from low proficiency speakers that forced us to exclude these participants from the data analysis. Having only tested intermediate to advanced speakers of English and Spanish may have prevented us from seeing a modulating effect of proficiency like the one found by Bernolet et al., (2013) and Hartsuiker & Bernolet (2017). Nonetheless, in Experiment 1, the proportion of passive responses did increase as Spanish proficiency increased, but there was no interaction with prime structure. We also found did find an interesting interaction between priming and language dominance in Experiment 2, indicating that in L3 to L2 priming, the fact that target language proficiency is higher than prime language proficiency may boost priming and, therefore, possibly also boost the integration of representation across L2 and L3. All in all, these findings don't allow us to have a clear picture on the effect of target language proficiency and language dominance in L2 to L3/L3 to L2 priming. We can only rely on the raw data to identify a trend toward a modulating effect of proficiency and language dominance where the higher the target

language proficiency the stronger the magnitude of priming. More data will need to be collected, especially from low proficiency speakers.

In Chapter 1, paragraph 1.6, we reviewed the relevant literature on the interaction between syntactic and semantic information during syntactic priming tasks and specifically on the role of animacy. The studies we reviewed presented mixed findings: we cannot be certain that syntactic and semantic features have independent effects on priming nor can we state that they are fully interdependent. Even less clear is how these two factors interact in L2 (or L3) processing. In our study, we attempted to contribute to the literature on this topic by juxtaposing two animacy conditions that allowed us to compare the effect of patient animacy (agent animacy was kept constant) on priming and production of passive sentences in the L2 and the L3. The results from both experiments confirm our initial prediction that participants would produce more passive responses after animate patient primes. Interestingly, none of our models identified a significant prime structure x animacy interaction, suggesting that priming magnitude was not influenced by animacy conditions in either language direction. This suggests that the patient's inherent accessibility, more than its derived accessibility, allowed for the animate entity to be more easily retrievable and to be encoded in a prominent sentential position, namely the subject of a passive sentence. These findings lend support to the hypothesis that syntactic priming and animacy influence the choice of syntactic structure independently of each other (Pickering & Ferreira, 2008). Our findings also seem to suggest that, contrary to what is generally assumed for L2 speakers, our participants show a tendency towards incremental planning: animacy, as a cue for accessibility, caused animate entities to be more easily retrievable hence to be processed first and possibly be assigned prominent grammatical functions (Branigan et al., 2008, p. 174), irrespective of the syntactic structure that the prime activated. Contrary to our initial prediction, there was no effect of proficiency interacting with the effect of animacy, possibly also due to the lack of low proficient speakers within our population.

4.2. Conclusions

Taken together, our findings are compatible with the extension of the bilingual shared-syntax model (Hartsuiker et al. 2004) to multilingual syntactic processing: provided that speakers have a high enough proficiency in L2 and L3, they conveniently merge abstract representations of similar syntactic structure. In our participants, we hypothesize that not only is passive representation shared between English L2 and Spanish L3, as demonstrated by our study, but it is also shared with their L1, due to the structural similarity for passive sentences

across the three languages. With the present data, it is not possible to outline a clear role of proficiency in multilingual language processing but we can only assume that, given more data, a clearer and significant pattern will emerge to provide support for the developmental model of L2s syntax acquisition as proposed by Hartsuiker & Bernolet (2015). Moreover, while we did find that patient animacy affected passive structure production cross-linguistically while it did not influence the magnitude of priming, we postulate that this pattern may change once data for low proficient speakers are collected and analyzed.

To conclude, our study demonstrated that priming can occur between two non-native languages, irrespective of direction. Furthermore, in our case, evidence of shared representation was found based on structural similarity rather than language relatedness.

4.3. Limitations and follow-up

As it may be clear by this point, the main limitation of our study is the fact that is significantly underpowered. Notably, besides having a low number of participants across the board, the sample was underrepresented as we did not have enough low proficiency speakers to be able to include them in our analysis. Evidently, data collection is ongoing and we hope to have a more balanced sample in the future to expand our findings.

Finally, we did find cross-linguistic priming between L2 and L3, and vice versa, in two typologically different languages. However, to truly understand how language relatedness may influence priming as opposed to structural similarity, we will compare our findings to Giovannini's (2022) findings. In her study, parallel to ours in methodology and materials, Giovannini investigated cross-linguistic priming of transitive and dative structures between English L2 and German L3. A joint analysis of the data from our study and hers will provide more fine grained evidence on L3 processing in late trilinguals. The puzzle may also be completed by collecting comparable data involving the participants' L1.

References

Beas, O. (2014). *Voice and v* in Spanish: The Case of Ser- passives and Estar + Passive Participle Constructions.*

Bencini, G. M. L., & Valian, V. V. (2008). Abstract sentence representations in 3-year-olds: Evidence from language production and comprehension. *Journal of Memory and Language*, *59*(1), 97–113. https://doi.org/10.1016/j.jml.2007.12.007

Bernolet, S., Hartsuiker, R. J., & Pickering, M. J. (2013). From language-specific to shared syntactic representations: The influence of second language proficiency on syntactic sharing in bilinguals. *Cognition*, *127*(3), 287–306. https://doi.org/10.1016/j.cognition.2013.02.005

Bock, J. K. (1986). Syntactic persistence in language production. *Cognitive Psychology*, *18*(3), 355–387. https://doi.org/10.1016/0010-0285(86)90004-6

Bock, K. (1989). Closed-class immanence in sentence production. *Cognition*, *31*(2), 163–186. https://doi.org/10.1016/0010-0277(89)90022-x

Bock, K., & Loebell, H. (1990). Framing sentences. *Cognition*, *35*(1), 1–39. https://doi.org/10.1016/0010-0277(90)90035-i

Bock, K., & Warren, R. K. (1985). Conceptual accessibility and syntactic structure in sentence formulation. *Cognition*, *21*(1), 47–67. https://doi.org/10.1016/0010-0277(85)90023-x

Bock, K., Loebell, H., & Morey, R. (1992). From conceptual roles to structural relations: Bridging the syntactic cleft. *Psychological Review*, *99*(1), 150–171. https://doi.org/10.1037/0033-295x.99.1.150

Bot, K. D. (1992). Bilingual Production Model: Levelt's "Speaking" Model Adapted. *Applied Linguistics*, *13*(1), 1–24. https://doi.org/10.1093/applin/13.1.1

Branigan, H. P., & Pickering, M. J. (2017). An experimental approach to linguistic

representation. *Behavioral and Brain Sciences*, *40*. https://doi.org/10.1017/s0140525x16002028

Branigan, H. P., Pickering, M. J., & Tanaka, M. (2008). Contributions of animacy to grammatical function assignment and word order during production. *Lingua*, *118*(2), 172–189. https://doi.org/10.1016/j.lingua.2007.02.003

Buckle, L., Lieven, E., & Theakston, A. L. (2017). The effects of animacy and syntax on priming: A developmental study. *Frontiers in Psychology*, *8*. https://doi.org/10.3389/fpsyg.2017.02246

Budwig, N. (1990). The linguistic marking of nonprototypical agency: An exploration into children's use of passives. *Linguistics*, *28*(6). https://doi.org/10.1515/ling.1990.28.6.1221

Cai, Z. G., Pickering, M. J., & Branigan, H. P. (2012). Mapping concepts to syntax: Evidence from structural priming in Mandarin Chinese. *Journal of Memory and Language*, *66*(4), 833–849. https://doi.org/10.1016/j.jml.2012.03.009

Carando, A. (2015). *The emergence of L1 innovations in Spanish-English bilinguals: Evidence from cross-linguistic structural priming* [Ph.D dissertation]. CUNY Academic Works. https://academicworks.cuny.edu/gc_etds/537.

Castillo Peña, C. (2013). Las oraciones pasivas, medias e impersonales. In *GREIT Gramatica de referencia de espa español para italófonos*. CLUEB.

Cenoz, J. (2000). Research on multilingual acquisition. In *English in Europe: The Acquisition of a Third Language* (pp. 39–53). Multilingual Matters.

Cenoz, J. (2013). Defining multilingualism. *Annual Review of Applied Linguistics*, *33*, 3–18. https://doi.org/10.1017/s026719051300007x

Cenoz, J., & Genesee, F. (1998). Psycholinguistic perspectives on multilingualism and multi-lingual education. In *Beyond Bilingualism: Multilingualism and Multilingual*

Education. Multilingual Matters.

Chen, X., Branigan, H. P., Wang, S., Huang, J., & Pickering, M. J. (2020). Syntactic representation is independent of semantics in Mandarin: Evidence from syntactic priming. *Language, Cognition and Neuroscience*, *35*(2), 211–220. https://doi.org/10.1080/23273798.2019.1644355

Cho-Reyes, S., Mack, J. E., & Thompson, C. K. (2016). Grammatical encoding and learning in agrammatic aphasia: Evidence from structural priming. *Journal of Memory and Language*, *91*, 202–218. https://doi.org/10.1016/j.jml.2016.02.004

Chomsky, N., & Chomsky, I. P. & P. of L. (Emeritus) N. (2006). *Language and mind*. Cambridge University Press.

De Bot, K., & Jaensch, C. (2015). What is special about L3 processing? *Bilingualism: Language and Cognition*, *18*(2), 130–144. https://doi.org/10.1017/s1366728913000448

Estival, D. (1985). Syntactic priming of the passive in English. *Text - Interdisciplinary Journal for the Study of Discourse*, *5*(1–2). https://doi.org/10.1515/text.1.1985.5.1-2.7

Favier, S., Wright, A., Meyer, A., & Huettig, F. (2019). Proficiency modulates between- but not within-language structural priming. *Journal of Cultural Cognitive Science*, *3*(S1), 105–124. https://doi.org/10.1007/s41809-019-00029-1

Ferreira, F. (1994). Choice of Passive Voice is Affected by Verb Type and Animacy. *Journal of Memory and Language*, *33*(6), 715–736. https://doi.org/10.1006/jmla.1994.1034

Ferreira, V. S., & Bock, K. (2006). The functions of structural priming. *Language and Cognitive Processes*, *21*(7–8), 1011–1029. https://doi.org/10.1080/01690960600824609

Flett, S. (2003). *Syntactic priming in L1 and L2 Spanish.* Linguistics Postgraduate Conference , University of Edinburgh.

Fox, D., & Grodzinsky, Y. (1998). Children's passive: A view from the by-phrase. *Linguistic Inquiry*, *29*(2), 311–332. https://doi.org/10.1162/002438998553761

Gámez, P. B., & Vasilyeva, M. (2015). Increasing second language learners' production and comprehension of developmentally advanced syntactic forms. *Language Learning and Development*, *11*(2), 128–151. https://doi.org/10.1080/15475441.2014.894873

Gámez, P. B., & Vasilyeva, M. (2020). Shared syntactic representations in balanced bilinguals: Cross-linguistic priming with and without verb overlap. *Language Learning and Development*, *16*(1), 89–106. https://doi.org/10.1080/15475441.2019.1689822

Gámez, P. B., Shimpi, P. M., Waterfall, H. R., & Huttenlocher, J. (2009). Priming a perspective in Spanish monolingual children: The use of syntactic alternatives. *Journal of Child Language*, *36*(2), 269–290. https://doi.org/10.1017/s0305000908008945

Giovannini, A. (2022). *Cross-linguistic syntactic representation between L2 and L3 in late trilinguals* (MA thesis). Ca' Foscari University of Venice.

Grosjean, F. (2010). *Bilingual: life and reality*. Harvard University Press. http://dx.doi.org/10.4159/9780674056459

Hammarberg, B. (2001). Roles of L1 and L2 in L3 Production and Acquisition. In *Cross-linguistic Influence in Third Language Acquisition: Psycholinguistic Perspectives* (pp. 21–41). Multilingual Matters.

Hartsuiker, R. J., & Bernolet, S. (2015). The development of shared syntax in second language learning. *Bilingualism: Language and Cognition*, *20*(2), 219–234. https://doi.org/10.1017/s1366728915000164

Hartsuiker, R. J., & Pickering, M. J. (2008). Language integration in bilingual sentence production. *Acta Psychologica*, *128*(3), 479–489.

https://doi.org/10.1016/j.actpsy.2007.08.005

Hartsuiker, R. J., Beerts, S., Loncke, M., Desmet, T., & Bernolet, S. (2016). Cross-linguistic structural priming in multilinguals: Further evidence for shared syntax. *Journal of Memory and Language*, *90*, 14–30. https://doi.org/10.1016/j.jml.2016.03.003

Hartsuiker, R. J., Pickering, M. J., & Veltkamp, E. (2004). Is syntax separate or shared between languages? *Psychological Science*, *15*(6), 409–414. https://doi.org/10.1111/j.0956-7976.2004.00693.

Haspelmath, M. (1990). The grammaticization of passive morphology. *Studies in Language*, *14*(1), 25–72. https://doi.org/10.1075/sl.14.1.03has

Haspelmath, M. (1994). Passive participles across languages. In *Typological Studies in Language* (p. 151). John Benjamins Publishing Company. http://dx.doi.org/10.1075/tsl.27.08has

Herdina, P., & Jessner, U. (2002). *A dynamic model of multilingualism: Perspectives of change in psycholinguistics*. Multilingual Matters.

Hoffmann, C. (2001). Towards a description of trilingual competence. *International Journal of Bilingualism*, *5*(1), 1–17. https://doi.org/10.1177/13670069010050010101

Hwang, H., Shin, J.-A., & Hartsuiker, R. J. (2017). Late bilinguals share syntax unsparingly between L1 and L2: Evidence from crosslinguistically similar and different constructions. *Language Learning*, *68*(1), 177–205. https://doi.org/10.1111/lang.12272

Jaeggli, O. A. (1986). Passive. *Linguistic Inquiry*, *17*(4), 587–622.

Jisa, H., Reilly, J., Verhoeven, L., Baruch, E., & Rosado, E. (2002). Passive voice constructions in written texts. *Written Language and Literacy*, *5*(2), 163–181. https://doi.org/10.1075/wll.5.2.03jis

Kantola, L., & van Gompel, R. P. G. (2011). Between- and within-language priming is the same: Evidence for shared bilingual syntactic representations. *Memory &*

Cognition, *39*(2), 276–290. https://doi.org/10.3758/s13421-010-0016-5

Konopka, A. E., Meyer, A., & Forest, T. A. (2018). Planning to speak in L1 and L2. *Cognitive Psychology*, *102*, 72–104. https://doi.org/10.1016/j.cogpsych.2017.12.003

Lee, J., Yoshida, M., & Thompson, C. K. (2015). Grammatical planning units during real-time sentence production in speakers with agrammatic aphasia and healthy speakers. *Journal of Speech, Language, and Hearing Research*, *58*(4), 1182–1194. https://doi.org/10.1044/2015_jslhr-l-14-0250

Levelt, W. J. M., & Kelter, S. (1982). Surface form and memory in question answering. *Cognitive Psychology*, *14*(1), 78–106. https://doi.org/10.1016/0010-0285(82)90005-6

Liu, S., Hong, D., Huang, J., Wang, S., Liu, X., Branigan, H. P., & Pickering, M. J. (2021). Syntactic priming across highly similar languages is not affected by language proficiency. *Language, Cognition and Neuroscience*, *37*(4), 469–480. https://doi.org/10.1080/23273798.2021.1994620

Loebell, H., & Bock, K. (2003). Structural priming across languages. *Linguistics*, *41*(5). https://doi.org/10.1515/ling.2003.026

Noh, E. (2011). Distribución de la pasiva del español: análisis sintáctico basándose en un corpus lingüístico. In V. Maurya & M. Insúa (Eds.), *Actas del I Congreso Ibero-asiático de Hispanistas Siglo de Oro e Hispanismo general.* (pp. 457–470). Pamplona: GRISO.

Norming. (2018). In *The SAGE Encyclopedia of Educational Research, Measurement, and Evaluation*. 2455 Teller Road, Thousand Oaks, California 91320 : SAGE Publications, Inc. Retrieved from http://dx.doi.org/10.4135/9781506326139.n477

Pavlovia. (n.d.). Retrieved March 7, 2022, from https://pavlovia.org/

Peirce, J., Gray, J. R., Simpson, S., MacAskill, M., Höchenberger, R., Sogo, H., … Lindeløv, J. K. (2019). PsychoPy2: Experiments in behavior made easy. *Behavior Research*

Methods, *51*(1), 195–203. https://doi.org/10.3758/s13428-018-01193-y

Pickering, M. J., & Branigan, H. P. (1998). The Representation of Verbs: Evidence from syntactic priming in language production. *Journal of Memory and Language*, *39*(4), 633–651. https://doi.org/10.1006/jmla.1998.2592

Pickering, M. J., & Ferreira, V. S. (2008). Structural priming: A critical review. *Psychological Bulletin*, *134*(3), 427–459. https://doi.org/10.1037/0033-2909.134.3.427

Prat-Sala, M. (1997). *Production of different word orders : A psycholinguistic and developmental approach* [Ph.D dissertation]. The University of Edinburgh.

Prat-Sala, M., & Branigan, H. P. (2000). Discourse constraints on syntactic processing in language production: A cross-linguistic study in English and spanish. *Journal of Memory and Language*, *42*(2), 168–182. https://doi.org/10.1006/jmla.1999.2668

R Core Team (2021). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.

RAE. (2010). *Nueva gramática de la lengua española: Manual*. Planeta Publishing Corporation.

Sadri Mirdamadi, F., & De Jong, N. H. (2014). The effect of syntactic complexity on fluency: Comparing actives and passives in L1 and L2 speech. *Second Language Research*, *31*(1), 105–116. https://doi.org/10.1177/0267658314554498

Schoonbaert, S., Hartsuiker, R. J., & Pickering, M. J. (2007). The representation of lexical and syntactic information in bilinguals: Evidence from syntactic priming. *Journal of Memory and Language*, *56*(2), 153–171. https://doi.org/10.1016/j.jml.2006.10.002

Shimpi, P. M., Gámez, P. B., Huttenlocher, J., & Vasilyeva, M. (2007). Syntactic priming in 3- and 4-year-old children: Evidence for abstract representations of transitive and dative forms. *Developmental Psychology*, *43*(6), 1334–1346. https://doi.org/10.1037/0012-1649.43.6.1334

Takagaki, T. (2005). On the productivity of Spanish passive constructions. In *Corpus-based*

Approaches to Sentence Structures (pp. 289–309). John Benjamins Publishing.

Ullman, M. T. (2001). The neural basis of lexicon and grammar in first and second language: The declarative/procedural model. *Bilingualism: Language and Cognition*, *4*(2), 105–122. https://doi.org/10.1017/s1366728901000220

Vasilyeva, M., & Gámez, P. B. (2015). Exploring interactions between semantic and syntactic processes: The role of animacy in syntactic priming. *Journal of Experimental Child Psychology*, *138*, 15–30. https://doi.org/10.1016/j.jecp.2015.04.009

Vasilyeva, M., Waterfall, H., Gámez, P. B., Gómez, L. E., Bowers, E., & Shimpi, P. (2010). Cross-linguistic syntactic priming in bilingual children. *Journal of Child Language*, *37*(5), 1047–1064. https://doi.org/10.1017/s0305000909990213

Wanner, A. (2009). *Deconstructing the English passive*. Walter de Gruyter.

Weiner, E. J., & Labov, W. (1983). Constraints on the agentless passive. Journal of Linguistics, 19(1), 29–58. https://doi.org/10.1017/s0022226700007441

Ziegler, J., & Snedeker, J. (2018). How broad are thematic roles? Evidence from structural priming. *Cognition*, *179*, 221–240. https://doi.org/10.1016/j.cognition.2018.06.019

Appendix A

English prime sentences

Inanimate agent - Animate patient (a = active; b = passive)

4 a. The company hired the young lawyer.
b. The young lawyer was hired by the company.
10 a. The sun blinded the man.
b. The man was blinded by the sun.
16 a. The alarm awakened the old man.
b. The old man was awakened by the alarm.
22 a. The words offended the girl.
b. The girl was offended by the words.
28 a. The tornado injured the girl.
b. The girl was injured by the tornado.
34 a. The story saddened the young boy.
b. The young boy was saddened by the story.
40 a. The speech inspired the students.
b. The students were inspired by the speech.
46 a. A lifeboat saved the woman.
b. The woman was saved by a lifeboat.
52 a. A helicopter is pursuing the thieves.
b. The thieves are pursued by the helicopter.
58 a. The tank ran over the soldier.
b. The soldier was run over by the tank.
64 a. The detective was intrigued by the mystery.
b. The mystery intrigued the detective.
70 a. An asteroid hit the dinosaurs.
b. The dinosaurs were hit by an asteroid.
76 a. The fireworks startled the dog.
b. The dog was startled by the fireworks.
82 a. The performance delighted the audience.
b. The audience was delighted by the performance.
88 a. The announcement surprised the passengers.
b. The passengers were surprised by the announcement.
94 a. The boat pulled the water-skier.

b. The water-skier was pulled by the boat.

Inanimate agent - Inanimate patient (a = active; b = passive)

1 a. A computer controlled the traffic lights.

b. The traffic lights were controlled by a computer.

7 a. The sprinkler watered the plants.

b. The plants were watered by the sprinkler.

13 a. The blender chopped the apple.

b. The apple was chopped by the blender.

19 a. The autopilot landed the plane.

b. The plane was landed by the autopilot.

25 a. The program scheduled the exam time.

b. The exam time was scheduled by the program.

31 a. The truck emptied the garbage bin.

b. The garbage bin was emptied by the truck.

37 a. The fire burnt the forest.

b. The forest was burned by the fire.

43 a. The machine graded the tests.

b. The tests were graded by the machine.

49 a. The printer printed the papers.

b. The papers were printed by the printer.

55 a. A ball broke the window.

b. The window was broken by a ball.

61 a. The gun fired a bullet.

b. The bullet was fired by the gun.

67 a. The wind shook the branches.

b. The branches were shaken by the wind.

73 a. A picture hid the safe.

b. The safe was hidden by a picture.

79 a. The dishwasher washed all the dishes.

b. All the dishes were washed by the dishwasher.

85 a. The hurricane ruined the crop.

b. The crop was ruined by the hurricane.

91 a. The water flooded the streets.

b. The streets were flooded by the water.

Spanish prime sentences

Inanimate agent - Animate patient (a = active; b = passive)

4	a.	La empresa contrató al joven abogado.
	b.	El joven abogado fue contratado por la empresa.
10	a.	El sol cegó al hombre.
	b.	El hombre fue cegado por el sol.
16	a.	Una alarma despertó al hombre.
	b.	El hombre fue despertado por una alarma.
22	a.	Las palabras ofendieron a la chica.
	b.	La chica fue ofendida por las palabras.
28	a.	El tornado lastimó a la chica.
	b.	La chica fue lastimada por el tornado.
34	a.	La trágica historia afectó al joven.
	b.	El joven fue afectado por la trágica historia.
40	a.	El discurso motivó a los estudiantes.
	b.	Los estudiantes fueron motivados por el discurso.
46	a.	Un bote de emergencia salvó a la mujer.
	b.	La mujer fue salvada por un bote de emergencia.
52	a.	El helicóptero persiguió a los ladrones.
	b.	Los ladrones fueron perseguidos por el helicóptero.
58	a.	El tanque arrolló al soldado.
	b.	El soldado fue arrollado por el tanque.
64	a.	El detective fue cautivado por el misterio.
	b.	El misterio cautivó al detective
70	a.	Un meteorito golpeó a los dinosaurios.
	b.	Los dinosaurios fueron golpeados por un meteorito.
76	a.	Los fuegos artificiales aterrorizaron al perro.
	b.	El perro fue aterrorizado por los fuegos artificiales.
82	a.	La actuación deleitó al público.
	b.	El público fue deleitado por la actuación.
88	a.	El anuncio sorprendió a los pasajeros.
	b.	Los pasajeros fueron sorprendidos por el anuncio.
94	a.	El barco tiró al esquiador acuático.
	b.	El esquiador acuático fue tirado por un barco.

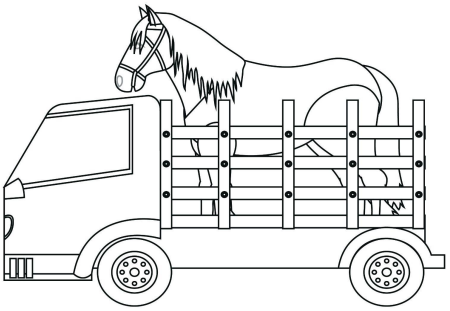
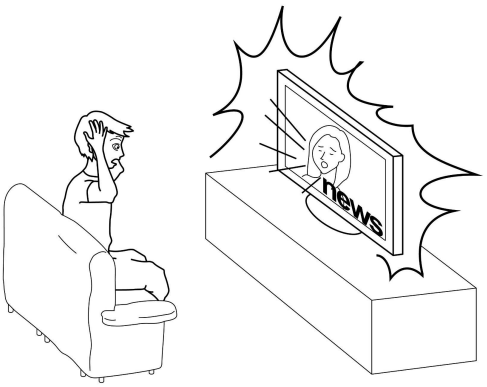
Inanimate agent - Inanimate patient (a = active; b = passive)

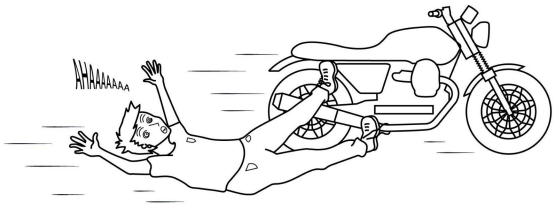
1 a. Un ordenador controló los semáforos.
b. Los semáforos fueron controlados por un ordenador.
7 a. El aspersor regó las plantas.
b. Las plantas fueron regadas por el aspersor.
13 a. La licuadora trituró las manzanas.
b. Las manzanas fueron trituradas por la licuadora.
19 a. El piloto automático aterrizó el avión.
b. El avión fue aterrizado por el piloto automático.
25 a. Un ordenador programó el horario del examen.
b. El horario del examen fue programado por un ordenador.
31 a. El camión vació el contenedor de basura.
b. El contenedor de basura fue vaciado por el camión.
37 a. El incendio quemó el bosque.
b. El bosque fue quemado por el incendio.
43 a. Una máquina corrigió los exámenes.
b. Los exámenes fueron corregidos por una máquina.
49 a. La impresora imprimió los papeles.
b. Los papeles fueron impresos por la impresora.
55 a. Una pelota quebró la ventana.
b. La ventana fue quebrada por una pelota.
61 a. El arma disparó una bala.
b. La bala fue disparada por el arma.
67 a. El viento sacudió las ramas.
b. Las ramas fueron sacudidas por el viento.
73 a. Un cuadro ocultó la caja fuerte.
b. La caja fuerte fue ocultada por un cuadro.
79 a. El lavavajillas lavó todos los platos.
b. Todos los platos fueron lavados por el lavavajillas.
85 a. El huracán arruinó la cosecha.
b. La cosecha fue arruinada por el huracán.
91 a. El agua inundó las calles.
b. Las calles fueron inundadas por el agua.

Appendix B

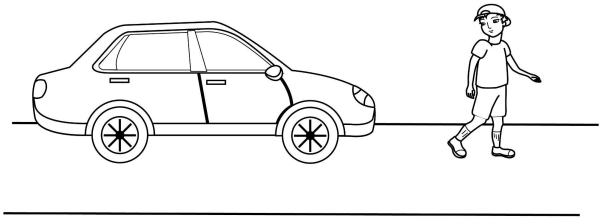
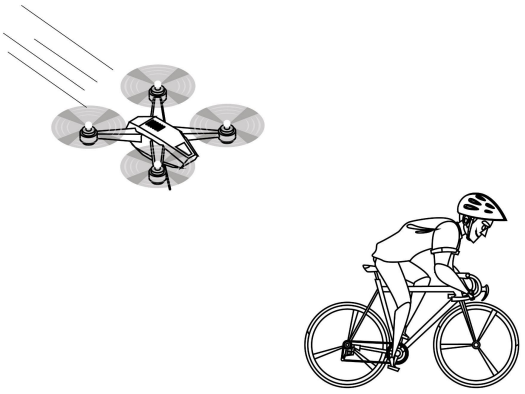
Experimental pictures

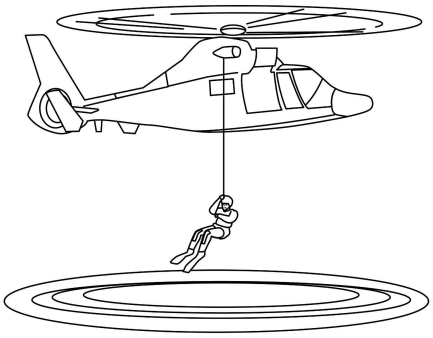
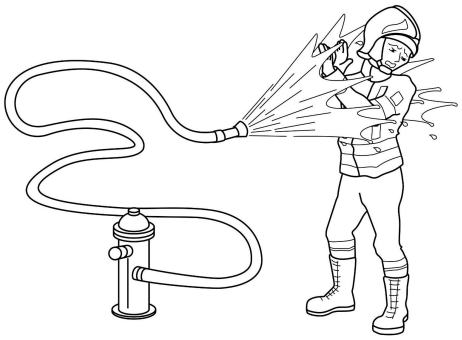
Inanimate agent - Animate patient

Image	English Target verb	Spanish Target verb
	carry	transportar
	strike	atropellar
	shock	conmocionar

	hit	golpear
	scare	asustar
	drag	arrastrar

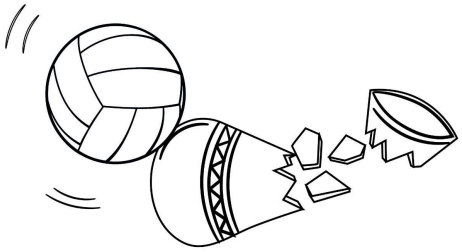
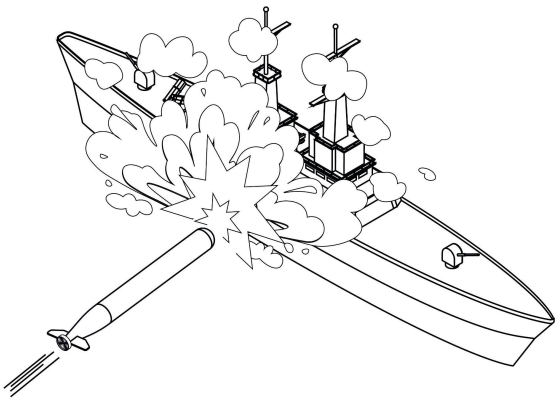
	protect	proteger
	trap	atrapar
	tie	atar

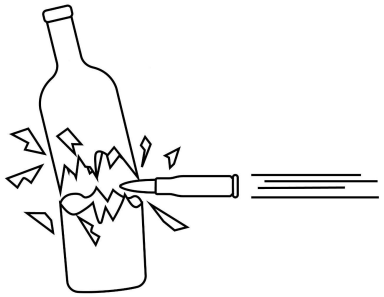
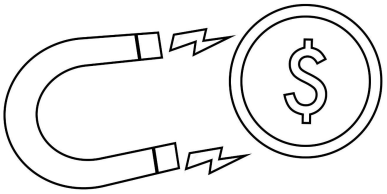
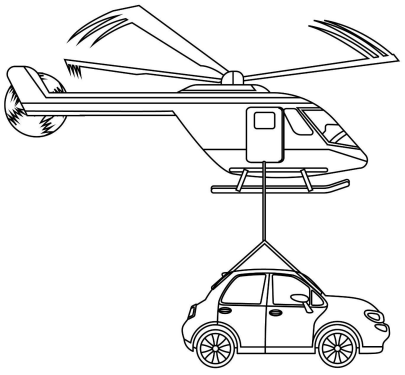
	follow	seguir
	lift	levantar
	chase	perseguir

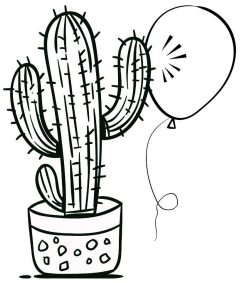
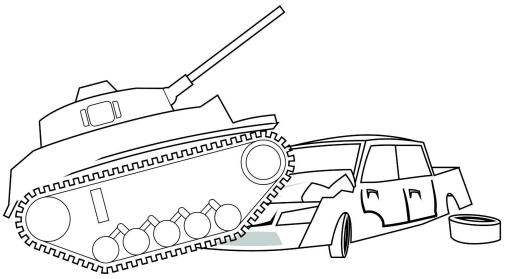
	crush	aplastar
	rescue	rescatar
	spray	rociar

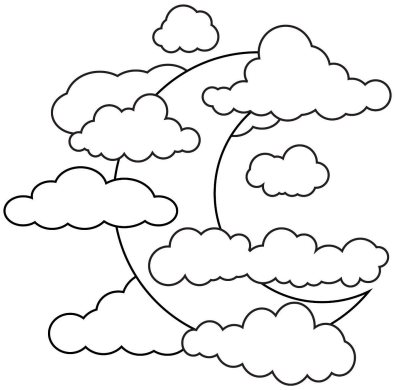
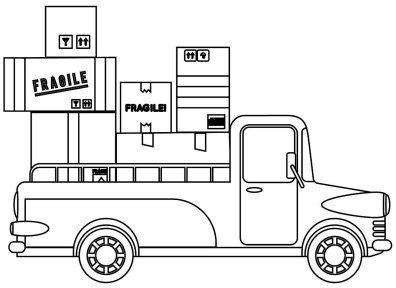
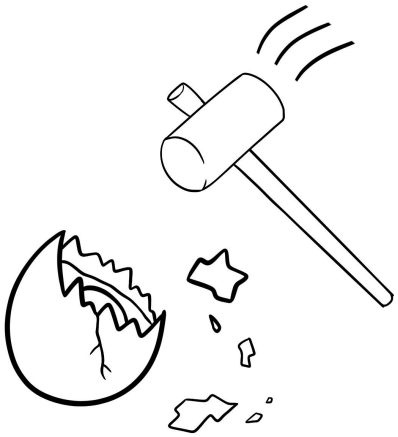
	cover	cover

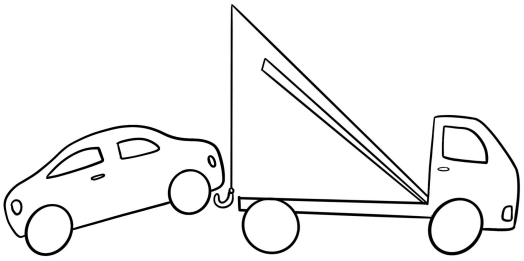
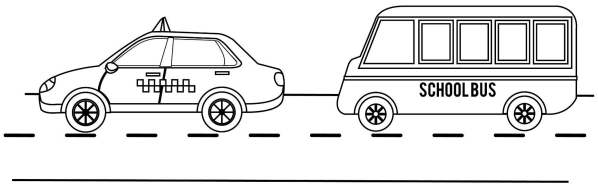
Inanimate agent - Inanimate patient

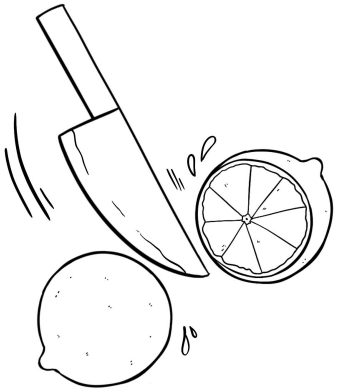
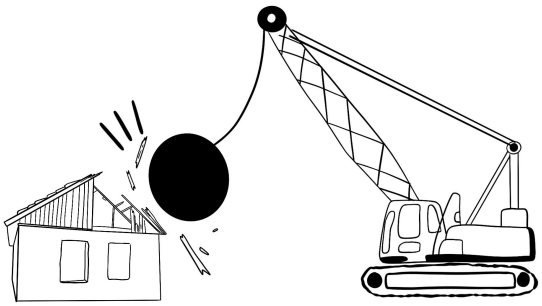
Image	**English Target verb**	**Spanish Target verb**
	smash	romper
	hit	golpear

	shatter	destrozar
	attract	atraer
	lift	levantar

	chase	perseguir
	prick	pinchar
	crush	aplastar

	cover	cubrir
	carry	transportar
	crack	agrietar

	tow	remolcar
	follow	seguir
	destroy	destruir

	slice	cortar
	demolish	demoler

Appendix C

Bilingual Language Profile: English-Spanish

In the first phase of the study, we would like to ask you to help us by answering the following questions concerning your language history, use, attitudes, and proficiency. This survey was created to better understand the profiles of L2 learners of English and Spanish.

The survey consists of 18 questions and will take less than 10 minutes to complete.
This is not a test, so there are no right or wrong answers. Please answer every question to the best of your ability.
Thank you very much for your help.

Q1 PARTICIPANT ID

_____

LANGUAGE HISTORY

In this section, we would like you to answer some questions about your language history.

Q2 Is Italian your only native language?

❍ Yes

❍ No

Q3 If not, what other languages do you speak as native?

_____

Q4 At what age did you start learning ENGLISH?

❍ 0 - 5 years old

❍ 6 - 10 years old

❍ 11 - 14 years old

❍ 15 - 19 years old

❍ 20 +

Q5 At what age did you start learning SPANISH?

- ❍ 0 - 5 years old
- ❍ 6 - 10 years old
- ❍ 11 - 14 years old
- ❍ 15 - 19 years old
- ❍ 20 +

Q6 At what age did you start to feel comfortable using ENGLISH?

- ❍ For as long as I can remember
- ❍ 0 - 5 years old
- ❍ 6 - 10 years old
- ❍ 11 - 14 years old
- ❍ 15 - 19 years old
- ❍ 20 +
- ❍ Not yet comfortable

Q7 At what age did you start to feel comfortable using SPANISH?

- ❍ For as long as I can remember
- ❍ 0 - 5 years old
- ❍ 6 - 10 years old
- ❍ 11 - 14 years old
- ❍ 15 - 19 years old
- ❍ 20 +
- ❍ Not yet comfortable

Q8 Have you ever lived in an ENGLISH speaking country?

- ❍ Yes
- ❍ No

Q9 If yes, how many years have you lived in that country?

❍ Less than 1 year

❍ 1 - 3 years

❍ Less than 1 year

❍ 1 - 3 years

❍ More than 3 years More than 3 years

Q10 Have you ever lived in an SPANISH speaking country?

❍ Yes

❍ No

Q11 If yes, how many years have you lived in that country?

❍ Less than 1 year

❍ 1 - 3 years

❍ More than 3 years

LANGUAGE USE

In this section, we would like you to answer some questions about your language use.
Please consider only you language use in last 6 months.
If the contexts don't apply to your life, please select Never.

Q12 In an average week, for how many hours do you use ENGLISH in the following contexts?

	Never	less than 1 hour	1-3 hours	more than 3 hours
With friends	❍	❍	❍	❍
With family	❍	❍	❍	❍
At university	❍	❍	❍	❍
At work	❍	❍	❍	❍
On social media	❍	❍	❍	❍

Q19 In an average week, for how many hours do you use SPANISH in the following contexts?

	Never	less than 1 hour	1-3 hours	more than 3 hours
With friends	❍	❍	❍	❍
With family	❍	❍	❍	❍
At university	❍	❍	❍	❍
At work	❍	❍	❍	❍
On social media	❍	❍	❍	❍

Q20 In an average week, for how many hours do you use ENGLISH in the following contexts?

	Never	less than 1 hour	1-3 hours	more than 3 hours
Watching television (movies, tv series, ...)	❍	❍	❍	❍
Listening to radio or podcasts	❍	❍	❍	❍
Reading for fun	❍	❍	❍	❍
Reading for school/work	❍	❍	❍	❍
Writing emails/texts to friends	❍	❍	❍	❍
Listening to music	❍	❍	❍	❍

Q21 In an average week, for how many hours do you use SPANISH in the following contexts?

	Never	less than 1 hour	1-3 hours	more than 3 hours
Watching television (movies, tv series, ...)	❍	❍	❍	❍
Listening to radio or podcasts	❍	❍	❍	❍
Reading for fun	❍	❍	❍	❍
Reading for school/work	❍	❍	❍	❍
Writing emails/texts to friends	❍	❍	❍	❍
Listening to music	❍	❍	❍	❍

LANGUAGE PROFICIENCY
In this section, we would like you to rate your language proficiency.

Q23 What level of ENGLISH do you think you have?
❍ A1
❍ A2
❍ B1
❍ B2
❍ C1
❍ C2

Q24 If you have taken any standardised language proficiency tests (e.g., IELTS, TOEFL, CAE ect.), please write the name of each test and the score you received. If you do not remember the exact score, then indicate an "Approximate score" instead.

_____

Q25 What level of SPANISH do you think you have?
❍ A1
❍ A2
❍ B1
❍ B2
❍ C1
❍ C2

Q26 If you have taken any standardised language proficiency tests (e.g., DELE), please write the name of each test and the score you received. If you do not remember the exact score, then indicate an "Approximate score" instead.

_____

Q27 From 1 (not very well) to 6 (very well),

	1	2	3	4	5	6
How well do you SPEAK English?	❍	❍	❍	❍	❍	❍
How well do you READ English?	❍	❍	❍	❍	❍	❍
How well do you WRITE English?	❍	❍	❍	❍	❍	❍
How well do you UNDERSTAND English?	❍	❍	❍	❍	❍	❍

Q28 From 1 (not very well) to 6 (very well),

	1	2	3	4	5	6
How well do you SPEAK Spanish?	❍	❍	❍	❍	❍	❍
How well do you READ Spanish?	❍	❍	❍	❍	❍	❍
How well do you WRITE Spanish?	❍	❍	❍	❍	❍	❍
How well do you UNDERSTAND Spanish?	❍	❍	❍	❍	❍	❍

Appendix D

Modulo per l'espressione del consenso informato

Cross-linguistic syntactic representation between L2 and L3

Gentile partecipante,

Il presente studio è condotto dalla studentessa Chiara Facipieri sotto la supervisione della Professoressa Giulia Bencini del Dipartimento di Studi Linguistici e Culturali Comparati dell'Università Ca' Foscari di Venezia sulla piattaforma online Qualtrics, Google Forms e Pavlovia. Accettando questo modulo, esprime il suo consenso alla partecipazione allo studio e alle attività in esso incluse.

La partecipazione a questo studio è volontaria e potrà decidere di abbandonarlo in qualsiasi momento senza alcun tipo di conseguenza negativa. Esprimendo il suo consenso, autorizzerà i/le ricercatori/trici ad archiviare in formato digitale ed elaborare in maniera confidenziale i suoi dati personali per l'intera durata del progetto di ricerca. A tutela della sua privacy, tutti i dati raccolti non saranno mai riconducibili alla sua persona, in accordo con il codice etico e di condotta dell'Università Ca' Foscari di Venezia e con le normative vigenti. I dati verranno trattati in forma anonima in accordo con il Regolamento UE 2016/679 e il Decreto Legislativo n. 196/2003; inoltre, i risultati delle analisi dei dati verranno presentati e pubblicati in tesi, libri o articoli per riviste scientifiche in forma aggregata e anonima. Può richiedere in ogni momento di modificare, rettificare o eliminare il suo consenso alla partecipazione allo studio e tutti i dati raccolti contattando il/la responsabile della raccolta dati.

Lo studio e i moduli che le viene chiesto di compilare hanno ricevuto l'approvazione della Commissione Etica di Ateneo in data 05.02.2020, verbale n. 1/2020 (per ulteriori informazioni: commissione.etica@unive.it).

Metodologia di ricerca

Il presente studio è rivolto a soggetti di età superiore a 18 anni madrelingua italiani con conoscenza della lingua inglese e spagnola con diversi livelli di competenza. L'interesse principale è quello di indagare la rappresentazione cross-linguistica nelle lingue di competenza del parlante per alcune strutture sintattiche. L'esperimento avrà una durata di

circa 30 minuti. Le attività proposte potranno coinvolgere la presentazione di frasi in inglese o in spagnolo da leggere ad alta voce e la successiva presentazione di immagini da descrivere in inglese o in spagnolo. Infine, potremmo chiederle di compilare un breve questionario sul profilo linguistico, il background familiare e il percorso educativo.

Contatti

Per qualsiasi domanda relativa alle procedure dello studio e per modificare/revocare il consenso alla partecipazione allo studio, ora o in futuro, può contattare:

- Supervisore della ricerca: Professoressa Giulia Bencini, tel. studio +39 041 234 7839, indirizzo email: giulia.bencini@unive.it
- Ricercatore/responsabile della raccolta dati: CHIARA FACIPIERI; indirizzo email: 841539@stud.unive.it
- Eventuali altri recapiti: Staff BemboLab. Email: bembolab@unive.it, Telefono: 041/2345738 - 041/2345748>

Informativa sul trattamento dei dati nell'ambito del progetto

ai sensi dell'art.13 del Regolamento UE 2016/679 ("Regolamento")

Con il presente documento, l'Università Ca' Foscari Venezia ("Università") le fornisce informazioni in merito al trattamento dei dati personali raccolti all'interno del progetto di tesi denominato Cross-linguistic syntactic representation between L2 and L3 che si prefigge di indagare la rappresentazione cross-linguistica nelle lingue di competenza del parlante ed è condotto dalla studentessa Chiara Facipieri e supervisionato dalla Professoressa Giulia Bencini. Ove necessitasse di ulteriori informazioni relative al progetto, la preghiamo di contattare il Principal Investigator scrivendo all'indirizzo di posta elettronica giulia.bencini@unive.it.

Il progetto è stato redatto conformemente agli standard metodologici del settore disciplinare interessato ed è depositato presso il Laboratorio BemboLab – Dipartimento di Studi Linguistici e Culturali Comparati. dell'Università Ca' Foscari Venezia ove verrà conservato per cinque anni dalla conclusione programmata della ricerca stessa.

1. **Titolare del Trattamento**

Il Titolare del Trattamento è l'Università Ca' Foscari Venezia con sede legale in Dorsoduro 3246, 30123 Venezia, rappresentata dal Magnifico Rettore *pro tempore*.

2. **Responsabile della Protezione dei Dati**

L'Università Ca' Foscari ha nominato il "Responsabile della Protezione dei Dati", che può essere contattato scrivendo all'indirizzo di posta elettronica dpo@unive.it o al seguente indirizzo: Università Ca' Foscari Venezia, Responsabile della Protezione dei Dati, Dorsoduro 3246, 30123 Venezia (VE).

3. **Categorie di Dati Personali, Finalità e Base Giuridica**

Il trattamento ha ad oggetto i seguenti dati personali dati anagrafici, dati di contatto, background linguistico e livello educativo del partecipante.

I predetti dati saranno raccolti attraverso l'utilizzo delle piattaforme Qualtrics.com, Google Forms.

Il trattamento dei dati personali verrà effettuato con strumenti cartacei ed informatici, adottando misure tecniche e organizzative adeguate a proteggerli da accessi non autorizzati o illeciti, dalla distruzione, dalla perdita di integrità e riservatezza, anche accidentali.

Per la tutela della riservatezza dei partecipanti, i dati verranno successivamente privati dei riferimenti direttamente identificativi (ad es. nome e cognome, codice fiscale, etc.), in modo che non siano più immediatamente riconducibili al soggetto a cui si riferiscono, e analizzati ai soli fini della realizzazione del suddetto progetto.

Le attività di ricerca sono svolte nell'ambito dell'esecuzione delle finalità istituzionali di ricerca scientifica dell'Ateneo, pertanto la base giuridica è rappresentata dall'art. 6.1.e) del Regolamento ("esecuzione di un compito di interesse pubblico").

È possibile opporsi al predetto trattamento in qualsiasi momento, scrivendo al Responsabile della Protezione dei Dati personali ai recapiti sopra indicati. L'Ateneo si asterrà dal trattare ulteriormente i predetti dati personali salvo sussistano motivi cogenti che legittimino la prosecuzione dello stesso.

4. **Tempi di Conservazione**

I dati saranno conservati per la durata del progetto e successivamente *per 5 anni al termine dei quali saranno cancellati. I dati potranno essere utilizzati per ulteriori progetti di ricerca*.

5. **Destinatari e Categorie di Destinatari dei Dati Personali**

I dati raccolti saranno trattati dai ricercatori dell'Università e dai ricercatori impegnati nel progetto, che agiscono sulla base di specifiche istruzioni fornite in ordine alle finalità e modalità del trattamento medesimo, nonché da soggetti che forniscono servizi ausiliari

all'Università nominati 'responsabili del trattamento'. La lista aggiornata dei responsabili del trattamento è disponibile alla pagina: https://www.unive.it/pag/34666/.

I dati, in forma aggregata ed anonima (in modo da non renderla identificabile), potranno inoltre essere comunicati ad altre Università o enti per lo svolgimento delle attività di ricerca e diffusi per attività di disseminazione dei risultati (ad es. in pubblicazioni, rapporti di ricerca, banche dati nonché citazioni durante lezioni, seminari e convegni). Potranno altresì esaminare tutta la documentazione (comprensiva dei dati identificativi dei partecipanti) raccolta nell'ambito del progetto sia organismi nazionali e internazionali sia comitati delle riviste scientifiche italiane e straniere al fine di controllare che la ricerca sia condotta correttamente e in conformità alle disposizioni vigenti, nonché eventuali auditor.

6. **Diritti dell'Interessato e Modalità di Esercizio**

Lei potrà esercitare nei confronti dell'Università tutti i diritti previsti dagli artt. 15 e ss. del Regolamento; in particolare, potrà ottenere: l'accesso ai dati personali, la loro rettifica o integrazione, la cancellazione (c.d. "diritto all'oblio"), la limitazione e l'opposizione del trattamento. La richiesta potrà essere presentata, senza alcuna formalità, contattando direttamente il Principal Investigator *giulia.bencini@unive.it* e/o il Responsabile della Protezione dei Dati all'indirizzo dpo@unive.it ovvero inviando una comunicazione al seguente recapito: Università Ca' Foscari Venezia – Responsabile della Protezione dei dati, Dorsoduro 3246, 30123 Venezia. In alternativa, è possibile contattare l'Università, scrivendo a PEC protocollo@pec.unive.it.

Inoltre, se ritiene che i dati personali siano stati trattati in violazione a quanto disposto dal Regolamento, potrà fare reclamo al Garante per la Protezione dei Dati Personali o adire le opportune sedi giudiziarie.

Il/La sottoscritto/a _____

dichiara

di aver letto con attenzione e compreso le informazioni contenute nel presente documento. Dichiara di esprimere il proprio consenso a partecipare allo studio qui descritto e dichiara di aver letto l'informativa sul trattamento dei dati personali. Il consenso potrà essere modificato/revocato in qualsiasi momento.

Il/La ricercatore/trice invierà quanto prima una copia del modulo di consenso informato compilato.

☐ Acconsento a partecipare allo studio e dichiaro di aver letto l'informativa sul trattamento dei dati

☐ Non acconsento a partecipare allo studio e dichiaro di aver letto l'informativa sul trattamento dei dati